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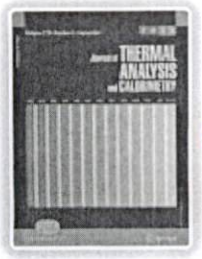

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Published: 13 January 2022

Effects of on MnO_2 nanoparticles behavior of a sardine oil methyl ester operated in thermal barrier coated engine

C. Sivakandhan, P. V. Elumalai, M. Murugan, A. Saravanan, P. S. Ranjit & Bhemuni Varaprasad

Journal of Thermal Analysis and Calorimetry **147**, 8919–8931 (2022)

Abstract

In the present study, an experimental investigation has been carried out with a single-cylinder four-stroke conventional engine using sardine oil methyl ester (SOME) and diesel with MnO_2 nanoparticle at different load conditions. MnO_2 nanoparticles of 25 ppm concentration were mixed with SOME and diesel with the aid of ultrasonication. Because of its long life and low heat conductivity, partly stabilized zirconium with a thickness of 0.5 mm is used as the coating material. Plasma spraying was used to coat the piston top face, as well as the inlet and outflow valves. MnO_2 has a lot of promise, as well as good physical and chemical qualities, and it reduces emissions in diesel engines. The outcome of results showed that the performance was improved while using nanoadditive along with SOME. Break Thermal Efficiency, rate of heat release, and in-

experimental investigation with enzymatic lipase based methyl esterified biodiesel. Heat Mass Transf und Stoffuebertragung. Heat and Mass Transfer; 2019;55:3613–31.

39. Elumalai, PV., Sivakandhan, C., Parthasarathy, M. et al. Investigation on the mitigation of environmental harmful emissions by incorporating nanoparticles to biofuel water nano emulsion in low heat rejection engine. Heat Mass Transfer; 2021;57:1235–1250. https://doi.org/10.1007/s00231-021-03028-z.

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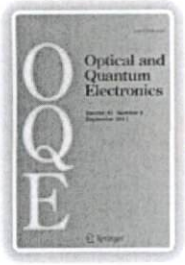

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Antimonene-gold based twin-core SPR sensor with a side-polished semi-arc groove dual sensing channel: an investigation with 2D material

Shivam Singh & Yogendra Kumar Prajapati

Optical and Quantum Electronics **54**, Article number: 114 (2022)

Abstract

We propose surface plasmon resonance (SPR) based single-side polished photonic crystal fiber (SSP-PCF) sensor for low as well as high refractive index (RI) sensing. To achieve this, an active metal gold (Au) is deposited on the PCF's flat narrow channels to form a dual-sensing channel. Following that, a thin nanolayer antimonene is deposited on Au, as its buckled honeycomb lattice structure aids in the trapping of numerous biomolecules. For the sensing range of 1.27 to 1.39, numerical results show that the wavelength sensitivity (WS) and amplitude sensitivity (AS) mounted on 77,000 nmRIU^{-1} and 1320.41 RIU^{-1}, respectively, with wavelength resolution (RW), and amplitude resolution (RA), as high as 1.298×10^{-6} RIU, and 8.6×10^{-7} RIU. The promising results obtained from the proposed SSP-PCF sensor offers improved

sensors Sens. Actuators B, Chem. **202** 557–567(2014).

Zhu, C., Du, D., Lin, Y.: Graphene and graphene-like 2D materials for optical biosensing and bioimaging: A review. 2D Materials **2**, 032004 (2015)

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Shivam Singh & Yogendra Kumar Prajapati

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Sustainable Energy Technologies and Assessments
Volume 52, Part A, August 2022, 102098

Performance evaluation of artificial neural networks in sustainable modelling biodiesel synthesis

Mark Treve [a], Indrajit Patra [b], P. Prabu [c] ✉, S. Rama Sree [d] ✉, N. Keerthi Kumar [e] ✉, Yousef Methkal Abd Algani [f], B. Kiran Bala [g], S. Balaji [h]

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Multimedia Tools and Applications (2022) 81:11605–11619
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Adaptive tamper detection watermarking scheme for medical images in transform domain

Prasanth Vaidya Sanivarapu[1]

Received: 20 April 2021 / Revised: 10 August 2021 / Accepted: 14 January 2022 /
Published online: 18 February 2022

Abstract

A novel robust tamper detection medical watermarking scheme is proposed in the transform domain for authentication and detecting tamper pixels of medical images. In this scheme, 2-level Discrete Wavelet Transform is applied to a significant image to produce four sub-bands (SB) ($C_{LL}, C_{LH}, C_{HL}, C_{HH}$). Coefficients of LL sub-bands are considered in embedding the watermark. The SB is partitioned into blocks to overcome image processing attacks. LSB is set to zero for each block and then Schur decomposition is applied in generating Authenticated Block Bits (ABB). In developing confusion to the intruders, the watermark is scrambled using Quantum Hilbert Image Scrambling. Watermarking helps in authentication and tamper detection of the significant image after tampering. The scheme is tested with image processing attacks for robustness. Peak signal to noise ratio (PSNR) and Normalized Cross-Correlation (NCC) metrics are utilized as metrics in evaluating the proposed scheme with PSNR greater than 30dB and NCC values nearer to 1 without attacks and even with attacks, NCC values are greater than 0.95, which shows the robustness of the proposed scheme.

Keywords Medical images · DWT · Tamper detection · Schur decomposition · Digital watermarking

1 Introduction

With the rapidly increasing number of electronic commerce websites and applications, intellectual property protection is a highly significant concern for content owners who exhibit digital representation of photographs, books, manuscripts, and original artwork on the internet [17]. Besides accessing the data it is easily manipulated with different types of tools available today. Digital data can be like a business, organizational, e-commerce, stock-market, and any multimedia data [32, 33]. Among all types of digital data, medical data has its own significance. Medical data consists of digital content like X-rays, CT scans,

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ORIGINAL ARTICLE

Fingerprint-based robust medical image watermarking in hybrid transform

S. Prasanth Vaidya[1]

Accepted: 7 January 2022

Abstract
To protect the medical images integrity, digital watermark is embedded into the medical images. A non-blind medical image watermarking scheme based on hybrid transform is propounded. In this paper, fingerprint of the patient is used as watermark for better authentication, identifying the original medical image and privacy of the patients. In this scheme, lifting wavelet transform (LWT) and discrete wavelet transform (DWT) are utilized for amplifying the watermarking algorithm. The scaling and embedding factors are calculated adaptively with the help of Local Binary Pattern values of the host medical image to achieve better imperceptibility and robustness for medical images and fingerprint watermark, respectively. Two-level decomposition is done where for the first level LWT is utilized and for the second level decomposition DWT is utilized. At the extraction side, non-blind recovery of fingerprint watermark is performed which is similar to the embedding process. The propounded design is implemented on various medical images like Chest X-ray, CT scan and so on. The propounded design provides better imperceptibility and robustness with the combination of LWT–DWT. The result analysis proves that the proposed fingerprint watermarking scheme has attained best results in terms of robustness and authentication with different medical image attacks. Peak Signal to Noise Ratio and Normalized Correlation Coefficient metrics are used for evaluating the proposed scheme. Furthermore, superior results are obtained when compared to related medical image watermarking schemes.

Keywords Medical image watermarking · Lifting wavelet transform (LWT) · Discrete wavelet transform (DWT) · Local binary pattern (LBP) · Non-blind watermarking · Electronic patient record (EPR)

1 Introduction

The corona virus COVID-19 pandemic is the defining global health crisis of our time and the greatest challenge we have faced since World War Two. The WHO formally declared the novel corona-virus severe acute respiratory syndrome corona-virus 2 [1]. To reduce the risk of person-to-person viral transmission during the COVID-19 pandemic, government introduced social distancing and other measures. Many hospitals have closed their doors to patients who have been trying to avail the facilities and doctors are not encouraged to meet the patient directly [7]. With all these considerations, now-a-days every doctor is meditating the patients through online only. Previously many metropolitan cities and multi-specialty clinics are only maintaining online data of patients reports and records. Due to the present situation, every doctor is asking the patients and hospital management to send the record online to diagnose the patient report. Transfer of medical records of patients over a communication channel is known as telemedicine. American Telemedicine Association (ATA) defined telemedicine as the medical data that are transferred from one location to another location through electronic communication channel for improving the patients health status [32]. During the communication channel, the patients data should not be corrupted or modified or morphed at the receiver side; it may lead to serious trouble to patient while diagnosis. For small hospitals, maintaining and storing Electronic Patient Record (EPR) is of great concern [25]. The EPR data containing patient details, like diagnosis, disease, treatment and so on, have to be maintained confidentially [35]. For this reason, security to the medical image is required, which can be achieved with watermarking tech-

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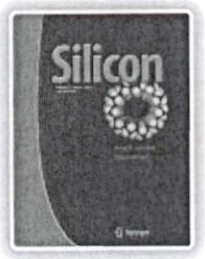

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Mobile FD-CR with High-Speed VTFET CMOS SOI Switch Under Channel Estimation Error

Ashish K. Rao, Santoshkumar Sabat, Neelam Srivastava & Rajiv K. Singh

Silicon (2022)

Abstract

In this paper, Silicon-on-Insulator vertical TFET based CMOS high-speed switch is implemented on Full-duplex Cognitive Radio (FD-CR), and the impact of cognitive radio (CR) node mobility on the performance of a full-duplex (FD) system is investigated under imperfect channel estimation. In this regard, a vertical SOI CMOS structure is designed, and its performance parameters are investigated, and then it is employed in the FD system. The mobile CRs are considered, and the channel between primary transmitter (PT) and CRs is time selective due to node mobility. Jake's model is used to model CR node mobility. Here, the energy detection (ED) technique is used for spectrum sensing. The expressions for the false alarm and detection probabilities have been obtained, considering the sensing and residual self-interference (RSI) channel as Nakagami-m

material gate vertical T-shaped tunnel FET. Silicon 13:1139–1150

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Department of Electronics and Communication Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh, India

Santoshkumar Sabat

Contributions

All authors have equally participated in preparing the manuscript during the implementation of ideas, findings, results, and manuscript writing.

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All procedures performed in studies involving human participants were in accordance with the ethical standards.

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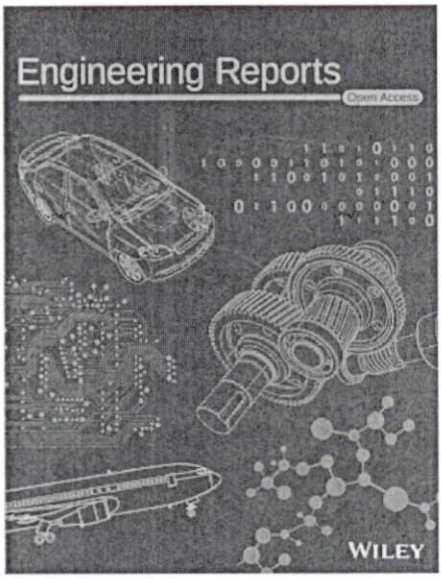

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International Journal of Communication Systems / Volume 35, Issue 7 / e5099

RESEARCH ARTICLE

Transmit antenna selection strategies for spectrally efficient spatial modulation techniques

Vishnu Vardhan Gudla, Vinoth Babu Kumaravelu ✉, Asha S, Arthi Murugadass

Vishnu Vardhan Gudla

Department of Electronics and Communication Engineering, Aditya Engineering College, Surampalem, India

Jawaharlal Nehru Technological University Kakinada, Kakinada, East Godavari District, India

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cted to offer unprecedented amounts of spectral n (SM) techniques have the capability to achieve onflicting design parameters. Fully generalized SM (FGSM) and fully quadrature SM (FQSM) are the recent high-rate SM variants, where the spectral efficiency is linearly proportional to the number of transmit antennas. The transmit antenna selection schemes can efficiently improve the average bit error rate (ABER) performance of SM techniques. The main objective of this work is to investigate the employment of transmit antenna selection schemes to FGSM and FQSM. Initially, Euclidean distance optimized antenna selection (EDAS) scheme is employed to FGSM and FQSM. It offers superior performance than conventional FGSM/FQSM without transmit antenna selection at the cost of higher computational complexity. In order to reduce the complexity cost, four suboptimal schemes based on channel capacity, correlation and combination of them are proposed and employed to FGSM and FQSM. The suboptimal transmit antenna selection based on capacity and correlation (TAS-A-C) offers a minimum gain of ~6 dB over conventional FGSM/FQSM with significantly lower complexity. In addition, the performance of all schemes is investigated for increased number of available transmit antennas. As the proposed schemes address the spectral and energy efficiency trade-off effectively, while corroborating better ABER performance, they have the potential to become a competing candidate for next-generation networks.

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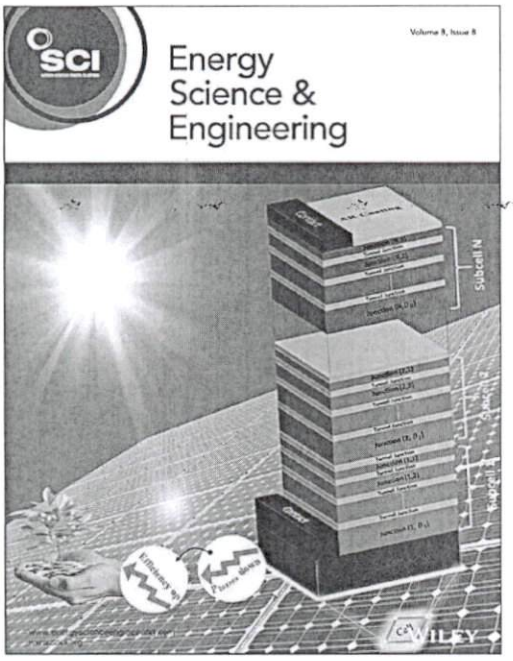

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Influence of cobalt chromium nanoparticles in homogeneous charge compression ignition engine operated with citronella oil

N.S. Senthur, C Anand, M Ramesh Kumar, P.V. Elumalai, Mohamed Iqbal Shajahan, Ali Cemal Benim, Emad Abouel Nasr, H.M.A. H

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Abstract

Stringent emission standards and gr o develop an advanced combustion technology on; HCCI) useful in internal combustion engine d through transesterification process v e CI engine. Cobalt chromium nanoparti m with the help of an ultrasonicator. The preser d to analyze various performance (brake fuel consumption (BSFC)), combustion (p mission (unburnt hydrocarbon (UBHC), CO, N gine with neat diesel, CBD 5% (citronella biodi iodiesel 10% + 90% diesel), CBD 15% (citrone tronella biodiesel 20% + 80% diesel), and CBD diesel +30 ppm cobalt). To carry out the ex 5.2 kW, 1500 rpm, single-cylinder, four-strok Nanoparticles were used to improve , and heat transfer rate within the oil layer en better results than the other citronella bioc reased the BTE and HRR by 5.49% and 6.8% y and greater cetane number of the fuel. T d smoke was decreased by 33.33%, 34.32%, 5.1%, and 17.34%, respectively, compared to neat biodiesel in the HCCI engine at 80% load.

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Research Article

Horse herd optimization algorithm for economic dispatch problems

Subhamay Basu, Sajjan Kumar & Mousumi Basu

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Abstract

This article applies the horse herd optimization (HHO) algorithm to convoluted economic dispatch (ED) problems. HHO mimics the social behaviour of horses of different ages using six significant traits: grazing, hierarchy, sociability, imitation, defence mechanism and roam. The efficacy of the HHO method is demonstrated on five different ED problems, namely, valve-point effects, prohibited feasible area, ramp rate limits and multiple fuels. The simulated outcomes of the recommended method are comparable to those obtained by established artificial intelligence methods. Comparative and statistical analyses demonstrate that the proposed HHO algorithm performs well and can produce superior results to some other well-

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Horse herd optimization algorithm for economic dispatch problems

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https://orcid.org/0000-0002-7321-278X

Abstract

This article applies the horse herd optimization (HHO) algorithm to convoluted economic dispatch (ED) problems. HHO mimics the social behaviour of horses of different ages using six significant traits: grazing, hierarchy, sociability, imitation, defence mechanism and roam. The efficacy of the HHO method is demonstrated on five different ED problems, namely, valve-point effects, prohibited feasible area, ramp rate limits and multiple fuels. The simulated outcomes of the recommended method are comparable to those obtained by established artificial intelligence methods. Comparative and statistical analyses demonstrate that the proposed HHO algorithm performs well and can produce superior results to some other well-known and established algorithms, namely, differential evolution (DE), success-history based adaptive differential evolution with linear population size reduction

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Autonomous detection of malevolent nodes using secure heterogeneous cluster protocol

C. Kotteeswaran [a], Indrajit Patra [b], Regonda Nagaraju [c], D. Sungeetha [d], Bapayya Naidu Kommula [e], Yousef Methkal Abd Algani [f, g], S. Murugavalli [h], B. Kiran Bala [i]

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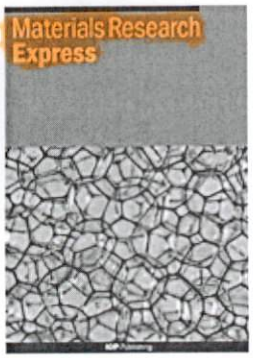

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Materials Research Express

PAPER

Effects of asna fibre reinforced with epoxy resin with and without steel wire mesh and simulation of car bumper

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Abstract

The utilization of natural fiber composites has been increased in replacing various parts in the automobile sector made up of synthetic fiber due to its degradability nature and environment friendliness. In this work, the naturally available Asna fiber was processed and the composites were prepared without and with steel wire mesh in various volume fractions (v_f) of the fiber. In the present experimental investigation, the influence of different composite on the thermal, mechanical, and water absorption characteristics. Various properties such as tensile, flexural and impact strength were tested for the multiple composites. Subsequently, a simulation model of a car front bumper was prepared using ANSYS to test it while defining the determined properties of the composites. The test results showed that when v_f was increased from 0.4 to 0.5%, the tensile and flexural were decreased by 0.72% and 59%, respectively, whereas impact strength was increased by 5.9% for the composite without wire mesh. The tensile and flexural strengths were decreased by 18.2%, whereas impact strength was increased by 1.6% for 0.5 v_f of the composite when steel wire mesh was added to the composite. The investigation of composite's thermal behavior showed that when the temperature range comes within 330 °C–370 °C, the composites started decomposing. Various images were captured using Scanning Electron Microscope to investigate the fibers' dispersion in epoxy polymers and its interfacial bonding. The simulation results showed that the bumper made up of the composite with wire mesh provides a better impact strength as compared to other composites and steel.

1. Introduction

At this moment, the thrive of utilizing natural fibers instead of synthetic fibers has been increased due to increasing environmental concerns. Animals, plants or geological processes produce natural fibers due to the presence of cellulose and protein in plant and animal fibers, respectively. It offers several advantages such as renewable and decomposable within a short span of time compared to synthetic fibers and thus exhibits an environmentally friendly characteristic. Natural fiber production results in the reduction in greenhouse gas emission and energy requirement as compared to the production of synthetic fiber such as glass fiber [1, 2]. Utilizing natural fiber provides the required property of a material to reinforcements such as recyclability, lower density, better strength, lower cost, non-toxic, required toughness, flexibility, ease to process, fatigue resistance and non-corrosive [3]. All these properties make natural fiber pose a great potential to substitute synthetic fibers to manufacture eco-friendly composites. Natural fiber composites, also known as bio-composites, can be utilized as insulation, the body of an automobile, noise-absorbing panels, furniture, building and body of

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Dhineshbabu N. R., Raghavendra Babu B., Arunmetha S., Arivanandan M. & Jayavel R.

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Abstract

Here, the modified Hummer's method was used to prepare reduced graphene oxide (RGO) nanostructures. The functional properties of the prepared RGO nanostructures were studied by using the X-ray diffraction method (XRD), and scanning electron microscopy (SEM). Using the *in situ* polymerization process, polypyrrole (PPy) was prepared. During polymerization, an ultrasound-assisted

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A simple method for functionalization of polypyrrole-coated cotton fabrics by reduced graphene oxide for UV screening

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Abstract

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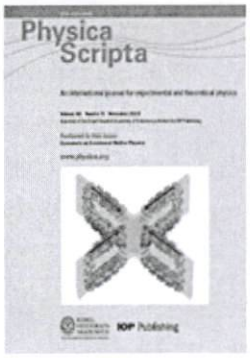

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PAPER

A comprehensive study of large negative dispersion and highly nonlinear perforated core PCF: theoretical insight

Shivam Singh[1], Anurag Upadhyay[5,2], Divya Sharma[3] and Sofyan A Taya[5,4]

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A designed setup of low-priced in-house goniometer/tensiometer

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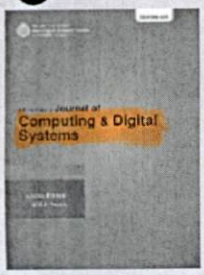
Abstract

In many educational institutes and industries, the contact angle and surface tension analysis are done to measure the quality of a solid surface and of a liquid. In order to determine these, the sessile and pendant droplet method are the most widely used methods, which are conventionally obtained using commercial goniometer/tensiometer. In view of the growing concern regardingcompact and inexpensive but accurate experimental devices, we have developed a low-priced in-house goniometer/tensiometer. This device has the benefit of easiness, compactness, and movability over the conventional measurement instruments. In this study, we have used the commercial Drop image advanced as well as the Drop analysis plugin in ImageJ with high quality sharp edges images to compute static contact angle and



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A Qualitative Report on Diffusion b ased I mage Inpainting Models

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Abstract: Diffusion equations have been successfully applied in the field of digital image processing for the past twenty years, describing the random motion of the particles in physics. Image inpainting is a significant research problem in the image processing. Its main intent is to complete the unknown parts of the image from the knowledge of known parts of the image. This research problem can be used to restore damaged photograph, random loss of wavelet coefficients during transmission, superimposed text, noise, and/or blur. According to available models on digital image inpainting, this paper attempts to make an outline of state-of-the-art diffusion based image inpainting models with corresponding mathematical representation. We also compared the state-of-the-art diffusion based inpainting techniques in terms of its main idea, type of distortion, strengths, and weaknesses.

Keywords: Inpainting, Diffusion, Variational methods, Partial Differential Equations, Fractional Calculus

1. Introduction

Digital image inpainting is a progressive and fascinating research topic in past few years where retouching and restoration of damaged regions is done in an indistinguishable form for anyone having no knowledge of the reference image. Inpainting is executed by professional artists in the fine art museums. They propagated the colors from the boundary into the damaged parts and filled in the gap [1], [2].

The professional artists are carried out this retouching work, which is exhaustive and subjective also consume more time. To replace the manual work, the computer graphics community is inspired to deal the work using graphics algorithms to recover the small damages and cracks in the digital images of ancient paintings and old photos. The examples of damaged images are presented in Figure 1.

Image inpainting is regarded as a branch of image restoration where image inpainting and the traditional restoration problems are different [1], [2]. In traditional restoration problems, such as haze removal and motion deblurring target region is damaged but not totally unknown. On the other hand, in the inpainting issues, information can only be inferred from the outside of the target region.

Inpainting has been developed throughout the past two decades. There are diverse applications of image like covering the scratch removal in the restoration of historical images [1], occlusions removal such as text, logos, and subtitles [2], lost blocks recovery in the transmission of wireless images [3], objects removal in image editing [4]. Other applications comprise of eliminating illustrations like location and orientation from medical, aerial, and military images.

Image inpainting approaches depend upon the source regions in the image used to complete the missing or unknown regions. These can be classified into four groups. These are diffusion based (generally called image inpainting) [1], [2], [3], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [26], [27], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37] texture-based (generally called texture synthesis) [38], [39], hybrid- based [40], [41], [42], [43], and learning based image inpainting models [44], [45], [46], [47] (generally called image completion).

There is wide distinction between image inpainting, texture synthesis, and image completion, however all these are allied techniques. Many researchers handled these terms with the similar interpretation and for all the cases the inpainting term is used in general way. The main variations between these allied methods are the size of the missing part or unknown part to be recovered and the type of information to be filled in the missing part. The typical prerequisite of all the allied methods is the missing regions are to be known in advance.

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Paper

A reconfigurable integrated level shifted carrier based PWM method for modular multilevel converters

Aswini Kumar Muthavarapu, Anjana K. G., Jayanta Biswas, Mukti Barai

0.1002/tee.23606

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tegrated level shifted carrier-based pulse width dular multilevel converters (MMCs). The principles (LSC-PWM) methods such as phase disposition PWM (PD-PWM), phase opposition disposition PWM (POD-PWM) and alternate phase opposition disposition PWM (APOD-PWM) methods are combined to develop the concept of reconfigurable ILSC-PWM method. The main objectives of the proposed reconfigurable ILSC-PWM method is to develop the pulse width modulated output voltage with both half-wave and quarter-wave symmetries and to reduce the total harmonic distortion (THD). A simplified mathematical approach is developed to formulate reconfigurable single ILSC wave for MMC with N number of submodules (SMs) per arm. The functionality and performance of the reconfigurable ILSC-PWM method are carried out on three-phase five-level MMC in MATLAB/Simulink. A hardware prototype of single-phase five-level MMC is designed for experimental validation. The proposed ILSC-PWM method is implemented on an Altera/Cyclone I series (EP1C12Q240C8N) field programmable gate array (FPGA). Computer Simulations and laboratory experimental results are presented. © 2022

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Paper

A reconfigurable integrated level shifted carrier based PWM method for modular multilevel converters

Aswini Kumar Muthavarapu ✉, Anjana K. G., Jayanta Biswas, Mukti Barai ✉

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https://doi.org/10.1002/tee.23606

Abstract

This article presents a reconfigurable integrated level shifted carrier-based pulse width modulation (ILSC-PWM) method for modular multilevel converters (MMCs). The principles of basic level shifted carrier-based PWM (LSC-PWM) methods such as phase disposition PWM (PD-PWM), phase opposition disposition PWM (POD-PWM) and alternate phase opposition disposition PWM (APOD-PWM) methods are combined to develop the concept of reconfigurable ILSC-PWM method. The main objectives of the proposed reconfigurable ILSC-PWM method is to develop the pulse width modulated output voltage with both half-wave and quarter-wave symmetries and to reduce the total harmonic distortion (THD). A simplified mathematical approach is developed to formulate reconfigurable single ILSC wave for MMC with N number of submodules (SMs) per arm. The functionality and performance of the reconfigurable ILSC-PWM method are carried out on three-phase five-level MMC in MATLAB/Simulink. A hardware prototype of single-phase five-level MMC is designed for experimental validation. The proposed ILSC-PWM method is implemented on an Altera/Cyclone I series (EP1C12Q240C8N) field programmable gate array (FPGA). Computer Simulations and laboratory experimental results are presented.

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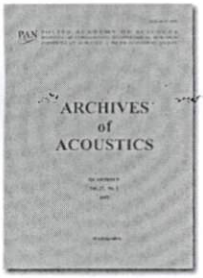

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Acoustic Response of an Isotropic Beam Under Axially Variable Loads Using Ritz and Rayleigh Integral Methods

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Vibro-acoustic response of an isotropic beam under the action of variable axial loads (VALs), is presented in the study. Effects of six different types of VALs and three types of end conditions on buckling, free vibration and sound radiation characteristics are investigated. Static buckling and free vibration behaviours using shear and normal deformable theorem and Ritz method. However, the forced vibration response is evaluated using modal superposition method and the acoustic radiation characteristics are obtained using Rayleigh integral. The nature of variation of VALs and end conditions are influencing buckling and free vibration characteristics remarkably. Results indicate that the acoustic response is highly sensitive to the nature of VAL and intensity of the VAL. In general, sound power at resonance decreases when the magnitude of VAL is increased.

Keywords: Ritz method; variable axial load; buckling; vibration; sound radiation.

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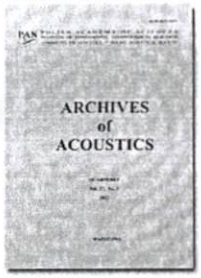

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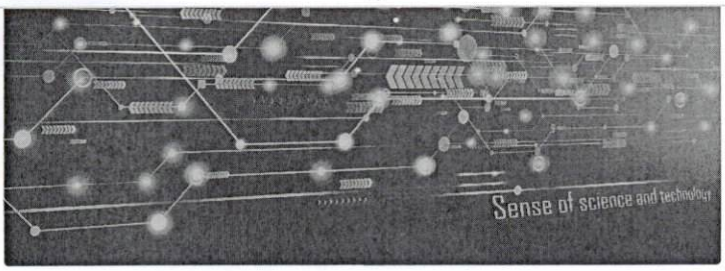

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Original Article

An Efficient Android Malware Detection Framework with Stacking Ensemble Model

A. Lakshmanarao[1,2], M. Shashi[2]

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Received: 13 March 2022 Revised: 21 April 2022 Accepted: 22 April 2022 Published: 26 April 2022

Abstract *- Due to the increased frequency of cyber-attacks with various targeted objectives, cyber security has become a major concern for society. Android phones being the most widely used devices, they are targeted in most of the attacks with malware. So, it is vital to explore innovative ways of identifying Android Malware attacks. Machine learning and deep learning have been employed to develop classifiers to determine if an app is malware or benign. Android apps are represented by a set of attributes that can describe their behaviour. This paper proposes a stacking ensemble model for detecting Android malware. The proposed framework is designed with two variants of stacking ensemble: blending and stacking. The dex files of android apps are extracted and translated into images. Later, a stacking ensemble is applied to the image dataset. Convolutional Neural Networks are used as base learners, and a Support Vector Machine is used as a meta learner. The experimental results of modelling with blending and stacking showed 99% and 98.3% accuracy, which advocates support of the proposed framework for Android malware detection.*

Keywords - *Android malware detection, CNN, Stacking Ensemble, SVM.*

1. Introduction

The number of attacks on mobile devices appears to increase unprecedentedly. More than 14.4 million attacks on mobile phones were recorded worldwide in the second quarter of 2021 only from a single antivirus (Kaspersky reports) firm [1]. Android has a dominant position in the smartphone market. However, this success has a downside as more per cent of mobile malware targets Android phones for stealing money or personal information. Attackers could use various Android development platforms to create malicious mobile apps. Infecting users' mobile devices with malicious software might have severe implications. Despite Google Play's numerous measures to keep dangerous apps out, attackers continue to find their way onto the mobile devices and penalize unsuspecting victims. Therefore, Android malware is becoming a growing threat to businesses and individuals. Machine Learning is a field of computer science that deals with developing intelligent systems by integrating prior examples and making forecasts of future occurrences. Because of these properties are widely used in cybersecurity, such as intrusion detection and malware detection. Anti-malware solutions have focused on signature-based recognition, which requires prior knowledge of the malware in the form of a signature. Early identification of Android

Malware is essential to limit the negative effects. Malware analysis techniques are classified into static Analysis and dynamic Analysis. Static Analysis is the most frequently used and preferred method by many researchers due to its low computation complexity and ease of implementation. This method analyses the application's source code without running it on an emulator or a real device. The APK archive is first unpacked to collect methods, manifests, meta-data, and media assets to perform this. The app's source code format at this point is dex bytecode, which is difficult to work with. Therefore it can be decompiled to java code/Smali code to make it more readable and process-able. After the extraction of the mobile app, several static features can be extracted. Static features include android app permission features, opcode sequences in the apk, strings, Method API features, Component features, intent features, and system command features. The extracted app does not contain all these features directly. Various tools can be used to extract all these features. In dynamic Analysis, the app is run in an isolated environment where it is feasible to obtain as much data as possible on the app's activity. In this method, additional features are extracted from the app's network traffic, sequence of events happening in the app execution, log behaviours, API monitoring etc. The authors proposed a stacking ensemble model with Convolutional Neural Networks and a Support Vector Machine for malware detection.

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Subjects

An Efficient Sorting Algorithm for Capacitor Voltage Balance of Modular Multilevel Converter With Space Vector Pulsewidth Modulation

Publisher: IEEE

Aswini Kumar Muthavarapu ; Jayanta Biswas ; Mukti Barai All Authors

Abstract: Thisarticle presents an efficient analogue sorting algorithm for balancing the submodule (SM) capacitor voltages of modular multilevel converter (MMC). The proposed analo... **View more**

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Abstract:

Thisarticle presents an efficient analogue sorting algorithm for balancing the submodule (SM) capacitor voltages of modular multilevel converter (MMC). The proposed analogue sorting algorithm offers the advantage of fast convergence rate without any need of recursive loops for the implementation on embedded devices. It can be easily implemented with combinational logic operations on field programmable gate array (FPGA) and provides less hardware and computational overhead. The functionality and performance of the proposed analogue sorting algorithm is evaluated with the simulation model of three phase five-level MMC in MATLAB/Simulink environment. The real time implementation of the proposed sorting algorithm with the SM capacitor voltage balancing strategy is implemented on Altera/Cylone - I (EP1C12Q240C8N) FPGA. A five-level continuous space vector pulsewidth modulation (CSVPWM) is realized on a PIC microcontroller (PIC18F452). A down-scaled model of single-phase five-level MMC is designed and constructed to investigate the reliable and stable operation of MMC with the proposed analogue sorting algorithm and SVPWM method. Simulation and experimental results are presented for validation.

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Contents

The modular multilevel converter (MMC) [1], [2] has become the most prospective and emerging multilevel voltage converter topology for high power applications due to its modularity, scalability, and excellent output performance. One of the major advantage of MMCs is the elimination of individual dc voltage sources that are required in most of the cascaded configuration of multicell converters [3]. High voltage conversion is achieved in MMC by stacking a large number of submodules (SMs) made up of half-bridges, full-bridges, or other classical power units together [4]. Fig. 1(a) illustrates the three-phase of MMC with each arm consisting of N number of SMs connected in series. The SMs are two terminal devices. A half-bridge SM as shown in Fig. 1(b) is considered for the proposed work due to its low losses and simpler in construction compared to the other SMs.

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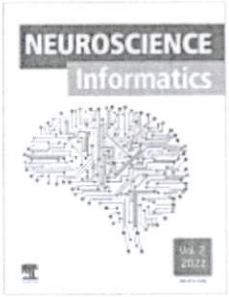

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Original Research Article

An investigation about the relationship between dysarthria level of speech and the neurological state of Parkinson's patients

Biswajit Karan [a, b], Sitanshu Sekhar Sahu [a], Juan Rafael Orozco-Arroyave [c, d]

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https://doi.org/10.1016/j.bbe.2022.04.003

Abstract

Parkinson's disease (PD) is the most common neurological disorder that typically affects elderly people. In the earlier stage of disease, it has been seen that 90% of the patients develop voice disorders namely hypokinetic dysarthria. As time passes, the severity of PD increases, and patients have difficulty performing different speech tasks. During the progression of the disease, due to less control of articulatory organs such as the tongue, jaw, and lips, the quality of speech signals deteriorates. Periodic medical evaluations are very important for PD patients; however, having access to a medical appointment with a neurologist is a privilege in

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Energy
Volume 245, 15 April 2022, 123180

An optimal energy management among the electric vehicle charging stations and electricity distribution system using GPC-RERNN approach

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Highlights

- The main role of this work is to produce maximum amount of energy with minimum cost.
- The proposed method minimizes the voltage and power losses on distribution systems.
- RERNN used to originate the quality-of-service constrained decision form for EVCSs.
- The GPC is utilized to rectify an optimization issues by equilibrium restrictions.

Overview

Aims and Scope

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Keywords

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Volume 219, Issue 12
June 2022
2200063

Research Article

Analysis of Band Alignment Engineering and Interface Defects on a GaAs/GaSb Heterostructure Solar Cell

Girija Shankar Sahoo, Guru Prasad Mishra

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In photovoltaic sector, optimal utilization of the solar spectrum combined with improved power conversion efficiency is the call of the day. Such elasticity is provided by heterostructure solar cells. But it is found that with a high lattice mismatch and band discontinuities, the open-circuit voltage (V_{oc}) and the fill factor deteriorates handsomely. As a result, the second requirement is still unsatisfied. To address such issues, band alignment engineering is introduced in this paper. Silvaco ATLAS is used to virtually create and verify the proposed model. Herein, different recombination events and their effects on the cell's V_{oc} are investigated in depth. Furthermore, interface trap defect is introduced to investigate its effect on the lower efficiency and V_{oc}. However, it is found that, in GaAs/GaSb heterostructures, the reduced V_{oc} and efficiency issues can be avoided, because the proposed model is able to achieve a lower trap density of 10^5 cm^{-2}.

Conflict of Interest

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Android Malware Detection with Deep Learning using RNN from Opcode Sequences

A. Lakshmanarao
Aditya Engineering College,Surampalem

M. Shashi
Andhra University, Visakhapatnam

DOI: https://doi.org/10.3991/ijim.v16i01.26433

Keywords: Android, Malware, Opcodes, Recurrent Neural Networks

ABSTRACT

Android is the most widely used operating system in smartphones. Mobile users can download and access apps easily from the play store. Due to lack of security awareness and risk associated with mobile apps, malware apps would be downloaded by normal users in general. The consequences after installing a malware app are unpredictable. Malware apps can gather user personal data, browsing history, user profiles, user sensitive data like passwords. Hence, android malware detection is essential for providing security to mobile users. Android malware detection using machine learning is done either by extracting static features (opcodes, permissions, intents, system commands) or by extracting dynamic features (log behavior, system calls, dataflow). In this paper, opcode sequences are extracted from malware and benign apps, and Recurrent Neural Networks are proposed on extracted sequences. Benign apps are collected from the play store, apkpure.com and malware apps are collected from the virus share website. The proposed Recurrent Neural Network model could achieve 96% accuracy for android malware detection.

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Anti pathogenic studies of new mixed ligand metal chelates

Sanivarapu, AK ; Babu, BK ; Anil Kumar, B ; Mohana Rao, K ; Ravichandra, G ; Swarnalatha, B

Abstract

Drug discovery aimed at the methodical extermination of life-threatening bacterial infection, especially considering the emergence of multi-drug resistance of pathogenic bacteria has remained a challenge for medicinal inorganic chemistry. In this article, the mixed ligand complexes of Cu (II), Co (II), and Ni (II) containing heterocyclic ligands were synthesized and characterized by IR, LC-MS, UV, and TG-DTA. Complexes are screened for Anti-microbial activity against human pathogenic bacteria.

Keyword(s)

Heterocyclic ligands and anti-microbial activity; Life-threatening bacterial infection; Mixed ligand complexes; Multi-drug resistance; Pathogenic bacteria

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Indian Journal of Biochemistry & Biophysics
Vol. 59, February 2022, pp. 189-196

Anti pathogenic studies of new mixed ligand metal chelates

AK Sanivarapu[1,2], BK Babu[2]*, B Anil Kumar[2], K Mohana Rao[2], G Ravichandra[2] & B Swarnalatha[3]

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Drug discovery aimed at the methodical extermination of life-threatening bacterial infection, especially considering the emergence of multi-drug resistance of pathogenic bacteria has remained a challenge for medicinal inorganic chemistry. In this article, the mixed ligand complexes of Cu (II), Co (II), and Ni (II) containing heterocyclic ligands were synthesized and characterized by IR, LC-MS, UV, and TG-DTA. Complexes are screened for Anti-microbial activity against human pathogenic bacteria.

Keywords: Heterocyclic ligands and anti-microbial activity, Life-threatening bacterial infection, Mixed ligand complexes, Multi-drug resistance, Pathogenic bacteria

In recent years, the world's mortality rate has increased due to multi -resistance to antibiotics in treating infectious diseases that are directly related to bacteria[1-3]. Therefore, there is a necessity to develop new Antibacterial drugs with excellent mechanisms and structural activity[4-6]. Numerous challenges encountered in antibiotic chemistry can overcome in bioinorganic chemistry[7]. Coordination chemistry of transition metals with biologically active ligands is important in metallo-enzymes and other biological activities[8]. In most cases, complexation of metal with ligands shows higher bioactivities than the free ligands[9] and drug resistance and some side effects are reduced[10]. Chelating ligands containing donor atoms like O, S, and N have high biocidal actions of the metal complexes[11-13]. When a metal ion chelates with ligands the polarity of the metal ion gets reduced appreciably, due to the overlap of ligand orbital and partial sharing of its positive charge with metal atoms. Hence the lipophilicity of the complexes increases due to delocalization of the π-electron on the chelating ring[14-15]. Consequently, the metal complexes easily penetrate into the cell membrane of microbes blocking the enzymes of organisms; in some cases, metal complexes also block the synthesis of proteins which restricts further growth of organisms. It has been found that mixed ligand complexes are more active biologically than the ligand itself hence they are used in fighting microbial infections[16-22]. This makes the researchers interested in the synthesis of mixed ligand complexes.

In this review various kinds of mixed ligand complexes are synthesized with metal atoms of Cu(II), Ni(II), Co(II) and ligands such as Riboflavin, Tyrosine, Arginine, Bipyridyl, Phenyl- acetic acid as primary ligands NCO, N_3 are selected as secondary ligands and focus is placed on antibacterial activities on six pathogens: *Shigella sonnei* NK4010 (Gram-negative), *Salmonella enterica serovar* C6953 (Gram-negative), *Aeromonas hydrophilla* DH1585 (Gram negative), *Vibrio cholera* 010 *gawa* CO855 (Gram negative), *Klebsiella pneumonia* MTCC109 (Gram negative), *Micrococcus luteus* MTCC106 (Gram positive).

Materials and Methods

Chemicals

All chemicals reagents and solvents are procured from renowned companies and were of analytical grade used as received without further purification.

Instruments

IR spectra are obtained with a Shimadzu IR Prestige 21 FT-IR spectrophotometer. Electronic spectra are recorded on LABINDIA UV3000+ UV/Vis spectrophotometer. LC-MS spectra are recorded on AGILANT QQQ (ESI-MS). Mass spectrometer. TG-DTA spectra are obtained using SDT Q600 V20.9 BUILD 20.

Synthesis of metal complexes

Riboflavin complexes

Coordination compounds of complexes 1 and 2 were prepared by the addition of 1 mM solutions of

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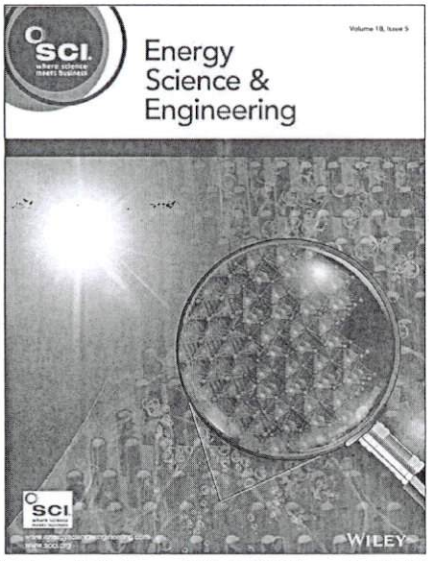

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ORIGINAL ARTICLE

Artificial neural networks model for predicting the behavior of different injection pressure characteristics powered by blend of biofuel-nano emulsion

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Abstract

This investigation deals with the usage of graphene oxide (GO) nanoparticles with orange peel biodiesel in a conventional CI engine. The different fuel blends used for this experiment are biodiesel 10% + diesel 80% + ethanol 5% + surfactant 5% + GO 50 ppm (B10), biodiesel 20% + diesel 70% + ethanol 5% + surfactant 5% + GO 50 ppm (B20), biodiesel 50% + diesel 40% + ethanol 5% + surfactant 5% + GO 50 ppm (B50) and B100. The addition of ethanol has dual benefits for improving the vaporization of fuel blends and reduction of oxides of nitrogen (NOx) emission. Span80 and Tween80 were chosen as surfactants based on hydrophilic-lipophilic balance numbers. It is useful for improving the homogeneity of immiscible fuel blends. From this study, the injection pressure (IP) was varied from 180, 200 to 220 bar for better atomization characteristics of nano additive biodiesel blend. The experimental results indicated that an increase in the percentages of biodiesel beyond 20% in the blend, NOx increases, and hydrocarbon (HC) and carbon dioxide (CO) emissions were found to be decreased. It is also observed that the highest brake thermal efficiency (BTE) was found for fuel 20 at

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Article

Assessment of CI Engine Performance and Exhaust Air Quality Outfitted with Real-Time Emulsion Fuel Injection System

Krishnamoorthy Ramalingam [1,*], Elumalai Perumal Venkatesan [2,3], Abdul Aabid [4] and Muneer Baig [4]

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Abstract: The main target of the current research work is effectively eliminating fossil fuel dependency and improving the exhaust air quality of conventional Compression Ignition (CI) engines. This research paper demonstrates for the first time that a nanofluid (water without surfactant) stored in separate tanks can be quantified, collected, and immediately emulsified by a high shear mixer before transfer into the combustion chamber of a diesel engine. The experiment was carried out under different load states (25%, 50%, 75% and 100%) with a constant speed of 1500 rpm. Biofuel was extracted from citronella leaves using an energy-intensive process. The 5% water share was used for preparing the biofuel emulsion and nano-biofuel emulsion. A cobalt chromate nanoadditive was used to make the nanofluid. An experimental investigation was performed with prepared test fuels, namely, ultra-low sulphur diesel (ULSD), 100% Citronella (B100), surfactant-free Diesel emulsion (SDE), surfactant-free bioemulsion (SBE), and Surfactant free nano-bioemulsion (SNBE), in a test engine. The properties of the sample test fuels was ensured according to EN and ASTM standards. The observation performance results show that the SNBE blend exhibited lower BTE (by 0.5%) and higher SFC (by 3.4%) than ULSD at peak load. The emission results show that the SNBE blend exhibited lower HC, CO, NO_x, and smoke emissions by 23.86%, 31.81%, 2.94%, and 24.63%, respectively, compared to USD at peak load. The CP and HRR results for SNBE were closer to ULSD fuel. Overall, the novel concept of an RTEFI (Real-time emulsion fuel injection) system was proved to be workable and to maintain its benefits of better fuel economy and greener emissions.

Keywords: nanofuel; diesel engine; emission; real-time emulsion fuel

Citation: Ramalingam, K.; Perumal Venkatesan, E.; Aabid, A.; Baig, M. Assessment of CI Engine Performance and Exhaust Air Quality Outfitted with Real-Time Emulsion Fuel Injection System. *Sustainability* **2022**, *14*, 5313. https://doi.org/10.3390/su14095313

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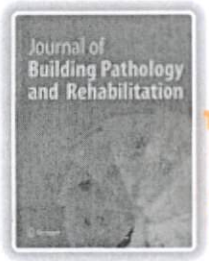
1. Introduction

Over the past twenty years, the rate of air pollution has grown rapidly and fossil fuels are becoming depleted due to the growth of industrialization and the drastic increase in the number of transport vehicles. The drain on global fossil energy sources is assessed as being likely to increase over the next ten years, and thought should be given to long-term utilization as well [1,2]. Among the many types of conversion equipment, the basic fuel engine has particular benefits, such as durability, reliability, power output, energy consumption, etc., Nevertheless, diesel fuel engines create high amounts of smoke emissions and nitrogen oxide [3,4]. At present, government emission regulations are very stringent in order to preserve human and environmental health. For these reasons, the scientific community seeks to discover renewable and emission-free alternate fuels for basic engines [5].

To satisfy energy demand, vegetable oil-based alternative fuels have received a great deal of consideration, as it is sustainable and non-toxic. Out of high viscous biofuel, today many researchers are attracted to the topic of low-viscosity biofuel because of its



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RESEARCH ARTICLE

Design optimization of non-overflow section of a concrete gravity dam

Batta Jaya Naga Satish[1] · Chava Venkatesh[2] · B. Anitha Reddy[3] · Komma Hemanth Kumar Reddy[4] · Ramamohana Reddy Bellum[5]

Received: 20 June 2021 / Revised: 22 December 2021 / Accepted: 1 February 2022

Abstract
The ever-increasing demand for concrete used in the construction and infrastructure field leads to increasing global pollution over the decades. Hence, the construction field should look always for using its raw materials in sustainable ways without affecting the functionality of the structure. Design optimization is one such decision-making strategy in providing an engineered solution with maximum reliability, environmental sustainability and cost efficiency of constructed facilities. In the present study, the design optimization of a non-overflow section of a concrete gravity dam has been studied. The modelling and analysis of the non-overflow section of the concrete gravity dam have been carried out in the FEM package ANSYS along with appropriate algorithms. The parameters considered for the algorithmic optimization of the typical dam section are geometrical properties of the Dam as design variables (for fixed height and freeboard) to minimize the volume of concrete without compromising on loading and factor of safety requirements as per IS code provisions. The current work is focused on optimizing the non-overflow section of a concrete gravity dam by the reduction in its volume, to its weight which is always in direct proportion. Decreasing the dam's weight is must both from the sustainable design and economical point of view. All effective load combinations (as per IS: 6512-2003) where the dam is subjected to maximum loads under ideal operating conditions are considered for stress analysis and optimization. The results of the optimization are presented and discussed in this paper. This study observed that the reduction of 9.95% weight of non-overflow section for concrete gravity dam without actually compromising on the increased factor of safety, which is in association with its functioning under standard normal operating conditions subjects to IS code provisions. Also, green house gas CO_2 emission can be reduced, indicating the sustainable design solution for massive constructions like concrete gravity dam.

Keywords Concrete gravity dam · Design optimization · Non-overflow section · Sustainable design · CO_2 emission

1 Introduction

The ever-increasing demand for concrete used in the construction and infrastructure field leads to increasing global pollution over the decades. Hence, the construction field should look always for using its raw materials in sustainable ways without affecting the functionality of the structure. Design optimization is one such decision-making strategy in providing an engineered solution with maximum reliability, environmental sustainability and cost efficiency of constructed facilities. Since the construction of massive concrete structures such as Dams and Bridges consumes a large amount of concrete, Design optimization for minimization of construction costs and environmental impact has been attracted in recent years [1–4]. Concrete is most commonly used for civil infrastructures and buildings, is a composite

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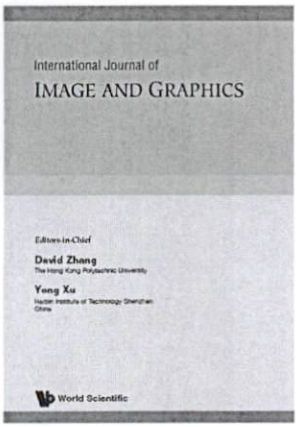

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Detection and Localization of Copy-Move Forgery in Digital Images: Review and Challenges

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Abstract

Copy move forgery in digital images became a common problem due to the wide accessibility of image processing algorithms and open-source editing software. The human visual system cannot identify the traces of forgery in the tampered image. The proliferation of such digital images through the internet and social media is possible with a finger touch. These tampered images have been used in news reports, judicial forensics, medical records, and financial statements. In this paper, a detailed review has been carried on various copy-move forgery detection (CMFD) and localization techniques. Further, challenges in the research are identified along with possible solutions.

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Development and Evaluation of Dust Cleaning System for a Solar PV Panel

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ABSTRACT

The most promising application of solar energy is the conversion of solar energy into electrical energy by using solar photovoltaic (PV) panel. The performance of solar based PV panel is definitely influenced by the amount of solar radiation, which are reaching on the panel surface. Since the solar PV panels are operating in open atmosphere dust particles get deposited on their surfaces and most of the times they have to work in this condition. These deposited dust particles create a layer of dust particles over the panel surface which prevents the 100% penetration of solar radiation into the panel surface. Therefore, proper cleaning of the panel surface becomes very necessary. In order to improve the performance of the PV panel an automatic microcontroller driven dust cleaning technique is developed which is capable of removing the accumulated dust particles from the PV panel surface. Moreover, an experimental study has been performed to analyse the efficiency of this developed technique. The developed cleaning system showed an improvement of 27.98% in the output power of PV panel when compared to the dusty panel.

Keywords: Solar energy; Photovoltaic panel; Dust; Automatic cleaning.

INTRODUCTION

Human sustainability and development of any nation highly depends upon three factors that are water, power and health. Excluding the other two factors the remaining third factor, i.e., power is most significant for every individual and it provide a major contribution in the development of any nations. The unavailability or shortage of power affect the industrial and economic growth of the country. But, due to the rapid growth in the population and fast depletion of fossil reserves an alarming signal can be observed in the power storage scheme. Thus, it is necessary to plan an alternative way so that the issue of power shortage can be minimised (García and Balenzategui, 2004; Hammond et al., 1997). In this regard, the application of renewable energy can be treated as the primary form of electrical power generation. The practice of encouraging renewable energy as the primary form of electrical power generation is not only sponsoring the green energy atmosphere but also sufficing the energy requirement of the world energy traders (Jager-Waldau, 2011). Also, the usage of renewable energy reduces the carbon emission which helps in mitigating the greenhouse effects and promoting the clean energy (Arango et al., 2018).

The available renewable energy sources are hydro, geothermal, biomass, wind and solar (sunlight based). Out of these sources, solar energy is getting increasingly more consideration in the last two decades in view of its enormous advantages, such as ease of accessibility of raw material (because sun rays are available in the infinite amount) of the sun rays, no discharge of any poisons gasses, can be utilised in remote territories, do not produce noise issue, simple installation and fillip by government. Also, the energy originating from the sun is very huge and is an infrangible energy

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Abstract

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The expansion of urbanisation with improved living conditions are forecast to increase energy demand. One such massive consumption of fossil fuels is the transport sector. The new vehicles registered in India have an 843% growth rate over just 66 years (1951–2017). In addition to environmental concerns, and depletion of fossil fuels, bio-fuel based alternative fuels are intended to contribute to future energy requirements. Hence, this paper mainly concentrates on the

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Abstract

The expansion of urbanisation with improved living conditions are forecast to increase energy demand. One such massive consumption of fossil fuels is the transport sector. The new vehicles registered in India have an 843% growth rate over just 66 years (1951–2017). In addition to environmental concerns, and depletion of fossil fuels, bio-fuel based alternative fuels are intended to contribute to future energy requirements. Hence, this paper mainly concentrates on the biofuel to make use in a single-cylinder, 7.35 kW, in-direct injection, diesel engine

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Effective Cyber Security Using IoT to Prevent E-Threats and Hacking During Covid-19

Dr. Santosh Kumar[1], Dr. Rajeev Yadav[2], Dr. Priyanka Kaushik[3], S B G Tilak Babu[4], Dr. Rajesh Kumar Dubey[5] and Dr. Muthukumar Subramanian[6]

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ABSTRACT- This research work is conducted to make the analysis of digital technology is one of the most admired and effective technologies that has been applied in the global context for faster data management. Starting from business management to connectivity, everywhere the application of IoT and digital technology is undeniable. Besides the advancement of the data management, cyber security is also important to prevent the data stealing or accessing from the unauthorized data. In this context the IoT security technology focusing on the safeguarding the IoT devices connected with internet. Different technologies are taken under the consideration for developing the IoT based cyber security such as Device authentication, Secure on boarding, data encryption and creation of the bootstrap server. All of these technologies are effective to its ground for protecting the digital data. In order to prevent cyber threats and hacking activities like SQL injection, Phishing, and DoS, this research paper has proposed a newer technique of the encryption process by using the python codes and also shown the difference between typical conventional system and proposed system for understanding both the system in a better way.

General Terms: Cryptography, Cryptanalysis, Pattern recognition, Data Security, Hacking.

Keywords: Interdisciplinary, Cyber security, Theory of computation, Internet of Things (IoT), E-threat.

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1. INTRODUCTION

1.1 Background

Advanced technology has widely changed today's world. By utilizing, IoT based digital technology, various complex tasks can be done faster without any error. Moreover, the digital-based technology also offers to operate the tasks like business operation, progress monitoring, and financial transaction through online processes. Moreover, data management also gets quite easier and more efficient as well after the rapid implementation of IoT technology. These kinds of wide diversified facilities effectively help the spread the usage of the IoT technology in the market faster [1].

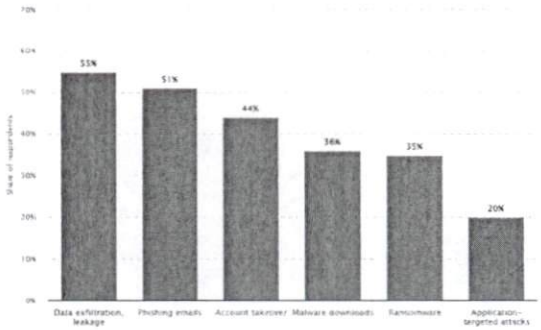

Figure 1: Cyberattacks during a pandemic

During pandemics, the incidents of cyber-attacks have been increased regardless of the location and industry. More specifically, most of the cyber-attacks that happened during this time are related to data exfiltration leakage and phishing the sensitive emails. This helps in analyzing the fact that the need of identifying the different IoT tools and methods used are needed to be analyzed.

1.2 Purpose

The main purpose of this research work is to demonstrate the ways the different cyber security methods and tools used in the time of pandemics to protect users from hackers or cyber

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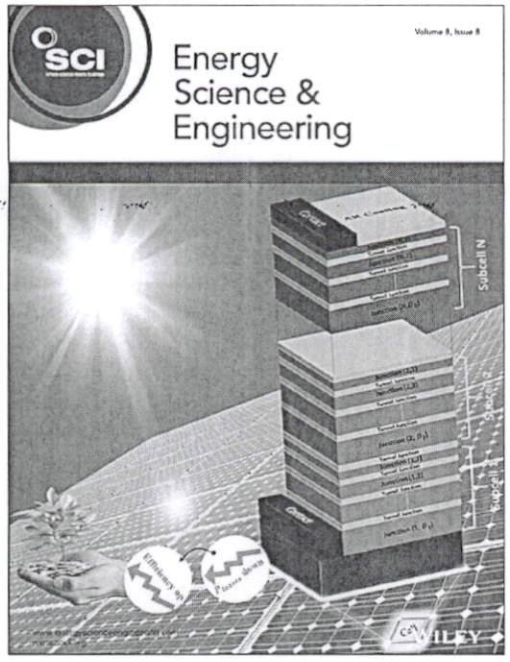

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Experimental based comparative exergy analysis of a spark-ignition Honda GX270 Genset engine fueled with LPG and syngas

Nataraj Ganesan, Bibhuti B. Sahoo, Porpatham Ekambaram, P.V Elumalai, Olusegun D. Samuel, Christopher C. Enweremadu, Asif Afzal, C. Ahamed Saleel

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Abstract

The present study investigates three different fuels such as gasoline, liquefied petroleum gas (LPG), and syngas in spark-ignition Honda GX270 Genset engine under wide-open throttle position on its performance, combustion characteristic as well as availability analysis. The results showed that when the engine operated with gasoline fuel, the brake thermal efficiency was higher than that of LPG and syngas by 6.2% and 7.4%, respectively, throughout the engine load condition. Brake-specific fuel consumption of the engine with syngas (660 g/kW h) and LPG fuel (812 g/kW h) was higher than that of the gasoline fuel (510 g/kW h) at the 4.5 kW of engine load. The engine emission results showed syngas operation caused a significant reduction in NOx by 58.4%, CO by 16.5%, HC by 23.2% compared to gasoline fuel at peak load conditions. On the other hand, exergy analysis concludes the exergy efficiency for all the test fuels increases with an increase in engine load due to a high rise in shaft output. At a 4.5 kW power output, the exergy efficiency of the engine was improved to 46.45% from 45.62% and 29.73% with syngas, gasoline, and LPG, respectively. The maximum exhaust gas availability has been observed as 24.51% of availability input for syngas at 100% load condition.

1 INTRODUCTION

The use of alternative fuels in internal combustion (IC) engines have received much interest nowadays due to the dramatic increase in fuel costs and strict emission regulations. Various alternative fuels for IC engines have already existed, almost from the invention of

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Abstract

The present study investigates three different fuels such as gasoline, liquefied petroleum gas (LPG), and syngas in spark-ignition Honda GX270 Genset engine under wide-open throttle position on its performance, combustion characteristic as well as availability analysis. The results showed that when the engine operated with gasoline fuel, the brake thermal efficiency was higher than that of LPG and syngas by 6.2% and 7.4%, respectively, throughout the engine load condition. Brake-specific fuel consumption of the engine with syngas (660 g/kW h) and LPG fuel (812 g/kW h) was higher than that of the gasoline fuel (510 g/kW h) at the 4.5 kW of engine load. The engine emission results [illegible] caused a significant reduction in NOx by 58.4%, CO by 16.5%,

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Experimental Investigations on Hydrogen Supplemented Pinus Sylvestris Oil-based Diesel Engine for Performance Enhancement and Reduction in Emissions

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The paper mainly aims at improving the performance and reduction in exhaust emissions of an indirect injection diesel engine fuelled with alternative and modern biofuel Pinus Sylvestris oil, which is traditionally oxygenated and obtained from the resins of the Pinus Sylvestris tree. Its physical and chemical properties are similar to the regular petro-diesel fuel and can be used without transesterification directly in diesel engines. On the other hand, a lower cetane value hangs its direct use in diesel engines. Hence, the experiment followed a complementary approach to supplementing small dosages of gaseous Hydrogen (GH_2), which is highly flammable, colorless, odorless, and plenty available to overcome the de–merits nature of emissions. Gaseous Hydrogen was inducted through the inlet manifold and controlled by Timed Manifold Injection (TMI) in 5% to 7% of the total energy with the step of 1%. In addition to GH_2 supp–lementation, preheating the inlet air in the range of 40 ^{0}C to 60 ^{0}C with an increment of 10 ^{0}C was allowed to suck through the same inlet manifold. Supplementation of 6% GH_2 and 40 ^{0}C preheated air showed better results than conventional diesel operations without any engine modifications. All required NFPA Class I Division 2 Group B standards in this experiment were considered during the handling and use of gaseous Hydrogen.

Keywords: *Pinus Sylvestris oil, Pine oil, Hydrogen, In-direct Injection, NFPA standards, Performance, and Emissions*

1. INTRODUCTION

Unanimously reports coming from studies into alter–native and renewable fuels expect an enormous fossil fuel demand by 2030, and the sudden rise in oil prices has already influenced these effects. Further, its envi–ronmental impact is a significant concern [1, 2]. Researchers started working on sustainable, reliable, and environmentally friendly alternative fuels to over–come these demerits concerning economic and envi–ronmental issues with fossil fuels. Further, using these alternative fuels may be in the straightway of its use or in the trans-esterified way or blending of either straight vegetable oil or its bio-diesel with conventional diesel operation. Biodiesel is one such option to replace con–ventional diesel. Biodiesel is produced through the trans -esterified process in different catalysts at different tem–peratures [3-7]. Due to their higher free fatty acids, some biodiesel preparations have touched the two-stage trans-esterification process [8, 9].

The use of this biodiesel had reduced the emissions like Smoke, HC, CO, and CO_2, and an increase in NOx was observed [10-13]. However, another set of researchers executed their experimentation with micro-emulsion fuels. Drastic reduction in NOx was observed with a penalty on CO, HC, and thermal brake efficiency [14, 15]. Even alcohols, oxygenated and less Viscosity, and reduced emissions and combustion were enhanced from diesel engines [16]. On the other side, it is also reported that alcohols being less viscous, suffer from miscibility with diesel fuel [17]. Few researchers exten–ded their work with Pinus Sylvestris in diesel engines. Pinus Sylvestris is stable concerning its use as well as storage. Being unique in this direction, its feedstock can be made available from the forest and, having phy–sicochemical properties very close to diesel, can be blended directly with diesel fuel. It is evident from the literature; that more than 30,000 tons of Pinus Sylvestris are produced globally every year [18]. Hydrogen as a supplement with different alternative fuels also succeeded in using diesel engines with enhanced brake thermal efficiency and reduction in emissions [19-22].

However, using these alternative fuels to replace the conventional diesel operation had a penalty on engine performance due to its low heating value and higher Viscosity than Petro-diesel. The high-energy supplement hydrogen overcame such deficiency.

2. MATERIALS & METHODS

Pinus Sylvestris (PS) trees can rise to a height of between 40 and 80 meters and have a smooth crown and

Received: July 2021, Accepted: February 2022
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False-Positive-Free SVD Based Audio Watermarking with Integer Wavelet Transform

Gulivindala Suresh[1] · Venkata Lalitha Narla[2] · D. P. Gangwar[3] · Aditya Kumar Sahu[4]

Received: 17 July 2021 / Revised: 20 March 2022 / Accepted: 22 March 2022 /
Published online: 18 April 2022

Abstract

Singular Value Decomposition (SVD) became a promising approach for developing digital media watermarking techniques due to stability and higher energy packing nature of singular values. Nevertheless, SVD based watermarking techniques suffers from false positive problem (FPP) when singular vectors are shared for extraction. Eliminating FPP in the development of digital audio watermarking (DAW) is still a challenging task. In this work, SVD based schemes and their vulnerability to FPP are studied, analyzed, and elucidated in detail. Further, a false positive free SVD based DAW scheme has been devised in Integer Wavelet Transform (IWT) domain. Audio is partitioned into segments. Each audio segment is transformed using IWT and SVD is applied on Arnold transformed watermark. Principal Component (PC) is obtained with the product of singular vector matrix and singular values matrix. Transformed audio is modified based on PC of watermark image. The developed scheme has been tested on benchmark dataset and it maintains imperceptibility, robustness, and capacity as

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Health monitoring jeopardy prophylaxis model based on machine learning in fog computing

Ravi Kumar Suggala ✉, M. Vamsi Krishna, Sangram Keshari Swain

First published: 18 April 2022
https://doi.org/10.1002/ett.4497

Abstract

Cloud-based fog computing was developed in recent years to make it easier for patients to monitor distant health and discover mosquito-borne syndromes at an initial period, allowing to track the mosquito-borne illnesses. Many obstacles have been confronted by the technology, including high latency, mobility, overhead connectivity, and location consciousness. Due to the security issue and wrong prediction of the diseases, users are affected by getting wrong alert messages from fog which increase the disease spreading. Hence a novel Prevention Technique based on Fog Computing has been introduced to prevent the epidemic syndrome at an initial period and safeguard the people around the world. Initially, each user register their personal information in Pristine Database through IoT device. These information are encrypted with 16 round of key-dependent operation via new Blowfish Encryption Algorithm. Subsequently, the mosquito spawned disease is diagnosed by measuring the resemblance factor between the user and disease through the Hybrid Endemic Halsen Classifier and the Resemblance Coefficient are used to diagnose and categorize users as infected or unaffected. The mosquito-borne disease is detected using this method by assessing the similarity factor between the user and the disease with less computing time. As a result, if a new symptom is found rather than one from the given medical dataset, the information will be saved in the Pristine Database, and the classification process will be faster with less computing time in the future if the same symptom is identified. Finally, the novel Temporal Social Network Analysis was developed to assess the likelihood of a disease breakout also analyze the infected users and send the awareness message to take the precautionary measures in the cloud processing layer. Thus, the proposed work effectively predicts and prevents the

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RESEARCH ARTICLE

Health monitoring jeopardy prophylaxis model based on machine learning in fog computing

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First published: 18 April

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Cloud-based fog computing was developed in recent years to make it easier for patients to monitor distant health and discover mosquito-borne syndromes at an initial period, allowing to track the mosquito-borne illnesses. Many obstacles have been confronted by the technology, including high latency, mobility, overhead connectivity, and location consciousness. Due to the security issue and wrong prediction of the diseases, users are affected by getting wrong alert messages from fog which increase the disease spreading. Hence a novel Prevention Technique based on Fog Computing has been introduced to prevent the epidemic syndrome at an initial period and safeguard the people around the

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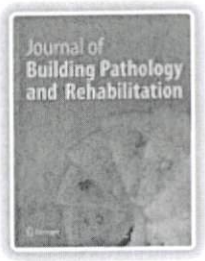

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RESEARCH ARTICLE

Mechanical properties of self-compacting concrete using steel slag and glass powder

K. P. P. Bharathi[1] · S. K. Adari[2] · Urmila Pallepamula[1]

Received: 29 January 2022 / Revised: 26 March 2022 / Accepted: 27 March 2022

Abstract
Concrete is the universally accepted building material for all types of construction and is the most commonly used material after water. The developments in concrete has led to the evolution of many types of concretes like geo-polymer concrete, self-compacting concrete, fibre reinforced concrete. Self-compacting concrete is a special type of concrete which flows by its own weight and is having variety of application. The uncontrolled and indiscriminate use of concrete depletes natural resources, as the main constituents such as fine and coarse aggregates which are extracted from the natural rocks. Besides, the use of cement contributes to the production of high volume of greenhouse gases resulting in the global warming. These issues posed a big challenge for the present day engineers to look after the possible alternatives to produce eco-friendly concrete. Apart from this, there were numerous industrial wastes like Steel slag, Glass powder, Fly ash, Ground granulated blast furnace slag etc., that are being deposited in the dump yards with no purpose. In the present study, it is aimed to study the fresh and hardened concrete properties by utilising the industrial wastes such as glass powder and steel slag in the self-compacting concrete. The experimentation is carried out on M20 grade concrete, by partially replacing the cement with 20% of glass powder and fine aggregate with varying quantities of steel slag as 25%, 50% and 75%. The obtained results witnessed that the optimum replacement of fine aggregate as 50% in combination with 20% of glass powder yielding in improved workability. The compressive strength, split tensile strength and flexure strength have shown an increase of 20.95%, 17.05% and 24.44% compared to conventional concrete.

Keywords Self compacting concrete · Glass powder · Steel slag · Fresh properties · Mechanical properties

1 Introduction

Concrete is the most widely used construction material in the world, with an annual consumption of 11 billion tons [1]. Cement is the primary component of concrete, which releases approximately 0.9 tons of CO_2 into the atmosphere for every ton produced [2, 3] and the use of coarse aggregate and fine aggregate which occupies around 70% of the concrete volume leads to depletion of natural resources [4, 5]. Though industrialization generates a lot of benefits to people, it accelerates the problem with waste management and environmental pollution. Taking this into consideration, industrial by-products such as slag, silica fume, glass powder, fly ash, etc. are used to fully or partially replace the constituents of concrete which results in a significant increase in strength and also the environmental performance [6, 7]. The development of concrete structures has been increased over the last few decades as a result of increased production and improved working environments [8]. Self-compacting concrete (SCC) has the property of compacting under its own weight when placed in the formwork [9]. As the total time of construction and the cost reduces by the use of SCC and it also eliminates vibration and can be very useful when there is congested reinforcement [10]. Because of their superior engineering and performance properties, fly ash (FA), ground granulated blast furnace slag (GGBFS), and silica fume (SF) are the most commonly used materials in the production of high strength and high-performance concrete [11]. Steel slag is a by-product of the steel industry produced during the manufacturing process, with iron accounting for 15–20% of the crude material used [12–15].

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Numerical analysis of offshore topside with FGM under impact loads

S. Pachaiappan & S. Chandrasekaran

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Abstract

Impact loads due to the fall of objects always challenge the integrity and strength of the structural components. The deck of an offshore platform's topside is prone to impact loads during its construction and operation stages. Fall of objects from a considerable height may damage the structural components and lead to excessive deformation of the deck, which affects the platform operations and results in losses of lives. Impact loads generally arise from the fall of crane hooks, machinery, drill pipes, equipment, and tools. Severe impact load on deck may damage stiffeners, secondary beams, the collapse of the deck, etc. The topside deck and supporting structural components should possess adequate energy absorption. Functionally graded materials (FGMs) possess improved resistance to second-order vibrations, buckling, bending, high pressure, and temperature. FGM as a structural element in offshore platform

topside of an offshore platform using FGM and X52 steel under special loads. Innovative Infrastructure Solut 5:1–14. https://doi.org/10.1007/s41062-020-00337-4

42. Chandrasekaran S, Hari S, Amirthalingam M (2020) Wire arc additive manufacturing of functionally graded material for marine risers. Mater Sci Eng 25:139530. https://doi.org/10.1016/j.msea.2020.139530

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Performance comparison of empirical model and Particle Swarm Optimization & its boiling point prediction models for waste sunflower oil biodiesel

Olusegun D. Samuel [a, n], Mohammad Kaveh [b], Oluwayomi J. Oyejide [a], P.V. Elumalai [c, d], Tikendra Nath Verma [e], Kottakkaran Sooppy Nisar [f], C Ahamed Saleel [g], Asif Afzal [h, i, j], O.S.I. Fayomi [k, l], H.I. Owamah [m], Selçuk Sarıkoç [o], Christopher C. Enweremadu [n]

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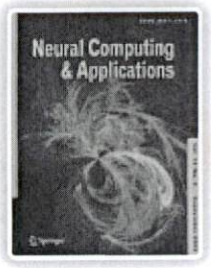

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ORIGINAL ARTICLE

Performance estimation of tubular solar still with a wicked rotating drum using DT, LR, and KNN techniques of machine learning

A. Saravanan[1] · Satyajeet Parida[2] · M. Murugan[3] · M. Sreenivasa Reddy[1] · Purabi Bora[4] · S. Rama Sree[5]

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Abstract

The decision tree (DT), linear regression (LR), and K-nearest neighbours (KNN) models were employed in this work to estimate the thermal performance of tubular solar still with a wicked rotating drum. These three models were developed using real-world experimental data and calculated values. This study used a dataset containing 95 experimental iterations in total. Five input parameters, including solar intensity, basin water temperature, wind speed, ambient temperature, and glass temperature, were used as the independent variables of the DT, LR, and KNN models, and two dependent variables, thermal efficiency and productivity, were predicted. The DT model was the most significant model due to its lowest error and most incredible R^2 value compared to the LR and KNN model performances. The MAE, RMSE, and R^2 values for the DT model were 0.566828, 0.85135, and 0.9602, respectively, with the model efficiency of 0.961, which is the most significant value compared to other models. These results suggest that the DT model is a good fit for forecasting the thermal performance of tubular solar stills.

Keywords Machine learning · Tubular solar still · k-nearest neighbours · Decision tree · Linear regression

Abbreviations

ANN	Artificial neural network
DT	Decision tree
FFNN	Feedforward neural network
HHO	Harris Hawks optimizer
KNN	K-nearest neighbours
LM	Levenberg–Marquardt
LR	Linear regression
LSTM	Long short-term memory
MAE	Mean absolute error
ML	Machine learning
NN	Neural network
R^2	Coefficient of determination
RF	Random forest
RMSE	Root-mean-square error
SS	Solar still
SVM	Support vector machine
TSS	Tubular solar still
VHC	Volumetric heat capacity
WNN	Wavelet neural network

Symbols

$I(t)$	Solar intensity, W/m^2
m_w	Freshwater productivity, kg
T_a	Ambient temperature, °C
T_b	Basin temperature, °C
T_g	Glass cover temperature, °C
T_w	Basin water temperature, °C

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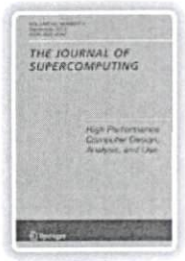

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Quasi oppositional Aquila optimizer-based task scheduling approach in an IoT enabled cloud environment

M. Kandan[1] · Anbazhagan Krishnamurthy[2] · S. Arun Mozhi Selvi[3] · Mohamed Yacin Sikkandar[4] · Mohamed Abdelkader Aboamer[4] · T. Tamilvizhi[5]

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Abstract

Large-scale applications of the Internet of Things (IoT) necessitate significant computing tasks and storage resources that are progressively installed in the cloud environment. Related to classical computing models, the features of the cloud, such as pay-as-you-go, indefinite expansions, and dynamic acquisition, signify various services to these applications utilizing the IoT structure. A major challenge is to fulfill the quality of service necessities but schedule tasks to resources. The resource allocation scheme is affected by different undefined reasons in real-time platforms. Several works have considered the factors in the design of effective task scheduling techniques. In this context, this research addresses the issue of resource allocation and management in an IoT-enabled CC environment by designing a novel quasi-oppositional Aquila optimizer-based task scheduling (QOAO-TS) technique. The QOAO technique involves the integration of quasi-oppositional-based learning with an Aquila optimizer (AO). The traditional AO is stimulated by Aquila's behavior while catching the prey, and the QOAO is derived to improve the performance of the AO. The QOAO-TS technique aims to fulfill the makespan by accomplishing the optimum task scheduling process. The proposed QOAO-TS technique considers the relationship among task scheduling and satisfies the client's needs by minimizing the makespan. A wide range of simulations take place, and the results are investigated in terms of the span, throughput, flow time, lateness, and utilization ratio.

Keywords Cloud computing · Internet of Things · Task scheduling · Objective function · Makespan · Bioinspired algorithm

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RADICAL OF FILTERS OF TRANSITIVE BE-ALGEBRAS

V. Venkata Kumar, M. Sambasiva Rao and S. Kalesha Vali

Communicated by Ayman Badawi

MSC 2010 Classifications: 03G25.

Keywords and phrases: Self-distributive BE-algebra, filter, radical of a filter, semi-maximal filter, ideal, skew-simple BE-algebra.

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Abstract The notion of skew-simple BE-algebras is introduced and derived an equivalent assertions for every skew-simple BE-algebra to become semi-simple. The concept of radical of filters is introduced in a BE-algebra and certain properties of these radicals are derived in terms of direct products and homomorphisms. The concept of semi-maximal filters is introduced in BE-algebras. Some equivalent assertions are derived for every semi-maximal filter to become a maximal filter. Properties of semi-maximal filters are derived in terms of homomorphisms and congruences.

1 Introduction

The notion of BE-algebras was introduced and extensively studied by H. S. Kim and Y. H. Kim in [8]. These classes of BE-algebras were introduced as a generalization of the class of BCK-algebras of K. Iseki and S. Tanaka [7]. Some properties of filters of BE-algebras were studied by S. S. Ahn and Y. H. Kim in [1] and by B. L. Meng in [9]. In [16], A. Walendziak discussed some properties of commutative BE-algebras. He also investigated the relationship between BE-algebras, implicative algebras and J-algebras. In 2012, A. Rezaei, and A. Borumand Saeid [11], stated and proved the first, second and third isomorphism theorems in self-distributive BE-algebras. Later, these authors [12] introduced the notion of commutative ideals in a BE-algebra. In 2013, A. Borumand Saeid, A. Rezaei and R. A. Borzooei [3] extensively studied the properties of some types of filters in BE-algebras. In [4], Chajda *et al.*, Characterized the complements and relative complements of the set of all deductive systems as the so-called annihilators of Hilbert algebras. Later, Halaš[6] introduced the concepts of an annihilator and a relative annihilator of a given subset of a BCK-algebra. In [5], Z. Ciloglu and Y. Ceven introduced the notion of bounded BE-algebras and investigated some properties of them. A. Paad [10] introduced the notion of the radical of ideals in BL-algebras and then characterized the notion of the radical of ideals by elements of a BL-algebra.

In this work, we derive some significant properties of maximal filters of a bounded BE-algebra. The notion of skew-simple BE-algebras is introduced and studied its properties. We prove that the condition of self-distributivity is sufficient to satisfy all the properties of a skew-simple BE-algebra. It is observed that every semi-simple BE-algebra is a skew-simple BE-algebra and the converse is not true. However, some equivalent assertions are derived for a skew-simple BE-algebra to become a semi-simple BE-algebra. The concept of a radicals of a filter is introduced in bounded BE-algebras. The elements of a radical of a filter are characterized in self-distributive BE-algebras. Certain properties of these radicals are then derived with respect to set-intersection, direct products, and homomorphic images.

The concept of semi-maximal filters is introduced, in bounded BE-algebras, in terms of radical of filters. Some equivalent assertions are derived for every semi-maximal filter of a BE-algebra to become a maximal filter. Finally, properties of semi-maximal filters are derived with respect to homomorphism, Cartesian products and congruences.

Clearly $F \subseteq rad(F)$. Again, let $x \in rad(F)$. Then $xN * x \in F$. Since $1 \in F$, we get $(xN * x, 1) \in \theta_F$. Hence

$$\begin{aligned} F_{xN*x} \in \{1\}/F &\Rightarrow (F_x)N * F_x \in \{1\}/F \\ &\Rightarrow F_x \in rad(\{1\}/F) \\ &\Rightarrow F_x \in \{1\}/F \end{aligned}$$

which gives $(x, 1) \in \theta_F$. Hence $x = 1 * x \in F$. Thus $rad(F) \subseteq F$. Therefore F is semi-maximal of X. □

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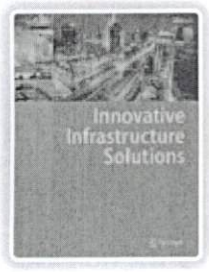

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Seismic performance of a truss bridge with different substructure configurations

Batta Jaya Naga Satish, B. Anitha Reddy, Chava Venkatesh, Komma Hemanth Kumar Reddy & Ramamohana Reddy Bellum

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Abstract

In the present study, the seismic responses of typical railway truss bridges have been investigated using different types of substructure configurations such as single-column bent, multi-column bent and linked-type column configurations. A nonlinear static pushover analysis method is employed to assess the performance of all three substructure configurations using yield strength, yield displacement and ductility capacity as parameters under design basis earthquake and maximum credible earthquake levels. In addition, to provide more comprehensive insights, the collapse margin ratio has been calculated and compared for all three substructure configurations. The results indicated that the performance level is immediate occupancy. For single-column bent configuration, it is elastic for multi-column and linked column bent configurations in transverse and longitudinal directions. Ductility capacity has been calculated and reported higher in single-column bent configuration and lower in multi-column bent configuration for the seismic force in the longitudinal direction. In the transverse direction, ductility is higher in linked column configuration and lower in a single-column bent configuration. The collapse margin ratio observed to be higher for the linked column configuration than the other two configurations. The result shows that the performance of linked column bent configuration is seismically safe and can be used as an effective substructure configuration for the bridge located in high seismic prone regions.

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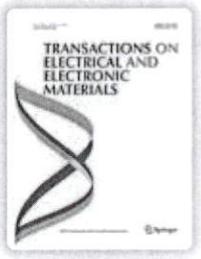

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Structural, Impedance and Modulus Studies of Effect of Magnesium (Mg) Substitution on Spinel $Li_4Ti_5O_{12}$ Anode Materials

B. Vikram Babu, M. Sushma Reddi, A. Rama Krishna, B. Sathish Mohan, G. Chandana, K. Anjani Devi, B. Sridhar & K. Samatha

Transactions on Electrical and Electronic Materials (2022)

Abstract

This research article aims at reporting the influence of magnesium by studying the structural, electrical impedance and modulus properties of the Mg substituted $Li_4Ti_5O_{12}$. These studies are useful for the electrochemical properties. The XRD reveals that the structure of all the Mg substituted materials belongs to the cubic spinel group having Fd-3m space symmetry. SEM images display the structural, morphological properties with the average size of grains falling in the vicinity of 1 μm. The electrical impedance of $Li_{4-x}Mg_xTi_5O_{12}$ materials was analyzed at frequencies between 20 Hz and 1 MHz and in the 30–120 °C range of temperature by employing the complex impedance spectroscopy (CIS) method. The modulus formalism is also a suitable tool to understand the

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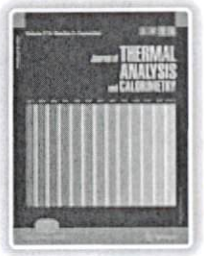

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The effect of thermal degradation and thermogravimetric analysis on pyrolysis oil production from waste milk packet for CI engine application

P. B. Senthilkumar, M. Parthasarathy, R. Nagarajan, N. Murgunachiappan, P. V. Elumalai & B. H. Varaprasad

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Abstract

Fossil fuels are non-renewable energy sources that are continuously depleting while also causing major environmental issues, which has led to the usage of alternative methods in conventional engines for better performance and emissions. Plastic is a non-degradable waste material, and recycling of waste plastic has gained much importance as the alternative source of energy, and it can be induced to the internal combustion engine to produce power generation and propulsion. The waste plastic oil (WPO) was extracted from the waste milk packet by

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The Ensemble of Unsupervised Incremental Learning Algorithm for Time Series Data

Document Type : Original Article

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Abstract

Data mining is one of the key concepts to discover hidden knowledge from available data. Along with the data mining, data analytics is a field to analyze and process data in a scientific and cognitive angle. It is more helpful to convert knowledge to actionable knowledge for accurate decision making. Data Stream Mining is another challenging area than normal Data Mining due to its dynamics. Dynamics of data in a stream includes changes in data frequency, volume and nature. This paper focuses on the behavior of data mining of machines in process/manufacturing industries. In general, such data is continuous numerical and time series data captured by various industrial sensors. By nature, equipment or machinery behaviour can change over time. It requires calibration/replacement before failure of machinery. By analyzing data, one can find the behavior or state change. To identify that, dynamic models are required to be built using data mining and data stream mining. Thus, we are following a semi-novel approach for building such models using "*Ensemble of Unsupervised Incremental Learning*" method. Results show how the existing methods are different from the proposed method. This method can be applied for any other domain like image/audio/video or text mining.

Keywords

Data mining ; Data Stream Mining ; Unsupervised Learning ; Incremental Learning

Main Subjects

Data Mining

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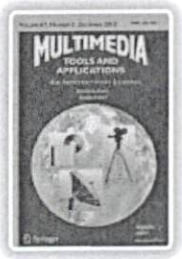

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Efficient detection of copy-move forgery using polar complex exponential transform and gradient direction pattern

S. B. G. Tilak Babu & Ch Srinivasa Rao

Multimedia Tools and Applications (2022)

Abstract

Evidence plays a vital role in image forensics. If evidence is an image, then its authenticity verification is the key to image forensics. One of the common forgeries in digital images is Copy-Move Forgery, which happens in a single image in which some portation of the image is copied and pasted in the same image. Copy Move Forgery Detection has demand in legal evidence, forensic examination and many more areas. The proposed method starts with the conversion of a grey image into overlapping blocks. Rotationally invariant stable Polar Complex Exponential Transform features are obtained from each overlapping block. The extracted feature dimensionality is further reduced using the Gradient Direction Pattern histogram. The similarity is identified among these histogram feature matrix rows. False matches are eliminated

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Enhancement of Performance and Reduction in Emissions of Hydrogen Supplemented Aleurites Fordii Biodiesel Blend Operated Diesel Engine

P.S. Ranjit[a,b], Shaik Khader Basha[c], Swapnil Sureshchardra Bhurat[d], Amitkumar Thakur[e], A. Veeresh Babu[f], G.S. Mahesh[g] and M. Sreenivasa Reddy[a]

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ABSTRACT:

The exponential growth in demand for energy and the non-availability of fossil energy and the immediate concern about environmental problems have intensified alternative fuels researchers' work. Aleurites Fordii (AF) biodiesel is a biomass-derived biofuel that can sequester carbon dioxide and release environmentally balancing O_2 and is thought to blend in 5-15% range with conventional petro-diesel fuel. Further, these blends were tested with 5% and 10% of total energy with GH_2 in a 4-stroke, 10 kW, water cooled, naturally aspirated, constant speed, in-direct injection compression ignition engine performance enhancement and reduction in emissions. All safety-related issues in handling and storage of GH_2 were considered as per National Fire Protection Association recommended standards. 5% AF biodiesel blend with 5% GH_2 (AFBD5H5) shown better performance with minimum emissions except NO_x was identified and compared with 90 ℃ pre-heated AF Straight Vegetable Oil (AFSVO), pure AF biodiesel (AFBD), 5% hydrogen supplemented AF Biodiesel (AFBD5H) and conventional petro-diesel operations.

KEYWORDS:

Aleurites Fordii; Tung oil; Straight vegetable oil; Biodiesel; Performance and emissions

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P.S. Ranjit, S.K. Basha, S.S. Bhurat, A. Thakur, A.V. Babu, G.S. Mahesh and M.S. Reddy. 2022. Enhancement of Performance and Reduction in Emissions of Hydrogen Supplemented Aleurites Fordii Biodiesel Blend Operated Diesel Engine, *Int. J. Vehicle Structures & Systems*, 14(2), 174-178. doi:10.4273/ijvss.14.2.08.

NOMENCLATURE:

AFSVO	Aleurites Fordii (AF) straight vegetable oil
AFBD	AF biodiesel
AFBD5H	AFBD with 5% gaseous Hydrogen
AFBD5	5% AFBD blended with conventional diesel
AFBD10	10% AFBD blended with conventional diesel
AFBD15	15% AFBD blended with conventional diesel
AFBD5H5	5% AFBD blended with conventional diesel along with 5% gaseous Hydrogen
AFBD5H10	5% AFBD blended with conventional diesel along with 10% gaseous Hydrogen

1. Introduction

Human life mainly depends on energy. Energy consumption continues to increase with fossil fuels being the primary source of supply. On the other hand, carbon reserves are not, as predicted. A source of oil demand and other significant worries about ecological problems and a significant fiscal consequence when consuming the same. Unconventional fuels, therefore, have a major part to play in addressing the scarcity of energy demand. However, considering economic issues, environmental problems and uninterrupted supply are critical when selecting renewable fuels. This alternate energy source might be renewable or biofuel. This paper utilizes both energies by utilizing Aleurites Fordii (AF) oil as bioenergy and supplementing it with GH_2 as clean energy. The major conclusion of the International Energy Agency (IEA) is that biofuel will occupy the sector by 27% by 2050, displacing traditional petro-diesel and related fuels [1]. In 2018, the Indian government renewed the National Biofuels Policy to boost the use of biofuels in transportation and agricultural pumps [2]. Furthermore, biofuel derived from biomass may trap carbon dioxide while emitting O_2, aiding in the stabilization of the climate AF is a member of the Euphorbiaceous family and is found in North Eastern India and adjacent Nations. After planting, the yield can be seen in 2 to 3 years, with an expected life of 11 years.

AF is largely composed of Alpha-Elaeostearic acid, which, in exchange for strong unsaturated fatty acids, makes it possible to produce biodiesel even at lower temperatures [3, 4]. Density and viscosity are both quite high. AF oil can be utilized in a variety of applications, including blending with other oils, pre-heating, transesterification and high-energy fuel replenishment. The other comprehensive technique for producing biodiesel from AF oil has previously been published in

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GENERALIZED LOWER SETS OF TRANSITIVE BE-ALGEBRAS

M. Bala Prabhakar, S. Kalesha Vali and M. Sambasiva Rao

Communicated by Ayman Badawi

MSC 2010 Classification: 06F35.

Keywords and phrases: Transitive BE-algebra, generalized lower set, ideal.

Abstract: The notion of generalized lower sets is introduced in transitive BE-algebras. Some properties of generalized lower sets are investigated in transitive BE-algebras. Furthermore, a sufficient condition is derived for every generalized lower set BE-algebra to become an ideal.

1 Introduction

The notion of BE-algebras was introduced and extensively studied by H.S. Kim and Y.H. Kim in [6]. These classes of BE-algebras were introduced as a generalization of the class of BCK-algebras of K. Iseki and S. Tanaka [5]. Some properties of filters of BE-algebras were studied by S.S. Ahn, Y.H. Kim and J.M. Ko in [2] and by B.L. Meng in [8]. In [11], A. Walendziak discussed some relationships between congruence relations and normal filters of a BE-algebra. In 2012, A. Rezaei and A. Borumand Saeid [9] stated and proved the first, second and third isomorphism theorems in self distributive BE-algebras. Later, these authors in [10] introduced the notion of commutative ideals in a BE-algebra. In 2013, A. Borumand Saeid, A. Rezaei and R.A. Borzooei [3] extensively studied the properties of some types of filters of BE-algebras. In [1], S.S. Ahn and K.S. So generalized the notion of upper sets in BE-algebras and discuss properties of the characterizations of generalized upper sets. In [7], H.S. Kim and K.J. Lee investigated several properties of upper and extended upper sets of BE-algebras.

In this paper, the concept of generalized lower sets is introduced in transitive BE-algebras as a dual of generalized upper sets. We discuss some significant properties of these generalized lower sets of transitive BE-algebras. It is observed that a generalized lower set of a transitive BE-algebra is not an ideal in general. However, a sufficient condition is derived for every generalized lower set to become an ideal. An equivalent condition is derived in terms of generalized lower sets for a subset of a transitive BE-algebra to become an ideal.

2 Preliminaries

In this section, we present certain definitions and results which are taken mostly from the papers [2], [4], [6] and [8] for the ready reference of the reader.

Definition 2.1. [6] An algebra $(X, *, 1)$ of type $(2, 0)$ is called a BE-algebra if it satisfies the following properties:

(1) $x * x = 1$,
(2) $x * 1 = 1$,
(3) $1 * x = x$,
(4) $x * (y * z) = y * (x * z)$ for all $x, y, z \in X$.

A BE-algebra X is called self-distributive if $x * (y * z) = (x * y) * (x * z)$ for all $x, y, z \in X$. A BE-algebra X is called transitive if $y * z \leq (x * y) * (x * z)$ for all $x, y, z \in X$. Every self-distributive BE-algebra is transitive. A BE-algebra X is called implicative if $(x * y) * x = x$ for all $x, y \in X$. A BE-algebra X is called commutative if $(x * y) * y = (y * x) * x$ for all $x, y \in X$.

The following two propositions are direct consequences of Lemma 3.15 and Theorem 3.12.

Proposition 3.16. *Let X be a transitive BE-algebra. Every non-empty subset I of X containing $[a^n; b]$ for all $a, b \in I$ and $n \in \mathbb{N}$ is a bounded subalgebra of X.*

Proposition 3.17. *Let X be a self-distributive BE-algebra. Every non-empty subset I of X containing $[a^n; b]$ for all $a, b \in I$ and $n \in \mathbb{N}$ is a bounded subalgebra of X.*

Theorem 3.18. *Let X be a transitive BE-algebra and I be an ideal of X. Then $I = \bigcup_{a,b \in I} [a^n; b]$ for every $n \in \mathbb{N}$.*

Proof. Assume that I is an ideal of X. Let $a, b \in I$ and $n \in \mathbb{N}$. Then by Theorem 3.12, $[a^n; b] \subseteq I$. Hence $\bigcup_{a,b \in I} [a^n; b] \subseteq I$. Again, let $x \in I$. Since $x \in [1^n; x]$, it follows that $I \subseteq \bigcup_{x \in I} [1^n; x] \subseteq \bigcup_{a,b \in I} [a^n; b]$. Hence $I = \bigcup_{a,b \in I} [a^n; b]$ for every $n \in \mathbb{N}$. □

Corollary 3.19. *Let X be a self-distributive BE-algebra and I be an ideal of X. Then $I = \bigcup_{a,b \in I} [a^n; b]$ for every $n \in \mathbb{N}$.*

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Technical Papers

Performance-Based Code Calibration and Total Probability of Failure of the Nuclear Containment Structure Subjected to Missile Impact

Jaswanth Gangolu, Ph.D.; Ajay Kumar; and Hrishikesh Sharma, Ph.D.

Abstract

The multifarious calamities upon nuclear containment structures (NCS) and insufficient reliability-based factors inspired the current study for the investigation of hard missile impact. Available codes for design and construction of NCS suggest a load factor of 1.0 and basic information for the missile impact scenarios. However, the current study proposes novel reliability-based load and resistance factors for NCS subjected to a hard missile impact. The performance-based probabilistic energy capacity and demand models have been used for the

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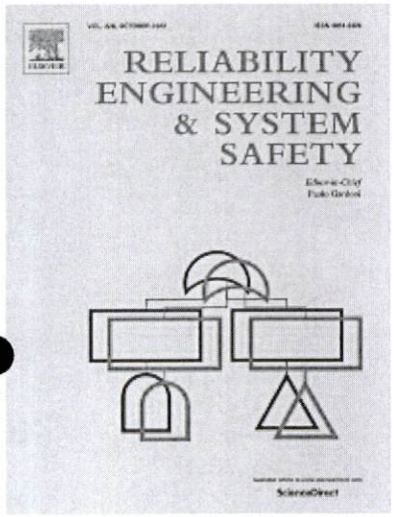

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Probabilistic demand models and performance-based fragility estimates for concrete protective structures subjected to missile impact

Jaswanth Gangolu [a], Ajay Kumar [b], Kasturi Bhuyan [b], Hrishikesh Sharma [b]

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Highlights

- Developed probabilistic demand and damage models are accounted for all inherent uncertainties.
- Representative containment configurations are chosen for probabilistic analysis.
- Fragility estimation is carried out on experimental results and Tarapur nuclear containment structure.

Abstract

The manifold missile attacks upon structures and deficiency of codal provisions motivated the current study to develop probabilistic demand models for protective structures subjected to hard missile impact. These energy-based models are estimated using a defined performance-based design framework (PBD) with three performance levels associated with four damage states, i.e. from minor damage to total collapse. The evaluation of unknown model parameters is constructed using the Bayesian approach. The current

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Analysis of Regenerative Raw Signals Using Variational Mode Decomposition

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regenerative chatter, signal processing, variational mode decomposition, chatter index

ABSTRACT

Faults like regenerative tool chatter have been evaluated by several researchers in order to suppress its adverse effect. However, many facets of this domain are yet to be addressed. In the present work, a new methodology has been proposed to process the recorded regenerative chatter signals in order to extract the chatter features. In the proposed approach, experiments have been performed and signals pertaining to regenerative tool chatter have been recorded using microphone. Thereafter, the recorded signals have been evaluated and preprocessed using variational mode decomposition (VMD) in order to extract chatter features. The decomposed signals that result in variational mode functions have been further evaluated by calculating a response termed as chatter index. This response has been used to predict the chatter severity during machining at different combinations of input parameters, on verifying the obtained results it has been found that the proposed methodology is significant in identifying the chatter severity.

1. INTRODUCTION

Nowadays, fault diagnosis is very essential and trending. A lot of signal processing techniques have been adopted by researchers in order to identify faults in machinery. The faults can be of any type including fault in bearings, gears, moving part, surface finish or tool failure [1-7]. The adopted signal processing technique should have the capability to identify the exact fault. The selection of techniques is a very essential step in the due process. The researchers in the past have done the selection on the basis of the type of signal and feature to be extracted. The popular techniques used till date are peak to peak analysis [8], wavelet [9-11], short time-frequency transform (STFT) [12], Hilbert Huang transform (HHT) [5, 13, 14], Fourier transform (FT) [15, 16], empirical mode decomposition (EMD) [17, 18], and ensemble empirical mode decomposition (EEMD) [3, 19, 20]. The selection of appropriate signal processing technique depends on the type of feature we want to extraction, for time information peak to peak analysis is preferred. For frequency information, Fourier transform is adopted. However, for both time and frequency information short-time Fourier transform (STFT), wavelet transform (WT), Hilbert Huang transform (HHT), empirical mode decomposition (EMD) and ensemble empirical mode decomposition (EEMD). Recently, a researcher has discussed in his work that, from the above mentioned time-frequency techniques, wavelet, STFT are suitable for non-stationary and linear signal. HHT, EMD and EEMD are suitable for non-stationary and nonlinear signals. However, for different signals, the efficiency of the technique may vary. In the case of raw chatter signals, the signal is usually associated with unwanted noise and contaminations. In order to filter out, these contaminations an appropriate signal processing techniques need to be adopted. In 2019, Shrivastava et al. have used EMD in order to sieve out the contaminations from the recorded tool chatter signals. They have found that EMD is suitable for processing the raw chatter signals but sometimes due to the mode mixing phenomenon, the extraction of exact features is affected. Hence, they reported EEMD as a more effective alternative [21]. Later, in 2020 it has been reported that being EEMD more effective that EMD it also has certain issues like the involvement of noise contents in the filtered signals [19]. These noise contents are associated with the noise that is added to the signal intentionally during the decomposition using EEMD. However, no appropriate technology has been implemented to the raw chatter signals in order to rectify such a problem. Hence, in the present work, the variational mode decomposition (VMD) technique has been adopted and implemented to the raw chatter signals.

VMD technique mainly decomposes a signal into sets of sub-signals called as variational mode functions (VMFs) [22]. It efficiently separated the non-linear, non-stationary and noisy signals into sub-signals according to the frequency range. The VMD technique does not prefer any sifting mechanism for the decomposition procedure, because of which VMD never faces the problem of mode mixing. VMD comprises the benefits of Wiener filtering and Hilbert transform, hence it provides more accurate and precise decomposition results.

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Original Paper | Published: 09 September 2022

Stabilization of soils with nanoclay subjected to freeze-thaw cycles

Mahmoud Al Khazaleh, Meeravali Karumanchi & Ramamohana Reddy Bellum

Nanotechnology for Environmental Engineering (2022)

Abstract

As the size of the soil particles varies from 4.75 mm to 1 nm, void spaces form at the nanolevel. Due to more void spaces impacting a higher plasticity index, more settlement, less stability, and soil structure affect soil properties, including shear strength, compaction, and consolidation. The establishment of nanotechnology, a novel stabilizing technique, was made due to the need to restore the structure to all qualities. Nanotechnology describes nanoparticles and weak natural soil, even in bad weather conditions, as a new means of filling gaps at the nanoscale, i.e., 1 to 100 nm, and enhancing all geotechnical features. The key benefit of this new technology is nanomaterials, which are filled with particles in void spaces ranging in size from 15 to 80 nm. This paper deals with stabilizing soft soils

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Ethics declarations

Conflict of interest

The authors declared that there is no conflict of interest statement to publish this paper.

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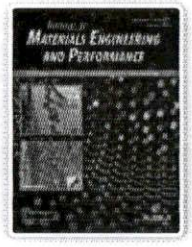

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Technical Article | Published: 28 September 2022

Characterization of AA7075 Surface Composites with Ex Situ Al_2O_3/SiC Reinforcements Tailored Using Friction Stir Processing

K. Suganeswaran, S. Ragu Nathan, R. Parameshwaran, N. Nithyavathy & N. R. Dhineshbabu

Journal of Materials Engineering and Performance (2022)

Abstract

Automotive monocoque is in need of AA7075 with enhanced strength and hardness properties. Fabrication of Surface Hybrid Composites (SHCs) by Friction Stir Processing is a prominent technique to satisfactorily enhance the aforementioned characteristics. SHCs are formed through different volume proportions of Al_2O_3/SiC reinforcements. Heat generation during the processing stage shows a linear trend along the longitudinal axis due to the thermal conductivity of AA7075. Microstructure of composites is observed with fine grain formation and homogeneous distribution of reinforcements. X-ray Diffraction pattern confirms the existence of both reinforcements in matrix alloy. Specimens with

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Conflict of interest

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Research Involving Human Participants and/or Animals

The Author(s) are stating that no human participants or animals were involved to carry out this investigation.

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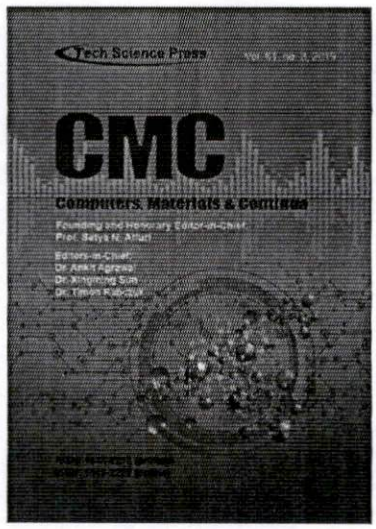

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Modified Differential Evolution Algorithm for Solving Dynamic Optimization with Existence of Infeasible Environments

CMC-Computers, Materials & Continua, Vol.74, No.1, pp. 1-17, 2023,
DOI:10.32604/cmc.2023.027448

Abstract Dynamic constrained optimization is a challenging research topic in which the objective function and/or constraints change over time. In such problems, it is commonly assumed that all problem instances are feasible. In reality some instances can be infeasible due to various practical issues, such as a sudden change in resource requirements or a big change in the

Computers, Materials & Continua
DOI: 10.32604/cmc.2023.032549
Article

Tech Science Press

Blockchain Driven Metaheuristic Route Planning in Secure Wireless Sensor Networks

M. V. Rajesh[1], T. Archana Acharya[2], Hafis Hajiyev[3], E. Laxmi Lydia[4], Haya Mesfer Alshahrani[5], Mohamed K Nour[6], Abdullah Mohamed[7] and Mesfer Al Duhayyim[8,*]

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Received: 22 May 2022; Accepted: 22 June 2022

Abstract: Recently, Internet of Things (IoT) has been developed into a field of research and it purposes at linking many sensors enabling devices mostly to data collection and track applications. Wireless sensor network (WSN) is a vital element of IoT paradigm since its inception and has developed into one of the chosen platforms for deploying many smart city application regions such as disaster management, intelligent transportation, home automation, smart buildings, and other such IoT-based application. The routing approaches were extremely-utilized energy efficient approaches with an initial drive that is, for balancing the energy amongst sensor nodes. The clustering and routing procedures assumed that Non-Polynomial (NP) hard problems but bio-simulated approaches are utilized to a recognized time for resolving such problems. With this motivation, this paper presents a new blockchain with Enhanced Hunger Games Search based Route Planning (BCEHGS-RP) scheme for IoT assisted WSN. The presented BCEHGS-RP model majorly employs BC technology for secure communication in the IoT supported WSN environment. In addition, an effective multihop route planning approach was designed by the use of EHGS technique. The proposed EHGS technique is derived from the concept of Hill Climbing strategy (HCS) and HGS algorithm. Moreover, a fitness function with two parameters namely residual energy (RE) and intercluster distance to elect optimal routes. The performance validation of the BCEHGS-RP model is experimented with under diverse number of nodes.

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Published: 12 July 2022

Design of a broadband dispersion compensated ultra-high nonlinear photonic crystal fiber

Sanat Kumar Pandey, Shivam Singh, J. B. Maurya, R. N. Verma & Yogendra Kumar Prajapati

Optical and Quantum Electronics **54**, Article number: 503 (2022)

Abstract

A photonic crystal fiber (PCF) with four circular rings of air holes expanded toward the cladding region is proposed. Four circular tiny air hole rings have been used between the air holes in a regular circular PCF to achieve low dispersion and confinement loss. Additionally, the core region is perforated with a rectangular-shaped hole filled with an extremely nonlinear material, gallium phosphide, to achieve the desired level of nonlinearity. We achieved extremely high nonlinearity and birefringence values of 4.6104 W^{-1} km^{-1} and 0.078 at the 1.55 μm telecommunication window by doing so. Further, we observed the structure with varying pitch (Λ) values and found a significant reduction in dispersion and

birefringence and high-nonlinearity photonic crystal fiber with As_2S_3 core. Opt. Commun. **410**, 396–402 (2018)

Zhao, T., Lian, Z., Benson, T., Wang, X., Zhang, W., Lou, S.: Highly-nonlinear polarization-maintaining As_2Se_3-based photonic quasi-crystal fiber for supercontinuum generation. Opt. Mater. **73**, 343–349 (2017)

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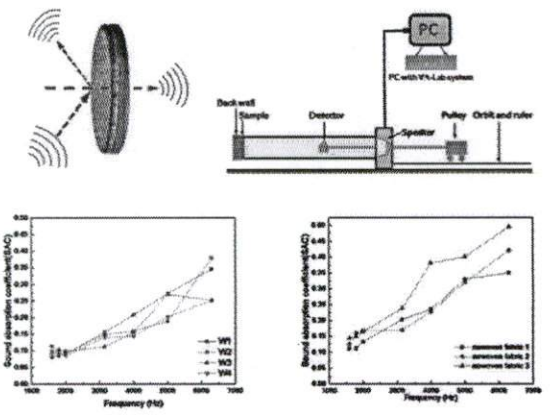
Jingshu Wang, Xiaoning Tang

First Published: 14 October 2022



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RESEARCH ARTICLE

Mechanical and thermal performances of styrene butadiene rubber nanocomposites with boron nitride nanosheets, carbon nanotubes, and the hybrid filler system

Lichao Gu, Hao Nan, Ruiguang Xing, Gaofei Pan, Yufei Wang, Xin Ge

Polymer Composites / Volume 43, Issue 9 / p. 6571-6577

RESEARCH ARTICLE

Preparation and characterization of opuntia-cladode fiber and citron peel biochar toughened epoxy biocomposite

Senthil Kannan N., N. Nagabhooshanam ✉, Anil Kumar, Pothamsetty Kasi V. Rao, Pravin P. Patil, B. V. V. L. Kala Bharathi

First published: 08 August 2022
https://doi.org/10.1002/pc.26970

Abstract

In this research, citron peel biochar and opuntia-cladode fibers (OCF) reinforced epoxy composites were fabricated and characterized for mechanical, wear, and electrical properties. The biochar was prepared from the waste peels of citron edible fruit whereas the opuntia fiber was from the cladode of the opuntia plant. The laminates were fabricated by hand layup process and evaluated in accordance with the ASTM standards. The results revealed that the mechanical properties such as tensile strength, flexural strength, impact toughness, hardness and adhesion strength were increased by 36.2%, 30.6%, 91.3%, 1.1%, and 5.3% for composite designation EC containing 30 vol% of OCF. Similarly, the addition of citron biochar of 2 vol% increased the load bearing and dielectric properties. However, the inclusion of 30 vol% of OCF on composite designation EC the sp. wear rate recorded 0.018 mm^3/Nm. Similarly, the lowest coefficient of friction and sp. wear rate is observed to be 0.42 and 0.008 mm^3/Nm for the composite with 2.0 vol% biochar. The ECO_4 composite designation represented a maximum dielectric constant and dielectric loss of about 7.4 and 1.1, respectively. The SEM fractography demonstrates that the silane-treatment strengthened the fiber-matrix interface and improved the interlocking mechanism. Such mechanically robust, wear-resistant improved and electrically conductive composites could be utilized in applications such as industrial sectors, spacecraft, automobile parts, packaging industries, and electrical appliances.

Polymer Composites / Volume 43, Issue 9 / p. 6571-6577

RESEARCH ARTICLE

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Senthil Kannan N., N. Nagabhooshanam, Anil Kumar, Pothamsetty Kasi V. Rao, Pravin P. Patil, B. V. V. L. Kala Bhar

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Abstract

In this resear fibers (OCF) reinforced epoxy composites w nical, wear, and electrical properties. Th els of citron edible fruit whereas the opuntia fi ant. The laminates were fabricated by dance with the ASTM standards. The results re as tensile strength, flexural strength, imp ngth were increased by 36.2%, 30.6%, 91.3% EC containing 30 vol% of OCF. Similarly, the ed the load bearing and dielectric properties. However, the inclusion of 30 vol% of OCF on composite designation EC the sp. wear rate recorded 0.018 mm^3/Nm. Similarly, the lowest coefficient of friction and sp. wear rate is observed to be 0.42 and 0.008 mm^3/Nm for the composite with 2.0 vol% biochar. The ECO_4 composite designation represented a maximum dielectric constant and dielectric loss of about 7.4 and 1.1, respectively. The SEM fractography demonstrates that the silane-treatment strengthened the fiber-matrix interface and improved the interlocking mechanism. Such mechanically robust, wear-resistant improved and electrically conductive composites could be utilized in applications such as industrial sectors, spacecraft, automobile parts, packaging industries, and electrical appliances.

Polymer Composites / Volume 43, Issue 9 / p. 5996-6003

RESEARCH ARTICLE

EMI shielding of cobalt, red onion husk biochar and carbon short fiber-PVA composite on X and Ku band frequencies

G. Devi ✉, N. Nagabhooshanam, Mohan Chokkalingam, Santosh Kumar Sahu

First published: 16 July 2022
https://doi.org/10.1002/pc.26898
Citations: 1

Abstract

This present study discusses the effects of doped novel cobalt-onion peel-based water soluble Poly vinyl alcohol (PVA) composite for its electromagnetic interference shielding (EMI) effectiveness in high-frequency bands such as X and Ku region. The primary aim of this study was to prepare a flexible electromagnetic shielding material for protecting electronic gadgets from the EMI effect. The biochar particles were prepared from red onion peel and mixed with cobalt/chopped carbon fiber (CCF) to form a compound structure. According to the results, the biochar and CCF addition improved the relative permittivity up to 9.6. Similarly, the hysteresis analysis showed a broad "S" curve for 2 vol% cobalt-added PVA composite. Moreover the doped composites are better in mechanical properties and the highest tensile strength of 79 MPa with Shore-D hardness of 37 was noted for PV3 composite designation. Finally, the highest wave shielding of −44.37 dB and − 49.62 dB for X and Ku band were observed for composite designation PVA4. This EMI shielding effectiveness improved composites could be used as shielding material for modern industrial, defense, and medical applications.

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Authors hereby confirming that there is no conflict and competing interest between authors.

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RESEARCH ARTICLE

EMI shielding of cobalt, red onion husk biochar and carbon short fiber-PVA composite on X and Ku band frequencies

G. Devi ✉, N. Nagabhooshanam, Mohan Chokkalingam, Santosh Kumar Sahu

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This pr novel cobalt-onion peel-based water soluble Poly vinyl alcohol (PVA) composite for its electromagnetic interference shielding (EMI) effectiveness in high-frequency bands such as X and Ku region. The primary aim of this study was to prepare a flexible electromagnetic shielding material for protecting electronic gadgets from the EMI effect. The biochar particles were prepared from red onion peel and mixed with cobalt/chopped carbon fiber (CCF) to form a compound structure. According to the results, the biochar and CCF addition improved the relative permittivity up to 9.6. Similarly, the hysteresis analysis showed a broad "S" curve for 2 vol% cobalt-added PVA composite. Moreover the doped composites are better in mechanical properties and the highest tensile strength of 79 MPa with Shore-D hardness of 37 was noted for PV3 composite designation. Finally, the highest wave shielding of −44.37 dB and − 49.62 dB for X and Ku band were observed for composite designation PVA4. This EMI shielding effectiveness improved composites could be used as shielding material for modern industrial, defense, and medical applications.

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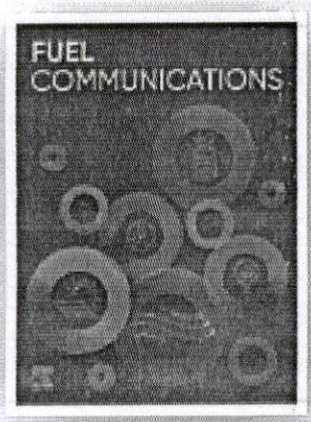

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Full Length Article

Combustion and emission behaviors of dual-fuel premixed charge compression ignition engine powered with n-pentanol and blend of diesel/waste tire oil included nanoparticles

P.V. Elumalai [a, b, 1], Santosh Kumar Dash [c], M. Parthasarathy [d, 1], N.R. Dhineshbabu [e], Dhinesh Balasubramanian [f, g, h], Dao Nam Cao [i, 1], Thanh Hai Truong [j], Anh Tuan Le [k], Anh Tuan Hoang [l, 1]

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Volume 323, 1 September 2022, 124415

Full Length Article

Experimental assessment on characteristics of premixed charge compression ignition engine fueled with multi-walled carbon nanotube-included *Tamanu* methyl ester

N. Murugu Nachippan [a], M. Parthasarathy [a], P.V. Elumalai [b, g], A. Backiyaraj [a], Dhinesh Balasubramanian [c, d, e], Anh Tuan Hoang [f]

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Research Article

Investigation of High-Temperature Wear Behaviour of AA 2618-Nano Si_3N_4 Composites Using Statistical Techniques

Santhi M. George,[1] Amel Gacem,[2] A. Kistan,[3] R. Mohammed Ashick,[4] L. Malleswara Rao,[5] Vinod Singh Rajput,[6] N. Nagabooshanam,[7] Moamen S. Refat,[8] Amnah Mohammed Alsuhaibani,[9] and David Christopher[10]

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The wear behaviour of hot pressed AA 2618 aluminium alloy matrix composites reinforced through nano Si_3N_4 elements (1 percent and 2 percent) has been investigated in this paper. Temperatures of 50°C, 150°C, and 250°C were used to examine the tribological characteristics of the models under a range of loads and pressures. The best wear performance was found in AA 2618/2wt percent Si_3N_4. Under a load of 30 N and temperature of 250°C, it was discovered that Si3N4-enriched AA 2618 alloy was 35.7% more wear-resistant than unreinforced AA 2618 alloy. Metal flow and plain delamination were the most common wear mechanisms at higher temperatures. Delamination is the most common wear mechanism at temperatures between 50 and 250 degrees Celsius. In the analysis of variance, the wear rate was influenced by temperature, load, and the presence of Si_3N_4 by 47.2%. In order to predict the wear rate, regression equations (linear and nonlinear) were developed by Taguchi method. Using a high determination coefficient, the nonlinear regression was the preeminent success rate (92.8 percent).

1. Introduction

Lightweight, inexpensive, and energy-efficient alloys are becoming increasingly popular. It is broadly used in the automotive industries for its maximum specific strength, corrosion resistance, and excellent low-temperature properties [1]. Although Al alloys have some drawbacks, the most significant one is their less amount of wear and mechanical properties at higher temperatures [2, 3]. Al metal matrix composites have been developed to address these shortcomings (AMMCs). Al MMCs are commonly reinforced with a variety of materials, including SiC, Al_2O_3,B_4C, TiC, CNT, GNPs, GO, and Y_2O_3 [4]. Since Si_3N_4 has a high melting point and good thermal conductivity, it was a natural choice for Al MMC reinforcement. Research into MMCs' wear and friction patterns is essential [5–7]. In the event that two surfaces are in close proximity to each other, material loss can occur. Consequently, wear has become a major cause of

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Research Article

Nanotitanium Oxide Particles and Jute-Hemp Fiber Hybrid Composites: Evaluate the Mechanical, Water Absorptions, and Morphological Behaviors

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Organic fiber-based biocomposites have gained prominence in a variety of sectors over the last four to five years due to their exceptional mechanical and physical properties. Natural fiber-based composites are increasingly being employed in autos, ships, airplanes, and infrastructure projects. The current study will look at the effect of nanotitanium oxide (TiO_2) fillers on the properties of hybridised jute-hemp-based composites. In this work, TiO_2-filled biocomposites were created using the hand layup method in hybrid jute-hemp composites containing jute fiber mats, woven hemp mats, and epoxy resin. After nanotitanium oxide fillers were injected in various weight proportions, the mechanical properties of fiber-reinforced polymers were investigated. The mechanical properties of laminated composites were tested using the ASTM standard. Compared to 2 and 4 wt.% of TiO_2, the 6 wt.% was provided the highest mechanical strength. Among the different types of specimen, the E-type specimen (30 wt.% of hemp, 7 wt.% of jute, 57 wt.% of epoxy, and 6 wt.% of TiO_2) gives their highest contribution, i.e., for tensile 24.21%, for flexural 25.03%, and for impact 24.56%. The scanning electron microscope was utilized to analyse the microstructures of nanocomposites.

1. Introduction

The utilization of composite materials has increased at an astounding rate, and these materials today have a remarkable and wide variety of uses. Minimal weight, strong fatigue tolerance, high corrosion resilience, insulation, and low coefficient of thermal expansion are key benefits of composites over several metallic materials. Polymer matrix composites (PMCs) offer outstanding physical and thermal qualities, like high specific toughness, as well as high toughness and rust resistance. The researchers emerged as viable alternatives to traditional metals in a wide range of applications, including aeroplanes, warships, housing, vehicles, microelectronics components, and maritime construction [1, 2]. The resources used throughout the airframe of a Boeing 777 contain 50% aluminium and 12% polymers by weightiness. However, in

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Research Article

Investigations of Nanoparticles (Al_2O_3-SiO_2) Addition on the Mechanical Properties of Blended Matrix Polymer Composite

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The manufacture and investigation of the characteristics of nanocomposites with nanoparticles are made by the sol-gel technique. It comprises two substances (aluminium oxide-silicon oxide), as well as the influence of such particles on the mechanical characteristics of a polymeric matrix is described in this study. Tensile, bending, and hardness tests were utilized to assess the mechanical characteristics of the hybrid material. The evaluation results of composite nanoparticles revealed a clear dispersion of chemical components among aluminium oxide and calcium oxide, softness in particulate matter during crystallization at high and low temperatures, the initiation of various nanostructures forms, and distinct stages of an alumina particle. When compared to a polymeric mix without nanoparticle inclusion, mechanical behaviour tests demonstrated a considerable improvement in the mechanical capabilities of the nanocomposites, notably at 2%. Mechanical parameters such as tensile strength are 61.36 MPa, flexural strength is 74.25 MPa, and hardness is 83.27 D at 2.5 wt% at 600°C heat treatment conditions. Under 900°C heat treatment conditions, tensile properties of 54.12 MPa at 1 wt. percent, flexural properties of 79.21 MPa at 2 wt. percent, and shore hardness of 81.21 D at 2.5 wt. percent of nanoparticles were measured.

1. Introduction

Nanotechnology is a large and comprehensive scientific discipline that has exploded in popularity in current decades, and nanoparticles are the foundation of nanotechnologies. Nanostructures are advanced inorganic materials that are gaining professional curiosity due to their remarkable qualities when compared to other types of substances [1]. Nanocomposite particles are made up of two separate materials consolidated into a single hybridized particle, resulting in a multifaceted substance that may be employed in a variety of sectors, such as pharmaceuticals, electronics, and manufacturing, or to improve existing features [2]. As a result, interest in this type of material has grown, as have the tactics employed to make it [3]. Natural fibre may be utilized to make nanostructures, while tapioca plant films could

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Research Article

A Comprehensive Study of Ceramic Matrix Composites for Space Applications

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Ceramic matrix composites (CMCs) have grown in popularity as a material for a range of high as well as protection components, increasing the need to better understand the impacts of multiple machining methods. It is primarily composed of ceramic fibers embedded in the matrix. Ceramic materials, especially carbon fibers and carbon were used to create the matrix and fibers. These ceramics include a huge variety of non-metallic inorganic materials that are regularly utilized under high temperatures. The aircraft industry became revolutionized by this unique combination of materials, which made parts better resistant under extreme conditions as well as lighter than the earlier technology. The development, properties, and production of ceramic matrix composites, as well as space applications, are discussed in this article. Ceramic materials have an interesting set of properties, including great strength and stiffness under extremely high temperatures, chemical inertness, low density, etc. In CMC, ceramics are used in the matrix as well as reinforcement. The matrix material keeps things running smoothly while the reinforcement delivers unique special properties. Ceramic matrix composites are developed for applications that required high thermal and mechanical characteristics, which include nuclear power plants, aircraft, chemical plants, space structures, and transportation services. Even though advanced aircraft relies on high-performance propulsion systems, improving the total impulses over the total mass ratio for rocket engines becomes essential for improving their performance that demands reduced engine structural weight as well as higher component heat resistance. The evolution of new ultra-high-temperature composites having high-temperature resistance as well as low density that a substitute super alloy and refractory metal material has become so essential and laid the foundation for high-performance engine design. The benefits of continuous fiber- reinforced CMC with high-temperature engine designs have long been recognized as a better measure of a country's ability to design and produce spacecraft, modern aircraft, and weapons. Ceramic matrix composites materials are used in various aircraft type engines, aircraft brake disks, high-temperature gas turbines components, slide bearing components, hot gas duct, flame holders and components for burners are made by using oxide CMCs.

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Research Article

Design and Fabrication of Patient-Specific Implant for Maxillofacial Surgery Using Additive Manufacturing

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Patient-specific implants are well known for fixing the fracture for bone repairs. However, the exact fixation of the fabricated implant to the patients is a challenging task. To overcome this problem, in the present study two kinds of designs are developed and fabricated. Based on the exact fitting to the patient's oral system, the best design is selected to fabricate. Computed tomography (CT) scan data of the patient oral anatomy is converted into a 3D model using the DICOM Software "Slicer 3D." The patient-specific maxillofacial implant is fabricated using fused filament fabrication (FFF) and direct metal laser sintering (DMLS) techniques. Before fabricating real time product, a prototype is fabricated at the initial stage using FFF. Later, stress distribution and displacement of the implant was investigated using a FEM simulation. The conclusion of the present work results are potential for FFF of patient-specific implants out of Ti-6Al-4V.

1. Introduction

Subperiosteally dental implant is a framework like custom made structure with abutments for support and fixation of dental restorations [1]. Subperiosteal dental implants are made from biocompatible materials like cobalt chromium (CoCr) and [2–4] Titanium alloys. Masticatory force is transferred to and distributed over a large area of the bone surface, rather than the bulk of the bone, as compared to root form implants [5, 6]. In general, for fixing the dental implants to the patient an acceptable bone is required to support the implant and also should contain healthy gums [7]. In some cases, bone grafting is created due to bone density is low. Nevertheless, in the case of severe bone resorption, extensive bone regeneration requirement represents clinical treatment challenges leading to hesitation from patients. Therefore, in recent times patient-specific implants are developing to avoid the above problems faced by various patients [8]. For the age group of 50–60 years, patient-specific implants are avoiding the regenerative surgeries and fixing the dental restoration [9].

Apart from dental restoration, maxillary and jawbone reconstructions find applications in treating bone defects caused by tumors, injuries, or infections [10]. However, such reconstruction represents major challenges from both the engineering and medical aspect. Subperiosteal implants are fabricated by the following three methods: (i) classic/traditional method, (ii) hybrid method, and (iii) digital method [11]. In the traditional method, the surgery needs to be performed twice, where during the first surgery the impression of the bone and the refractory model is made. The implant is designed based on the refractory model in Co Cr or Titanium alloy [12]. The second surgery is then done to install the implant on the patient. Though it takes two

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Research Article

An Artificial Intelligence Mechanism for the Prediction of Signal Strength in Drones to IoT Devices in Smart Cities

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Drones, the Internet of Things (IoT), and Artificial Intelligence (AI) could be used to create extraordinary responses to today's difficulties in smart city challenges. A drone, which would be effectively a data-gathering device, could approach regions that become complicated, dangerous, or even impossible to achieve for individuals. In addition to interacting with one another, drones must maintain touch with some other ground-based entities, including IoT sensors, robotics, and people. Throughout this study, an intelligent approach for predicting the signal power from a drone to IoT applications in smart cities is presented in terms of maintaining internet connectivity, offering the necessary quality of service (QoS), and determining the drone's transmission range offered. Predicting signal power and fading channel circumstances enables the adaptable transmission of data, which improves QoS for endpoint users/devices while lowering transmitting data power usage. Depending on many relevant criteria, an artificial neural network (ANN)-centered precise and effective method is provided to forecast the signal strength from such drones. The signal strength estimations are also utilized to forecast the drone's flight patterns. The results demonstrate that the proposed ANN approach has an excellent correlation with the verification data collected through computations, with the determination of coefficient *R*2 values of 0.97 and 0.98, correspondingly, for changes in drone height and distances from a drone. Furthermore, the finding shows that signal distortions could be considerably decreased and strengthened.

1. Introduction

Drones are often referred to as unmanned aircraft systems. The drone is a flying robot, and it can be remotely controlled or flown automatically using software-controlled systems. It works in conjunction with sensitive devices and the global positioning system (GPS). Drones are now in demand for testing and multiple applications because of their versatility and capability to be used in a broad variety of applications, such as control, security, observation, and the rapid surveillance of inaccessible terrain. Furthermore, it is an alternative technology that enhances the ability of first responders to reach the areas of environmental disaster and carry out rescue operations. It can assist in emergency preparedness situations, such as medicine distribution, forest fire extinguishing, vital infrastructure preservation and testing, coastal surveillance, and police upgrades, and it can help meet the public safety standards of urban areas.

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Research Article

Investigation on Durability Behavior of Fiber Reinforced Concrete with Steel Slag/Bacteria beneath Diverse Exposure Conditions

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One of society's most perplexing concerns is trash management. Among them is steel slag, which is obtained from steel mills and is used in the building industry as a partial substitution ingredient in concrete. To ensure that the concrete lasts the desired service life without deteriorating, bacteria (*Bacillus subtilis*) are introduced to ensure that the construction performs as planned. The research is focused on the M30 grade concrete mix specified in the Indian Standard Code. Concrete specimens containing fiber, steel slag, and bacteria are subjected to a variety of environmental conditions, including extreme, extremely severe, severe, moderate, and mild. The ultrasonic pulse velocity, sorptivity, water absorption, rapid chloride penetration, and acid resistance characteristics of the fiber-reinforced bacterial concrete are compared to those of regular concrete specimens.

1. Introduction

The 30 million tonnes of steel slag waste have been generated from the steel manufacturing industry every year in India. Utilizing this waste as a useful product in construction industry will reduce the over mining of natural resources. A single way of application can give the solutions for two problems such as waste management and depletion of natural resources. Steel slags are available in various sizes that can be used as substitute materials for fine and coarse aggregates in concrete. The properties of the steel slag such as size, shape, density, specific gravity, color, and appearance are compared to the conventional aggregates. Among all the properties, the water absorption of steel slag is slightly more than the normal coarse aggregates as, the micropores of the steel slag absorb greater portion of water from its surface [1]. The by-product of steel manufacturing plant is called steel slag and is used as a boosting material in clayey soil to improve the SBC of the soil [2]. Steel slag can be added as a basic ingredient material in concrete as well as a supplement material in cement for binding [3]. The depth of penetration of water in steel slag aggregate is higher in coarse form and lower in fine form while using in concrete. The same can be rectified by immersing the aggregate in water before using it into concrete [4]. The steel slag aggregate concrete having high resistivity to various imposed loads to avoid surface cracking in such a way that the particle binding in it [5]. Other than Blast Furnace Slag, the ferrous slag produced from the steel extraction producing major pollution element to the environment especially which leads leachate. Only

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Rectifier Acoustical Cardiac Activity Detection Analysis of ECG Signal

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ABSTRACT- Skilled cardiologists follow a series of steps to recognize the heartbeats of a patient. But it is a very difficult task to tune to particular frequencies for a doctor. So, in this manuscript, it is sorted into two series MIT-BIH data set steps for processing the heartbeat of a person without noise from a respiratory system to save a person from false detection of heart diseases. So, we expect our work is useful for researchers, educators, physicians. If the speed of the heart is faster or slower than it is said to be it is called an abnormality. Sudden cardiac death may also be attained due to false detection of a heartbeat. So, the early detection of this heartbeat is necessary to save the life of the patients. So, the algorithm proposed in this paper is useful in removing unnecessary sounds by surroundings and the overall mortality rate due to heart diseases can be reduced.

Keywords: Heartbeat, Phonocardiogram, Electrocardiogram, Heart rate variability, Noise.

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1. INTRODUCTION

Now a day's cardiac problems are very much common to even-aged, adults and even children due to increased levels of stress. The first stage to escape from this problem is a physical examination by doctors. Most doctors take several years for mastering in perfect detection of disorders of the heart [1-3]. It is even difficult for senior surgeons to estimate the disorder by a simple stethoscope. The period of a normal heartbeat is 30 ms. The characteristics of ECG signal indicating the cardiac disorder is a great deal quieter than others. ECG signal characteristics are shown in *Figure 1* taken from the MIT-BIH database [4-6]. Skilled cardiologists were also confused during this observation because of noise from surroundings. It is important to tune to frequencies of heart sounds to get a perfect diagnosis. Signal processing plays a major role in this medical diagnosis. For newborn babies, it is essential for recognizing holes in ventricles which may cause different heart sounds called murmur. Detection of a murmur by stethoscope is difficult due to human errors [7,8]. In this speech processing plays an important role i.e.., processing of recorded signals can estimate well than humans by computers. This is also called Phonocardiography. Phonocardiography requires more knowledge and time. Here introduced a Graphical User Interface (GUI) called MATLAB to measure the diameter of the hole in the heart. The heart has four chambers upper - atria, lower-ventricles [9-11].

ECG signal detection is related to cardiac activity. It is detected with two approaches first one traditional detection method which detected the ECG by stethoscope approach. The auditory stethoscope approaches are operated by the sound transmission from the heart of the patients [12-16]. It is air-filled tubes in hollow shapes to the ears of the listeners. If the diaphragm is positioned on the patient's body the sound vibrates the diaphragms, created the acoustic pressure wave that is traveling up to the tubing of the listener's ear. It is shown in *Figure 2*.

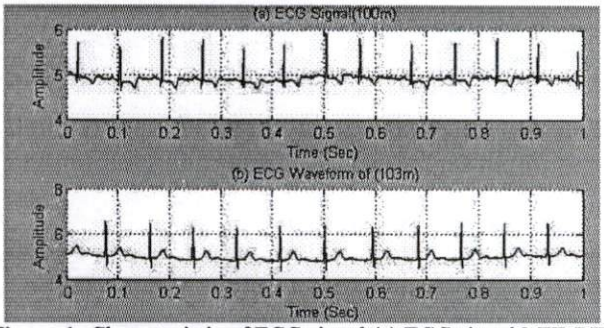

Figure 1: Characteristic of ECG signal (a) ECG signal MIT-BIH (100m database) (b) ECG signal MIT-BIH (103m database)

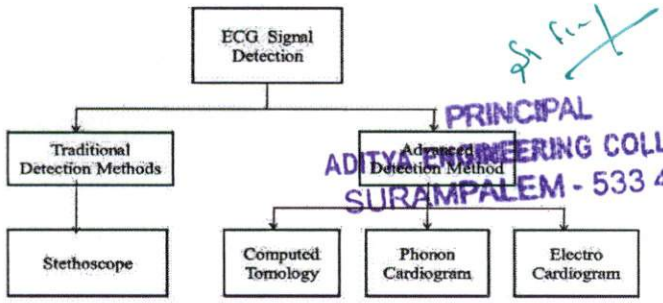

Figure 2: Overview of different Heart Beat measurement techniques

Heart muscles squeeze blood from different organs. The valve of the heart completely opens or completely closes when blood comes and goes out of the heart. But due to Stenosis valve does

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A Soft Computing Techniques Analysis for Planar Microstrip Antenna for Wireless Communications

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ABSTRACT- The use of neural-network computational modules for radio frequency and microwave modelling and design has lately gained popularity as an uncommon but useful technique for this type of modelling and design. It is possible to train neural networks to study the behaviour of active and passive mechanisms and circuits. In this study, technologists will learn about what neural networks are and how they can be used to model microstrip patch antennas. An artificial neural network is used in this work to investigate in depth several designs and analysis methodologies for microstrip patch antennas. Various network structures are also discussed in this study for wireless communications. Microstrip antenna design has been presented and the use of ANN in microstrip antenna design are also shown in this article.

Keywords: IANN, Microstrip, Antenna, Wireless Communication.

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1. INTRODUCTION

Now a days, due to the increasing demand for faster communication, scientists and researchers have been attempting to improve existing devices and develop new ones. Recent advancements in communication and radar technology have accelerated antenna growth. An antenna allows data to be broadcast from one area to another. Newer technologies have modified the role, size, and design of antennas. Antennas have evolved rapidly over time, yet testing and implementation remain constant. The performance of a single antenna element may vary depending on the system and environment. An antenna is required to suit the needs of today's and tomorrow's wireless communication systems [1-3]. Researchers have a big challenge in developing small antennas for improved wireless and mobile communications. Smaller communication equipment requires smaller data transmission antennas [4-7].

Patch antennas can be analysed numerically or analytically. Methods based on mathematical or analytical notions of electrical or magnetic current distribution in the patch It is classified into four types: MOM, SDT, and FEM (FEM). Magnetic current distribution modelling includes transmission line, cavity, and multi-port network models (MNM). Numerical approaches can solve the problem, but they are tedious and time intensive, and the outcome can change if the geometry changes. The analytical models can also be used for a few patches' antenna forms. Artificial Neural Networks (ANN) are a novel type of soft computing based on learning (ANNs). Soft computing was coined by Zadeh in 1992. Soft computing differs from hard computing in that it does not require complex arithmetic. Soft computing includes ANNs, fuzzy logic, machine learning, and evolutionary computation (PSO-particle swarm optimization) [5-7]. Neural Networks are thought of as a model that mimics the human brain's functions. An example of a soft computing technique that takes its methodology from biological processes is the neural network. With the use of this comparison, artificial neural networks (ANNs) were able to learn and adapt like a human brain through training and testing. It was motivated by biological systems to handle non-linear challenges in scientific and antenna engineering sectors. Fault tolerance, high speed processing, parallel processing, non-linear mapping, and approximation are some of the capabilities of ANNs. Microstrip antenna properties, such as radiation pattern, bandwidth, and gain, can benefit from these soft computing advantages as well. An ANN model for a microstrip line is developed, and it is shown to be faster than the usual method. To determine the resonance frequency of thick circular microstrip antennas, an RBF network neural model was developed [8-10]. The network is trained using a variety of learning algorithms in accordance with the learning approach. Delta-bar-delta extended techniques were used by the neural model to get the best results from the MLP. employing radial basis function networks to improve laser diode line width. The clustering methods are learned using an extended delta-bar-delta algorithm. The concept of fractal geometries, which is employed in nature to model complex structures like coastlines and clouds, can be applied to the downsizing of antennas. An artificial neural network can be used to estimate the rectangular microstrip patch antenna's input impedance (ANN). A coaxially fed rectangular microstrip antenna based on ANNs was presented by the same author for use in calculating radiation resistance [11-18].

This paper provides a soft computing techniques-based analysis for microstrip antenna for wireless applications. This paper

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Effective Cyber Security Using IoT to Prevent E-Threats and Hacking During Covid-19

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ABSTRACT- This research work is conducted to make the analysis of digital technology is one of the most admired and effective technologies that has been applied in the global context for faster data management. Starting from business management to connectivity, everywhere the application of IoT and digital technology is undeniable. Besides the advancement of the data management, cyber security is also important to prevent the data stealing or accessing from the unauthorized data. In this context the IoT security technology focusing on the safeguarding the IoT devices connected with internet. Different technologies are taken under the consideration for developing the IoT based cyber security such as Device authentication, Secure on boarding, data encryption and creation of the bootstrap server. All of these technologies are effective to its ground for protecting the digital data. In order to prevent cyber threats and hacking activities like SQL injection, Phishing, and DoS, this research paper has proposed a newer technique of the encryption process by using the python codes and also shown the difference between typical conventional system and proposed system for understanding both the system in a better way.

General Terms: Cryptography, Cryptanalysis, Pattern recognition, Data Security, Hacking.

Keywords: Interdisciplinary, Cyber security, Theory of computation, Internet of Things (IoT), E-threat.

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1. INTRODUCTION

1.1 Background

Advanced technology has widely changed today's world. By utilizing, IoT based digital technology, various complex tasks can be done faster without any error. Moreover, the digital-based technology also offers to operate the tasks like business operation, progress monitoring, and financial transaction through online processes. Moreover, data management also gets quite easier and more efficient as well after the rapid implementation of IoT technology. These kinds of wide diversified facilities effectively help the spread the usage of the IoT technology in the market faster [1].

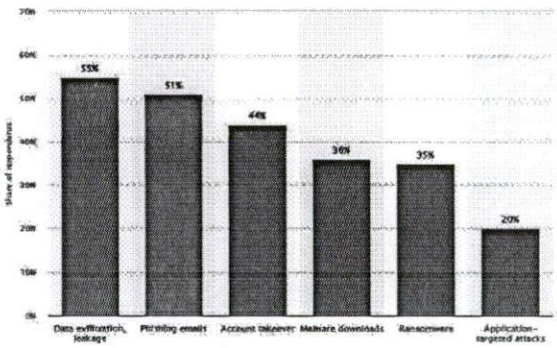
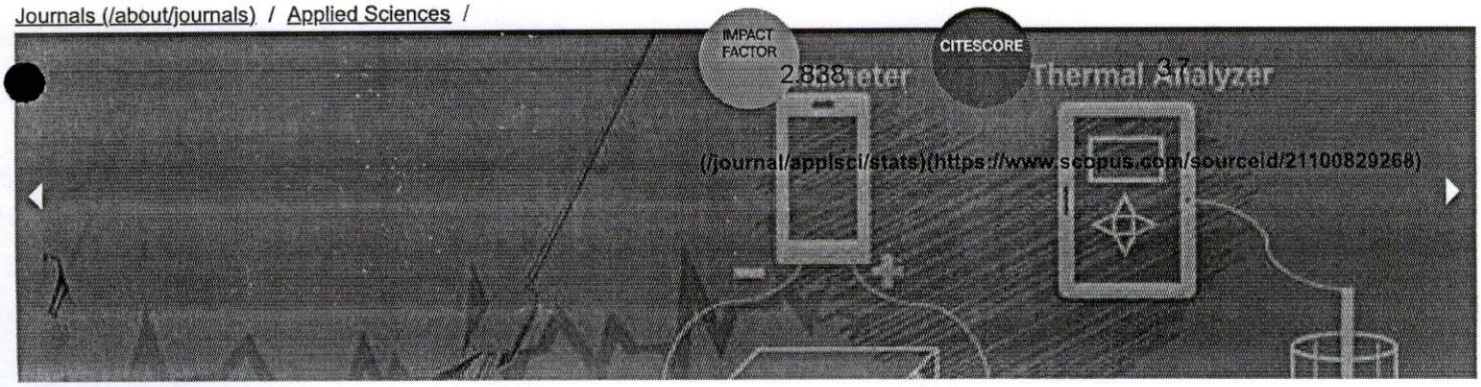


Figure 1: Cyberattacks during a pandemic

During pandemics, the incidents of cyber-attacks have been increased regardless of the location and industry. More specifically, most of the cyber-attacks that happened during this time are related to data exfiltration leakage and phishing the sensitive emails. This helps in analyzing the fact that the need of identifying the different IoT tools and methods used are needed to be analyzed.

1.2 Purpose

The main purpose of this research work is to demonstrate the ways the different cyber security methods and tools used in the time of pandemics to protect users from hackers or cyber



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Article

Digital Watermarking System for Copyright Protection and Authentication of Images Using Cryptographic Techniques

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Abstract: Digital images are transferred with ease through the network. Many users are using the images without the knowledge of the owners. Therefore, a novel watermarking scheme is proposed to ensure copyright protection and authentication of images using cryptography techniques. Here, a quick response (QR) image is generated for a watermark image that contains public and private keys prepared using a cryptosystem. Later, this QR image is scrambled using a chaotic logistic map. The public and private keys are used to cipher and decipher the data. Next, the scrambled QR watermark is embedded into a color image using a single-level discrete wavelet transform followed by singular value decomposition using the key value. Finally, the inverse process is applied to extract the watermark. The proposed method is validated using various image processing attacks. The results are then compared with state-of-the-art watermarking schemes. The experimental results show that the scheme provides good results in terms of robustness and imperceptibility.

Keywords: digital watermarking; invisible watermark; QR code; RSA; singular value decomposition; discrete wavelet transform

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1. Introduction

Recently, with the development of long-range informal communication on the web, the capacity and dissemination of interactive media content have become extremely simple. On the other hand, this simplicity has led to the need for copyright protection, blocking information theft, and data genuineness [1,2].

To handle the above issues, digital watermarking has emerged as an appropriate solution. Digital watermarking is a way of embedding a watermark into a significant image/media. A watermark acts as copyright data, shielding advanced information from illicit replication and conveyance [3,4]. A watermark is a sort of marker clandestinely inserted in a signal (audio, video, or image information). A watermark embedded into media may or may not relate to it. Watermarks are utilized to check the realness or uprightness of the watermarked signal [5,6].

Watermarking is a strategy that is broadly utilized and ceaselessly created by utilizing different strategies and executions [7,8]. In the proposed method, discrete wavelet transform (DWT) and singular value decomposition (SVD) techniques are combined to accomplish the vigor and imperceptibility of the watermark. The scheme is generally achievable for clients and has an oddity edge over the other existing digital watermarking methods [9]. The idea of embedding the watermark information is to prevent intruders or other members from claiming to be the rightful owner of the data [10,11].

The literature review is provided in Section 2. The methods used in the proposed scheme are provided in Section 3. Section 4 provides the process of embedding and extraction of the propounded method. Section 5 presents the experimental results with various images, attacks, and metrics. Finally, the conclusion is provided in Section 6.

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Magnetohydrodynamic Radiative Simulations of Eyring–Powell Micropolar Fluid from an Isothermal Cone

Jyoti Atul Dhanke, K. Thanesh Kumar, Pudhari Srilatha, Kurapati Swarnalatha, P. Satish & S. Abdul Gaffar

International Journal of Applied and Computational Mathematics **8**, Article number: 232 (2022)

Abstract

The magnetohydrodynamics thermal convection viscoelastic micropolar fluid from an isothermal cone is presented in this article. Greater temperature invokes radiation impacts that are studied by approximating Rosseland diffusion flux. To explain the non-Newtonian dynamics of the fluid, the Eyring–Powell viscoelastic model is employed that gives a great analogy for magnetic polymers. In order to simulate the polymer's microstructural and shearing features, the Eringen's micropolar Eyring–Powell fluid models are coupled. The Keller-Box scheme is used to solve the dimensionless couple conservation equations. Validation using previously published Newtonian solutions is also included. The fluctuations of

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Eyring–Powell fluid **Micropolar fluid** **Vortex viscosity** **Magnetohydrodynamics** **Radiation** **Wall couple stress** **Angular velocity** **Heat transfer rate**

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WEDM Machining Performance of Al Based Metal Matrix Composites Reinforced with Rice Husk Ash

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Keywords: Metal Matrix Composite, Aluminum, Rice Husk Ash, Density, WEDM, Cutting Speed

Abstract. With the enhancement in science and technology, necessity of complex shapes in manufacturing industries becomes essential for more versatile applications. These lead to demand for light weight and durable materials for applications in aerospace, defence, automotive, as well as sports and thermal management. Due to its high-tech structural, functional applications like defence, automobile, aerospace, thermal sensitive materials. Al-Matrix composites are considered as one of those classes of advanced engineering materials. In the present study, Al-RHA (Rice Husk Ash) composites are prepared by powder metallurgy route using 10% and 15% RHA by weight as reinforcement. Presence of abrasive particles leads to difficulty of conventional machining on Al-RHA composites hence non-conventional machining WEDM (Wire-Electric Discharge Machining) has been investigated. Suitable machining parameters for composites using wire EDM have been tried to get maximum material removal rate and speed. Optimizations of experimental parameters have been studied using Taguchi and Anova to standardize the process parameters for machining. Prime process parameters like servo-voltage, pulse-on time and pulse-off-time have been taken into consideration to study cutting quality of Al-RHA Metal matrix Composite using cutting speed as response parameters while effect of RHA weight fraction addition is also considered for evaluation to understand its influence on affecting the response.

Introduction

Metal matrix Composite (MMCs) are produced by joining two or more materials which are dissimilar in chemical and physical behaviour. This material is having well attention, by reason of less density, goodstiffness and strength. Nowadays, these types of materials requirement is increasing very fast in the area of automotive industries and aerospace engineering. The current research work in this composite has been stirred in the direction of aluminium based metal matrix composites, because of its varied applications such as bicycle frames, vehicle shafts, automotive pistons etc. Ceramic particles show larger mechanical properties to unreinforced Al as matrix. Utilization of waste material in Metal matrix composite is noted to be recent trend of research in present day for low-priced manufacturing. Among several reinforcements used are fly ash, fibres, rice husk ash etc. Rice husk ash is available in largeamount as solid waste by-product and it can be used as one of the low-density and most suitable reinforcement. In one studyAl alloy (AlSi10Mg) Composites developed by liquid processingwith RHA and fly ash and it is found that the hardness of the composite is linearly increasing with the rise of weight fraction of the RHA particles, around 10% RHA and fly ash (FA) showed maximum hardness. Adding RHA beyond 10 % decreased tensile strength and with the increase of FA percentage elongation also increases [1].MMC fabricated with Al alloy (A356) reinforced with 2%,4 % , and 6 % RHA particles and reported that a significant increase in terms of impact test, tensile test, compressive test and optimize results are noted to be at 6% RHA. Due to its weighty mechanical strength this Al Alloy-RHA Hybrid MMC found versatile applications in Industrial and Construction Material [2].

About this Journal

Aims and scope

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Research Article

Improved Support Vector Machine and Image Processing Enabled Methodology for Detection and Classification of Grape Leaf Disease

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In recent years, agricultural image processing research has been a key emphasis. Image processing techniques are used by computers to analyze images. New advancements in image capture and data processing have simplified the resolution of a wide range of agricultural concerns. Crop disease classification and identification are crucial for the agricultural industry's technical and commercial well-being. In agriculture, image processing begins with a digital color picture of a diseased leaf. Plant health and disease detection must be monitored on a regular basis in property agriculture. Plant diseases have had a tremendous impact on civilization and the Earth as a whole. Extensions of detection strategies and classification methods try to identify and categorize each ailment that affects the plant rather than focusing on a single disease among several illnesses and symptoms. This article describes a new support vector machine and image processing-enabled approach for detecting and classifying grape leaf disease. The given architecture includes steps for image capture, denoising, enhancement, segmentation, feature extraction, classification, and detection. Image denoising is conducted using the mean function, image enhancement is performed using the CLAHE method, pictures are segmented using the fuzzy C Means algorithm, features are retrieved using PCA, and images are eventually classed using the PSO SVM, BPNN, and random forest algorithms. The accuracy of PSO SVM is higher in performing classification and detection of grape leaf diseases.

1. Introduction

In recent years, there has been a significant increase in the amount of focus placed on agricultural image processing [1, 2]. The use of image processing has been shown to be beneficial in a wide variety of sectors, including agriculture. In agriculture, pictures are captured by cameras, aircraft, or satellites and then processed to expose information. This may be done in a variety of ways. Computers using various image processing techniques examine these pictures for

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Tribological enhancement of modified jatropha oil by activated carbon nanoparticle for metalworking fluid application

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KEYWORDS

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Activated carbon
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Tribology
Nanoparticle
Coefficient of friction
Mean wear scar diameter

ABSTRACT

The excessively use of petroleum-based oil as a metalworking fluid is hazardous to the worker and cause a pollution to the environment. As a result, environmentally friendly oil has gradually replaced petroleum-based oil in the machining process. The goal of this study is to investigate the tribological enhancement of modified jatropha oil (MJO) by activated carbon nanoparticle (AC) ranging from 0.01 to 0.05 wt.% through the four-ball test and turning process. The results reveal that MJO with 0.025wt% AC nanoparticle has exceptional tribological performance in terms of friction and wear, resulting in extended tool life in terms of machining length (7000mm) and machining time (49 minutes). The addition of 0.025wt.% AC nanoparticle created a protective layer that facilitates rolling action at the sliding surfaces. As a result, MJO with 0.025wt% AC has excellent tribological properties, making it a viable alternative as an environmentally friendly metalworking fluid.

1.0 INTRODUCTION

Tribological performance in lubrication is the study of controlling and managing lubricity, friction, and wear. The interfacial friction within the sliding system phenomena is a process that is continually accompanied by the change of energy form, where moving two objects together with the condition that both of them are in motion certainly dissipates the energy as it is the phenomenon of friction (Chan et al., 2018). Lubricants are primarily used to lubricate machines

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Energy Sources, Part A: Recovery, Utilization, and Environmental Effects ›
Volume 44, 2022 - Issue 4

Research Article

Environmental and exergoeconomic assessments of a novel biomass gasification based solid oxide fuel cell and heat engine hybrid energy system

Abhishek Kumar Tripathi

a Department of Mining Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh, India

ra, Narukullapati Bharath Kumar, Ali Majdi,

7 Aug 2022, Published online: 13 Sep 2022

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ABSTRACT

Recently, the exploitation of renewable energies and technologies in order to reduce the restrictions of fossil fuels is the attention of energy managers and engineers. Additionally, energy production cycles based on solid oxide fuel cells (SOFCs) are known for their versatility in fuel intake. In this regard, in the current

article the thermodynamic-conceptual assessment of a novel combined energy system (CES) based on biomass gasification is developed. The proposed CES is

Energy Sources, Part A: Recovery, Utilization, and Environmental Effects ›
Volume 44, 2022 - Issue 3

Research Article

Effect of particle loading and temperature on the rheological behavior of Al_2O_3 and TiO_2 nanofluids

Pritam Kumar Das

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ar Dash, Ranjan Ganguly, nal Venkatesan, Ali A. Rajhi, Saboor Shaik &

Jul 2022, Published online: 03 Aug 2022

30/15567036.2022.2103214

ABSTRACT

Nanofluids, which are stable suspension of nanoparticles in a carrier liquid, have gained traction in the past two decades for multiple scientific traits and a wide range of industrial features; one of them pivots around their improved physical properties and superior heat transfer capabilities over pure fluid. Viscosity plays a vital role in fluid flow and heat transfer characteristics of a nanofluid, as it is linked to the pumping power of fluid. The presence of the particles in the surfacted host liquids alters the viscosity of the medium and in nanofluid, and hence nanofluid

Journal of Energy Storage

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Journal of Energy Storage
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Research papers

Thermal management system of lithium-ion battery packs for electric vehicles: An insight based on bibliometric study

M. Murugan [a] ✉, A. Saravanan [b], P.V. Elumalai [b], G. Murali [c], N.R. Dhineshbabu [d], Pramod Kumar [a], Asif Afzal [e, f, g]

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International Transactions on Electrical Energy Systems / Volume 31, Issue 5 / e12833

RESEARCH ARTICLE

Efficient energy management of hybrid renewable energy sources-based smart-grid system using a hybrid IDEA-CFA technique

Bapayya Naidu Kommula ✉, Heqing Song, Liang Chen, Chunxiang Xu

First published: 08 March 2021
https://doi.org/10.1002/2050-7038.12833

Summary

A hybrid technique-based energy management scheme for optimal sizing of solar, wind, battery along the integral of pumped hydro storage (PHS) is presented in this paper. The suggested control scheme is the consolidated implementation of both Improved Dolphin Echolocation Algorithm (IDEA) and Cuttlefish Algorithm (CFA). Searching behavior of Dolphin Echolocation Algorithm (DEA) is changed through utilizing productive search capacities such as levy flight, so it is known as IDEA. The prominent intension of this work is the optimal energy management in between the source side as well as load side also the total cost function minimization through the suggested IDEA-CFA control procedure. In the proposed work, the IDEA joined with CFA develops the appraisal approach for setting specific control signals to the system as well as generating control signals to disconnected path in subject to power assortment in between the source side as well as load side. Based on equality as well as inequality constraints, the objective function is classified by system data. The suggested model is implemented at MATLAB/Simulink work site as well as execution will be evaluated along the present strategies. The annualized cost and lifetime of HRES considering the system component with capital cost, operation and maintenance cost, replacement cost and lifetime are analyzed. The system component such as PV, Wind, BESS, water pump, water turbine, and upper reservoir are analyzed. The capital cost, operation and maintenance cost, replacement cost and lifetime of PV are 865 [$/kW], 18 [$/year], 865 [$/kW], and 25 [year].

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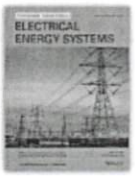

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RESEARCH ARTICLE

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Bapayya Naidu Kommula, Heqing Song, Liang Chen, Chunxiang Xu

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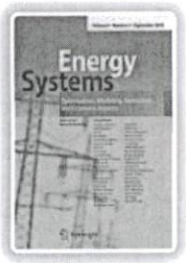

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An efficient integration and control approach to increase the conversion efficiency of high-current low-voltage DC/DC converter

P. Rajesh, Francis H. Shajin & Bapayya Naidu Kommula

Energy Systems (2021)

Abstract

In this manuscript, to increase the conversion efficiency of high current low voltage bidirectional DC/DC converter is proposed. The proposed converter uses switched inductor and switched coupled mutual inductance in the proposed system. Here, the switched inductor is an impedance network consists of split inductors and switches, which provides the high voltage conversion ratio and improves the output power quality that need for the low voltage applications. It also used as a filter to circulate the high frequency switching harmonics. In the proposed circuit, leakage current and power loss of mutual inductance is decreased because of soft switching. Thus the proposed method helps to reduce the switching loss, possibly low electro magnetic interference (EMI) and easier thermal management. This is used in the

DC-DC converter for dynamic performance enhancement of hybrid AC/DC microgrid. Electronics **9**(10), 1653 (2020)

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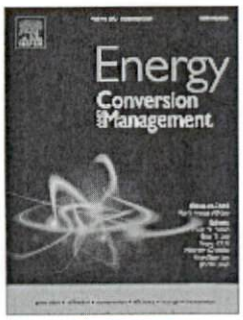

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Experimental investigation of strategies to enhance the homogeneous charge compression ignition engine characteristics powered by waste plastic oil

Parthasarathy, M. [a], Ramkumar, S. [a], Elumalai, P.V. [b], Sachin Kumar Gupta [b], Krishnamoorthy, R. [c], Mohammed Iqbal, S. [d], Santosh Kumar Dash [b], Silambarasan, R. [e]

https://doi.org/10.1016/j.enconman.2021.114026

Highlights

- • Developed HCCI Engine powered by waste plastic oil (WPO) and compared with conventional CI engine.
- • Inlet air temperature (IAT) and injection pressure (IP) of WPO were optimized for the HCCI engine.
- • Increase in IP higher than 10 bar resulted in preignition of the fuel.
- • NOx and smoke emissions drastically reduced for HCCI mode as compared to conventional CI engine.
- • HCCI engine performance optimized for 90 °C IAT and 8 bar IP.

Abstract

In the present-day scenario, the regulations over vehicle emissions are highly stringent, and the manufacturers are struggling to satisfy the emission norms. Waste plastic oil (WPO)

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Energy Conversion and Management
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Parthasarathy, M. [a], Ramkumar, S. [a], Elumalai, P.V. [b], Sachin Kumar Gupta [b], Krishnamoorthy, R. [c], Mohammed Iqbal, S. [d], Santosh Kumar Dash [b], Silambarasan, R. [e]

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Research Article

Effect of Cerium Oxide Nanoparticles to Improve the Combustion Characteristics of Palm Oil Nano Water Emulsion using Low Heat Rejection Engine

P.V Elumalai, M. Murugan, A. Saravanan &

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Feb 2021, Published online: 13 Apr 2021

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ABSTRACT

Biodiesel plays an important role in the automotive sector due to the enormous demand for conventional fuels such as diesel. A significant drawback of utilizing conventional fuel in the base engine is tailpipe emissions. The addition of water into the fuel reduced the harmful pollutants emitted from the engine and improved engine performance. The palm oil was used as biodiesel and it was mixed with 5% (by volume)

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P.V Elumalai, M. Parthasarathy, M. Murugan, A. Saravanan & C. Sivakandhan

Pages 1482-1496 | Received 05 Dec 2020, Accepted 16 Feb 2021, Published online: 13 Apr 2021

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ABSTRACT

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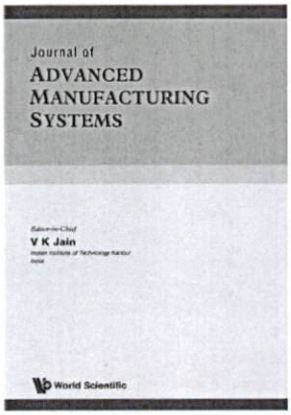

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Influence of Various Pulse Waveforms during Fabrication of Micro Rectangular Pattern by Masked Tool using Electrochemical Micromachining

S. Kunar*,‡ and B. Bhattacharyya†
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Maskless electrochemical micromachining (EMM) is an alternative method to fabricate microsurface textures on conductive substances, but it is still very challenging issue to create microsurface textures by this method. This paper proposes a new issue that maskless EMM process generates micro rectangular patterns using various pulse waveforms i.e. triangular, sine and square of pulsed DC power supply at constant voltage mode on stainless steel (SS-304) workpiece. A novel concept of maskless EMM setup consisting of EMM cell, electrode holding devices, electrical connections and vertical cross flow electrolyte system is introduced for the generation of high-quality micro rectangular patterns using various pulse waveforms. Another important finding is that SU-8 2150 negative photoresist can fabricate more than 28 micro rectangular patterned samples with higher dimensional accuracy and surface quality. The influence of machining voltage, inter electrode gap, pulse frequency, duty ratio and flow rate is investigated on machining performance such as length overcut, width overcut, machining depth and surface roughness (R_a) of micro rectangular pattern using three pulse waveforms. One mathematical model is developed to show the effectiveness of three pulse waveforms by the estimation of current efficiencies. From the experimental investigation, it is observed that higher frequency with square waveform at constant duty ratio is suitable to generate high-quality micro rectangular patterns under pulsed DC power supply.

Keywords: Maskless EMM; microsurface texture; micro rectangular pattern; pulse waveforms; reused masked tool; machined characteristics.

1. Introduction

Electrochemical micromachining (EMM) is a noncontact type advanced micromachining process in which material is removed from a textured workpiece in controlled manner through the electrochemical anodic dissolution in an electrolyte. Fabrication of microsurface textures is an effective approach on some microproducts, which are more functional like improved heat transfer efficiency, enhanced tribological performance, reduced wettability, etc.[1] EMM is a suitable method for the

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International Journal of Pattern Recognition and Artificial Intelligence | Vol. 35, No. 05, 2150015 (2021) | Pattern Recognition

Modeling a Virtual Bare-Hand Interface System Using a Robust Hand Detection Approach for HCI

Songhita Misra, G. Sridevi and R. H. Laskar

https://doi.org/10.

Department of ECE, Aditya Engineering College, Surampalem, India

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Abstract

A practically deployable gesture recognition system is developed using a robust hand detection method implemented using a motion-based image segmentation process and a two-level bare hand classification model, which is integrated with a gesture classification system of 58 gestures using new robust features. Since detection of bare hand is affected by nonideal conditions, multiple color-texture features are analyzed in this study. In the second stage of the system, 18 new ASCII characters are introduced and analyzed along with the existing 40 characters (alphabets, numbers, and arithmetic operators). New 15 dimensional features are introduced along with the existing features to enhance the classification accuracy of the gestures. Significance of features statistically tested using one-way analysis of variance (ANOVA), Kruskal–Wallis and Friedman test, which

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IMPROVING DATA AGGREGATION EFFICIENCY USING MULTI-LAYER APPROACH IN IoT

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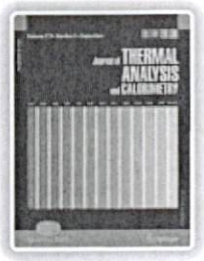
Abstract - Recently, tremendous growth and interest in the deployment of tiny sensors in the Internet of Things (IoT) for smart applications improves human lives. With the increasing need for energy-efficient mechanisms in IoT communication, the data aggregation technique for reducing data transmissions is considered a significant research problem. The basic idea in most of the aggregation mechanisms is to build the clustering or aggregation tree in an application layer over IoT, resulting in high complexity. To solve such a problem, the proposed MLDA designs an energy-aware aggregation layer that focuses on utilizing the network layer factors in data aggregation by providing transparency of accessing the topology structure from the network layer. Moreover, the proposed work also focuses on the design of the load-balanced topology structure in the network layer for efficient routing and also takes support from such network structure for energy-efficient data aggregation. The proposed Multi-Layer based Data Aggregation approach (MLDA) avoids the hotspot problem and inefficient data aggregation. The MLDA achieves such goals by improving the network layer protocol, RPL activities and designing the aggregation layer to eliminate redundant transmissions. By using an energy-efficient network structure, the impact of redundant data transmissions on network resources and data aggregation efficiency are eliminated. To support SUM, AVG, MAX, and MIN aggregation functions without redundant data transmissions, the Double Hash Bloom Filter (DHBF), observation scheme, and merge sort are used in the developed aggregation layer. Thus, the proposed MLDA improves the data aggregation efficiency in terms of both energy and accuracy.

Keywords: IoT; data Aggregation; RPL; redundant Data Transmission; Multi-layer approach

1. Introduction

There is a growing interest in deploying the Internet of Things (IoT) in various smart applications. With the deployment of a huge number of smart devices and their applications, gathering and analyzing the data is becoming one of the main challenges [Dehkordi, *et al*(2020)]. As the tiny sensor devices are powered by batteries, energy-efficient operations are critical in IoT applications [Karamitsios, and Orphanoudakis, (2017)]. Large scale and dense IoT network creates a tradeoff between the waste of energy due to data redundancy and maintaining the data aggregation efficiency. The data aggregation scheme has to lessen the redundant readings of sensors in the surrounding area [Chandnani, and Khairnar, (2020)][Wala, et al (2020)].

The data aggregation efficiency is largely dependent on the network topology. Thus, the support from lower layers, especially from the network layer is essential to improve the data aggregation efficiency without wasting the energy of sensor devices. It necessitates the importance of a multi-layer data aggregation approach [Guimaraes, *et.al* (2019)]. However, there is a lack of providing load balanced and an energy-efficient topology structure in the network layer, thereby improving the data aggregation efficiency. Mapping the network topology structure to the aggregation activities is crucial. However, it increases the network cost when connecting the non-adjacent layers, such as the network and application layer via messages. Thus, the proposed work plans to integrate the aggregation layer upper to the network layer. Before transferring the received data to the gateway, It is desirable for a parent node in the aggregation layer to eliminate redundancies in the received data from the neighboring nodes and to aggregate the data effectively. Thus, the proposed MLDA plans to take a network layer support in creating the load-balanced DODAG structure in RPL and eliminates the redundant transmissions significantly to improve the data aggregation efficiency without wasting the network resources.



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Published: 05 May 2021

Evaluation of water emulsion in biodiesel for engine performance and emission characteristics

P. V. Elumalai, M. Parthasarathy, V. Hariharan, J. Jayakar & S. Mohammed Iqbal

Journal of Thermal Analysis and Calorimetry **147**, 4285–4301 (2022)

Abstract

The present experiment was conducted by executing detailed tests on performance, combustion, and emission characteristics to prove that the Nerium biodiesel emulsified fuel can be an eco-friendly fuel. The emulsified biodiesel was formed by mixing with a small proportion of water in the limits of 5%, 10%, and 15% by volume. This study also assessed the stability of different emulsified blends. The properties were tested according to ASTM requirements. The blend of 60% diesel, 20% biodiesel, 15% water, and 5% surfactant showed the higher brake thermal efficiency and in-cylinder pressure by 13.72% and 12.6%, respectively, when related to base fuel. Also, carbon monoxide, oxides of nitrogen, opacity of smoke and hydrocarbon emission of the above blend decreased by 42.87%, 6.5%, 12.96%, and

nano emulsion in low heat rejection engine. Heat Mass Transfer. 2021. https://doi.org/10.1007/s00231-021-03028-7.

Author information

P.V. Elumalai, M. Parthasarathy have equally contributed.

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Experimental investigation of diesel engine with Neem seed oil and compressed natural gas

Shaik Khader Basha | P. S. Ranjit | du Ravi Kumar

b Department of Mechanical Engineering, Aditya Engineering College, Surampalem, India

Received 09 Aug 2020, Accepted ... Apr 2021, Published online: 12 May 2021

Abstract

In the present scenario, the world economy is developed by modernisation and mechanisation by balancing the use of renewable energy sources rather than non-renewable energy sources. The fossil fuels derived from non-renewable sources are costly and polluting the environment, which has driven to search for better alternative fuels. The present experimentation investigates the influence of blending of Neem seed biodiesel (NSOB) with diesel along with supplementation of compressed natural

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Received 09 Aug 2020, Accepted 22 Apr 2021, Accepted author version posted online: 28 Apr 2021, Published online: 12 May 2021

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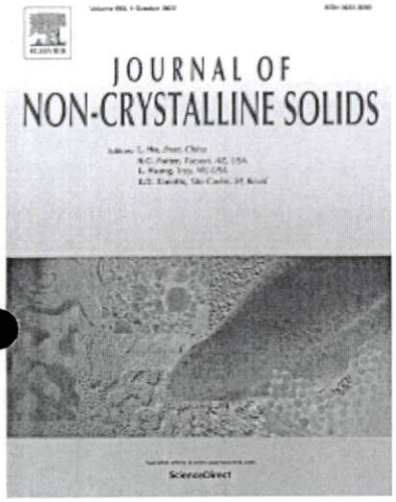
Abstract

In the present scenario, the world economy is developed by modernisation and mechanisation by balancing the use of renewable energy sources rather than non-renewable energy sources. The fossil fuels derived from non-renewable sources are costly and polluting the environment, which has driven to search for better alternative fuels. The present experimentation investigates the influence of blending of Neem seed biodiesel (NSOB) with diesel along with supplementation of ... different blends of NSOB added to conventional diesel from 10% to 30% with 10% increment and CNG was inducted through the



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The role of Sm_2O_3 on the structural, optical and spectroscopic properties of multi-component ternary borate glasses for orange-red emission applications

S. Hemalatha [a], M. Nagaraja [a], A. Madhu [b], K. Suresh [c], Srinatha N [d]

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Abstract

This paper reports, Sm^{3+}-doped Sodium-Zinc-Borate glasses have been prepared by the melt-quenching method and the influence of samarium concentration on their structural, optical and spectroscopic properties. The findings of X-ray diffraction and Raman demonstrate that the glasses were non-crystalline and amorphous glassy nature. The optical findings show the non-linear variation of indirect energy band gap with Sm^{3+} concentration. Spectroscopic intensity parameters and radiative properties of Sm^{3+} ions were evaluated by performing Judd-Ofelt theoretical calculations. The emission cross-section (σ_{em}) of various transitions were calculated using Futchbauer-Ladenburgh theory by means of the radiative parameters. The decay curves exhibit non-exponential behavior after 0.5 mol % Sm^{3+} doping, which were analyzed using Inokuti-Hirayama model. Also, 45 % quantum efficiency was attained for 0.5 mol% Sm^{3+} doped glasses. From the investigated luminescence studies, 0.5 mol% of Sm^{3+} doped glass demonstrates the maximum emission intensity in the orange-red region as evidenced from the CIE colour coordinates diagram. The findings show that the prepared glasses are appropriate for orange-red emission applications.

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Eco. Env. & Cons. 27 (May Suppl. Issue) : 2021; pp. (S270-S275)

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Yield response of Okra to different row spacings and fertilizer application methods under drip irrigation system

V.V. Tejaswini[1], *K. Sai Manogna[2], N. V. Deekshithulu[3] and K. Sindhuja[4]

[1&2] Department of Applied Engineering, Vignan Foundation For Science and Technology, Vadlamudi 522 213
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[4]M.Tech (FPT), JNTU, Kakinada 533 005

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ABSTRACT

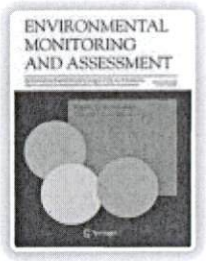
An experiment was conducted to study the okra yield response (*Abelmoschus esculentus* L. Moench) to the different methods of fertilizer application (i.e through fertigation tank and by manual application) & row to row spacing during February-May 2017. Two row spacings of 40x60 cm and 50x60 cm were selected. Analysis of the data showed that the response of the okra crop was considered a better combination of 50 x 60 cm through fertigation method compared to manual application. Yield in plot III was observed to be 22% more compared to manual application under same row to row spacing. Yield attributes such as pod weight, pod length and pod perimeter was also observed to be best in spacing of 50 x 60 cm. Similarly plant characteristics namely plant height, root depth and lateral distribution of roots were also found to be highest in 50 x 60 cm by fertigation method.

Key words : *Yield, Row to row spacing, Fertigation, Pod perimeter*

Introduction

Water and land resources are the primary needs of agriculture and economic development in any country. The need for these resources will continue to grow due to the increasing population. The world population is growing rapidly than the food supply. India has only 2.4% of the world's landmass and 4% of its freshwater resources. However, it is necessary to support 17.31% of the country's population, which is growing at an startling rate of 2% per year since independence. Agriculture sector consumes around 70 to 80% of available water. Water is perceived as an essential resource for livelihoods, food security and environmental sustainability. If sufficient water resources are available, the intensity of cultivation can be increased to 300% and above, and large areas of fallow land can be brought under arable land,which will solve the problem of food insecurity for a growing population..

In the current context of limited availability of surface water and depletion of groundwater resources day by day the only alternative is to use pressurized irrigation systems, i.e. drip or sprinkler irrigation systems, to meet the food security of a growing population and increasing the arable land by utilizing the limited water resources judicially . In micro-irrigation system, water is injected directly into the root zone of the plant through a network of main lines, submains and lateral lines with emission



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Understanding the microstructure, mineralogical and adsorption characteristics of guar gum blended soil as a liner material

Anandha Kumar Subramani, Sujatha Evangelin Ramani & Rangabhashiyam Selvasembian

Environmental Monitoring and Assessment **193**, Article number: 855 (2021)

Abstract

Guar gum blended soil (GGBS) offers potentially advantageous engineering characteristics of hydraulic conductivity and strength for a soil to be used as a liner material. Characterization techniques such as X-ray diffraction, X-ray fluorescence, Fourier transform infrared spectroscopy and scanning electron microscope were used to examine the mineral composition, functional groups and morphological changes in the unblended soil (UBS) and GGBS. These characterization approaches are used to understand adsorption-associated mechanisms of Pb(II) removal. Batch adsorption tests were performed to evaluate the adsorption capacity of UBS and the GGBS with various proportions (0.5%, 1.0%, 1.5% and 2.0%) of guar gum (GG) towards the removal of Pb(II) ions. Batch adsorption experiments were

613401, Tamil Nadu, India. The authors thank the Vice-Chancellor of SASTRA for the support and infrastructure provided during the period of the study.

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International Journal of Life science and Pharma Research

Review Article

Biotechnology

Strategies for Tracking Immune Surveillance of Tumor Milieu during Angiogenesis

Praveen Kumar Vemuri[1*], Greeshma Nimmagadda[1], Sreedhar Bodiga[2], Vijaya Lakshmi Bodiga[3], Suryanarayana Veeravilli[4] and KRS Sambasiva Rao[5]

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Abstract: Cancer is a multi-stage, multi-mechanistic, multifactorial complex process that has excessive potential for excessive proliferation with no relation to the physiological organ. Inherited genetic inclinations contribute extensively to about 10 % of breast cancers and about 13 % of colon cancers incidences. In the industrialized countries, 7% of most cancer deaths result from viral infections; 4% from occupational hazards; 2% from sunlight; 2% from air, water, and soil pollution; and less than 1% from diet and lifestyle. Formation of new blood vessels, angiogenesis, is elicited by tissue hypoxia and is essential for normal course of development of every tissue and organ. Angiogenesis unequivocally promotes tumor growth and metastasis. Tumors exhibit different rates of pathological angiogenesis and involve not only abnormally proliferating cancer cells, but also various tumor-infiltrating leukocytes and stromal cells. Local milieu of the cancers polarizes the leukocytes to support the tumor growth further. Although conventional knowledge reveals that immune surveillance helps to suppress tumor development, unresolved immune mechanisms including chronic inflammation can promote growth and progression of tumors. In this review, we outline the immune cells and their derived factors, including immunosuppressive and inflammatory cytokines that either can promote or inhibit cancer development, and the role of tumor microenvironment in this process of regulation. In the present review, the role of T-lymphocytese, NK cells, antibody dependent cell cytotoxicity, tumor escape mechanisms are presented.

Keywords: Angiogenesis, Cancer, Carcinogen, Milieu, Metastasis, Tumor

***Corresponding Author**

Praveen Kumar Vemuri , Department of Biotechnology, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India.

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ORIGINAL PAPER

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An experimental investigation on the combustion characteristics of a direct injection diesel engine fuelled with an algal biodiesel and its diesel blends

Nabam Hina Papu[1] · Pradip Lingfa[1] · Santosh Kumar Dash[2]

Received: 4 September 2020 / Accepted: 18 February 2021

Abstract

Conscientious efforts by researchers established that microalgae have huge potential for future energy production. Microalgae strain *Euglena sanguinea* has been collected locally and cultivated in a photoautotrophic mode. The microalgae lipid is extracted from the biomass and subsequently, biodiesel (BD) has been prepared for diesel engine experimental investigation. The main objective of the present study was to analyze various combustion characteristics of underutilized *E. sanguinea* BD in an agricultural diesel engine. Combustion performance of *E. sanguinea* biodiesel and its five different diesel–biodiesel blends (ES10, ES20, ES30, ES40, and ES50) have been studied at different engine loading conditions (0–100%). At full load, ignition delay (ID) reduced by 12.04% for ES100, 8.43% for ES50 and 7.22% for ES40. Combustion duration gradually drops up to ES40 and after that it increases marginally as biodiesel (BD) dosage increases in the blend. Peak cylinder pressure (PCP) and mean gas temperature (MGT) increases with an increase in algae BD concentration in the blend. Net heat release rate (NHRR) and rate of pressure rise (RPR) decrease with an increase in the algal BD concentration in the blend. At full load, PCP and MGT of ES100 (58.11 bar and 1204.84 °C) was 3.03% and 4%, respectively, higher than diesel fuel (56.4 bar and 1160.42 °C). Peak NHRR and maximum RPR of ES100 (43.10 J/°CA and 4.8 bar/°CA) was 12.07% and 10.61%, respectively, lower than diesel fuel (49.02 J/°CA and 5.37 bar/°CA). Overall, microalgae *E. sanguinea* biodiesel/diesel fuel blend up to 40% (ES40) is recommended for regular use in diesel engines.

✉ Santosh Kumar Dash
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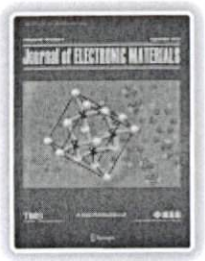
[1] Department of Mechanical Engineering, NERIST, Nirjuli,, Arunachal Pradesh 791109, India

[2] Department of Mechanical Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh 533437, India

Published online: 11 March 2021



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Linear and Nonlinear Optical Properties of CuO NPs for Photonics

N. R. Dhineshbabu & R. Vettumperumal

Journal of Electronic Materials 50, 3668–3675 (2021)

Abstract

The optical properties of various nanomaterials make them quite interesting and play a vital role in the fabrication of devices used in the optoelectronic and photonic fields. The research community around the world is curios to understand the physical phenomena behind such nanomaterials. In this study, copper oxide (CuO) nanoparticles (NPs) were prepared by a sonochemical method and their detailed optical properties analyzed by ultraviolet–visible (UV–Vis) spectroscopy. The normal dispersion of the refractive index of the CuO NPs was illustrated by the Wemple–DiDomenico single-oscillator method to yield the oscillator strength, static refractive index, dispersion energy (E_d), energy of effective dispersion oscillator (E_o), carrier concentration, and N/m^* values. In addition, nonlinear optical parameters such as the refractive index, third-order nonlinear susceptibility, and optical polarization were also estimated. The nonlinear optical performance of the CuO NPs was

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On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Design of Automated Visual Inspection System for Beverage Industry Production Line

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automated visual inspection system, coverage industry production line, visual inspection, image processing

ABSTRACT

This paper provides an overall design and implementation perspective of a laboratory-scale automated visual inspection system for the beverage industry's production line. A case study has been undertaken where the image processing algorithm inspects the beverage bottle for any defects. Different defects such as improper labeling and improper liquid level can be detected using the image processing algorithm. A laboratory prototype of the conveyor belt has been built, and a prototype filling plant has been established to verify the simulation results.

1. INTRODUCTION

Quality inspection of the finished product is a significant challenge in the production process of an industrial manufacturing plant. A multistaged inspection comprising of different parts, sub-parts, sub-assemblies, and final products is required to improve the finished product's quality and reliability in a mass production facility. Visual inspection of the finished product quality is the industry's norm because using visual inspection, a functional defect or a cosmetic defect can be ascertained easily. A human-based visual inspection system is slow, erratic, expensive, and less accurate. Therefore, the modern manufacturing industry focuses on automated visual inspection systems using high-end imaging devices and high-power processing platforms [1].

A review of the industrial vision system can be found in the studies [2-8]. Figure 1 presents the flow of product in an assembly line where the raw material is converted to a finished product in different steps, and after the finished product is available, a set of the inspection system is initiated to inspect the quality of the finished product. Once the quality of the finished product is ascertained, then it is packed and dispatched to the market.

Visual inspection system can have four types of inspection, such as:

- Inspection of dimensional quality
- Inspection of surface quality
- Inspection of correct assembling
- Inspection of accurate or correct operation

Designing an automated visual inspection system is complicated as it requires multiple high-resolution cameras with high-speed capturing and processing facilities. Dedicated illumination and optical system play a vital role in the automated visual inspection system. Multiple vision platforms are used for the inspection of the different features of the finished product. Every vision platform comprises multiple camera and illumination sources used for image acquisition and image processing. For image acquisition, geometric camera calibration is one of the essential steps. Camera parameters include intrinsic, extrinsic, and distortion coefficients.

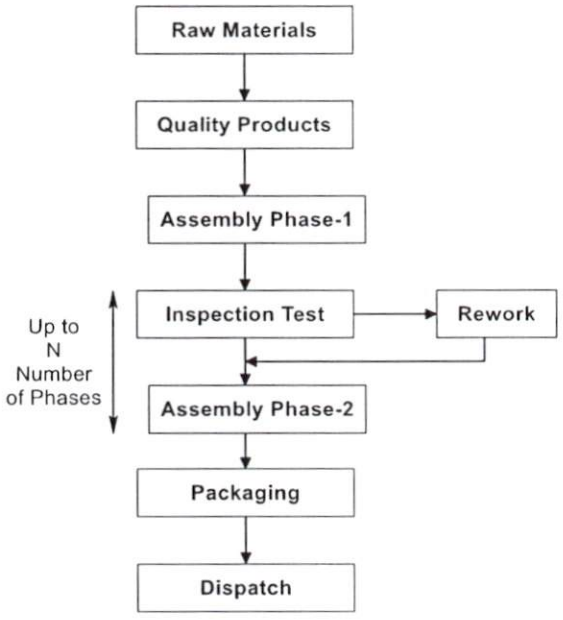

Figure 1. Flow of product in an assembly line

Pinhole camera model and lens distortion model of camera calibration is widely used [9, 10]. Machine vision-based can-end inspection system has been discussed by Chen et al. [11] and vision inspection system for beer bottle has been discussed by Duan et al. [12]. Feature extraction for fill level and bottle cap inspection in the bottling machine has been proposed by Yazdi et al. [13]. Vision-based liquid particle inspection of pharmaceutical injection has been proposed by Zhang et al. [14]. A vision-based system for empty bottle inspection has been reported by Huang et al. [15]. Saliency detection and

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IDEALS OF TRANSITIVE BE-ALGEBRAS

M. Bala Prabhakar, S. Kalesha Vali and M. Sambasiva Rao

Communicated by Ayman Badawi

MSC 2010 Classifications: Primary 03G25.

Keywords and phrases: BE-algebra, filter, ideal, semi-ideal, congruence, homomorphism.

Abstract. The notion of ideals is introduced in transitive BE-algebras. Some characterization theorems of ideals of transitive BE-algebras are derived. The notion of semi-ideals is introduced and studied a relationship between semi-ideals and ideals. Properties of ideals are studied with the help of homomorphisms and congruences.

1 Introduction

The concept of BE-algebras was introduced and extensively studied by H.S. Kim and Y.H. Kim in [6]. The class of BE-algebras was introduced as a generalization of the class of BCK-algebras of K. Iseki and S. Tanaka [5]. Some properties of filters of BE-algebras were studied by S.S. Ahn and Y.H. Kim in [1] and by B.L. Meng in [7]. In [10], A. Walendziak discussed some relationships between congruence relations and normal filters of a BE-algebra. In [9], P. Sun investigated homomorphism theorems via dual ideals of BCK-algebras.

In this work, the notion of ideals is introduced in transitive BE-algebras as a generalization of special type of down sets in many algebraic structures. Some necessary and sufficient conditions are derived for a non-empty subsets of BE-algebras to become ideals. The concepts of semi-ideals and strong semi-ideals are introduced and then some relations among these sets of ideals are studied. Some properties of ideals are derived in terms of homomorphisms and congruences.

2 Preliminaries

In this section, we present certain definitions and results which are taken mostly from the papers [1], [2], [3], [6], [7]and [8] for the ready reference.

Definition 2.1. [6] An algebra $(X, *, 1)$ of type $(2, 0)$ is called a BE-algebra if it satisfies the following properties:

(1) $x * x = 1$,
(2) $x * 1 = 1$,
(3) $1 * x = x$,
(4) $x * (y * z) = y * (x * z)$ for all $x, y, z \in X$.

A BE-algebra X is called *self-distributive* if $x * (y * z) = (x * y) * (x * z)$ for all $x, y, z \in X$. A BE-algebra X is called *transitive* if $y * z \leq (x * y) * (x * z)$ for all $x, y, z \in X$. Every self-distributive BE-algebra is transitive. A BE-algebra X is called *commutative* if $(x * y) * y = (y * x) * x$ for all $x, y \in X$. We introduce a relation $\leq$ on X by $x \leq y$ if and only if $x * y = 1$ for all $x, y \in X$. If X is commutative, then the relation $\leq$ is a partial ordering on X.

Theorem 2.2. [7] *Let X be a transitive BE-algebra and $x, y, z \in X$. Then*

(1) $1 \leq x$ *implies* $x = 1$,
(2) $y \leq z$ *implies* $x * y \leq x * z$.

Definition 2.3. [6] A non-empty subset F of a BE-algebra X is called a filter of X if, for all $x, y \in X$, it satisfies the following properties:

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Investigation of TIG Cladding of NiTi Wire on Substrate 304L to Study the Effect of Applied Current on Microstructure and Mechanical Properties

Pramod Kumar, Amar Nath Sinha, Chetan Kumar Hirwani, Akhilesh Kumar Singh, Piyush Kumar Pathak, M. Murugan & A. Saravanan

Transactions of the Indian Institute of Metals **74**, 1333–1348 (2021)

Abstract

NiTi wire of 1 mm diameter was deposited on austenitic stainless steel (304L) for surface property modification using the tungsten inert gas (TIG) cladding process. The study shows that the microstructure and mechanical properties of the NiTi cladding are governed by TIG process parameters, namely TIG current. The micro-hardness of the NiTi clad region has improved 4.7 times compared to the substrate material 304L. The wear resistance of the clad layer against the abrasive disc (Al_2O_3) shows up to 6 times improvement than the substrate material austenitic stainless steel 304L. The presence of Ti-rich (Ni,Fe)Ti, NiTiFeCr and intermetallics, responsible for high hardness and high wear resistance, has

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Investigation on the mitigation of environmental harmful emissions by incorporating nanoparticles to biofuel water nano emulsion in low heat rejection engine

P.V Elumalai, C Sivakandhan, M Parthasarathy, S Mohamed Iqbal & M Arunkumar

Heat and Mass Transfer **57**, 1235–1250 (2021)

Abstract

The quantity of energy consumers in the country is extensive in the current quick-moving situation; the whole car industry puts a significant part in energy utilization. Biofuels have lured consideration among other alternative fuels as indicated by their natural element and synthetic creation.In this test, the aluminum nanoparticles are prepared by three various proportions (50, 100 and 150 ppm) being used in the base engine. To introduced thermal

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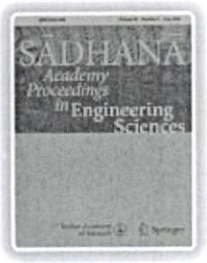

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Study of microstructure and mechanical properties of NiTi wire cladding on super austenitic stainless steel 904L by TIG cladding process

Pramod Kumar, Amar Nath Sinha, A Saravanan, M Murugan & Chetan Kumar Hirwani

Sādhanā **46**, Article number: 91 (2021)

Abstract

NiTi wire coating was preplaced on super austenitic stainless steel (904L) for enhancing the surface mechanical property. Melting of NiTi wire of 1 mm diameter formed a clad track on the 904L stainless steel substrate using the TIG cladding process. The influence of TIG current on microstructure, phase formation, micro-hardness and abrasive wear resistance characteristics of the clad surface have been investigated. The maximum average micro-hardness of the NiTi clad layer was 952HV at current of 40 A which is 5.95 times greater than the substrate material 904L. The EDS and XRD study of the NiTi coating layer confirmed the formation of NiTi, NiTi2, and B2 (NiTiFeCr) structure as major constituent phases and some intermetallic (Cr-Fe-

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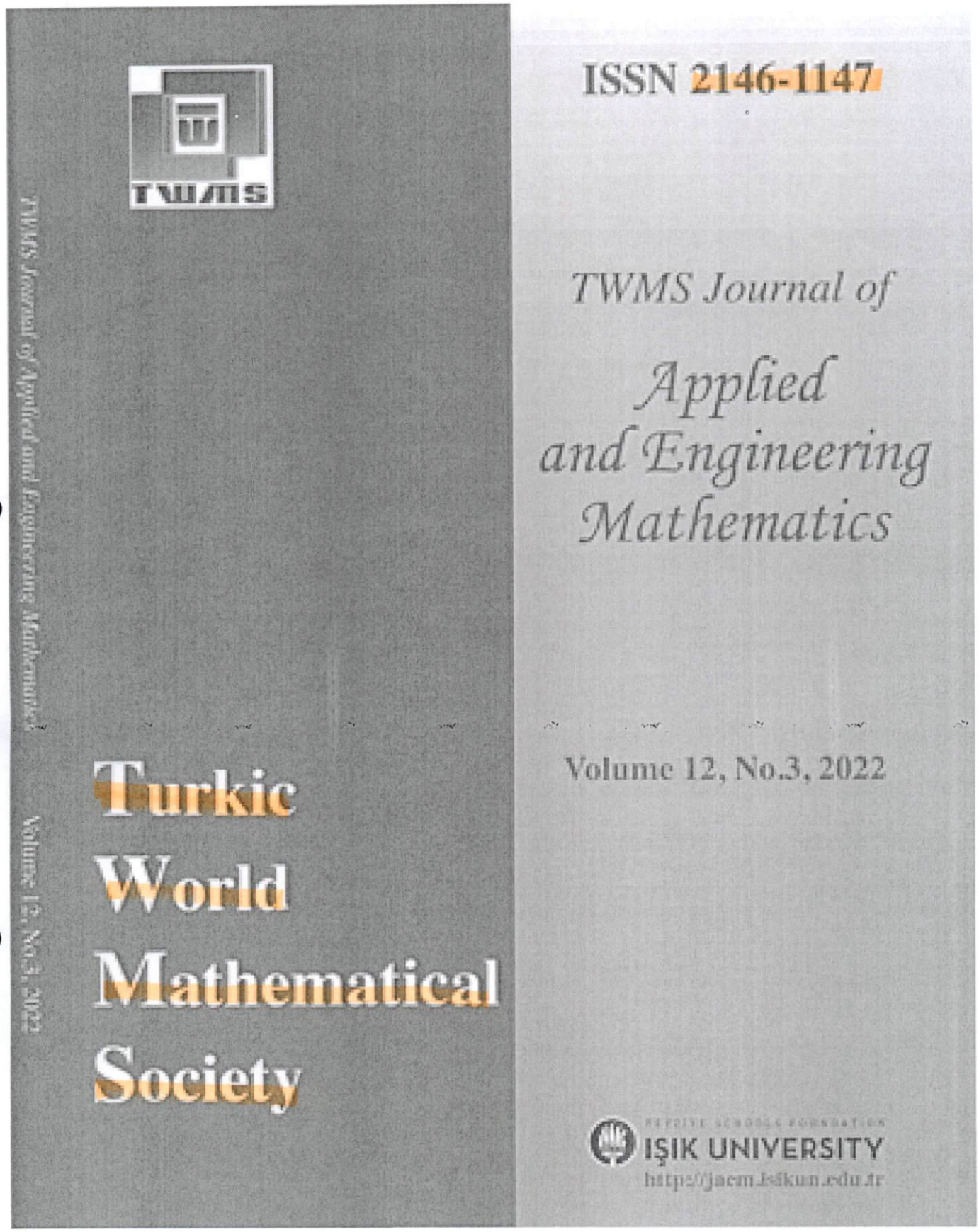

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TWMS J. App. and Eng. Math. V.11, N.4, 2021, pp. 1023-1035

REGULAR FILTERS OF COMMUTATIVE BE-ALGEBRAS

V. V. KUMAR[1], M. S. RAO[2], S. KALESHA VALI[3], §

Abstract. The concept of regular filters is introduced in commutative BE-algebras. The class of all regular filters of a commutative BE-algebra is characterized in terms of dual annihilators. Some equivalent conditions are derived for every filter of a commutative BE-algebra to become a regular filter. Some properties of prime regular filters of a commutative BE-algebra are investigated.

Keywords: Commutative BE-algebra; regular filter; minimal prime filter; prime regular filter.

AMS Subject Classification: 03G25.

1. Introduction

Y. Imai and K. Iséki introduced two classes of abstract algebras: BCK-algebras and BCI-algebras [8]. It is known that the class of BCK-algebras is a proper subclass of the class of BCI-algebras. In [5, 6] Q. P. Hu and X. Li introduced a wide class of abstract algebras: BCH-algebras. They have shown that the class of BCI-algebras is a proper subclass of the class of BCH-algebras. J. Neggers and H. S. Kim [12] introduced the notion of a d-algebra which is a generalization of BCK-algebras, and also they introduced the notion of a B-algebra [13, 14], i.e., (I) $x*x = 0$; (II) $x*0 = x$; (III) $(x*y)*z = x*(z*(0*y))$, for any $x, y, z \in X$, which is equivalent in some sense to the groups. Moreover, Y.B. Jun, E.H. Roh and H.S. Kim [9] introduced a new notion, called an BH-algebra, which is another generalization of $BCH/BCI/BCK$-algebras, i.e., (I); (II) and (IV) $x * y = 0$ and $y * x = 0$ imply $x = y$ for any $x, y \in X$.

The notion of BE-algebras was introduced and extensively studied by H.S. Kim and Y.H. Kim in [10]. These classes of BE-algebras were introduced as a generalization of the class of BCK-algebras of K. Iseki and S. Tanaka [7]. Some properties of filters of

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Electrical, Optical, and Reliability Analysis of QD-Embedded Kesterite Solar Cell

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G. S. Sahoo ; S. Routray ; K. P. Pradhan ; G. P. Mishra All Authors

Abstract: Quantum engineering in kesterite solar cells reveals a blending advancement keeping in mind that copper–zinc–tin–sulfide (CZTS)-based material requires high-research impl... **View more**

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Abstract:

Quantum engineering in kesterite solar cells reveals a blending advancement keeping in mind that copper–zinc–tin–sulfide (CZTS)-based material requires high-research implementation as a replacement for CIGS materials. In this article, a quantum-dot-embedded kesterite solar cell is proposed, in which $CZTS_xSe1-_x$ and CZTS are taken as dot and barrier, respectively, with different sulfur (S) and selenium (Se) content. Focus is given on the incorporation of quantum dots (QDs) and a detailed investigation is carried out through optical and electrical performance, which shows the uniqueness of this study. Quantum efficiency of the solar cell with separate internal and external absorption is also investigated. Different issues on carrier propagation, recombination, and collection are emphasized to highlight the effect of carrier quantization in material. The reliability analysis of the solar cell is also a new scope to investigate the trap-assisted recombination. The detail analysis and remarkable efficiency may bring a new path for next-generation solar cells.

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Contents

Energy from the Sun has been the most inspiring alternative solution to settle the ever-increasing demand of the world's energy requirements and establish a clean and green source of energy for future [1]. Currently, photovoltaic (PV) market analysis shows positive developments in the production of diverse technology and materials around the world. On the other hand, further enhancement of efficiency and high cost are the shortcomings of crystalline silicon (c-Si) solar cells, which brings a new scope to investigate on new materials to promote low-cost and high-efficiency PV technology [2]. Kesterite copper–zinc–tin–sulfide (CZTS) crystal is a new material having extensive potential to harvest energy from sunlight [3]. The kesterite-type CZTS is a derivative of two indium cations in the tetragonal unit cell of a chalcopyrite-type lattice, which are substituted for two tin cations, while the other two indium cations are substituted for two zinc cations [3]. It has a kesterite symmetrical structure with excellent optical parameters, electrical properties, and tunable bandgap from 1 to 1.5 eV. In addition, high absorption coefficient makes the material able to achieve high external quantum efficiency (EQE) [3]. Although thin-film chalcogenide materials such as CIGS and CdTe have achieved remarkable efficiency of 23% and 22.1%, respectively, being an earth-abundant material, kesterite solar cells also have tremendous potential to achieve high efficiency [4]. The use of materials such as indium, gallium, and tellurium in CIGS and CdTe is classified in critical raw materials [5]. Currently, CZTSSe with 12.6% and CZTS with 11% are recorded as highest efficiency separately [5]. In addition,

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Research Article

Micro-electrochemical jet machining of large area microtexturing with tool movement strategy

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ABSTRACT

Microtextured surfaces, particularly circular micropattern, significantly enhance the function and performance of microfabricated devices and engineering parts. A distinctive and inventive concept of maskless microelectrochemical jet machining (EJM) is utilized for producing the microcircular pattern over large area. In this research work, an advanced concept, i.e. maskless micro-EJM is presented to produce the microtextures on large area using the reusable masked tool movement strategy on stainless steel. One masked patterned tool can fabricate many high-quality

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Research Article

Micro-electrochemical jet machining of large area microtexturing with tool movement strategy

S. Kunar

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ABSTRACT

Microtextured surfaces, particularly circular micropattern, significantly enhance the function and performance of microfabricated devices and engineering parts. A distinctive and inventive concept of maskless microelectrochemical jet machining (EJM) is utilized for producing the microcircular pattern over large area. In this research work, an advanced concept, i.e. maskless micro-EJM is presented to produce the microtextures on large area using the reusable masked tool movement strategy on stainless steel. One masked patterned tool can fabricate many high-quality micropatterned samples over large area using the tool movement strategy.

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Original research article

Thermo-mechanical analysis of laser welding of Grade 91 steel plates

M. Zubairuddin [a], R. Ravi kumar [b], P.K. Chaursaia [b], Baharin Ali [c]

[a] Aditya Engineering College, Surampalem 533437, India
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https://doi.org/10.1016/j.ijleo.2021.167510

Abstract

Generation of residual stresses and distortion in weld component is a major concern in Grade 91 steel thin plates. In the present study, FEM based Laser welding analysis of Grade 91 steel is carried out for 3 thick plates using SYSWELD software. Heat input optimization has been carried out by bead-on-plate welding at different heat input. Optimized heat input with full depth of penetration is used for a square butt joint of Grade 91 steel laser welding. Experimentally measured residual stresses using X-ray diffraction technique are compared with predicted results. Residual stresses comparison shows that due to phase transformation effect the peak tensile stress values are observed next to heat affected zone. The predicted distortion in longitudinal and transverse directions is validated with experimental results.

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Automated Computer Aided Diagnosis Using Altered Multi-Phase Level Sets in Application to Categorize the Breast Cancer Biopsy Images

Rajyalakshmi Uppada ✉ ... asad Kodati & Sanagapallela Koteswara Rao

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As macroscopic Breast Cancer (BC) imaging diagnostics do not provide satisfied data, microscopic image analysis is used to get optimum cell-nuclei segmentation for image categorization. The paper presents a Novel Hybrid Segmentation Method which uses the energy detail coefficients attained from Non-Subsampled Contourlet Transform for cell-nuclei segmentation of BC histopathological images. NHSM solves the local

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Automated Computer Aided Diagnosis Using Altered Multi-Phase Level Sets in Application to Categorize the Breast Cancer Biopsy Images

Rajyalakshmi Uppada, Satya Prasad Kodati & Sanagapallela Koteswara Rao

Published online: 22 Aug 2021

Download citation https://doi.org/10.1080/03772063.2021.1962741

Abstract

As macroscopic Breast Cancer (BC) imaging diagnostics do not provide satisfied data, microscopic image analysis is used to get optimum cell-nuclei segmentation for image categorization. The paper presents a Novel Hybrid Segmentation Method which uses the energy detail coefficients attained from Non-Subsampled Contourlet Transform for cell-nuclei segmentation of BC histopathological images. NHSM solves the local inhomogeneities problem while preserving all necessary details. The

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https://doi.org/10.1007/s12652-021-02986-4

ORIGINAL RESEARCH

An integrated converter topology for torque ripple minimization in BLDC motor using an ITSA technique

Bapayya Naidu Kommula[1] · Venkata Reddy Kota[2]

Received: 27 August 2020 / Accepted: 27 February 2021 / Published online: 11 March 2021

Abstract
This paper proposed an enhanced DC–DC converter structure with hybrid control algorithm to diminish the torque ripple of a Brushless DC (BLDC) motor. Initially, the modeling of BLDC motor is designed with enhanced Cuk converter. Here, the operation and executions of Cuk converter is enhanced with the utilization of switched inductor. At that point, the control mechanism incorporates two controlling loops like speed and torque control loop are used to enhance the BLDC performance. So as to enhance the control loop operation, the Improved Tunicate Swarm optimization algorithm (ITSA) is presented. In this paper, the ITSA algorithm is explored to control the speed and torque error from BLDC motor. Here, the TSA search behavior is improved with crossover and mutation operator. In this paper, the output of proposed strategy is subjected with input of speed and torque controllers. Based on that, the best optimal gain parameters are resolved to upgrade the controller operation with the help of the required objective functions. The proposed controller is performed on the MATLAB/Simulink platform and the torque ripple minimization performance is compared with other existing systems like Particle Swarm Optimization algorithm and Bacterial Foraging algorithm.

Keywords Enhanced DC–DC converter · Speed control loop and torque control loop · Brush less DC · Torque ripple · Switched inductor

1 Introduction

The DC–DC converter has high capability based on speed driving structures, current and future timings are generally unpredictable. The BLDC motor is used as part of the zones of aeronautics, vehicle equipment and family machinery because of its minimal size, high power density, simple control and operation (Xia et al. 2014; Milivojevic et al. 2012; Huang et al. 2012a, b; Singh and Singh 2012) is considered to be the ideal choice for these parameters. BLDC motors consist of two classes. They are surface mounted permanent magnet BLDC motors and interior permanent-magnet BLDC motors (Faiz et al. 2017; Kommula and Kota 2018).

Normally, the Permanent magnet synchronous motors, is utilized as the drives of servo systems (Aghili 2011; Kommula and Kota 2019) which is otherwise called BLDC motor. A rotor has series of permanent magnets that are made of BLDC motors and the armature is static while the electronic control commutation system is used to circulate the electric power, rather than a mechanical commutator utilizing brushes. Unlike the mechanical commutator found in BLDC motors, a feedback as rotor-position into a control system is consolidated by BLDCs to accomplish commutation electronically. For smooth motor operation, regular BLDC motors drivers deliver with sinusoidal current waveforms. A sinusoidal commutation may bring about torque ripple due to the absence of a defective sinusoidal distributed magneto-motive force (Kommula and Kota 2016; 6; Kommula and Kota 2019). Generally framework execution can be improved by decreasing the speed fluctuations (Sung Jun Park et al. 2000; Aghiliet al. 2003) which has been exhibited by covering the motor drive's torque ripple of a servo system. By improving the machine plan, for instance, business superior electric motors diminish the pulsating torque expanding the quantity of the motor poles. Due to the

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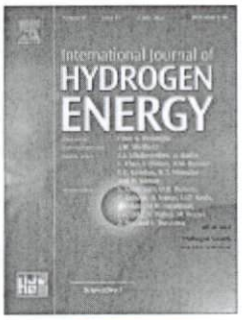

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Role of hydrogen in improving performance and emission characteristics of homogeneous charge compression ignition engine fueled with graphite oxide nanoparticle-added microalgae biodiesel/diesel blends

Parthasarathy Murugesan [a], Anh Tuan Hoang [b], Elumalai Perumal Venkatesan [c], Dash Santosh Kumar [c], Dhinesh Balasubramanian [d, e, f], Anh Tuan Le [g], Van Viet Pham [h]

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Highlights

- Dropped harmful emission by combination of GO and H_2-enriched ES20D80 in HCCI mode.
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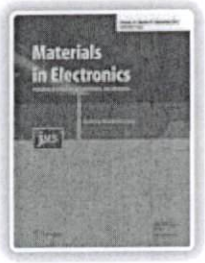

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Published: 20 October 2021

Preparation of sulfur doped TiO_2 nanoparticles from rutile sand and their performance testing in hybrid solar cells

S. Arunmetha ✉, N. R. Dhineshbabu, Atul Kumar & R. Jayavel

Journal of Materials Science: Materials in Electronics
32, 28382–28393 (2021)

Abstract

A new method was adopted to prepare sulfur contained TiO_2 nanoparticles extracted from rutile sand by chemical extraction process. The main aim of this work was to reduce the complexity of synthesis processes using a facile, scalable, and economic approach. The advantage of using sulfur dopant in the prepared sample was characterized and compared with the pure TiO_2 nanoparticles. The widespread characterization studies revealed that S–TiO_2 possesses 15–20 nm crystallite size and a spherical morphology with 95 $m^2 g^{-1}$ surface area. S–TiO_2 showed improved optical absorption shifted from the UV to visible region compared to pure TiO_2, thereby increasing photogenerated electrons and holes. The S–TiO_2 nanoparticles were applied to the hybrid solar cells active layer and the conversion efficiency was increased from 0.62 to

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N. R. Dhineshbabu

Centre for Nanoscience and Technology, Anna University, Chennai, 600025, India

R. Jayavel

Contributions

RJ planned and supervised the research work with necessary study materials; SA, the main author, carried out the experiments and investigations. NRD and AK conceived the methodology and reviewed the manuscript. All authors read and agreed to the final version of the manuscript.

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Material characterizations of *Moringa oleifera* gum (MOG)

R. Vettumperumal

N. R. Dhineshbabu

b Department of Electronics and Communication Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh, India

Pages 231-236 | Received 20 Jul 20

Abstract

The present study is focused on an inspection of the behavior of moringa oleifera gum. Attention paid to this material has increased the cultivation of the tree which plays a vital role to reduce global warming. Therefore, the authors make an effort to explore the properties of the material (structural, thermophysical, dielectric, and optical) of moringa oleifera gum (MOG) by X-ray diffraction method (XRD, field emission scanning electron microscope (FESEM), differential scanning calorimetry (DSC), impedance spectroscopy, Fourier transform infrared (FTIR) spectroscopy and ultra-violet (UV) visible spectroscopy methods. MOG shows a crystalline nature and its diffraction pattern is matched with the Ca_2SiO_4 crystalline structure. The existence of

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Articles

Material characterizations of *Moringa oleifera* gum (MOG)

R. Vettumperumal, N. R. Dhineshbabu & B. Karthikeyan

Pages 231-236 | Received 20 Jul 2021, Accepted 03 Oct 2021, Published online: 12 Oct 2021

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Abstract

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The present study is focused on an inspection of the behavior of moringa oleifera gum. Attention paid to this material has increased the cultivation of the tree which plays a vital role to reduce global warming. Therefore, the authors make an effort to explore the properties of the material (structural, thermophysical, dielectric, and optical) of moringa oleifera gum (MOG) by X-ray diffraction method (XRD, field emission scanning electron microscope (FESEM), differential scanning calorimetry (DSC), impedance spectroscopy, Fourier transform infrared (FTIR) spectroscopy and ultra-violet (UV) visible spectroscopy methods. MOG shows a crystalline nature and its diffraction pattern is matched with the Ca_2SiO_4 crystalline structure. The existence of the Ca_2SiO_4 structure is confirmed by elemental composition analysis and FTIR spectroscopy data. The melting point (55 °C) and specific heat capacity (65.43 J/g°C) of MOG are calculated from the DSC thermogram. At the low-frequency region, MOG exhibits conventional polar dielectric behavior with a high

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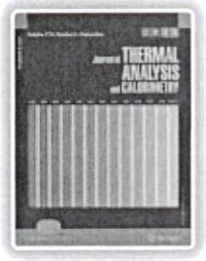

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Published: 26 February 2021

Effects of antioxidants to reduce the harmful pollutants from diesel engine using preheated palm oil–diesel blend

P. V. Elumalai, B. Dhinesh, J. Jayakar, M. Nambiraj & V. Hariharan

Journal of Thermal Analysis and Calorimetry **147**, 2439–2453 (2022)

Abstract

At present, IC engines are the primary power source in transit and must never be modified. The palm oil was collected from the palm tree and used in an internal combustion engine as an alternative fuel. In the present investigation, the palm oil is preheated to 110 °C using a heat exchanger to get a homogeneous mixture. The two additives, i.e., butylated hydroxytoluene (BHT) and *n*-butanol, were combined with preheated palm oil. The four fuels were prepared PN100, PND20, PND20 mixing with the 2000 ppm BHT of 1000 mL oil and other blends preheated PND20 palm oil mixing with the 2000 ppm *n*-butanol of 1000 mL oil. The blend 20 brake thermal efficiency was increased by 11.70% when compared with the mineral fuel, because the proper air–fuel mixture takes place. The oxides of nitrogen and smoke opacity were

Therm Anal Calorim. 2019;137:593–605. https://doi.org/10.1007/s10973-018-7948-6.

43. Zahir Hussain A, Santhoshkumar A, Ramanathan A. Assessment of pyrolysis waste engine oil as an alternative fuel source for diesel engine. J Therm Anal Calorim. 2020;1:1. https://doi.org/10.1007/s10973-020-09516-y.

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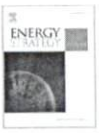
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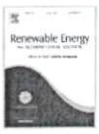
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Effect of injection timing in reducing the harmful pollutants emitted from CI engine using N-butanol antioxidant blended eco-friendly Mahua biodiesel

Elumalai P.V. [a], Parthasarathy M. [b], Joshua Stephen Chellakumar Isaac JoshuaRamesh Lalvani [c], Hassan Mehboob [d], Olusegun David Samuel [e, f], Christopher C. Enweremadu [f], C. Ahamed Saleel [g], Asif Afzal [h, i]

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Analysis of Electrical and Impedance Properties of the Group-I (Li, Na, K & Cs) Doped ZnO Nanorods

R. Vettumperumal, C. Maheswaran, J. Henry, K. Mohanraj & N. R. Dhineshbabu

Journal of Electronic Materials **50**, 7110–7118 (2021)

Abstract

ZnO and ZnO seed layers doped with group-I elements (Li, Na, K & Cs) were prepared by spin coating. Seed layer is used to prepare nanorods by hydrothermal method. Doped and undoped nanorods structural, surface morphology, and electrical conductivity properties are characterized by x-ray diffraction, field emission scanning electron microscopy (FESEM), and impedance spectroscopy. Undoped and doped ZnO nanorods show wurtzite structure without a secondary phase. Vertically aligned hexagonal-shaped nanorods are observed from FESEM and surface porosity is calculated. A single conduction process with a Debye relaxation peak is obtained in all the nanorods from impedance analysis. Electrical conductivity (σ_{ac}) measurement of undoped and doped ZnO nanorods follows Janscher's power law with high-frequency exponent values which leads to

Solid State Chem. 177, 207 (2004).

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Ethics declarations

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Research Article

Performance analysis of coal cleaning operations: Role of Probable Error in Separation and Organic Efficiency

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...ed online: 11 Nov 2021

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ABSTRACT

The Separation efficiency of coal cleaning equipment is typically assessed by Probable Error in Separation (E_p) and Organic Efficiency (E_{org}). The first one is determined based on the precise cut point density of separation and implies that for ideal separation the error is zero. The second one is calculated based on the yield of clean coal/middling at the target ash and implies that for ideal separation the efficiency is 100%. Plant

operators worldwide being accountable for the tonnage of the clean coal and middling produced regularly monitor E_{org} with some application in plant design in India. E_p is

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Performance analysis of coal cleaning operations: Role of Probable Error in Separation and Organic Efficiency

Subha Ranjan Paul & Sumantra Bhattacharya

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ABSTRACT

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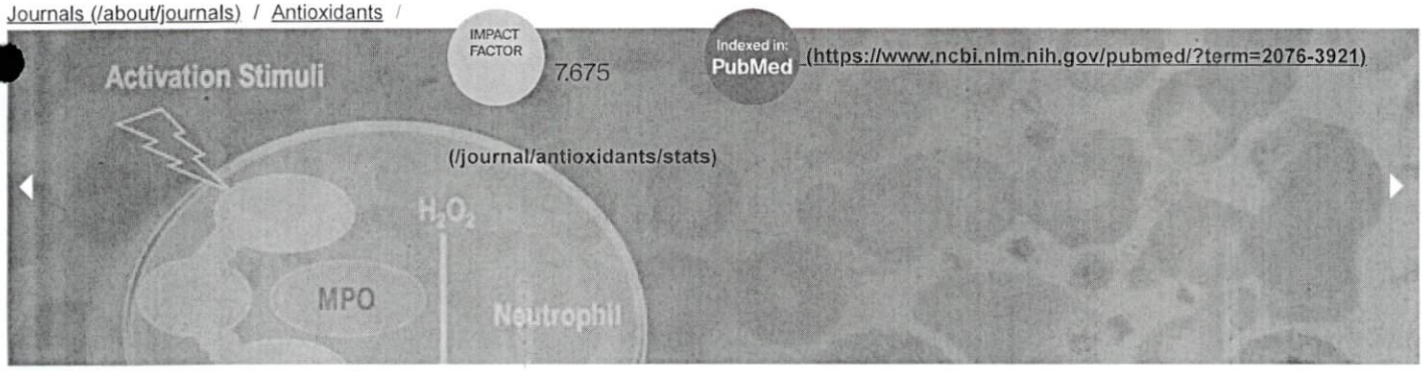
The Separation efficiency of coal cleaning equipment is typically assessed by Probable Error in Separation (E_p) and Organic Efficiency (E_{org}). The first one is determined based on the precise cut point density of separation and implies that for ideal separation the error is zero. The second one is calculated based on the yield of clean coal/middling at the target ash and implies that for ideal separation the efficiency is 100%. Plant operators worldwide being accountable for the tonnage of the clean coal and middling produced regularly monitor E_{org} with some



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Abstract The antioxidant capacity (AC); amounts of tocopherols, sterols, and polycyclic aromatic hydrocarbons; oxidative parameters; fatty acid composition (FAC); and sensory quality of cold-pressed black cumin oils (CPBCOs) available on the Polish market were analyzed and compared. The AC levels of the CPBCO samples [...] Read more.

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Correlation Study of Antioxidant Activity with Phenolic and Flavonoid Compounds in 12 Indonesian Indigenous Herbs

Yeni Maulidah Muflihah [1,2], Ganesh Gollavelli [3] and Yong-Chien Ling [1,*]

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Abstract: The antioxidant activity (AA), total phenolic content (TPC), and total flavonoid content (TFC) of selected Indonesian *Zingiberaceae* herbs were determined. An optimization extraction procedure was conducted by using Taguchi L_{16} orthogonal array. Four chemical assays were applied, including 2,2-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity assay, H_2O_2 scavenging activity assay, Folin–Ciocalteau (F–C) assay, and $NaNO_2$-$AlCl_3$-NaOH assay, which revealed remarkable differences in AA, TPC, and TFC. The result indicated the diversity of AA composition among the herbs, and *C. longa* exhibited the highest AA. HPLC-PAD analysis revealed that curcumin was present in five high antioxidant herbs, and the highest amount was in *C. longa*. Pearson correlation analysis indicated that the identified TPC and TFC were significant contributors to AA, and curcumin was likely the main contributing antioxidant compound. Our approach concluded that *C. longa* is the greatest source of natural antioxidants among 12 Indonesian indigenous *Zingiberaceae* herbs. The use of a mixed-method approach to augment the findings of solitary methods might facilitate future researchers to uncover deeper and hidden meanings.

Keywords: antioxidant activity; correlation analysis; flavonoid; Indonesian herbs; phenolic; mixed-method

Citation: Muflihah, Y.M.; Gollavelli, G.; Ling, Y.-C. Correlation Study of Antioxidant Activity with Phenolic and Flavonoid Compounds in 12 Indonesian Indigenous Herbs. *Antioxidants* **2021**, *10*, 1530. https://doi.org/10.3390/antiox10101530

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1. Introduction

The antioxidants are generally known as natural or synthetic compounds which avoid or prolong the damage of cells in the presence of reactive oxygen by opposing the oxidation process or inhibiting the reaction promoted by oxide or peroxide species, mostly known as free radical oxygen species [1]. The free radicals generated during cell metabolism will be deactivated and stabilized by the antioxidants before and after attacking the targets in the biological system [2]. Effective antioxidants break down the radical chain reaction and act as radical scavengers [1,3]. Antioxidants therefore play a predominant role as stabilizers to maintain biological functions without fail.

Antioxidants are from either natural or synthetic source. Natural plant extracts are usually rich in antioxidants, which are good sources for food additives, medicine, and cosmetics purposes [4]. In food, antioxidants are needed to prevent food deterioration during storage or processing and maintain the food quality of freshness, nutrients, texture, aroma, and functionality [5]. Antioxidants are present in food itself or by external addition. In medicinal use, antioxidant activity is generally due to their ability to exhibit radical scavenging capacities. The phytochemicals such as phenolics, flavonoids, anthocyanins, carotenoids, ascorbic acids, terpenoids, tannins, and tocopherols in medicinal plants are known for preventing and curing disease [6]. In cosmetics, the effective use of topical antioxidants to improve the protection system of endogenous cutaneous is well known [7].

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Diminishing Energy Consumption Cost and Optimal Energy Management of Photovoltaic Aided Electric Vehicle (PV-EV) By GFO-VITG Approach

...jin, Dr. Balapanur Mouli Chandra &

Mr. Bapayya Naidu Kommula

d Department of Electrical and Electronics Engineering, Aditya Engineering College(A), Andhra Pradesh, India

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...d online: 21 Oct 2021

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ABSTRACT

This paper proposes a hybrid GFO-VITG approach for the energy management system (EMS) of the photovoltaic (PV) aided electric vehicle (EV). The proposed system is the combination of Ground water flow optimization (GFO) and Vascular Invasive Tumor Growth optimization algorithm (VITG), and hence, it is known as the GFO-VITG method. The main aim of this paper is optimal energy management for

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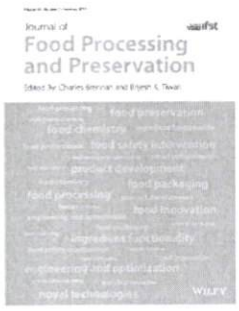

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ORIGINAL ARTICLE

Functional, thermal, pasting, and rheological properties of gluten-free maize composite flour: Effect of moth bean flour and hydrocolloid addition

Sai Krishna Vedantam, Jhansi Lakshmi Sagili, Praveen Kumar Dikkala, Kandi Sridhar

First published: 25 Oct

Jhansi Lakshmi Sagili
Department of Agricultural Engineering, Aditya Engineering College, Surampalem, India
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Abstract

Celiac disease is triggered by the consumption of gluten-rich foods that has emerged as a major global health problem. In fact, it is now important to look for an alternate and cheap source to develop a gluten-free diet using alternative ingredients. Therefore, the aim of the study was to evaluate the effect of moth bean flour and xanthan gum addition on the functional, thermal, pasting, and rheological properties of gluten-free maize dough. The results showed that the addition of moth bean and xanthan gum increased the functional (e.g., water absorption capacity of 1.89–2.52 g/g) and thermal (e.g., gelatinization onset temperature [T_o: 68.55–70.55°C] and enthalpy [ΔH: 1.66–2.89 J/g]) properties, while pasting properties varied. All formulations showed more solid-elastic than viscous behavior ($G' > G''$) with $\tan\delta < 1$. Thus, the study concluded that the addition of protein source and hydrocolloid to maize flour can be a potential alternative to

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Preparation of freestanding films from SWCNT/PANI nanocomposites using different blending techniques and characterization of their EMI shielding effectiveness in X-band

Sundaramoorthy, V. S. Padmapriya &

Dhineshbabu Nattanmai Raman

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Abstract

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Preparation of freestanding films from SWCNT/PANI nanocomposites using different blending techniques and characterization of their EMI shielding effectiveness in X-band

O. V. P. R. Siva Kumar, **Arunmetha Sundaramoorthy**, V. S. Padmapriya & Dhineshbabu Nattanmai Raman

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Abstract

Synthetic polyvinyl alcohol (PVA) was used as a matrix, and polyaniline/SWCNT (PS) was used as a filler in the composite to create thin films for electromagnetic interference (EMI) shielding. The blending methods, namely mechanical stirring and ultrasonication, were used to produce composites (commercially available

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July 2021

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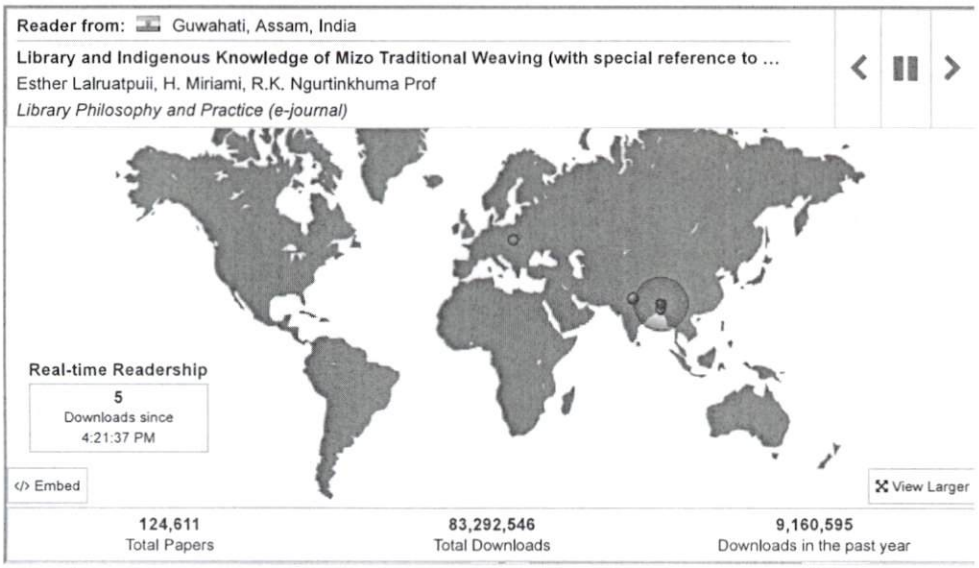

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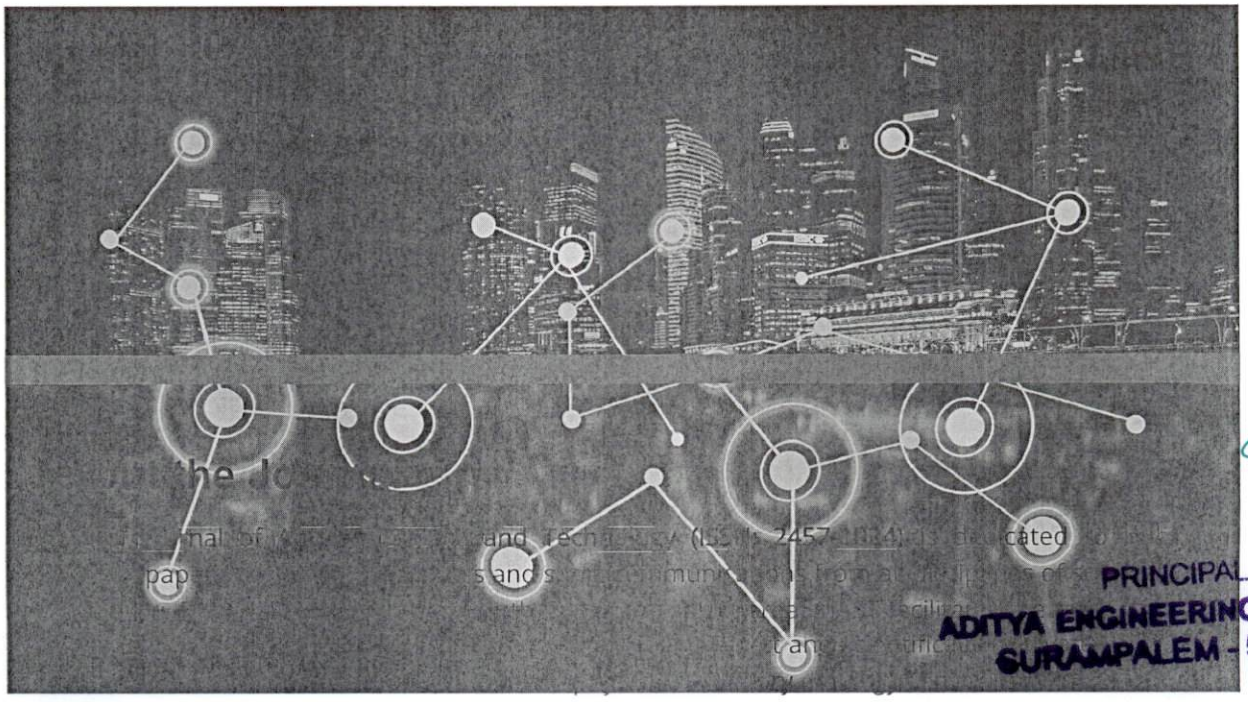

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Effect of Different Mulching Materials on Yield and Growth Parameters of Tomato Crop

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[2]Department of Agricultural Engineering, Vikas college of Engineering and Technology, Nunna-521212, Vijayawada, Andhra Pradesh, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

The present investigation was carried out to study the performance of yield and growth parameters of tomato crop under different mulching materials. This experiment was conducted at Vikas College of Engineering and Technology, Nunna, Vijayawada during the period from Jan 2020 to April 2020. The experimental field has an area of 180 m^2 (15m × 12m) and divided into 4 plots i.e., Drip with plastic mulch (A), Drip with live mulch (coconut coir) (S), Drip without mulch (M) and Control (without mulch and without drip) (K). Growth parameters like plant height, number of leaves per plant, soil parameters like bulk density, soil temperature, soil moisture and yield were observed for each treatment. Crop water requirement was calculated using CROPWAT 8.0. The results showed that the bulk density has no effect between the treatment plots. The soil moisture in initial stage is more in K and least in S; in flowering stage, M was high and least in K and in harvesting stage, it is high in A. The soil temperature was high in K and least in A. The readings of number of leaves was observed high in A and least in K. It was observed that highest yield was obtained in A and least in K. The weed control efficiency was found to be highest in A (57%) followed by S (41.3%) and weed control efficiency was lowest in M (22.8%).

Keywords: Mulch; crop water requirement; CROPWAT 8.0; weed control efficiency

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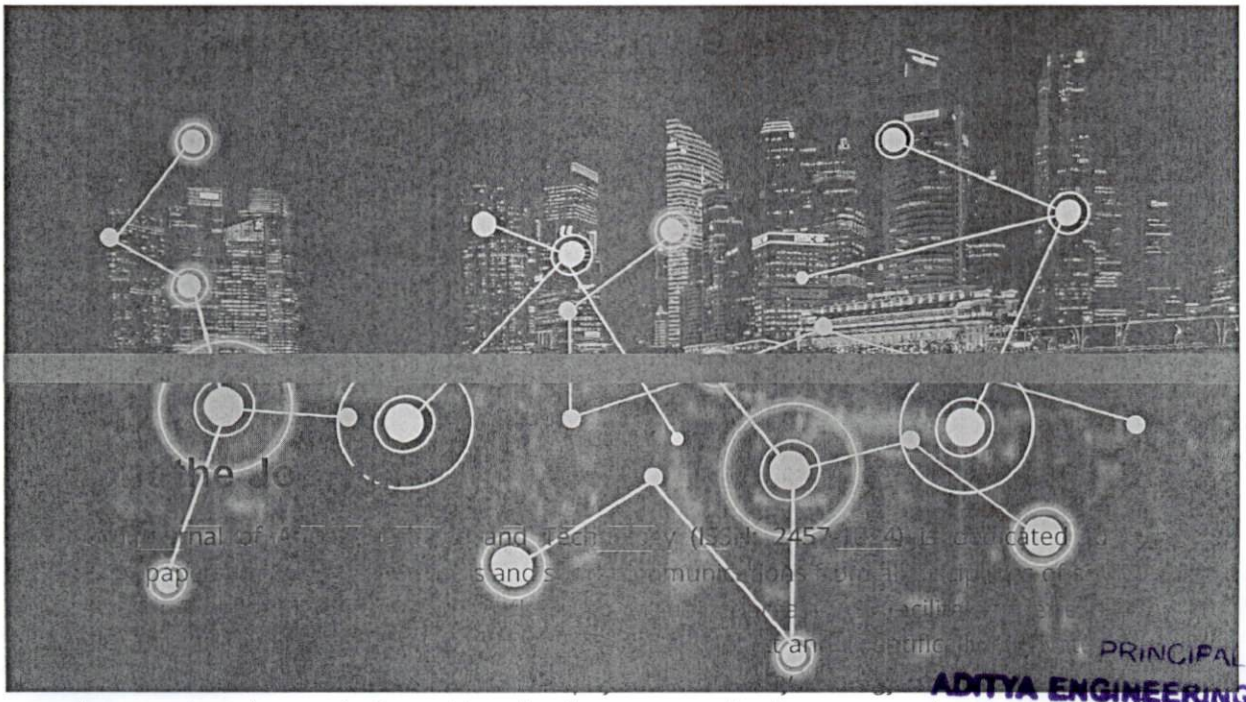

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Rehydration Characteristics of Mushrooms using Different Drying Techniques

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[2]Department of Agricultural Engineering, Aditya Engineering College, AP 533437, India.

Authors' contributions

This work was carried out in collaboration between both authors. Autho YV designed the study, performed the lab analysis, wrote the methodology, and wrote the first draft of the manuscript. Author NY managed the literature searches. Both authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Mushroom may be baked, fried, boiled, creamed, roasted, pickled and stuffed. In India, it is mainly consumed fresh and a negligible amount is used for processing. They can be processed as canned, dried and frozen mushrooms. The dried mushrooms are packed in hermetically sealed air tight tins for quality retention and stored in a cool dry place. The study's main objective is to know the effect of different drying methods on the quality of mushrooms and its dehydration, rehydration characteristics. Sun-drying and Cabinet tray drying methods were selected in the study. The rehydration ratio and coefficient of rehydration were calculated and compared for both the drying methods. An expert Committee did an Organoleptic evaluation. The results showed that cabinet tray dried mushrooms were reconstituted better compared to the sundried ones. The values of coefficient of rehydration and the rehydration ratio for cabinet dried mushrooms were found as 0.498 and 1:3.3 which were higher than sundried mushrooms. Cabinet tray dried mushrooms showed it's superiority in sensory assessment. The study concluded that mushrooms dehydrated by the cabinet tray drying have better rehydration characteristics than sun drying.

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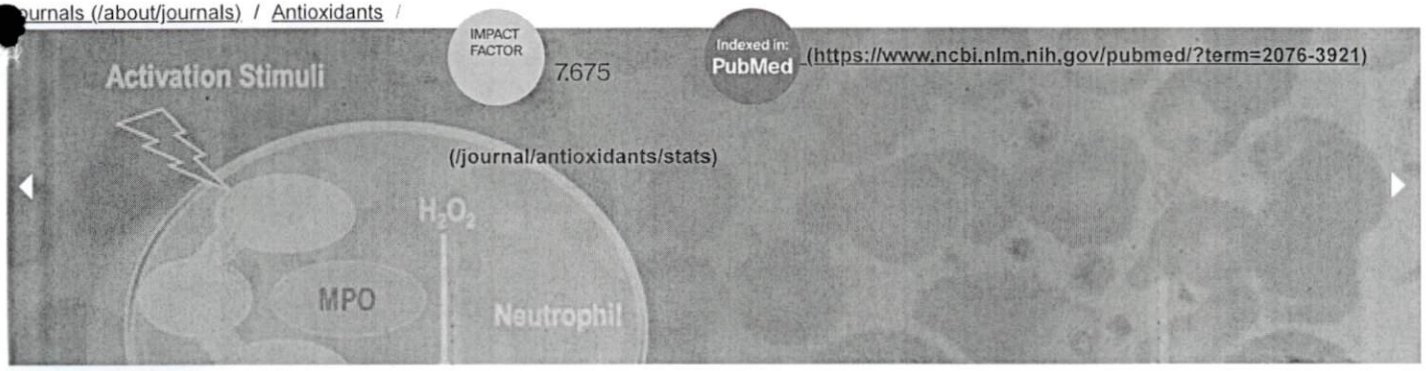

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by Aleksandra Szydlowska-Czerniak (https://sciprofiles.com/profile/1239531), Monika Momot (https://sciprofiles.com/profile/author/Sm1xMWVoamxNTG5CVXlPUGJjQWRlcTZRekoyT1puMHFrVk94ejFkSHRFND0=), Barbara Stawicka (https://sciprofiles.com/profile/2377621) and Dobrochna Rabiej-Kozioł (https://sciprofiles.com/profile/1282867)

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Abstract The antioxidant capacity (AC); amounts of tocopherols, sterols, and polycyclic aromatic hydrocarbons; oxidative parameters; fatty acid composition (FAC); and sensory quality of cold-pressed black cumin oils (CPBCOs) available on the Polish market were analyzed and compared. The AC levels of the CPBCO samples **[...] Read more.**

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Antioxidant Potential of Non-Extractable Fractions of Dried Persimmon (*Diospyros kaki* Thunb.) in Streptozotocin-Induced Diabetic Rats (/2076-3921/11/8/1555)

by Naoko Mochida (https://sciprofiles.com/profile/author/bElMQlk0RUxZLzE3Y1lYaUxnRXpKVE1sVXdsMUpQUE9LdlNzQUJ2Z1lyZz0=), Yoko Matsumura (https://sciprofiles.com/profile/2172824), Masahiro Kitabatake (https://sciprofiles.com/profile/author/akx1N01KK1hCZHdLMnh0SGZvaDU1bUhBU1VEUzluSDdZdU5lc2ozZEljRT0=), Toshihiro Ito (https://sciprofiles.com/profile/author/bHp1a3l1aXJxcm8rUHo5bmUxZGlrV1JJSHMyVVEvcy9TLzR4ZngyTHlPQT0=), Shin-ichi Kayano (https://sciprofiles.com/profile/397694) and Hiroe Kikuzaki (https://sciprofiles.com/profile/author/bGRXblJnMXlLY0dUeENZKzg0c1EwN3didlhoaGZ1SWxYUjA1T0F1Tk41OD0=)

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Ozone Pollution, Oxidative Stress, Regulatory T Cells and Antioxidants (/2076-3921/11/8/1553)

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Article

Correlation Study of Antioxidant Activity with Phenolic and Flavonoid Compounds in 12 Indonesian Indigenous Herbs

Yeni Maulidah Muflihah [1,2], Ganesh Gollavelli [3] and Yong-Chien Ling [1,*]

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Abstract: The antioxidant activity (AA), total phenolic content (TPC), and total flavonoid content (TFC) of selected Indonesian *Zingiberaceae* herbs were determined. An optimization extraction procedure was conducted by using Taguchi L_{16} orthogonal array. Four chemical assays were applied, including 2,2-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity assay, H_2O_2 scavenging activity assay, Folin–Ciocalteau (F–C) assay, and $NaNO_2$-$AlCl_3$-NaOH assay, which revealed remarkable differences in AA, TPC, and TFC. The result indicated the diversity of AA composition among the herbs, and *C. longa* exhibited the highest AA. HPLC-PAD analysis revealed that curcumin was present in five high antioxidant herbs, and the highest amount was in *C. longa*. Pearson correlation analysis indicated that the identified TPC and TFC were significant contributors to AA, and curcumin was likely the main contributing antioxidant compound. Our approach concluded that *C. longa* is the greatest source of natural antioxidants among 12 Indonesian indigenous *Zingiberaceae* herbs. The use of a mixed-method approach to augment the findings of solitary methods might facilitate future researchers to uncover deeper and hidden meanings.

Keywords: antioxidant activity; correlation analysis; flavonoid; Indonesian herbs; phenolic; mixed-method

Citation: Muflihah, Y.M.; Gollavelli, G.; Ling, Y.-C. Correlation Study of Antioxidant Activity with Phenolic and Flavonoid Compounds in 12 Indonesian Indigenous Herbs. *Antioxidants* **2021**, *10*, 1530. https://doi.org/10.3390/antiox10101530

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1. Introduction

The antioxidants are generally known as natural or synthetic compounds which avoid or prolong the damage of cells in the presence of reactive oxygen by opposing the oxidation process or inhibiting the reaction promoted by oxide or peroxide species, mostly known as free radical oxygen species [1]. The free radicals generated during cell metabolism will be deactivated and stabilized by the antioxidants before and after attacking the targets in the biological system [2]. Effective antioxidants break down the radical chain reaction and act as radical scavengers [1,3]. Antioxidants therefore play a predominant role as stabilizers to maintain biological functions without fail.

Antioxidants are from either natural or synthetic source. Natural plant extracts are usually rich in antioxidants, which are good sources for food additives, medicine, and cosmetics purposes [4]. In food, antioxidants are needed to prevent food deterioration during storage or processing and maintain the food quality of freshness, nutrients, texture, aroma, and functionality [5]. Antioxidants are present in food itself or by external addition. In medicinal use, antioxidant activity is generally due to their ability to exhibit radical scavenging capacities. The phytochemicals such as phenolics, flavonoids, anthocyanins, carotenoids, ascorbic acids, terpenoids, tannins, and tocopherols in medicinal plants are known for preventing and curing disease [6]. In cosmetics, the effective use of topical antioxidants to improve the protection system of endogenous cutaneous is well known [7].

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Iranian Journal of Materials Science and Engineering, Vol. 18, Number 3, September 2021
RESEARCH PAPER

Effect of Ultraviolet and Solar Radiation on Photocatalytic Dye (Black-E and Congo Red) Degradation Using Copper Oxide Nanostructure Particles

Usha Vengatakrishnan[1], Kalyanaraman Subramanian[1], Vettumperumal Rajapandi[2], Dhineshbabu Nattanmai Raman[3]
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DOI: 10.22068/ijmse.2145

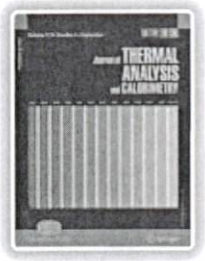
Abstract: *Copper oxide (CuO) nanostructure particles were prepared using KOH/NaOH catalyst by low cost precipitation method and characterized by powder X-ray diffraction (PXRD), scanning electron microscope (SEM) and energy dispersive X-ray spectra (EDX) analysis. The photocatalytic dye degradation study of pure CuO nanostructure particles are analysed against two azo dyes (Direct black 38 (Black-E) and Congo red) under ultraviolet (UV) and solar irradiation. The release of major active species (*OH) in the photocatalytic degradation by as prepared CuO nanostructure particles were investigated by photoluminescence (PL) spectra with two different excitation wavelength (325 and 355nm). The band gap of CuO nanostructure particles was calculated from diffuse reflectance spectra. The photocatalytic effect of CuO nanostructure particles is confirmed by the UV – Vis and photoluminescence spectra and from the kinetic studies under UV and solar radiations. The photocatalytic degradation results revealed that 16.35 and 7.5% of black E and Congo red dye was degraded under UV, while the degradation was 47.2 and 17.6% under solar light. The influence of pH on the photodegradation and change in the reaction temperature under solar irradiation were also investigated.*

Keywords: *copper oxide, precipitation method, photocatalytic activity, azo dyes, dyedegradation.*

1. INTRODUCTION

Nanotechnology is based on the smallest units of matter to process new material and devices towards superior scale performance on the basis of atomic scale range. Metal oxide nanoparticles are versatile materials with many scientific and industrial applications. [1] Copper oxide (CuO) is found to be a p-type semiconducting material with indirect bandgap of 1.2-1.51 eV and direct band gap of the order of 3.5 eV. [2, 3] It is also used in wide range of various applications like gas sensors [4], lithium ion batteries [5], solar cells [6], magnetic storage media [7], catalysis [8], field emission devices and semiconductors. CuO nanoparticles have been synthesised by many efficient approaches such as hydrothermal process [9], precipitation [10], microwave irradiation [11], co-precipitation [12], pyrolysis and thermal decomposition method [13], respectively. Among these, sol-gel method is energy efficient and less time-consuming process; however other processes are involved intricate synthesis process and energy intensive.

Nowadays, the water pollution is one of the major problems in the world. The continuous rise in the population with industrialization causes series number of hazardous organic contaminants disposed into natural water sources which are resistant to conventional chemical and biological treatments [14]. Several types of hazardous pollutants such as dyes, organic compounds, pharmaceuticals, heavy metals, agricultural chemicals and radioactive materials have been detected in the water sources. Among these, dyes are majorly used in different industries where it is estimated that nearly 15% of chemical dyes are directly disposed into the natural environment. Azo dyes are used in a diverse range of industries including paper, textile, food, additives, cosmetics, xerography, laser materials and laser printing industries [15]. Azo dyes are the largest group of synthetic dyes that are characterized by nitrogen to nitrogen double bonds (–N=N–). Therefore, sustainable approach in the waste water management includes novel and improved wastewater treatment technologies that are needed in order to reduce negative impacts on the water bodies. It is used to facilitate recycling and reuse of waste water. Some of the promising



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Experimental investigation for stability and surface properties of TiO_2 and Al_2O_3 water-based nanofluids

Pritam Kumar Das, Arnab Kumar Mallik, Altaf Hossain Molla, Apurba Kumar Santra, Ranjan Ganguly, Abhijit Saha, Sugam Kumar & V. K. Aswal

Journal of Thermal Analysis and Calorimetry **147**, 5617–5635 (2022)

Abstract

Nanofluids have gained recent attention because of their potential applications in diverse engineering fields like enhancing thermal transport, particle deposition, coating, surface patterning, etc. Stability of nanofluid is vital for their use in these industrial applications, although the pertinent database in the literature is often inadequate. Herein, we investigate the effect of surfactant concentration and particle solid volume fraction (φ) on stability of Ti- and Al-oxide nanoparticle suspensions that are stabilized with different surfactants. While TiO_2-AA, TiO_2-CTAB nanofluids are found to have appreciable stability, SDBS-stabilized Al_2O_3 nanofluid shows otherwise. TEM images provide the morphological characteristics of freshly prepared nanofluids, whereas the data of DLS and ZP are used to describe the nanofluid

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Sugam Kumar & V. K. Aswal

Contributions

PKD and AKM have carried out the experiments and data analysis and have contributed toward the manuscript preparation; AH, AS, SK and VKA have carried out the SANS measurements and analysis and data interpretation, AKS and RG have contributed towards planning and execution, manuscript preparation.

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Research Article | Published: 27 September 2021

Influence of anti-washout admixtures on the strength and microstructural characteristics of geopolymer concrete

Ramamohana Reddy Bellum

Journal of Building Pathology and Rehabilitation **6**, Article number: 35 (2021)

Abstract

Recent investigations proved that geopolymers produced with different industrial by-products have shown superior mechanical and microstructural performances compared to ordinary Portland cement (OPC) concrete. This study investigates the effectiveness of using different anti-washout admixtures (AWAs) to produce geopolymer concrete (GC) based underwater concrete (UWC). Two different AWAs were used in the present study i.e. Arabic gum (AG) and xanthan gum (XG). However, in the fabrication of GC two types of industrial by-products were used such as fly ash (FA) and ground granulated blast furnace slag (GGBFS). The influence of GC mixes in UWC was assessed in terms of workability, washout resistance, compressive strength, bleeding capacity and microstructural characteristics. The results indicate that among all GC samples, AG based

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The authors declare that they have no conflict of interest.

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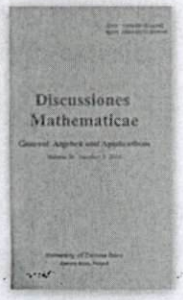

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QUASI-COMPLEMENTED *BE*-ALGEBRAS

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Abstract

The concept of O-filters is introduced in commutative BE-algebras. An equivalent condition is derived for every strong regular filter of a BE-algebra to become an O-filter. The concept of quasi-complemented BE-algebras is introduced and also characterized these classes of BE-algebras in terms of dual annihilators. The concept of strong regular filter is introduced and then quasi-complemented BE-algebras and strong BE-algebras are characterized in terms of strong regular filters and O-filters.

Keywords: commutative BE-algebra, O-filter, quasi-complemented BE-algebra, strong BE-algebra, strong regular filter.

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Thermo-hydraulic performance of a solar air heater with staggered C-shape finned absorber plate

A. Saravanan [a] ✉, M. Murugan [b], M. Sreenivasa Reddy [a], P.S. Ranjit [a], P.V. Elumalai [a], Pramod Kumar [b], S. Rama Sree [c]

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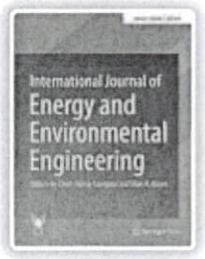
Highlights

- An experimental work is done with staggered C-shape fins placed on absorber plate of solar air heater.
- The effect of relevant geometric parameters is examined.
- Performance of C-shape finned absorber plate solar air heater with and without perforated has been investigated.
- The heat transfer for perforated finned absorber plate can be enhanced by 2.67 times than a smooth plate.

Abstract



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A multi-objective approach for renewable distributed generator unit's placement considering generation and load uncertainties

Kinjarapu Jayaram, Kollu Ravindra, K. R. K. V. Prasad & K. V. S. Ramachandra Murthy

International Journal of Energy and Environmental Engineering (2021)

Abstract

Penetration of Renewable distributed generation (RDG) units has increased in recent years due to increased environmental concerns and depleting fossil fuels. Deployment of RDG units will offer technical benefits such as loss minimization, bus voltage profile improvement, line loading reduction. Optimal allocation of RDG units is a challenging task as the generation is time-varying and uncertain in nature. In this work, optimal RDG allocation problem is formulated by considering time-varying and uncertain nature of generation and load demand using a Point estimate method (PEM)-based load flow with an objective to simultaneously minimize losses, improve voltage profile and reduce line loading. An efficient pareto front-based Multi-objective Backtracking search algorithm (PMBSA) is proposed in this work to

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K. R. K. V. Prasad & K. V. S. Ramachandra Murthy

Contributions

RK conceived the concept, framed the mathematical modeling and drafted the manuscript. KJ has done MATLAB programming, carried out data analysis to find PDF parameters and helped to formulate mathematical modeling. KRKVP checked the modeling, analyzed and substantiated the results, and helped in drafting the manuscript. KVSRM revised the manuscript and provided technical support.

Corresponding author

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A series-connected switched source and an H-bridge based multilevel inverter

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ABSTRACT

An inverter circuit is promoted in this paper, using series-connected switched dc sources along with an H-bridge circuit with optimized circuit elements like switching devices and diode clamped (DC) sources. This configuration uses DC supplies that can be strung together in series to create a significant voltage level. This topology consists of two parts, namely: 1) level production part and 2) polarity production part. The combination of some of the dc sources and switching devices completes the level production part. The H-bridge in the presented structure produces the polarity generation part. The DC-link capacitors are not needed in this design. There is a full presentation of the operating modes and modeling process of the proposed converter. Finally, in the MATLAB/SIMULINK setting the proposed topology is simulated and output current and voltage results have been examined.

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1. INTRODUCTION

Series-connected switched diode clamped-anode clamped (DC-AC) converters are highly flexible and modular in the family of multilevel inverters. In this group, "cascaded H-bridge (CHB)" converters 11]-[3] are the classical and traditional types. CHB converters have the advantages of equal voltage stress in symmetrical configurations, easy to add/remove the H-bridges to increase/decrease the number of output voltage levels. Multi-layer insulation (MLI) technology is spreading to several areas such as AC drives, static reactive compensators, micro-grid systems and renewable energy sources [4]-[6]. The "neutral point clamped (NPC)" or "diode clamped (DC)", "flying capacitor clamped (FCC)", and CHB converters [7]-[9] are established as standard topologies in the MLI family. In these configurations, the device count increases exponentially w.r.t the number of levels in the output voltage, the requirement of unequal voltage ratings of the clamping diodes, unequal capacitor size and a greater number of dc sources puts limitations on these topologies. Several new MLI configurations with the intention of avoiding the drawbacks in the standard topologies were proposed in the literature for several applications [10], [11]. In recent times, cascaded converters are attracting attention from industries as well as academia. Several such "voltage source inverters (VSIs)" were proposed in the literature [12]-[15] by employing several combinations of switches, DC power supplies. The converter has the advantages of reducing the number of components and reduced blocking voltage over the switching units to reduce the cost. In this configuration, the rest of the paper is arranged is being as: section 2 describes work and operating modes, section 3 presents the

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A single-phase simplified DC-AC converter using DC-link capacitors and an H-bridge

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DC-AC converter
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ABSTRACT

This paper introduces a simplified inverter circuit using a single dc source and an H-bridge with a least possible number of "switching devices". This topology does not employ multiple "dc sources", which enhances the reliability of the configuration. The topology consists of two parts, namely: "Level generation parts" as well as "Polarity generation parts", it is the mixture of some of the switching devices, DC-link capacitor and a single DC source completes the part of level generation. The H-bridge in the proposed structure produces the polarity generation part. A detailed explanation of the modulation system and operating modes of the proposed framework are discussed. Finally, in the MATLAB/SIMULINK platform, the projected network topology is simulated and the outcomes are presented.

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1. INTRODUCTION

Single-phase DC-AC converters are predominant in several industrial and household applications like lathe machines, centrifugal pumps, uninterrupted power supplies, etc. Multilevel single-phase DC-AC converters are highly attractive than two-level inverters due to the advantages of higher power rating, improved power quality and higher reliability. In this context, cascaded converters are highly flexible and modular in the family of multilevel inverters. In this group, "cascaded H-bridge (CHB)" converters [1]-[4] are the classical and traditional types. CHB converters have the advantages of equal voltage stress in symmetrical configurations, easy to add/remove the H-bridges to increase/decrease the voltage levels in the output. MLI technology is spreading to several areas such as AC drives, static reactive compensators, micro-grid systems and renewable energy sources [5]-[8]. The "Flying capacitors clamped (FCC)", "neutral point clamped (NPC)" and "CHB converters" [9]-[11] are established as normal topologies in the MLI family. In this configurations, the device count increases exponentially in reference to the increased in the voltage levels of output. The requirement of unequal voltage ratings of the clamping diodes, unequal capacitor size and a greater number of dc sources puts limitations on these topologies. Several new MLI configurations with the intention of avoiding the drawbacks in the standard topologies were proposed in the literature for several applications [12]-[16]. In recent times, cascaded converters are attracting attention from industries as well as

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An Efficient Covid19 Epidemic Analysis and Prediction Model Using Machine Learning Algorithms

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Keywords: Covid19, Kaggle, machine learning, Regression

ABSTRACT

The whole world is experiencing a novel infection called Coronavirus brought about by a Covid since 2019. The main concern about this disease is the absence of proficient authentic medicine The World Health Organization (WHO) proposed a few precautionary measures to manage the spread of illness and to lessen the defilement in this manner decreasing cases. In this paper, we analyzed the Coronavirus dataset accessible in Kaggle. The past contributions from a few researchers of comparative work covered a limited number of days. Our paper used the covid19 data till May 2021. The number of confirmed cases, recovered cases, and death cases are considered for analysis. The corona cases are analyzed in a daily, weekly manner to get insight into the dataset. After extensive analysis, we proposed machine learning regressors for covid 19 predictions. We applied linear regression, polynomial regression, Decision Tree Regressor, Random Forest Regressor. Decision Tree and Random Forest given an r-square value of 0.99. We also predicted future cases with these four algorithms. We can able to predict future cases better with the polynomial regression technique. This prediction can help to take preventive measures to control covid19 in near future. All the experiments are conducted with python language

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Original Paper | Published: 20 October 2021

Assessing the potential of xanthan gum to modify in-situ soil as baseliners for landfills

S. Anandha Kumar & E. R. Sujatha

International Journal of Environmental Science and Technology (2021)

Abstract

Bentonite clay is most commonly used as a landfill liner but is resource-intensive and suffers drawbacks like large volume change and desiccation cracking. It also poses construction difficulties and the handling of a large volume of material. In situ soil can be successfully modified into base liners for landfills which offers an economical and sustainable alternative to bentonite liners. In this study, an exocellular biopolymer, xanthan gum, is used to improve the in situ soil and provides a novel alternative liner material. A comparative study is also made by modifying the in situ soil with various percentage of bentonite. The results show that the maximum dry density of the in situ soil increased marginally for both the additives. Hydraulic conductivity decreased from 2.87×10^{-3} to 4.46×10^{-8} cm/s at 1% xanthan gum addition while in case of bentonite it reduces to

and evaluation of heavy metals removal from landfill leachate by pleurotus ostreatus. Waste Biomass Valoriz 9(3):503–511. https://doi.org/10.1007/s12649-017-0015-x

Wen K, Li Y, Huang W, Armwood C, Amini F, Li L (2019) Mechanical behaviors of hydrogel-impregnated sand. Constr Build Mater 207:174–180. https://doi.org/10.1016/j.conbuildmat.2019.02.141

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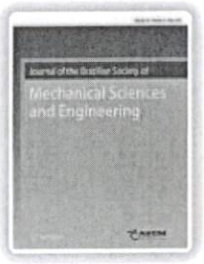

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TECHNICAL PAPER

Effect of welding current in TIG welding 304L steel on temperature distribution, microstructure and mechanical properties

Pramod Kumar[1,3] · Amar Nath Sinha[3] · Chetan Kumar Hirwani[3] · M. Murugan[1] · A. Saravanan[2] · Akhilesh Kumar Singh[1]

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Abstract

In the current research work, austenitic stainless steel 304L of 1.4-mm thin sheet has been butt welded using TIG welding process. The influence of welding current in TIG welding of 304L stainless steel on temperature distribution, microstructure and mechanical properties of the welded joint has been investigated. The microstructure and mechanical properties of TIG welded specimens at varying welding current (20–120A) and constant welding speed and voltage have been explored. The influence of welding current on the weld zone temperature variation was investigated. The microstructures of the FZ, HAZ and base metal have been studied and compared at varying welding current. The mechanical properties such as micro-hardness, bending stress and tensile strength of the welded joints at varying welding current have also been investigated. The phases of the FZ were also studied by XRD analysis. Tensile test of welded specimens and parent metal has been carried out for measuring UTS and percentage elongation. Surface morphology for the fractured samples during tensile test has also been examined.

Keywords Temperature distribution · 304L · Micro-hardness · Welding current · Microstructure · XRD

List of symbols

T	Temperature (K)
ρ	Density (kg/mm^3)
v	Welding speed (mm/s)
c	Specific heat (J/kg k)
k	Thermal conductivity (W/mm k)
Q_t	Heat generated per unit volume (J/mm^3)
T_0	Room temperature (303 K)
ε	Emissivity (0.6)
σ	Stefan-Boltzmann constant
h	Natural convection heat coefficient
q_f	Fraction of the heat deposited in the front quadrant
q_r	Fraction of the heat deposited in the rear quadrant
b_f	Front ellipsoid parameter
b_r	Rear ellipsoid parameter
a	Width of the profile
b	Depth of the profile

Abbreviations

HAZ	Heat-affected zone
FZ	Fusion zone
XRD	X-ray diffraction
FESEM	Field emission scanning electron microscope
UTS	Ultimate tensile strength
TIG	Tungsten inert gas
BCC	Body-centered cubic
CFD	Computational fluid dynamics
APDL	ANSYS parametric design language
GTAW	Gas tungsten arc welding
DCEN	Direct current electrode negative
SMAW	Shield metal arc welding
MAG	Metal active gas
EDX	Energy-dispersive X-ray
FEM	Finite element method
ASTM	American Society for Testing and Materials

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Evaluation of micro-structural and magnetic properties of nickel nano-ferrite and Mn^{2+} substituted nickel nano-ferrite

J. Suresh [a], B. Trinadh [a], B. Vikram Babu [b], P.V.S.S.S.N. Reddy [c], B. Sathish Mohan [d], A. Rama Krishna [e], K. Samatha [a]

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Highlights

- Mn^{2+} Substituted Nickel Nano-Ferrite is reported in this manuscript.
- Saturation magnetization and magnetic moment of the $NiFe_2O_4$ is lower than $Ni_{0.7}Mn_{0.3}Fe_2O_4$.
- Lattice parameter value and volume of unit cell rises with manganese substitution.
- Cation distribution indicates that the Ni^{2+} ions inhabit B-sites and Mn^{2+} ions dwell in tetrahedral A-spot and the Mn^{2+} ions swap Ni^{2+} from tetrahedral spot.

Abstract

The spinel ferrites have remarkable applications in electronic technology owing to their elevated saturation magnetization, steadiness, resistivity and little loss energy over a broad array of frequencies. The features with respect to structure and magnetism of manganese doped $NiFe_2O_4$ nano ferrite are extensively probed.

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Investigation into Machining Accuracy of Micro Circular Pattern Fabricated by Maskless Electrochemical Micromachining

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Abstract

Micro circular pattern defines the crucial performance of many micro-industrial components and micro-products. The dimensions, surface quality and location of micro circular pattern directly influence the product life. In maskless electrochemical micromachining (EMM), the maskless substrates are used for the manufacture of many impressions with insulated micro circular patterned tool. One textured tool produces more than twenty-three machined samples. This method is successfully utilized to produce multiple the dimple patterns because of its important benefits like stress and crack free surfaces, material independent of hardness, reusability of the tool and ability to cut the material irrespective of the hardness. The maskless EMM has some distinctive benefits i.e., less machining time and inexpensive. In this paper, the outcome of process variables i.e., electrolyte concentration and frequency on the machining accuracy and depth is investigated. Higher electrolyte concentration and lower pulsed frequency increase the overcut. The combination of lower electrolyte concentration and higher frequency is recommended for high machining accuracy.

Keywords: EMM, micro circular pattern, machining accuracy, overcut, depth

1. Introduction

Micropatterned surfaces characterize the advancement of micromachining technology for enhancing the performance of manufacturing components. These surfaces can change the thermal, tribological, etc. properties. Many reviewers have evaluated their theories on micro-texturing and microtextured techniques [1-2]. Various types of microscopic effect can be obtained by the different microscopic mechanisms. Surface microtextures retain the lubricating substances in micro-impression and act as lubricant reservoirs. These micro-textures reduce the shear stress in lubricated mating elements. Menezes et al. [3] shows the micro-features of micro-circular pattern used in many engineering fields and applied to the development of tribological properties of automobile components.

Various micro-texturing techniques i.e., abrasive jet machining, laser machining, electro-discharge machining, electrochemical machining, etc. are used for fabrication of different textures. Bao et al. [4], Rajurkar et al. [5] and Zhu et al. [6] presents that electrochemical machining is an advanced machining technique due to several benefits i.e., tool wear, free from residual stresses, cracks and burrs and inexpensive compared to other methods. Electrochemical machining method can dissolve the material by maskless or through-mask method. Natsu et al. [7] proposed the electrolyte jet machining for the generation of dimple pattern with 300μm in diameter. Nouraeiz et al. [8] presents the maskless EMM process in which the anode is kept near to the cathode for generation of my micropattern. Costa et al. [9] uses maskless electrochemical texturing method for generation of dimple arrays with diameter of 220μm. Byun et al. [10] proposes the micro- electrochemical machining technique for fabrication of micro-circular patterns with a tool electrode diameter of 275μm. But it takes more time for individual workpiece fabrication. Kunar et al. [11] fabricates surface structures in different phases to envisage the effect of EMM process variables on the dimple pattern. Thanigaivelan et al. [12] presents the effect of process inputs on overcut using electrochemical micromachining. Mahata et al. [13] uses through-mask electro-chemical micromachining to study the influence of duty ratio on other surface properties and overcut utilizing very thin mask. Kunar et al. [14] shows the impact of EMM process inputs on depth and overcut of dimple pattern have investigated.

The micro circular patterned surface is described by its various arithmetical properties i.e. shape, size, etc. All geometrical properties have lots of significance in tribological applications. Therefore, accurate micro-circular pattern generation is very important factor for the tribological purpose.

A novel method of maskless electrochemical micromachining technique, involving micropattern transfer without maskless workpieces, has been planned for the fabrication of micro-circular pattern with enhanced surface quality using developed electrochemical micromachining system, electrochemical micromachining cell with vertical cross flow system and EMM setup. One masked patterned tool can produce numerous micro-circular patterns. The purpose of the research paper is to explore the influence of process input, especially the influence of electrolyte concentration and pulse frequency on machining accuracy.

2. Experimental procedure

The developed setup consists of different sub-components i.e., pulsed power unit, electrolyte flow scheme, machining

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Micro-structural, dielectrical and magnetic properties of Cu^{2+} substituted $Ni_{0.7}Mn_{0.3-x}Cu_xFe_2O_4$ ($x = 0.0, 0.05, 0.1, 0.15$ and 0.2) nano-ferrites

J. Suresh [a], B. Trinadh [a], B. Vikram Babu [b], P.V.S.S.S.N. Reddy [c], A. Rama Krishna [d], B. Sathish Mohan [e], Ramu Yarra [c, f], K. Samatha [a]

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https://doi.org/10.1016/j.jmmm.2021.168464

Abstract

The nano-ferrites with chemical formula $Ni_{0.7}Mn_{0.3-x}Cu_xFe_2O_4$ having x between 0.0 and 0.2 were prepared by sol-gel auto-combustion process. The XRD pattern presents quite a good evidence for the formation of ferrite spinel phase in all the prepared samples. The broad lines indicate that the particles are of nano-size. The SEM studies reveal about the uniformity and crystallinity of the materials and also the spherical shape of the grains. Rise in copper density leads to fall in dielectric constant (ε_r) due to the relocation of Fe^{3+} from B-position to A-position. The dielectric loss (tan δ) maxima location swings towards the lower frequency as composition of dopant rises. The saturation magnetization and net magnetic moment decline with rise in Cu composition. The ESR technique ropes the subsistence of non collinear magnetic structure as predicted by VSM measurements.

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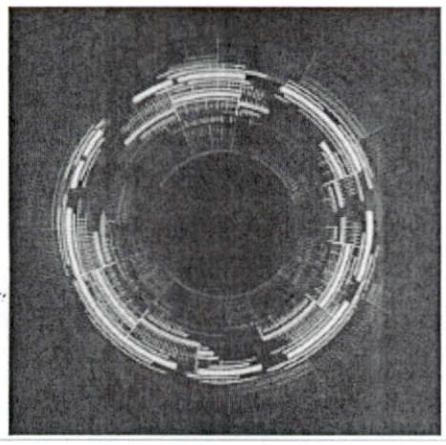

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Rama Reddy *et al. EURASIP Journal on Information Security* (2021) 2021:7
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RESEARCH Open Access

Proposing a reliable method of securing and verifying the credentials of graduates through blockchain

T. Rama Reddy[1*], P. V. G. D. Prasad Reddy[2], Rayudu Srinivas[1], Ch. V. Raghavendran[3], R. V. S. Lalitha[3] and B. Annapurna[4]

Abstract

Education acts as a soul in the overall societal development, in one way or the other. Aspirants, who gain their degrees genuinely, will help society with their knowledge and skills. But, on the other side of the coin, the problem of fake certificates is alarming and worrying. It has been prevalent in different forms from paper-based dummy certificates to replicas backed with database tampering and has increased to astronomic levels in this digital era. In this regard, an overlay mechanism using blockchain technology is proposed to store the genuine certificates in digital form and verify them firmly whenever needed without delay. The proposed system makes sure that the certificates, once verified, can be present online in an immutable form for further reference and provides a tamper-proof concealment to the existing certification system. To confirm the credibility of the proposed method, a prototype of blockchain-based credential securing and verification system is developed in ethereum test network. The implementation and test results show that it is a secure and feasible solution to online credential management system.

Keywords: Tamper-proof digital certificates, DAPPs, Credential verification, Etherium, Blockchain

1 Introduction

As technology is advancing, the creation of fake certificates becomes easier. The forged certificates range from fake universities issuing certificates to forged certificates of existing reputed universities. Due to centralization and digitalization, this fake credentials problem became pain in the neck for both the universities and recruiting organizations, and it needs to be addressed with a sharp solution. According to CareerBuilder (https://resources.careerbuilder.com/recruiting-solutions/how-much-is-that-bad-hire-costing-your-business), a company can lose 15,000 dollars on average, for a wrong hire or for hiring someone with a fake qualification. The loss is not just financial but may also cost the lives of innocent people because of the constructions designed by fake engineers and treatment given by fake doctors. Validating the certificates properly before taking someone into an organization is the key to solve this hitch. The primary cause of this problem is that credential verification is not as easy as it is seems. It takes a lot of resources, time, and money as well.

Blockchain technology helps us in building a decentralized application that keeps all the data secure and tamper-free. In this application, the data is stored in text format to ease the implementation and testing, but once the transaction is done, the data is converted into hash values and stored in the block within the entire network. This provides security since a single bit of modification in a block should tamper all the data in the entire chain which is not possible because multiple copies are distributed in the peer network. So the integrity of the data is maintained. The proposed method is implemented and tested using ethereum test net. Whenever some data is

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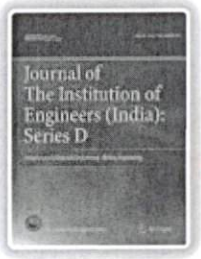

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ORIGINAL CONTRIBUTION

Safety Risk Assessment and Risk Prediction in Underground Coal Mines Using Machine Learning Techniques

D. P. Tripathy[1] · Satyajeet Parida[2] · Leki Khandu[3]

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Abstract Risk management focusses on the identification of uncertainties and its impacts associated with various functional activities carried out to achieve various mandates, goals and objectives of the company. To assess the risk level (as 'very high', 'high', 'medium' or 'low'), consequences and likelihood analysis are to be done based on the judgmental knowledge and experiences of the participants. The traditional methods of risk classification are time consuming and laborious if the inputs are voluminous. In this study, the hazards occurring in different sections of underground mining have been categorized, and associated risks have been predicted using different machine learning modelling techniques, namely KNN, SVM, logistic regression and decision tree by keeping the prescribed guidelines of the DGMS intact and using it as the basic building blocks to model the machine learning classification models.

Keywords Risk assessment · Risk classification · Coal mines · K nearest neighbours (KNN) · Decision tree · Support Vector Machine (SVM) and Logistic Regression

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Introduction

The mining industry exists with hazardous operations and arduous work environment that involve potential safety, environmental, and health risk to the miners. For the mining industry to be successful besides meeting the production requirement, it is also important to consider the safety and health of the workers as a prime concern. Unsafe conditions and acts in surface and underground mines lead to a significant number of accidents/disasters causing loss of human lives, injuries, damage to the property, affecting the production, etc.

A careful assessment of possible events that can happen in certain circumstances allows the controlled risk monitoring and the building of a proper risk management plan. A proper risk management plan minimizes the possibility of unexpected events and their impacts. It helps in the mapping of adverse events and detecting them even before they happen.

Risk management focusses on the identification of uncertainties and its impact associated with various functional activities carried out to achieve various mandates, goals, and objectives of the company. To assess the risk level (as 'very high', 'high', 'medium' or 'low'), consequences and likelihood analysis need to be done based on the judgmental knowledge and experiences of the participants. It would present the major risks associated with all the activities of the company and prioritize risks for the company along with some suggestions on mitigation measures.

Following are the points to ponder about risk management of an organisation:

- *Identifying risks* involving the identification of uncertainties based on the functional areas of the

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A novel compact fractal UWB antenna with dual band notched characteristics

V. N. Koteswara Rao Devana, Vella Satyanarayana, A. Vijaya Lakshmi, Y. Sukanya, Ch. Manohar Kumar, V. L. N. Phani Ponnapalli & Kamili Jagadeesh Babu

Analog Integrated Circuits and Signal Processing
110, 349–360 (2022)

A Correction to this article was published on 08 December 2021

This article has been updated

Abstract

A very compact dual band notched fractal structured antenna is proposed for UWB applications. A novel fractal patch with defected ground structure is utilized to achieve −10 dB bandwidth of 7.87 GHz from 3.77 GHz to 11.64 GHz. To notch upper WLAN band of 5.52–5.90 GHz, an S- shaped slot is introduced in the 50 Ω microstrip feed line. The X- band notch for down link of satellite communication applications from 7.22–8.16 GHz is achieved by two symmetrical L-structured parasitics on both sides of fractal patch. The proposed antenna having a compact size of 16

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Appreciation of "*Morning Bells*" by Jayashree Mohanraj

1. V. Jayasri Suma, 2. J. Bala Rajasekhar, 3.Y. Manjula 4. Dr. M. Sandra Carmel Sophia
1. Asst.Prof of English, 2. Asst.Prof of English, 3. Asst.Prof of English, 4. Prof of English Humanities & Basic Sciences
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ABSTRACT:

Jayshree Mohanraj is one of the most remembered writers of Andhra Pradesh in special and India in general. A multilingual translator, Jayshree Mohan Raj possessed the gift of translating poems from vernacular languages to English. As an experienced writer, Mohan Raj has captured the attention of the readers through her short stories, poems and Fiction in which she paints pictures of problems of middle class families. Her writings are very effective and inspiring as she narrates stories from her real life experiences. Her stories deal with realistic themes of predicament of children, situation of women, class conflict, and etc. '*Morning Bells*' is a very good example of a story which deals with four children who experience poverty and squalor because they have been cast away from home due to poor economic conditions.

KEY WORDS: Multilingual, translator, vernacular, middle class, problems, realistic, predicament.

INTRODUCTION

Jayashree Mohan raj hails from middle class family. Her life experiences left a great impact on her writings and very courageously Mohan raj presented the problems faced by middle class men, women and children. Mohan raj is a talented Indian writer of Short stories and a creative writer who has made a fine mark on the reader's mind at the global level.

THE STORY IN A NUT SHELL:

The present story titled *"Morning Bells"* is an honest presentation of small children who are deprived of food, clothing, shelter and basic necessities of life because they have been orphaned when they were kids. The story is about four rag pickers which provide deep insights into the hypocrisy of the aristocratic. Chotu, Ramu, Irfan and Munna are rag pickers. Who roam in the streets groping for garbage in public dustbins .Every day the routine goes on for the small boys and without any unhappiness or sorrow, the four boys go about their business of rag picking as they have no other choice. They enjoy doing the menial job as a gift from God and picked up objects which they discovered will give them some money. Each boy has his own story which is so painful. The boys have experienced pathetic situations like beatings and scolding of a drunken father, harassment of stepmother, physical abuse by the hotel proprietor, etc in their childhood. They believe that God's providence has brought them together. All four of them once met at a dumping yard and started to live together.

One day the four boys happened to come across the huge garbage bin. Their joy knew no bounds. All four of them quickly go near the garbage and to their astonishment; a swarm of flies rose up in the air. After searching poignantly in the bin, Chotu felt something soft and tender in his hands. He was shocked to see a dead infant. Without any second thought, Chotu calls Ramu and points at the lumpy thing inside the bin. Then both of them pick up the small bundle only to discover that it was a female infant. They wrapped the baby in an old newspaper and took it home along with them.

On the way to their shed, the four boys stopped at the temple. There they came across people of all classes and communities entering the temple. The author describes the temple goers adorned with bright vermilion marks and carrying the necessary things to be placed at the altar. Some of the temple goers displayed true devotion and

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FEMALE EMPOWERMENT THROUGH ECOLOGICAL RESTORATION AND PRESERVATION (ANALYSIS OF WANGARI MAATHAI'S UNBOWED)

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Dr. M. SANDRA CARMEL SOPHIA, Professor of English, Aditya Engineering College (A), Surampalem, sandrasophia27@gmail.com

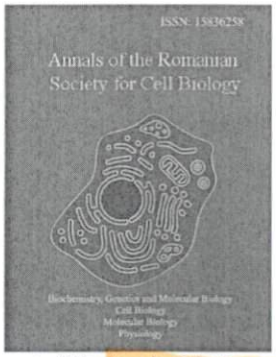
ABSTRACT- This article explores the kinship between women and environment projected by women writers in World literatures in general and African literature in particular. These writers have established a space to discuss the politics of gender, modernity, environmental issues and changes in Africa to articulate a culturally-located discourse of development. Women writers have taught women to stand up for themselves and what they believe in. Through their works of prose fiction they have been able to show women as important part of them that should voice out and not drown in the patriarchal abyss as society expects. Thus women writers during the twenty five years have made a significant contribution. Eventually the works of women writers underwent rapid changes and have steadily risen in quantity and quality. Women writers invite the readers to re-imagine and re-vision the truth that living ethically, beautifully well with human and the environment is necessary. They focus on the poignant aspects of protecting the environment and all creatures which share the ecosystem. Each of their writings has changed the way that ordinary human being perceives the world. Women writers have also shown that women have an effect on the health of the planet beginning from the smallest decisions of day-to-day lives to international policy through which each can make a difference to protect the planet. Thus women writers have offered a different mirror of their own while dealing with the themes of environment, female empowerment and ecological concerns. They may be titled as 'Guardians of the Planet'.

KEYWORDS: African Literature, Women, Environment, Feminism, Gender Equality, Re-imagine, Re-vision, Ecosystem, Female Empowerment, Preservation.

I. INTRODUCTION

Women Writers in Africa have established themselves in the sixteenth century after undergoing much struggle. The truth applies more to women writers who were unnoticed as serious writers. It is subsumed under the massive humming and bustling of her male counterpart who have taken women for granted. Thus women writers during the twenty five years have made a significant contribution to literature. Eventually the works of women writers underwent rapid changes and have steadily risen. Black women novelists are meditating on recreating and restoring the stereotyped images of women with a view to project a different picture. Women writers have focused to depict women who are empowered and try to seek a balance between the family and the natural world. Helen Chukwuma expresses;

> The identification of male positive disposition to the cause of women is a healthy development for African Literature. Firstly, it underscores the validity of women's complaint of subjugation and negative exposure. Secondly, it compliments and advances literature from the continent. With such unison of voice, the real essence of African Literature is brought to the fore and appreciated (Chukwuma 1990: 113).



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Histological aspects of the esophagus at Chinchilla (Chinchilla lanigera)

From three clinically solid Chinchilla guys butchered by the proprietor for their hide, were gathered throat pieces having a place with the three unique regions: cervical, thoracic and stomach. The tissue pieces were handled by the paraffin incorporation strategy so as to perform histological examination. In each of the three distinct fragments, the esophageal mucosa is spoken to by a separated squamous epithelium with a granular layer twice as evolved contrasted and the spinosum layer and with a medium level of surface keratinization. Muscularis of the mucosa is all around spoke to and present in every one of the three fragments, with an attentive thickening inclination from the cervical to the stomach portion. It is arranged on a solitary layer and is framed from smooth muscle cells with longitudinal orientation.

The antioxidants are not enough. Malus sylvestris (L.) Mill. extract enhances the carbon tetrachloride liver toxicity in albino rats

Liver toxicosis prompted by CCl4 presentation is an authoritative model for steatohepatitis. Cancer prevention agents are as often as possible utilized for hepatoprotection yet now and again they have no advantageous impact dependent on the prooxidant properties or lattice harmfulness. Four exploratory gatherings (Control, Extract, CCl4 and CCl4 + Extract) of pale skinned person rodents were utilized so as to assess the impact of the hydroglycerin alcoholic Malus sylvestris (L.) Mill. separate in CCl4-prompted steatohepatitis. Blood transaminases and TNF? were expanded after CCl4 organization and cell-interceded provocative reaction was improved similarly with transaminases and TNF?.

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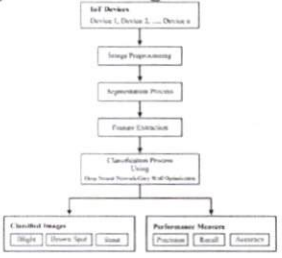

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IoT based Wheat Leaf Disease Classification using Hybridization of Optimized Deep Neural Network and Grey Wolf Optimization

Abstract: Image classification has become a hot research area in identifying diseases in plants. For eliminating the [illegible] plant diseases identification by image processing models can be used to save the agricultural products. This paper presents a new IoT and cloud based classification model of wheat leaf diseases using optimal deep neural network....Read More (http://annalsofrscb.ro/index.php/journal/article/view/39)

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Creating Awareness and Importance of 'English' For Students Hailing From Rural Areas

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Abstract

The ever-growing need for good communication skills in English creates a huge demand for English learning/teaching around the world. People's participation in dialogue of cultures requires communication and contributes to the total holistic formation of the human person. English education is the need of the hour and a powerful instrument of economic, social and cultural change. In underdeveloped countries like India, the progress of rural areas is questioned, because of unequal or lack of access to quality education. Poverty and illiteracy remain overwhelmingly a rural phenomena and poverty in rural areas is linked to illiteracy. Therefore development in rural areas faces a key challenge to achieve both poverty reduction and 'Education for All'. Quality of education depends on infrastructure such as classrooms, sanitation facilities, provision for digital learning, sports equipment facilities, professional competencies of teachers, access to books and learning materials, So the article is a discussion on the importance and creating awareness of English education for students hailing from rural areas since it is the powerful instrument of economic, social and cultural change.

Keywords: Communication, English Language, Dialogue of Cultures, Holistic Formation, Quality Education, English Education, Instrument of Social Change, Cultural Change.

Introduction:

Mankind has failed to get rid of poverty and squalor in the world despite tremendous growth in world incomes and unparalleled improvements in standards of living over the past few years. As a consequence, people are facing countless problems in countries like India particularly in rural areas and under developed regions. The major reason for this happens to be inequalities and injustice affecting the lives of the rural poor. Unequal access to quality education or lack of

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"The Problems Faced By The Rural Students In Conversing In English And Proposed Solutions To Develop Their Communication Skills"

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ABSTRACT: ***This paper reflects on the difficulties of speaking English in India's rural areas. Teaching policies are a social concern and also a personal challenge in Indian schools and universities. In most Indian schools and universities, the quality of English Language education paints an alarming picture. Teachers' language skills, language exposure, and materials are also big issues when it comes to the level of English language instruction. In fact, rural students face many challenges because they lack the ability to communicate in English with their classmates, classmates, and family members, as well as access to language proficiency labs, audiovisual aids, and other resources. In general, rural students consider English as a subject rather than an ability. This is their most difficult task. Students can only improve their level of proficiency if they study it as a language. The bulk of students prep exclusively for the exam. They aren't known for their ability to read poetry, but they are adept at memorising it. English is feared by rural students. Many professors, on the other hand, lack a long-term perspective on student life. They're solely concerned with analysis. Other language classroom interventions, such as metacognitive techniques, incentives, and coping methods, are recommended in the study to help students improve their language skills.***

Key Words:Metacognitive, Vernacular, Competence, Concentrates, Formulate, Mispractice.

Mend your speech a little,
Lest it may mar your fortune

-----William Shakespeare

1. INTRODUCTION

English is known as the "Queen of Languages" because it is a global language. It is thought to be a one-of-a-kind language. It is spoken as a mother tongue by over 450 million people.

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Development of different irrigation systems calculator using VB6

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Online published on 9 March, 2021.

Abstract

A computer program has been developed for design of surface and pressurized irrigation systems. The program includes two main parts: crop water requirements and hydraulic calculations of the system. It has been developed in Visual Basic 6.0 and gives opportunity for selecting some parameters from tables such as: agro-physical soil properties, characteristics of the corresponding crop, climatic data. It allows the user of the program to assume and set a definite value, for example the emitter discharge, plot parameters and etc. It includes the design of lateral, manifold, main line and pump calculations. The program has been compiled to work in Windows. This software is userfriendly and provides interaction at all stages of the design process and a solution based on individual's requirements and the information base available within the software. The individual not only can suit to his requirement but can also compare his design with several other alternate designs with different inputs. Design of system arrived by this software was tested with manual calculations at developer's level and results were found satisfactory.

Keywords

Visual basic 6.0, Crop water requirement, Surface irrigation system, Pressurized irrigation systems.

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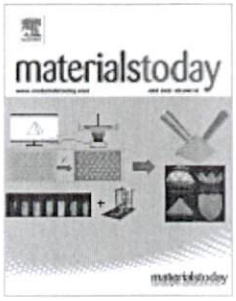

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Ceramics International
Volume 48, Issue 5, 1 March 2022, Pages 6808-6818

Influence of steel and PP fibers on mechanical and microstructural properties of fly ash-GGBFS based geopolymer composites

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Received 23 September 2021, Revised 12 November 2021, Accepted 23 November 2021, Available online 2 December 2021, Version of Record 5 February 2022.

https://doi.org/10.1016/j.ceramint.2021.11.232

Abstract

In this study, experimental investigations were carried out to estimate the mechanical and microstructural properties of polypropylene (PP) and steel fiber reinforced geopolymer mortar. Two industrial by-products are used as binders to produce the geopolymer composites, i.e., fly ash (FA) and ground granulated blast furnace slag (GGBFS). Different percentages of PP and steel fibers are used in geopolymer mortars to find the mechanical properties such as compressive, splitting tensile and flexural strengths were investigated to understand the strength behavior. However, the compressive elastic modulus values were estimated through the proposed equation based on the compressive strength of the fiber reinforced geopolymer composite samples. Moreover, to understand the geopolymeic reaction, microstructural studies, i.e., scanning electron microscopy (SEM), were conducted. The experimental results revealed that the addition of PP fibers up to 2.0% (volume fraction) enhanced the flexural properties of geopolymer mortar samples. The compressive strength of the steel fiber-reinforced geopolymer composite reached a maximum of 2.5% volume fraction, being a 13.26% improvement over the control mix. The flexural toughness index of the PP and steel fiber reinforced composites improved with increasing the fraction. However, steel fiber reinforced geopolymer samples are shown better flexural toughness compared to PP fibers. The SEM analysis of the geopolymer control mix achieved a good degree of geopolymerization and both the fibers yielded a considerable interfacial bonding with the geopolymer paste.

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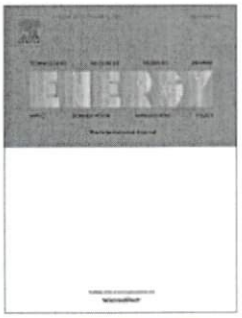

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Energy
Volume 242, 1 March 2022, 122910

Direct utilization of preheated deep fried oil in an indirect injection compression ignition engine with waste heat recovery framework

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Highlights

- Sunflower Oil based Deep Fried Oil (DFO) is identified as a novel feed stock.
- Preheating the DFO to 130 °C shown performance nearby diesel operation.
- Performance, emissions and combustion analysis was carried out.
- FFA analysis was carried out on virgin sunflower oil and sunflower oil based DFO and discussed.
- Combustion analysis instrumentation associated with IDI CI engine was discussed.

Abstract

The ever-growing use and expense of fossil fuels have prompted the planet to quest for alternatives to environmental issues. Efforts are being made worldwide to extract alternative fuels from more than 400 plant species for both edible and non-edible oils. Being edible oils consuming by the human race, this

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Volume 8, Issue 2, June 2022, Pages 244-249

An optimized technique for copy–move forgery localization using statistical features

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Abstract

Copy–Move Forgery Detection (CMFD) helps to detect copied and pasted areas in one image. It plays a crucial role in legal evidence, forensic investigation, defence, and many more places. In the proposed CMFD method, a two-step identification of forgery is presented. In step one, the suspected image will be classified into either one of two classes that are forged or authentic. Step two is carried out only if the suspected is classified as forged, then forged location will be identified using the block-matching procedure. Initially, the suspected image is decomposed into different orientations using Steerable Pyramid Transform (SPT); Grey Level Co-occurrence Matrix (GLCM) features are extracted from each orientation. These features are used to train Optimized Support Vector Machine (OSVM) as well as to classify. If the suspected image is categorized into forged, then the suspected grey image is converted into overlapping blocks, and from each block, GLCM features are extracted. The proper similarity threshold value and distance threshold value can locate the forged region using GLCM block features. The performance of the proposed method is tested using standard datasets CoMoFoD and CASIA Datasets. The proposed CMFD approach results are consistent, even the forged image suffered from attacks like JPEG compression, scaling, and rotation. The OSVM classifier is showing superiority over the Optimized Naive Bayes Classifier (ONBC), Extreme Learning Machine (ELM) and Support Vector Machine (SVM).

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Sustainable Energy Technologies and Assessments
Volume 49, February 2022, 101644

Design of MFA-PSO based fractional order PID controller for effective torque controlled BLDC motor

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Abstract

This paper presents an effective torque and speed regulation strategy for BLDC motor (BLDCM) using Modified Firefly Algorithm (MFA)–Particle Swarm Optimization (PSO) based Fractional Order PID (FOPID) controller. Due to simplicity and better steady state performance, typical PID controllers are used to control the BLDC motors. However, due to load variations, it has an issue with uncertainty. The PID controller tuning also contributes to uncertainty in the parameters of the structure. With the help of the FOPID controller, accurate control method can be provided to overcome the above problems. A combination of MFA and PSO algorithms are employed to tune the FOPID parameters. Simulations of proposed MFA-PSO based FOPID controller for BLDC speed are carrying away in Matlab/Simulink atmosphere. To authenticate the applicability of proposed controller for BLDC motor, the consequences are compared through Genetic Algorithm (GA), Firefly Algorithm (FA) and Firefly-Artificial Neural Network (ANN) based FOPID controllers.

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Keywords

Torque; BLDCM; MFA; PSO; PID; FOPID; GA; FA; ANN

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Load Balancing in RPL to Avoid Hotspot Problem for Improving Data Aggregation in IoT

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Abstract: Data aggregation plays a vital role in the Internet of Things (IoT), and it aggregates the collected sensor data from devices to suppress redundant data transmissions. Many-to-one traffic pattern in the IoT induces hotspot problem and inefficient data aggregation. The Routing protocol for low-power and lossy networks (RPL) in the network layer impacts the hotspot problem due to the frequent usage of forwarding nodes and load imbalance. The processes of network layer protocol, such as trickle algorithm and Objective Functions (OF) for Destination Oriented Directed Acyclic Graph (DODAG) construction, need more attention to avoid hotspot for efficient data aggregation. This work proposes a Load Balanced RPL (LoB-RPL) protocol to avoid hotspot creation using a composite metric based parent selection, DODAG construction, and local topology adaptive decision on trickle parameters. The LoB-RPL improves the Minimum Hop with Hysteresis Objective Function(MRHOF) using the composite metric based parent selection and tunes the parameters of the Trickle algorithm. It ensures efficient maintenance of DODAG structure, hotspot avoidance, and unnecessary DIO transmissions. Beyond the advantages of composite metric based parent selection, consideration of dynamic parameters may induce frequent parent switching in RPL. To avoid frequent changes in the DODAG structure, the LoB-RPL optimally decides the parent switching threshold. Thus, the proposed work ensures a load-balanced and an energy-efficient RPL routing as well as data aggregation in the IoT environment. The LoB-RPL delivers outperforming results compared to the base RPL under various inter-packet interval time over 50 node topologies.

Keywords: Data aggregation, RPL, IoT, Hotspot problem, Load balancing, Energy efficient DODAG structure, Trickle algorithm, Hysteresis function.

1. Introduction

With the tremendous growth of the Internet of Things (IoT) applications, balanced utilization of resources among sensor devices becomes a crucial factor [1]. Data aggregation is a vital operation for improving the efficiency of IoT communication and network lifetime. Routing Protocol for Low Power and Lossy Networks (RPL) is a widely adopted protocol for IoT networks [2]. The functionalities of the network layer harm the aggregation efficiency. The RPL processes at the network layer may induce uneven energy dissipation among sensor nodes. The RPL constructs the Destination Oriented Directed Acyclic Graph (DODAG) to connect the sensors and root node with the support of different Objective Functions (OFs), and trickle algorithm [3-6]. As per RPL, heavy load is applied on the sensor nodes nearer to the root node than other, to route the datapackets to the root node. It induces the hot spot problem. Thus, improving the efficiency of RPL in the network layer is essential to utilize the advantages of data aggregation techniques in the application layer completely.

The RPL includes a built-in energy-saving mechanism in the DODAG construction process, such as the Trickle algorithm [7], which aims to minimize the number of route updates and message broadcast in the network while maintaining the DODAG structure. However, the Trickle algorithm mainly faces the issue of load imbalancing. The load

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Impact of liquid fuel injection timings on gaseous hydrogen supplemented - preheated straight vegetable oil (SVO) operated compression ignition engine

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Departmnet of Mechanical Engineering, Aditya Engineering College (A), Surampalem, India

d online: 01 Apr 2020

30/15567036.2020.1745333

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ABSTRACT

Direct usage of straight vegetable oil (SVO) in transportation division is still a big challenge because of its unfavorable qualities, such as: high density, high viscosity, and lower calorific value. The present investigation address this issue with synchronous work of three components (i) preheating of the SVO with waste heat recovery framework, (ii) advancing the injection timing of liquid SVO in pre-heated mode from its manufacturer recommended timing, and (iii) supplementing with

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Impact of liquid fuel injection timings on gaseous hydrogen supplemented - preheated straight vegetable oil (SVO) operated compression ignition engine

P. S. Ranjit & Venkateswarlu Chintala

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ABSTRACT

Direct usage of straight vegetable oil (SVO) in transportation division is still a big challenge because of its unfavorable qualities, such as: high density, high viscosity, and lower calorific value. The present investigation address this issue with synchronous work of three components (i) preheating of the SVO with waste heat recovery framework, (ii) advancing the injection timing of liquid SVO in pre-heated mode from its manufacturer recommended timing, and (iii) supplementing with small dosage of gaseous hydrogen (GH_2). Experimental investigation was done on a Single cylinder, 4 S,

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Published: 17 January 2020

Stability and weighted sensitivity analysis of robust controller for heat exchanger

Sapna Gupta, Rajeev Gupta & Subhransu Padhee

Control Theory and Technology **18**, 56–71 (2020)

Abstract

This study presents a parametric system identification approach to estimate the dynamics of a chemical plant from experimental data and develops a robust PID controller for the plant. Parametric system identification of the heat exchanger system has been carried out using experimental data and prediction error method. The estimated model of the heat exchanger system is a time-delay model and a robust PID controller for the time-delayed model has been designed considering weighted sensitivity criteria. The mathematical background of parametric system identification, stability analysis, and H_∞ weighted sensitivity analysis have been provided in this paper. A graphical plot has been provided to determine the stability region in the (K_p,K_i), (K_p,K_d) and (K_i,K_d) plane. The stability region is a locus

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Chunk by Chunk Irrigation of Farm Field -Through Wireless Sensing Technique

Shaik Vahida, Rayudu Srinivas, Rama Reddy T, Sheik Shabuddin, B.Durga Anuja

Abstract: Farming act as a heart to Indian economy and is a work of farmers. Farmers pursue certain set of stages to farm a field and irrigation is essential stage among all stages. Farmers are using so many irrigation methods to farm a field and the Irrigation methods must be in such way that, it have to boost plant development while minimizing salt inequities, leaf injuries, soil erosion, and water loss. To get good results in irrigation we should use good irrigation system. Now a days, farmers are using so many irrigation systems to pump water on the farm like traditional, modern and automated methods. Even though farmers facing problems like current shocks, standing long time and monitoring each and everything to pump water on the entire farm. In this paper modernistic sensor-based water pumping system is proposed to made irrigation easy to the farmers by chunk by chunk irrigation and each chunk is supervised with the help of soil moisture, temperate and humidity sensors. One more criteria, farmer need to concentrate while selecting an irrigation method is power supply, especially in Andhra Pradesh there is a regular power cuts in the nights.so that farmers can't go every time to monitor how the irrigation is in the nights. Because in the nights snack and poisonous insects will be there in farm field, so it will be dangerous to the farmer's life.so, by using proposed irrigation method irrigation will be easy in regular power cut areas, sloppy area and irrigation at night time.one more benefit from this proposed method is man power will decrease.

Keywords: Farming, Irrigation, Sensor, Power-cuts.

I. INTRODUCTION

In every country, Farming is the Prime area of economy and farming makes straight usage of natural resources. Farming sector is key to less industrialized nations and fewer importance in countries which have good industrialization. Till industrialization, most people worked in farming.

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Before industry revolution most of the human beings worked as farmers and farmers cultivate maximum of their crops for their personal eating instead of buying. Currently, farming sector is the biggest income provider in India and is work of people we lived in rural areas of a country. And farming also play an important role to figure out the GDP of country. Maximum industries also use farming sector for raw materials. Over the past century a extraordinary alterations happened in farming practices as a result of the development of world market and improved technologies in farming sector [1].

In this farming sector farmer play a key role. Every human being eating food three times a day because of farmer only. Here farmer will follow some step like selection of crop, preparation of land, selection of seeds, sowing, irrigation, growth of a crop, fertilizing and lastly harvesting to cultivate the crop.in these all step one most important step is irrigation. Proper irrigation of farm field will result in good crop.so, we should select good irrigation method to get good results in farming in all aspects. And we need to consider the following thing before selecting irrigation method [2][3][4]

1. Manpower should reduce
2. Safe night time irrigation of farm field(to save farmer life from snacks and dangerous insects)
3. Based on crop type and season, irrigation should be done
4. SMS to information about irrigation work to the farmer to monitor from home itself

In this paper an automated method called "Chunk by Chunk Irrigation of Farm Field -Through Wireless Sensing Technique" is proposed which will act as good irrigation system by considering above things.

II. LITERATURE SURVEY

Here, a method is developed which will be better when compare with the following methods which are already in use with respect of man power reduction and save farmer life in night time while irrigation from snacks and poisonous insects.

A. Irrigation using traditional approaches

Pulley system, Chain Pump, Dhekli and Rahat are treated as traditional methods of Irrigation. These methods require animal or human labor to function. The first one is Moat, it contains drawing up water from a well to wet the farm field. Moat approach is cost effective and it consumes time and wastage of water will be avoided with this approach. And the next one is pump chain, this approach comprises of big dual wheels attached with a chain.

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Mechanical Properties of Glass Fiber Concrete with Different Dosages of Glass Fiber

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Abstract : Conventional concrete i.e. the concrete generally has low tensile strength with limited ductility and low resistance towards cracking. The micro cracks that are developed internally are inherent among concrete and can be explained with the help of propagation of that micro cracks due to its inferior tensile strength. Different fibers, added at a certain percentage of concrete known to improve the deformation properties of concrete along with the plasticity against crack resistance, such as flexural strength. Mainly concrete & ferroconcrete research has been moved to steel fibers, and glass fibers have recently become more available, with no corrosion problems associated with glass fibers. This article describes an experimental study of the usage of glass fibers in the structural concrete. High-dispersion CEM-FILL fiberglass of 14 µm diameter with an aspect ratio of 857 was used at a dosage of 0.33% to 1% by weight in concrete and its mechanical properties such as compressive strength, flexural strength and modulus of elasticity.

Keywords: Glass fiber, aspect ratio, indirect split tensile strength.

I. INTRODUCTION

There is increase in concrete use with an increase in development of infrastructure [1]. Due to this, the consumption of concrete is constantly increasing, and the main natural components that make concrete, i.e. small & coarse aggregates were depleted at a very rapid rate. This necessitates of the use of alternative materials that will be added to the cement without reducing its strength performance [2]. It is an idea to added ingredients which improve the performance. In this regard, several researchers have worked on the use of materials such as rice husk, sugar cane buggas & fiberglass, etc. On addition of a new fiberglass to standard concrete, you should keep in mind the short & long term interaction [3]. Ingredient with other elements, the effect on compression strength, flexural strength, performance, durability, permeability, tensile strength, bonding and uniformity [4]. Performance requirements are dependent on many other major factors such as type of mixing, mixing time, modes of transportation, placement, use of impurities, curing methods, and climatic factors [5]. This paper uses CEM-FIL anti cracking HD glass fibers having a modulus of elasticity of 72 GPa, of diameter of 14 µm, specific gravity of 2.68, length of 12 mm, and a aspect ratio of 857.10. Approximately, 212 million fibers per kg were used to prepare standard M30 concrete by replacing the fine aggregate by 1.5%. Fibers are available in large quantities and are a waste of the glass industry [6]. Thus, the use of such fibers not only increases the flexural strength of concrete, but also paves the way for easy disposal of industrial waste. In addition, the fibers are known to delay plastic shrinkage and shrinkage.

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II. MATERIALS AND METHODOLOGY

Natural sand adjacent to II zone that passes through 4.75 mm sieve and aggregates of nominal size 20 mm crushed stone are used as fine and coarse aggregates respectively. In this study, conventional OPC grade53 has used and the material properties are listed in the following table1.

Table1: Material Properties:

Material	Test for	Properties
Cement (OPC 53 Grade)	Specific gravity	3.4 Kg/m^3
	Fineness	2%
	Initial time	95 minutes
	Final time	185 minutes
	Consistency	31%
	Soundness	3mm
Fine Aggregate	Specific gravity	2.60 Kg/m^3
	Sieve analysis	Zone II
Coarse Aggregate	Sieve analysis	12.5-20mm
	Specific gravity	2.65 Kg/m^3
	Elongation index	12.5%
	Flakiness index	13.2%
	Water absorption	0.43%
Glass Fiber	Density	0.91
	Diameter	14µ
	Elasticity Modulus	72 GPA
	Water absorption	Nil
	Aspect ratio	857.1

Mix design for M35 Grade of concrete using glass fiber varying from 0.5 to 2.5% by weight in concrete were done by following the guidelines of IS 10262: 2009. The following Table 2 gives the adopted mix proportions per m^3 of M35 grade of concrete and Table 3 gives the quantity of fiber to be added for each batch mix [7].

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Optimal Allocation of UPFC and IPFC in Network Considering Sensitivity of Line Flows under Single Line Contingency

V. Srinivasa Rao, R. Srinivasa Rao, M. Ravindra

Abstract : This paper presents, optimal location for deployment of Unified Power Flow Controller (UPFC) and Interline Power Flow Controller (IPFC) in network considering sensitivity of line flows under single contingency. A sensitive approach is proposed which is considered based on Ranking Index (RI) and Performance Index (PI). A unitary change of power flow (PF) in each transmission line after outage of a branch element can be obtained from proposed index. The proposed Index is used to quantify loading level of network after a given outage. Contingencies are structured in descending order depending on value of proposed Index. Sensitivity factors are obtained by differentiating PF indices subject to parameters of UPFC and IPFC devices. Optimal deployment of UPFC and IPFC device is considered by the value of sensitivity factors attained by considering line outages in order of their severities which is given by proposed Index. The efficacy of proposed approach is computed and programmed on 5bus and IEEE 14bus networks under MATLAB environment.

Keywords : UPFC and IPFC, contingency analysis, sensitivity approach, ranking index, optimal placement.

I. INTRODUCTION

Due to severe contingencies or due to heavy loads, it will direct to a condition where the network is no longer present in secured operating region. Under these constraints, by applying controlling actions it is main objective of operator to bring back to normal secure state. The system leads in to unstable region due to delay of information or due to lack applicable control actions. In reality, contingencies such as line -outages lead to voltage constraint violations and results in to excess loading of the lines. The system can be recovered from this excess loading condition by reconfiguration of power system network and by controlling line parameters. However, the present transmission line infrastructure is not upgraded to the required level and hence it can lead to unstable condition. Because of meshed topology of electrical network and large quantity of equipment, the planning and operation of power system became very complex and research have been carried out on standard and abnormal conditions. One such abnormal conditions of power transmission network is the occurrence of contingencies. The contingency analysis is significant when future circumstances are uncertain. Thus, Contingency based forecast can give efficient energy management practices and helps to make more resilient power system. Also, it tends to minimize cost, improve energy efficacy, and develop the array of possible solutions compared with more firm planning. The sufficient generation has been running to meet up the load and that required transmission has been put up to transmit power to load. The equipment installed in network can fail, due to internal or external faults, such as transmission towers fall off, setting relay errors or lightning strikes. It is too expensive, to reconfigure a network design with adequate redundancy (i.e., reserve generation, additional transmission lines, etc.) so that load cannot be dropped due to internal or external faults rather, networks are reconfigured in such a way that dropping of load is adequately small. Thus, electrical networks are reconfigured to have adequate measurements and devices to endure all failure measures, but this cannot assure that the network can be 100% reliable. rectification is not possible.

In [1], the author presented Nonlinear program (NLP) and computed considering General Algebraic Modeling System(GAMS) and MATLAB parameters. It is known that FACTS devices are right solutions to enhance the stability of network and to minimize the congestion problems in overloaded lines and control voltages by governing their limits considering series and shunt impedance, voltage, current and phase angle [2]. The operation method of FACTS devices is suggested to improve steady-state security taking into consideration of line contingency problem [2]. Power systems are commonly designed and controlled based on N-1 constraint in security, which implies that system should remain secure under all first contingencies. It is suggested that, appropriate position and sizing of FACTS Controllers has enhanced system performance enormously [3]-[7]. PF in network is directed by allocating the FACTS devices in suitable lines in network without altering generation program and structure of system. There is much better significance of FACTS devices due to improvement in modernization of power electronics. The UPFC is the efficient FACTs device, PF controller as it can direct active and reactive PF in parallel or independently throughout lines and buses [8]-[12].

In [13], the author proposed two algorithms for optimal deployment of UPFC and wind farm in network to mitigate power congestion problem. UPFC can be utilized for bus and line voltage control through phase shifting, series compensation. UPFC integrates the properties of shunt and series controllers. IPFC device

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Irrigation Made Easy: Block Wise Filling Of Firm Filed Using WSN System

Shaik Vahida, Rayudu Srinivas, Rama Reddy T, Sheik Shabuddin, B. Durga Anuja

Abstract: Agriculture is playing very crucial part in our everyday life and is a job of Farmers. Farmers follow some steps ladders to firm a field and one among is irrigation (is an essential step in the farming). Irrigation systems must inspire plant development while diminishing salt disproportions, leaf injuries, environmental conditions, and water loss. Loss of water will arise because of, wind drift, vaporation, run-off and water sinking deep below the root. To acquire noble results in irrigation we must use noble irrigation system. Now a days, farmers are using so many irrigation systems like traditional methods, modern methods and automated methods. Even though farmers facing problems to irrigate farm filed in sloppy areas. In this paper an automatic sensor based water pumping system is proposed to made irrigation easy to the farmers by dividing firm field into blocks and each block is monitored with soil moisture, temperate and humidity sensors to pump the water and the proposed method is more useful for irrigation in sloppy areas.

Keywords: Agriculture, Blocks, Irrigation, Pumping, Sensor, Slope Areas, Water, WSN.

1 INTRODUCTION

In Indian economy, Agriculture acting a vital part and is a work of farmers and farmers are responsible for the food we will eat daily. Farmers start work early, and in planting and harvesting season work till sunset. Even though modern agricultural equipment has made the work far less physically demanding than it was a few generations ago, most of a farmers are still preferring hands-on physical work. Farmers follow some steps in farming. In Farming life cycle essential step is irrigation. Active irrigation will affect the whole development process. The main motive to increase irrigation attempts is consistency. The manufacturer has a lot of governing over how to apply water and quantity of water to apply it. Over 70 per cent of the rural households depend on agriculture. Agriculture is an important sector of Indian economy as it contributes about 18% to the total GDP and provides employment to over 60% of the population. Indian agriculture has registered impressive growth over last few decades. The food grain production has increased from 68 million.[1] Agriculture is a job of Farmers and farmers are playing very crucial role in survival of human beings as they produce food and fiber for human beings. They make responsible usage of natural resources and advanced technologies to accomplish farming task. They have the ability to deal with different seasons, climatic variations, soil conditions, and the often harsh catastrophic events of wildfire, drought, and floods. In some areas farmers are very specialized in what and how they produce a limited number of products. Farming is an industry that depends everyday on the natural environment and the careful and responsible use of it. Without the conscious caring for the natural resources and wildlife any and all farming enterprises are doomed to failure. Farming practices often provide natural biologically active filter mechanisms for water as well as vegetative stabilization of soils. Farmers and farming societies offer an exceptional atmosphere to raise people.

They offer opportunities for young and old alike to gain experiences in basic lifelong values, an appreciation for success, as well as the heartache of life's most challenging occurrences.

Farming Life Cycle:

The following are eight essential steps followed by farmer to produce a food [2-3]

1. Selection of crop
2. Preparation of land
3. Selection of seed
4. Sowing of seed
5. Irrigation
6. Crop growth
7. Fertilizing
8. Harvesting

Irrigation is an important step in farming. Irrigation is nothing but amount of water to be given to the plants. We have so many tradition, modern and automated methods to irrigate the firm. But there is no such good method to irrigate the firm in slope areas. So, in this paper proposed a new method to irrigate a firm filed in slope areas.

2 LITERATURE SURVEY

The main motive to increase irrigation attempts is consistency. The manufacturer has a lot of governing over how to apply water and quantity of water to apply. To get good results in irrigation we should use good irrigation system. So many methods available for irrigations. In the following mentioned all traditional, modern and automated methods those using in present farming world.[2-3]

2.1 Traditional Methods of Irrigation

The following are the approaches of irrigation that were used in the past years. Even currently several minor farms in rural areas use these. Though they are inexpensive than the new

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Analysis of Blast Induced Ground Vibration under Varying Controlled Blasting Parameter

Abhishek Kumar Tripathi, Gadhi Durga Nookaraju, K. S. Siva Subramanian

Abstract: Mining activity plays a major role for economic development of any nation. The drilling and blasting are the two key operations in the mining industry. The execution of these operations generates some disturbances to the environment, like noise and vibration. Blasting is the process of reducing large rock mass into the smaller fragments for our convinces of further processing. In this study the blast induced vibrations are monitored in the form of peak particle velocity (PPV) for the different cases of varying hole spacing. In this study, the PPV was measured for the three different directions, namely, transitional, vertical and longitudinal and it was observed that the PPV for in transitional direction is decreasing with the increment in the hole spacing between two consecutive rows. Further, it was observed that peak vector sum (PVS) having an inverse relation with the hole spacing.

Keywords : Peak particle velocity, Hole spacing, Blasting, Peak vector sum.

I. INTRODUCTION

Mining is the first and foremost source of minerals and commodities on which all countries depend for improving their standard of living. Mined minerals play an essential role in maintaining the living activities of the mankind. Mining creates a direct or indirect impact in every industry of a country. Therefore, it could be considered as an economic driven industry in the country. In India, the GDP contribution of the mining industry lies in between 2.2% to 2.5% [1]. In the mining industry, the under-earth minerals can be extracted by two different mining techniques, namely surface and subsurface mining [2]. In surface mining, the drilling and blasting are the two essential activities which are used for rock fragmentation. In order to get the desired size of fragmented rock the selection of an appropriated blasting is very much necessary [3]. By using suitable blasting operation, the size of the fragmented rock can be controlled. The selection of an appropriate blasting operation not only provide the required fragmented size of the rock, but it also enhances the production of mining industry [4].

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On the other hand, the blasting operation produces various hazards such as noise, ground vibration, fly rock and air over pressure [5]. These hazards, reduce the moral and safety of the miners and mining industry. Among all the mention hazards the generation of ground induced vibration is more serious because it can damage the surrounding structure, rock strength and may promote the chances of subsidence [6]. Due to the severity and impact of ground induced blast vibration on rock it can play a major role in the safe operation of blasting activities. Therefore, an adequate knowledge of ground induced vibration at the time of blasting is very much necessary for the safe blasting operation. The induced ground vibration during blasting can be measured in the form of Peak Particle Velocity (PPV) [7]. This PPV is nothing but the displacement value of ground particle with reference to time. It gives the maximum rate of change of ground displacement [8].

The Peak Particle Velocity mainly affected by controlled and uncontrolled blast parameters. The controlled blast parameters are burden, spacing, type of explosive and delay sequence. However, the uncontrolled parameters are the strength of the rock the density of the rock and rock type [9]. The uncontrolled parameters are mainly affected by the physical and mechanical properties of rock, whereas the controlled parameters are affected by the blasting operation [10]. In this research paper, a field investigation has been performed to study the blast induced vibration with reference to controlled blast parameter such as spacing between two consecutive holes. This study will help in designing the appropriate blasting scheme for the particular blast site.

II. BLAST INDUCED GROUND VIBRATION

At the time of blasting, when explosive in the holes are detonated a shock waves are produced in association with the gas pressure. These shock waves are also called as an elastic wave which travels in all directions and give rise to the ground vibrate. The excess amount of shock waves may cause damage to nearby structure and rock strata [11]. The ground vibration can be estimated in term of PPV. The PPV is the most elevated speed at which an individual earth particle moves or vibrates when the waves go through that earth particle [12]. A number of research work has been carried out to measure the peak particle velocity for the different blasting site. A study carried out on the twelve data set of a case study was analysed in order to get a get an accurate site-specific formulation for the peak particle velocity [13].

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Finding the Occurrence of Chromite Reserve in Mineral Exploration Survey by Using Remote Sensing Technique

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Abstract

The accurate estimation of the minerals is very essential task for any mining industries. In this regard the mineral exploration plays a key role in searching and estimating the valuable minerals for the mining industries. The main purpose this study is to find the probable source of the Chromite mineral resource and to conduct the complete geological survey of the selected study area. The concept of remote sensing technique is used in finding the probable occurrence of Chromite mineral reserve and the Advanced Space borne Thermal Emission and Reflectance Radiometer (ASTER) was used as an imaging instruments to create the detail map of land surface, temperature, reflectance and elevation. The preliminary exploration of the selected study area was completed successfully by using remote sensing technique. Based om the completed preliminary exploration an attempt has been made to drag the information about the occurrence of Chromite mineral reserves. The outcome of this study shown that the study area has the high potential chromite mineral zones but the second phase of mineral exploration was also recommended.

1. Introduction

Mining and mineral exploration is the backbone of any country. It helps in strengthen the economy of the country by providing significant amount of jobs and valuable mineral resources to the nation [1]. Before proceeding to the mining activity in any areas it is very much necessary to know the availability of the probable mineral in those areas. Mineral exploration is a practice which helps in finding the commercially viable concentrations of minerals or metals, for the mining industries. Since, the mineral exploration is a capital-intensive operation, therefore, a very accurate estimation of mineral deposit is very important [2]. This accurate estimation of mineral deposits helps the mining industry to grow economically by improving its volume. There are five essential steps in mineral exploration; these are selection of area, define the target, evaluation of the resource, defining the reserve and extraction. In defining and evaluation of mineral resource remote sensing can play an important role [3].

Remote sensing is one of the important tools of any mineral exploration techniques. In remote sensing technique the acquisition of information about any ground surface can be done without making any physical contact with the ground surface. This unique feature of remote sensing makes it an essential exploration technique during the exploration of mineral [4]. The efficient use of remote sensing not only save the time and money of mineral industries but it also provides an accurate useful information. Remote sensing plays a best role in discovering the high-value commodities such as diamonds and gold. The application of remote sensing in mineral exploration relies mostly on the capability of the sensor to identify lithological features and spectral signatures related to mineral deposits [5]. In this paper, the reconnaissance mineral exploration survey is carried out for the identification of probable Chromite mineral. The probable chromite occurrence can be detected based on spectral signatures of minerals and alteration zones associated with the deposits. Mineral alteration zones can be used as indicators for the identification of possible occurrence of ore deposits. The primary purpose of the paper is to carry out Geological Map Updation, Advanced Remote Sensing studies and then integrate the Geology, field data and Remote sensing data to demarcate prospect zones for Chromite deposits. The advanced Remote

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Driver Deviation and Drowsiness Detection Alert System

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ABSTRACT

Reliably various people lose their lives in view of deadly road incidents around the globe and sleepy driving is one of the principal drivers of street mishaps and passing. Exhaustion and little scope rest at the driving controls are consistently the primary drivers of certified disasters. In any case, starting signs of depletion can be recognized before a fundamental condition rises and along these lines, distinguishing proof of driver's shortcomings and its sign is advancing examination subject. By far most of the customary methods to recognize tiredness rely upon direct perspectives while some are intruding and may redirect drivers, while some require expensive sensors. Thusly, at the present time, light-weight, consistent driver's laziness acknowledgment structure is made and executed on the Android application. The structure records the chronicles and recognizes the driver's face in each packaging by using picture taking care of strategies.

Keywords: Intruding, Disasters, Sensors

I. INTRODUCTION

Utilizing python3 and AI the Drivers Deviation and Drowsiness location framework works. The framework will screen the driver's eyes and furthermore outward appearances by utilizing camera. We can recognize side effects of driver weariness sufficiently early to maintain a strategic distance from the individual from dozing. The Advancement of figuring innovation has given a superior way to building astute vehicle framework. Rest identification framework (tiredness location) for driver is one of the potential use of clever vehicle framework. Here we utilize AI to decide genuine human conduct during languor time of the driver. Along these lines, this task will be useful in identifying driver weariness.

At whatever point the driver nods off there will be an admonition yield as alert or pop-ups. So the individual in the driver seat right away wake up and can dodge serious wounds like mishaps. The Drowsiness is the essential reason for street mishaps in excess of an alcoholic driver. So it tends to be decreased to the more prominent degree by presenting the 'Rest Detection System' in the four wheelers or above.

Driver Deviation and Drowsiness Detection System is a constant rest discovery framework. The rest recognition framework consequently record, examine and process the outward appearances progressively. The Sleep Detection System likewise record articulations of eyes and example's of rest for certain timeframe. It shows the driver's real condition whether he is languid or feeling sleepy. On the off chance that a similar example rehashes for in excess of 20 edges, at that point the alarm message is given as a sound and furthermore a notice is passed. It makes the Driver to quickly wakeup and furthermore makes the person in question to get back in condition.

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ENACTMENT OF DEEP LEARNING METHODS FOR BIRD CATALOGING BY DEPLOYING CONVOLUTION NEURAL NETWORKS (CNN)

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ABSTRACT: The species understanding is integral for ensuring biodiversity. Locating bird species is a challenging task often resulting in difficult levels. It is a difficult problem in identifying both humans and computers. To provide a handy tool for bird identification, we develop a deep learning platform and a tensor flow framework for pointing out. To develop such a system a bird data to set is required to classify an image. Winged animal pictures were ordered by a convolution neural system (CNN) to distinguish includes in the picture. The algorithm takes input image, assigns importance to various objects, and differentiates one from the other. In CNN, the Sigmoid function is used to obtain the probability of the image. Image converted to grayscale format and divided into certain pixels where more feature extraction takes place. After, the algorithm is trained good accuracy developed is the score sheet is obtained from it. The outcome acquired was of high effectiveness as the framework could undoubtedly distinguish flying creature animal groups from a picture transferred by the client.

KEYWORDS: Image recognition, convolution neural network, deep learning, web Application.

I. INTRODUCTION

A significant issue in biology, which is the investigation of cooperation's among creatures and conditions, is to screen feathered creature populaces. Classification of bird species-based image data. Winged creature viewing is a recreational movement that can give unwinding in everyday life and elevate versatility to confront difficulties. It can offer medical advantages and satisfaction got from getting a charge out of nature. Winged animals are especially helpful natural markers, as they react rapidly to changes in their condition. Winged creature characterization should be possible physically by watching highlights like shading, shape, and so on. Nonetheless, with a gigantic measure of information, this quickly turns into a troublesome and tedious procedure. Recognition of article parts is a difficult undertaking in view of complex varieties or comparable subordinate classifications and edges of items.

To develop a model and classification of image takes place by using a calculation called convolutional neural system (CNN) to capture the data from winged animal pictures caught beforehand and contrasted and the transfer picture. In the initial stage, the input is taken from user uploaded from the web application. Next, the feature vector of each part of the body is recognized, gathered and filter in light of figure(shape), length (dimension), and shading Finally, a CNN model was organized by means of flying creature images for highlight extraction with the thought of certain highlights and referenced attributes and along these lines the characterized, prepared information was put away to the server to recognize the objective article.

II. RELATED WORK

Various fine-grained acknowledgment datasets, for example, ImageNet, ILSVRC, and Caltech-256, have prepared a specimen by a broad assortment of information to remove worldwide highlights, for example, hues, surfaces, and shapes from multi-mark objects dependent on the profile, dimension, and shading. Next CNN model was prepared by fledgling pictures for highlight extraction with the thought of certain highlights and referenced attributes and in this way the ordered, prepared information was put away to the server to recognize the objective item [1]. Numerous methodologies have been applied for nonexclusive item acknowledgment [2]. A few strategies apply neighborhood part discovering that utilizes deformable component replicas and domain CNN for object zone [3], age of a jumping box, and the choice of explicit parts for picture attestation. Concurrent region and division are utilized to limit score affirmations enough [4] Discriminative picture pieces and randomization procedures were in vital to see modules of pictures and destroy over fitting [5]. The present work furthermore

Patch antenna design optimization using opposition based grey wolf optimizer and map-reduce framework

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Abstract

Purpose

Microstrip patch antenna is generally used for several communication purposes particularly in the military and civilian applications. Even though several techniques have been made numerous achievements in several fields, some systems require additional improvements to meet few challenges. Yet, they require application-specific improvement for optimally designing microstrip patch antenna. The paper aims to discuss these issues.

Design/methodology/approach

This paper intends to adopt an advanced meta-heuristic search algorithm called as grey wolf optimization (GWO), which is said to be inspired by the hunting behaviour of grey wolves, for the design of patch antenna parameters. The searching for the optimal design of the antenna is paced up using the opposition-based solution search. Moreover, the proposed model derives a nonlinear objective model to aid the design of the solution space of antenna parameters. After executing the simulation model, this paper compares the performance of the proposed GWO-based microstrip patch antenna with several conventional models.

Findings

The gain of the proposed model is 27.05 per cent better than WOAD, 2.07 per cent better than AAD, 15.80 per cent better than GAD, 17.49 per cent better than PSAD and 3.77 per cent better than GWAD model. Thus, it has proved that the proposed antenna model has attained high gain, leads to cause superior performance.

Originality/value

This paper presents a technique for designing the microstrip patch antenna, using the proposed GWO algorithm. This is the first work utilizes GWO-based optimization for microstrip patch antenna.

Keywords

Energy Sources, Part A: Recovery, Utilization, and Environmental Effects

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Euglena Sanguinea algal biodiesel and its various diesel blends as diesel engine fuels: a study on the performance and emission characteristics

Nabam Hina Papu, Pradip Lingfa

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ABSTRACT

In this study, the performance and emission characteristics of a single cylinder four stroke diesel engine have been studied by using *Euglena Sanguinea* algal biodiesel and its various diesel blends (ES10, ES20, ES30, ES40, ES40, ES50, and ES100). BSFC and EGT increase with the increase in the concentration of biodiesel in diesel. The average BTE dropped by 1.4%, 1.97%, and 4.3% for ES20, ES30, and ES40 blends

respectively compared to diesel. For emission parameters, average reduction in CO, HC, and smoke was 21.25%, 29.32%, and 7.5% for ES30, and 16.9%, 23.69%, and

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Euglena Sanguinea algal biodiesel and its various diesel blends as diesel engine fuels: a study on the performance and emission characteristics

Nabam Hina Papu, Pradip Lingfa & Santosh Kumar Dash

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ABSTRACT

In this study, the performance and emission characteristics of a single cylinder four stroke diesel engine have been studied by using *Euglena Sanguinea* algal biodiesel and its various diesel blends (ES10, ES20, ES30, ES40, ES40, ES50, and ES100). BSFC and EGT increase with the increase in the concentration of biodiesel in diesel. The average BTE dropped by 1.4%, 1.97%, and 4.3% for ES20, ES30, and ES40 blends respectively compared to diesel. For emission parameters, average reduction in CO, HC, and smoke

The International Journal of Electrical Engineering & Education

Project-based learning: Design of data acquisition module for greenhouse system

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Department of Electrical and Electronics Engineering, Aditya Engineering College (Autonomous), Surampalem, Andhra Pradesh, India

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First Published June 2,

https://doi.org/10.1177/

Abstract

This study provides a project-based learning case study of the design of data acquisition module for the greenhouse system. The project-based learning environment is provided to the final year undergraduate engineering students where the students try to develop a prototype of a greenhouse system equipped with various sensors and actuators. The learning target is to develop a fully functional laboratory prototype of the greenhouse with sensors and actuators and perform data acquisition and data logging operations in the greenhouse. In addition to the development of hardware prototype, the students are encouraged to learn the theory and modeling aspects behind the problem. The result of the project-based learning approach has been encouraging since the students were able to design the working prototype of the greenhouse with basic control functionalities.

Keywords

Data acquisition, greenhouse system, project-based learning

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Thermal Science and Engineering Progress
Volume 19, 1 October 2020, 100581

Performance evaluation of square pyramid solar still with various vertical wick materials – An experimental approach

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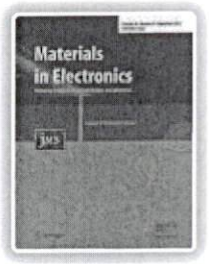
https://doi.org/10.1016/j.tsep.2020.100581

Highlights

- The theoretical and experimental analysis of square pyramid solar still was performed.
- Performance of still was evaluated for various depths of basin water.
- The productivity of condensate water was maximum for 2 cm basin water depth.
- Various wick materials were kept vertically in the solar still for enhancing the yield.
- Woolen fabric wick material has given the most optimum productivity among all the wick materials.

Abstract



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Published: 24 August 2020

Naturally derived $FeTiO_3$ nanoparticles: analysis of optical properties

Dhineshbabu Nattanmai Raman, Vettumperumal Rajapandi, Arunmetha Sundaramoorthy, Srither Satturappa Ravisekaran & Narendrakumar Annadurai

Journal of Materials Science: Materials in Electronics
31, 16951–16958 (2020)

Abstract

Eco-friendly metal titanates, which are abundant in nature, are widely used in our day-to-life in a variety of areas. This work is focused on the optical properties of $FeTiO_3$ (FT) nanoparticles prepared by acid extraction method from ilmenite sand. The prepared $FeTiO_3$ nanoparticles were analyzed by ultraviolet (UV) spectroscopy. Various linear optical parameters such as refractive index, extinction coefficient, absorption coefficient, real and imaginary parts of dielectric constant, loss tangent, optical conductivity, electron energy loss, and dielectric relaxation time were calculated in 1.5–6 eV energy range and discussed as a function of photon energy. The calculated values of the real part of complex permittivity and volume energy loss were higher than those of the imaginary part of complex permittivity and surface energy loss,

Technol. **117**, 1–60 (2012)

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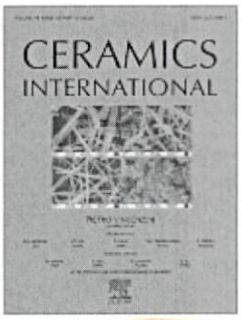

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Synthesis of dysprosium/Mn–Cu ferrite binary nanocomposite: Analysis of structural, morphological, dielectric, and optomagnetic properties

R. Rajesh Kanna [a], K. Sakthipandi [b], A. Senthil Kumar [c], N.R. Dhineshbabu [d], S.M. Seeni Mohamed Aliar Maraikkayar [e], A. Sabah Afroze [a], Rajshree B. Jotania [f], M. Sivabharathy [b]

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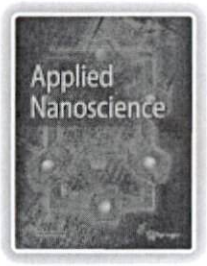
https://doi.org/10.1016/j.ceramint.2020.02.157

Abstract

Manganese–copper ferrite (MCFO) and dysprosium (Dy)-doped manganese–copper ferrite nanocomposites ($Mn_{0.5}Cu_{0.5}Dy_xFe_{2-x}O_4$) ($x$ = 0, 0.05, 0.10, and 0.15) were synthesized by sonochemical method. Crystal structure and the structural parameters of the MCFO were analyzed based on the doping concentration of Dy ion. It was observed that the average crystalline size of the synthesized nanocomposite decreases when the concentration of Dy increases. The existing spherical surface morphology of the MCFO and Dy-doped MCFO nanocomposites were obtained through scanning electron microscopy. In the UV spectrum, the pristine MCFO sample showed an absorbance peak at 743 nm whereas the absorbance values of Dy-doped ferrite nanocomposite considerably shifted (blue) toward a lower wavelength (231–222 nm). The dielectric parameters of all ferrite nanocomposites were studied in the frequency range of 100 Hz to 5 MHz. The dielectric spectrum revealed that dielectric constant and loss tangent decreased with increased doping



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Original Article | Published: 26 November 2020

A study of linear optical properties of ternary blends PVA/CMC/aloe vera biofilm for UV shielding

N. R. Dhineshbabu, R. Vettumperumal & R. Kokila

Applied Nanoscience **11**, 669–678 (2021)

Abstract

In this study, the solvent casting method was applied to prepare ternary blend PVA/CMC/aloe vera (60%/20%/20%) biofilms in the form of the freestanding polymeric film. The X-ray diffraction pattern revealed 93% of crystallinity of the polymeric film. The presence of functional bonding on the biofilms was analyzed by Fourier-transform infrared spectroscopy. The hardness and Young'smodulus of the prepared biofilms were examined by the nanoindentation technique. Ultraviolet (UV) absorption spectroscopy study showed that the PVA/CMC/aloe vera (PCA) blended biofilm absorption was around 280 nm, indicating a well-defined $n - \pi^*$ electronic transition. From the UV spectroscopy study, the absorption coefficient; Urbach energy; direct, indirect, and forbidden bandgap; optical and dielectric constant, and loss tangent of the PCA biofilm were calculated. Viscoelastic behavior of the

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Ethics declarations

Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Results in Physics
Volume 19, December 2020, 103487

Cadmium substitution effect on structural, electrical and magnetic properties of Ni-Zn nano ferrites

P. Anantha Rao [a], Vemuri Raghavendra [b], B. Suryanarayana [a], Taddesse Paulos [c], N. Murali [a] ✉, P.V.S.K. Phanidhar Varma [a], R. Giri Prasad [d], Y. Ramakrishna [a], K. Chandramouli [a]

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Highlights

- Increased crystallinity nature: Indicating its increasing stability.
- Decreased magnetic saturation and increased coercive force: Useful in memory devices.
- Decreased frequency of the vibration from FT-IR: Decreasing the tensile stress means applicable for sensible sensors.

International Journal of Advanced Science and Technology
Vol. 29, No. 7, (2020), pp. 12973 - 12978

Study on the Load Analysis of Strata Using Lod Cell in Underground Coal Mines

Abhishek Kumar Tripathi and Nalluri Satish Kumar
Department of Mining Engineering, Aditya Engineering College, Andhra Pradesh

Abstract

The failing of the strata in underground coal mines is one of the popular hazards during the coal winning operation. The main objective of this paper is to study the strata behaviour of underground coal in association the goaf edge distance (GED). An extensive case study was performed to study the variation of load on the strata under varying GED condition. The outcome of the study revealed that the load on the strata increase with the reduction in the value of goaf edge distance. This increase load value on the strata increases the pressure on the strata which brings the strata under the danger zone. Therefore, a systematic support system is recommended in the paper while performing the coal winning operation near the edge of the goaf.

Keywords: Strata, coal winning, load, goaf edge distance.

1. INTRODUCTION

Coal is a fossil fuel which helps in the development of development of the country. The development of any country is primarily depended on the availability of electrical power supply. Coal is one of the most important fossil fuels which aids in the generation of electrical power. In India, 60% of the total installed electrical power is based on coal. Therefore, the efficient extraction of coal from the mines is very necessary [1]. In general, there are two method for the extraction of coal from the mines such as open cast and underground method. In India the production of coal from open cast mines is more famous than the underground mines [2]. Even though, the open cast mines are cost effective than the underground mines still the many Indian coal mines are practicing the underground mines method due to the greater depth of the coal seam. Coal is a fossil fuel which helps in the development of development of the country. The development of any country is primarily depended on the availability of electrical power supply. Coal is one of the most important fossil fuels which aids in the generation of electrical power. In India, 60% of the total installed electrical power is based on coal. Therefore, the efficient extraction of coal from the mines is very necessary [3]. In general, there are two method for the extraction of coal from the mines such as open cast and underground method. In India the production of coal from open cast mines is more famous than the underground mines. Even though, the open cast mines are cost effective than the underground mines still the many Indian coal mines are practicing the underground mines method due to the greater depth of the coal seam [4].

There are two underground coal mining methods namely, Bord and Pillar (B&P) and Long wall [5]. In this paper the study of strata behaviour in B&P working was conducted. In bord and pillar (B&P) method of working the pressure developed on the strata is essentially based on three main factors, such as depth of thee working from the surface, area of development and area covered by the B&P method. In bord and pillar working, the maximum pressure experiences by the pillar is due to the overlying weight of the strata which consists mainly shale and sand stone [6]. Optimization of safety and recovering during underground coal mining involves a number of measurements through instrumentation and monitoring. Generally, the strata behaviour in underground coal mines are analysis theoretically and modelling do not yield reliable results. This happens because the differences in the characteristics of the surrounding rock mass between real and theoretical assumptions [7]. Thus, the physical measurements of strata behaviour in B&P working is more important than the theoretical modelling. This is the reason why most of the strata control norms are based on empirical formulations. These empirical formulations require quite dependent on the field measurements parameters. However, the field measurements of the parameters during underground mining are extremely challenging. Hazardous nature of instrumented site during

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JOURNAL OF CRITICAL REVIEWS

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AGE INVARIANT FACE RECOGNITION TECHNIQUES: A CRITICAL REVIEW STUDY

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ABSTRACT: Face recognition (FR) has drawn intensified interest and attention in the domain of computer vision.FR has been researched for the last three decades but, still it is a challenging research area because the face recognition accuracy is limited by the variability of personal appearances, variant poses, facial expressions, illumination, and aging. Age Invariant face recognition (AIFR) is a significant problem that has not been extensively studied until recently. In this paper, we survey some well-known techniques for cross-age face recognition. We present a comparative analysis of various approaches in terms of robustness to aging. Also, the important facial aging databases together with their number of images per each subject are briefly described. Finally, we present the discussions on the experimental results from these methods, challenges, conclusions, and guidelines for future work.

KEYWORDS: age progression, Age invariant face recognition, Deep learning, Generative method, Discriminative method, Convolutional Neural Network

I. INTRODUCTION

Despite major progress in AIFR techniques in the past decades owing to advances in face modeling and analysis, AIFR remains a challenging and unsolved problem. The difficulty of this problem emerges from the way that the appearance of human faces can undergo large variations due to the aging process as shown in Fig.1. Published approaches to AIFR are constrained and still, they are far from expectations. A couple of survey papers on facial identification that addresses the problems caused by variations in pose, illumination, and expression [1][2][3], have reported improved recognition rates on difficult datasets, even better than human performance. The aging process impact on the performance of FR is more when compared with other appearance variations. One of the solutions to resolve this problem is periodically updating the training data for every six months or one year through a data acquisition process. However, updating facial images frequently is a tedious and time-consuming task. Earlier literature available on cross-age facial recognition[4][5][6] broadly includes holistic based and feature-based approaches. This survey encompasses some of the approaches and solutions of AIFR in recent years that significantly improve the recognition accuracy. The remainder of this paper is structured as follows. In section 2, a survey of the methods and results on currently used facial aging datasets are presented. Section 3 discusses the existing challenges and promising future directions in this research. The last section concludes the study.

Figure 1. Face variations of an individual by age

International Journal of Advanced Science and Technology
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Study of the Dependence of Blast Induced Ground Vibration on Charge per Hole and Rock Strength

Abhishek Kumar Tripathi, G. Durga Nookaraju and Satyajeet Parida
Department of Mining Engineering, Aditya Engineering College, Andhra Pradesh

Abstract

The objective of this study is to examine the influence of control and uncontrol blast parameters on the blast-induced ground vibration. The blast-induced ground vibration can be measured in the form of peak particle velocity and peak vector sum. In this paper, the effect of control blast parameter, such as charge per hole was considered, on the blast induced ground vibration was studied. This study showed the proportional relation with blast-induced ground vibration. It was observed that the PPV value was higher in the longitudinal direction as compared to the other two directions at the time of the variation in charge per hole. Further, the effect of rock strength on the blast-induced ground vibration was also examined which showed that the higher strength rock produces more ground vibration at the time of blasting.

Keywords: *Blast induced ground vibration, peak particle velocity, blasting, rock strength, charge per hole*

1. INTRODUCTION

Mining industry is the backbone for the economic development of any nation. The wealth of the nation can be expressed with its mineral resources which helps in the effective industrial development of the country [1]. As these minerals are situated under the earth (within the earth crust) of sufficient depth, therefore, it is very difficult to access such minerals commodity. The surface and subsurface mining activities are the two possible ways to extract these under earth minerals. The surface mining activities have drawn a huge attention in last one decade because of its ease in operation and high mineral recovery efficiency. Drilling and blasting are considered to be the two essential mining operations by any surface mining industry. Drilling is the process of making holes in to hard surfaces and involves disintegration of rock mass. At the time of drilling, there are different types of forces, which act between the drill unit and rock interference and helps in obtaining the effective drilling results. The drilling results depend on the type of drill bits used and the mode of energy used for the drill operation [2]. Drilling of holes for the insertion of explosive charge is the very first step in any blasting operation. The blasting operation is the process of converting a huge rock mass in to small piece of fragments with the help of suitable explosive charge. During the process of blasting the energy produced by the explosives helps to fragment bigger size rock masses into smaller sizes [3]. The adoption of systematic and suitable blasting techniques helps in getting the required size of fragmented result [4].

The blasting operation, not only plays an important role in mining but it also performs some essential tasks in tunneling, excavation and civil constructional activities [5]. It is the most economical way to break large size rock masses. In blasting, whenever any explosive charge (which is inserted in blast hole) is initiated, comparatively a smaller amount gets used for the real task i.e. fragmentation of rock mass and a larger amount gets wasted in the form of gas, heat, pressure and shock waves. The mechanism of blasting explains that, whenever the explosive charge explodes in the blast hole (on the earth's surface), the generated pressure, due to the initiation of explosive, produces blast waves due to which, the particles surrounding the blast hole move and produce ground vibration [6]. This generated vibration is mainly caused by the explosion induced shock waves in the ground surrounding the blast hole [7]. Here a notable fact is that, 70 to 80 % of the energy gets wasted in the form of blast induced ground vibration (BIGV) and fly rock, dust and noise generation, which can be labelled as the side effects of blasting, whereas the rest, very small amount of energy is utilized for rock breakage [8]. The generation of these side effects have adverse impacts on the environment. Among all the generated side effects ground vibration has the most dangerous and instant impact on the surrounding civil structures. The generated BIGV can cause serious damage to the surrounding structures. As per the study conducted by various researchers [9],[10], the generated BIGV can be quantified by PPV (peak particle velocity) and frequency. The PPV is considered as the basic parameter to assess the level of BIGV. The PPV in simple terms, can be presented as the physical movement of ground particles during blasting operations, with respect to time [11]. The value of PPV mainly depends on the amount of charge per delay and the distance of the point in concern from the blast source [12]. As the rock is a 3D object, the PPV generated in the rock also consists of three directions, namely transitional, vertical and

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STUDY ON CROSS LINGUISTIC FEATURE WITHIN DRAVIDIAN AND ENGLISH SCRIPT TO ESTABLISH THE SOURCE OF QUESTIONED DOCUMENT

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Keywords: Dravidian language, Tamil Script, Questioned documents, Regional language effect, Telugu Script, Malayalam Script.

ABSTRACT

This paper presents the influence of Dravidian language and its acquired characteristics on the secondary language. In this paper the three Dravidian languages, namely, Tamil, Malayalam and Telugu were considered for studying the regional language features on English language (secondary language). The present study has been conducted by taking handwriting exemplar of 565 subjects and focus has been made on the Handwriting features of secondary language due to primary language. The main objective of the work is to observe what effect, if any, between two well- known scripts of the Handwriting of the same subject is carrying. The observations of this paper have shown that writer carrying the individual characters from the primary language while writing the secondary language. Handwriting and its uniqueness are a result of our subconscious mind and the same is observed in this study where the writer has picked up his or her frequently used individual characters from his or her primary language into the English script. This study will be useful in proving the authorship of questioned document where only one of the handwriting samples is available (i.e., either Regional or English) and the other handwriting's authorship needs to be identified.

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Analysis of Fingerprint Pattern Distribution Framework of Telugu Population in India

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ABSTRACT: Fingerprint and its comparison have been consequential in a criminal investigation as well as to settle civil disputes. The present study was conducted on the Telugu population having the sample loads of 1660 digit which consist of 73 Males and 93 Females. In the present research work, it was observed that the Ulnar loop patterns showed the highest number of repetition than the other patterns. It was observed that the Ulnar loop fingerprint pattern was reported to be the maximum repetition frequency of 835 times and on the other hand, the Tented arch pattern was recorded as the minimum repetition frequency of 36 times. Further, the female subjects in the Ulnar loop pattern were reported the higher percentage of repetition of 52.04% than the male subject of 48.08%. The outcomes of the present research work will help the Investigating agency by confining the area of investigation in the event that specific unique pattern is recuperated from the area of wrongdoing.

Key Words: Telugu population, Dermatoglyphics, Pattern distribution, fingerprint pattern, Individuality, Forensic Science, Criminal investigation, Crime Scene.

I. INTRODUCTION

Fingerprint pattern can play a pivotal role in finding the main culprits during the course of a criminal investigation. Fingerprint could be one of the crucial evidences at the crime scene apart from various types of evidence, namely, biological, chemical, trace and impression evidences. An impression / Pattern is a type of evidence of the crime scene where tire impression, footwear impression, foot mark, tool mark and fingerprints are being analyzed. The fingerprint impression can be found on the various surfaces such as pliable, fragile and rigid objects. There may be two types of impression visible and latent. The visible impression is one which doesn't need development, whereas the latent impression requires a proper enhancement or treatment by the use of chemical reagent or physical development powder [1].

The study of science and technology in the fingerprint is known as Dactyloscopy or Dactylography [2]. The study of epidermal ridges and the patterns formed by them is known as Dermatoglyphics [3]. The term Dermatoglyphics was coined by the anatomist Harold Cummins of Tulane University, which means skin carving (Krishan, 2009). Population distribution based on the fingerprint pattern can be an important evidence in ruling out or including the individual in population specific manner. A study conducted by [4] confirms the variation in a fingerprint pattern of individuals from different geographical origin. In the similar study, the Indian population has been subject for the study of Fingerprint patterns and different segment of the population has been chosen to be the subject of study. One such study has been performed in the Marathi population and it concluded that Ulnar Loop was the most common pattern among them, which was recorded to be 51.3% [5].

Fingerprint distribution has shown the varying nature with reference to the geographical origin. A study has been carried out by [6] showed the global variation of fingerprint pattern. In the same study it was observed that the two persons can be same by Anthropology wise, but their fingerprint impression has been an eminent identity

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From Epidemic to Pandemic- Covid-19- Psychological, Social and Environmental Impact- A Qualitative Study

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Abstract

Corona virus has shaken the entire globe and India is no exception to this. Minimal human interaction, social distancing, quarantine, isolation, lockdown are the terms that were being repeatedly pronounced and heard. The lockdown started in the month of March, 2020 and is being extended till May 2020. This paper discloses the psychological, social and enviroinmental impact of the pandemic. The findings divulge the responses collected from the survey. It has helped to comprehend the various aspects connected to Covid-19 and the ways to cope with the crisis.

Key words- *Covid-19, Corona virus, Psychological, Social, Environmental, Impact*

I. INTRODUCTION

From epidemic Corona virus hazard has become pandemic. It has scrapped its way into almost every continent, including our state of mind; Nation-wide lockdown has been prescribed in India. People are entangled in quarantine; it may be self-isolation at home or instructed quarantine to avert contamination. The objective of this study is to explore people's psychological impact on COVID-19 situation. The social and environmental aspects of the lockdown were also the point of focus and discussion.

II. LITERATURE SURVEY

Ellepola, A. Rajapakse's (2020) research paper on the foreseeable psychological impact of Covid-19 in Srilanka is based on the published literature on infectious diseases and disasters and clinical experience of the authors. It states that susceptible health care workers, quarantined persons, affected people require special attention. Improving psychological outcome is necessary by various clinics, training programs and workshops. A study on previous cases like these, identification of anguish at an earlier stage will prove to be effective in treating the present crisis in hand. Elders are vulnerable to anxiety disorders. There could be depression of anxiety disorders, symptoms of frustration, exhaustion and work related problems among the general public. Infodemics is another issue that is spoken in the article where people collect too much information from various sources and couldn't come to a conclusion. Psychological sequel post Covid 19 is something that needs to be taken immediate care of. Thus there would be major health implications causing prolonged psychological problems. Duration of the impact is prolonged as the spread is continuing globally. Stigmatization, unemployment, financial hardships could spoil the psychosocial interactions of people and further complicate the picture.

Sijia Li , Yilin Wang. Jia Xue Nan Zhao ,and Tingshao Zhu (2020) in their paper on "The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users"

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A Novel Approach to provide more Security for Multi-Click Recognition based Textual Graphical Scheme (SMCR-TG)

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Abstract

Nowadays password plays a vital role for User Authentication. To provide more security to information, password should be lengthy and typical. In order to avoid attacks whenever password becomes lengthy it becomes difficult for the users to remember that harder passwords. To overcome this technique called SR-MCR-TG is used which was an alternative to textual passwords. As it is easy to remember pictures than the textual passwords. In this paper, we have proposed an enhanced approach for graphical password based system named SMCR-TG, which offers much compensation to the existing system.

Keywords: *Graphical Password, Security, authentication, SMCR-TG*

1. Introduction

Information security plays an important role for protecting system data or information. So for Identification of a person a process called Authentication is required and most of the commonly used passwords are alphanumeric. In order to resist from brute force attack most of the users prefer strong passwords which is combination of numerical, letters and symbols [1]. As Textual passwords are tough to memorize, different graphical password authentication schemes were developed.

2. Categorization of Authentication Methods

Authentication techniques are of three types. Token based, Biometric based, and Knowledge based authentication

2.1. Token Based Authentication

It permits users to enter their userid and secret password to attain a token which gives access for user to obtain a particular resource without using their credentials. Token based authentication requires users to attain a token before they're granted network entry.

2.2 Biometric Based Authentication

For identification of a person Biometric Based Authentication uses human body characteristics like iris, retina, finger prints, signature and voice [7]. In token based authentication the user may forget the token otherwise key may be cracked so most of the authentication systems are biometric based as it is more secured because the body organs of a person cannot be accessed without their authorization but it requires hardware.

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ARTIFICIAL INTELLIGENCE AIDED DIAGNOSIS OF CHRONIC KIDNEY DISEASE

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Abstract

Disease Diagnosis is the most tough processes and requires sophisticated techniques to overcome the inefficiencies. The Artificial Intelligence Aided Machine Learning Techniques came into existence to deal more effectively with the arising problems related to medical diagnosis. As medical diagnosis is totally based on human abilities, uncertain factors and ambiguous symptoms, there is always a flaw in diagnosing the diseases. Machine Learning Techniques prove to be a more effective solution to this. This paper aims to present a brief outline of the classification of patients suffering from or not suffering from Chronic Kidney Disease, based on a standard data set available publicly. The classification is done using models developed using nine different machine learning algorithms like the Linear Regression, Generalized Regression, Discriminant Analysis, Classification Tree, Regression Tree, Support Vector Machine, K-Nearest Neighbours, Ensemble methods using Subspace and Rusboost. The models are trained and tested using different samples in 20 iterations. These models are evaluated using eleven various evaluation metrics for machine learning algorithms. After experimentation, it was observed that Models developed using Support Vector Machines have shown a high classification accuracy when compared to other models in more iterations and are best suited for classification problems.

Keywords— Disease Diagnosis, Machine Learning techniques, UCI CKD Data set, Linear Regression, Generalized Regression, Classification Trees, Regression Trees, Ensemble methods, SVM, K-Nearest Neighbours, Confusion Matrix.

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INTRODUCTION

Chronic Kidney Disease indicates an abnormal functioning of the kidney. As the disease propagates gradually, it shows fewer symptoms or indications at the early stage, whereas it is the stage in which the chances of cure are highest. Owing to the ill-defined or vague symptoms, diagnosis by humans can be highly erroneous. The other factors, which may produce an error in a human diagnosis can be negligence, fatigue, lack of experience, confusion, etc. To overcome this, a well-trained Artificial Intelligence (AI) Models can be utilized.

The Models can be created using the available data and different AI techniques or the Machine Learning (ML) techniques. The training to the models can be given by sets of repeatedly verified data. In manual diagnosis, the concerned personnel has to mine the information required from a huge collection of medical data, which can be controlled by few clicks in computer-based diagnosis using Artificial Intelligence as mentioned in the paper published by Gharehchopogh et. al (Farhad Soleimanian Gharehchopogh, 2013). Therefore, using such Artificial Intelligence aided computer-based diagnosis techniques, the future reference to data already analyzed is a way much easier than the manual diagnosis. These models can now be used for diagnosing if a patient suffers from a disease or not very easily.

LITERATURE REVIEW

Few works related to the area of Thyroid Disease diagnosis have already been done by Razia (Razia et al., 2020), Mukherjee (Mukherjee, 2016), Appiah (Appiah et al., 2015). The literature presented here gives diverse approaches to categorize and assess the test cases of different diseases by the use of a variety of learning algorithms. The key utilization of the classification techniques or algorithms or practices is to envisage the target class precisely for every sample in the data set. The latest study is concentrated on the utilization of these classification techniques in the field of bioinformatics or general medicine science. The center of attention of this review is to study the different approaches used for the prediction and classification of diseases suffered by humans.

J Lena and R Swain (Jena & Swain, 2018) classified a Chronic Kidney Disease (CKD) data set using the Naïve Bayes and Multilayer Perceptron classification techniques to predict the output class for each sample of the dataset and evaluated it using some criteria. The dataset used for the purpose and the percentage of samples used for training and testing was not mentioned.

Y. Wu, H. Wang and F. Wu (Wu et al., 2017) used random forest classifiers to classify tuberculosis and sarcoidosis based on the available medical reports of patients. As various medical data formats, maintained at various isolated systems were used, feature selection was difficult to classify the disease.

In the paper by Y. Udovychenko, A. Popov and I. Chaikovsky (Udovychenko et al., 2015), applied the k-Nearest Neighbour algorithm for classification of Myocardium Current Density Distribution Maps (CDDM). CDDMs covering most of the possible cases of patients suffering from ischemic heart disease were compared with healthy heart persons. The selection of the value of 'k' in the k-NN classifier was done mainly to optimize the classification accuracy. The main criteria for selecting a value of k in k-NN is to optimize the functions like precision, specificity, accuracy and sensitivity of classification.

In the work done by D. Chauhan et. al (Chauhan & Jaiswal, 2016), a model for classification and detection of Lung Cancer diseases based on a machine learning approach was projected. Though, the approach obtained good results, but a considerable expertise in computation was necessary for execution in addition to the standard datasets considered for comparing the working of the proposed model. A prediction model based on PCA and LDA with user-friendly features was developed. The proposed method was developed and validated in MATLAB with ICA and SURF method.

Hannan (Hannan et al., 2010) have worked on diagnosis of heart diseases using Neural Networks like GRNN & RBNN, Kumari (V. Anuja Kumari & R.Chitra, 2013) worked on classification of diabetes diseases using Support Vector Machines, Subas (Abdulhamit Subas, Emina Alickovic, 2017) have diagnosed Chronic Kidney Disease using Random Forest, Siwy (Siwy et al., 2017) have diagnosed Chronic Kidney Disease using urinary proteome analysis, Charleonnan (Charleonnan et al., 2016) have worked on analysis of kidney disease using few machine learning techniques and Sinha (Parul Sinha & Poonam Sinha, 2015) have used KNN and SVM for chronic kidney disease prediction.

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Performance Evaluation and Simulation of a Nine-Level Voltage Source Inverter

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Abstract. A nine-level inverter topology with a minimum component count and higher reliability is proposed in this paper. The presented topology employs a T-type converter (T^2C), a two-level cell, an H-bridge circuit, and two dc power supplies. This topology has the advantage of operating two-level cell switches and half of the H-bridge switches at low-frequency. This reduces the switching losses in the proposed topology compared to other configurations. The operating modes of the proposed inverter are analyzed in detail during zero, positive, and negative levels. The proposed topology is gated using sine-triangle Pulse Width Modulation in MATLAB/Simulink environment and the output results are illustrated.

Keywords — ***multilevel inverter, T-type converter, nine-level, pulse width modulation (PWM), total harmonic distortion***

1 Introduction

Multilevel inverter (MLIs) topologies are finding their applications in several areas such as AC drives, FACTS, renewable energy sources [1-2]. Although Neutral point clamped (NPC), Flying capacitor clamped (FCC) and Cascaded H-bridge (CHB) converters [3-6] are the standard MLI topologies, the component count in these topologies increases drastically w.r.t the number of levels in the output voltage. In order to alleviate the limitations in standard topologies, new MLIs with a reduced number of components are developed and are suggested in many applications [7-9]. From the past few decades, many such Voltage Source Inverters (VSIs) have been reported using several combinations of power semiconductor devices, isolated dc supplies and other devices [10-12]. In particular, the lower switch count symmetric H-bridge (HB) inverter requires eight switching devices and four dc power supplies [13], or two dc power supplies and 12 switching devices [14] to produce a 9-level (9-L) PWM voltage. Lower switch count asymmetric HB circuit employs the different magnitudes of independent dc supplies [15], [16]. Further, the reduced device count modified converter uses ten switching devices and four same magnitude dc power supplies to output the 9-level voltage [17].

The proposed converter offers a reduced count of switching devices, reduced number of dc power supplies, and lower off-state voltage stress across the switching devices. This script is detailed as follows: IInd Section explores the working of the proposed inverter, and its operating modes, in Section III, the modulation scheme with improved spectral performance is shown, in IVth Section, the simulation results at different values of modulation indices are discussed and Vth Section, discusses the conclusion.

2 System Configuration

Fig. 1 depicts the proposed single-phase 9-L circuit operating with the inverter principle, using ten switching devices and two independent dc sources. All the switching devices used in the proposed configuration are of bi-directional conducting devices with uni-directional voltage sustaining ability. The switches S_4 and S_5 are joined in anti-series to achieve the bi-directional voltage blocking capability. The switches S_1 and S_2 form a two-level cell and controlled at the fundamental switching frequency (f_m). The switches S_7 and S_8 also operate at the switching frequency equal to f_m that results in reduced switching losses of the configuration. The dc supplies can be obtained either from rectifier circuits, battery banks, or pv arrays.

Comparative Analysis of Thyristor based and PWM based Controlled Rectifier

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Abstract: This paper provides different control aspects and fault detection aspects of a PWM rectifiers and thyristor based phase controlled converters. A comparative analysis of firing angle control of 3-phase phase controlled converter and sinusoidal PWM based control of 3-phase controlled converter has been discussed and simulated.

Keywords: Phase controlled converter, firing angle, PWM

Introduction

Control and fault detection of phase controlled converter are one of the most important parameter in power electronics. Phase controlled rectifier can be controlled either by using delay angle or by using PWM technique. In delay angle based control, there is only one pulse per half-cycle in input current of converter. So 3rd order harmonic is encountered which is difficult to eliminate. PWM based control technique, the output voltage is controlled by varying pulse width.

New synchronization method for phase controlled converter for weak AC source has been discussed in [1,7]. A generalized firing angle control and microprocessor based firing angle control of phase controlled converter has been discussed in [2,3,4,6,8,9,13]. Phase locked loop control of thyristor converter has been discussed in [5]. Harmonic issues generated due to unbalanced source has been discussed in [10]. Fault diagnosis and control of thyristor phase controlled converter has been discussed in [12,14].

This paper provides a comparative analysis of firing angle control scheme and sinusoidal PWM based control of PWM rectifier. Fault diagnosis aspect and different control aspects have also been discussed.

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Analysis of V-Clamp based seven-level Inverter

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Abstract— ***A seven-level inverter topology with the minimum component count is presented in this paper. This topology is based on novel V-clamp structure. All branches of the V-clamp structure withstand a single-level voltage of the DC-bus capacitors during its turn-off process. Therefore, the switching devices are modulated as simple as one switch and the dynamic voltage unbalancing issue is avoided. In this paper, the operating principle and the modulation method of the V-clamped converter are analyzed in detail. In addition, the simulation results for various modulation indices are presented in detail. The operating modes of the proposed inverter are analyzed in detail during zero, positive, and negative levels. The proposed topology is gated using sinusoidal Pulse Width Modulation in MATLAB/Simulink environment.***

Keywords— *multilevel inverter, seven-level, pulse width modulation*

1. Introduction

Conventional multilevel topologies, such as the neutral point clamped converter (NPCC), flying capacitor converter (FCC), cascaded H-bridge converter (CHBC), as well as the modular multilevel converter (MMC), have been well studied and commercialized in the past decades [1-3]. However, when the voltage levels increase, the number of clamping diodes in the NPCC and flying capacitors (FCs) in the FCC rises tremendously [4,5]. Furthermore, the NPCC suffers from indirect clamping of the inner devices when the voltage level is higher than three [4]. The CHBC and MMC are easier to expand the voltage levels due to their modular design [5]. But the CHBC needs a phase-shifting transformer to provide isolated DC sources, which results in substantial investment and volume [6-9]. The MMC shows good prospects for HVDC transmission. But the complex controls (e.g., capacitor voltage balancing control and circulating current suppression control) and relative high primary investment make the MMC less attractive in medium-voltage applications [10-12].

The proposed converter offers the benefits of a reduced number of switching devices, a reduced number of dc power supplies, and lower off-state voltage stress across the switching devices. This script is detailed as follows: II[nd] Section explores the operation of the proposed inverter, and its operating modes, in Section III, the modulation scheme with improved spectral performance is shown, in IV[th] Section, the simulation results at different values of modulation indices are discussed and V[th] Section, discusses the conclusion.

2. System Configuration

Fig. 1 shows the proposed three-phase seven-level inverter using switching devices, clamping diodes, and dc-link capacitors with a single independent dc source. All the switching devices used in the proposed configuration are of bi-directional conducting devices with uni-directional voltage sustaining ability. The dc supplies can be obtained either from rectifier circuits, battery banks, or pv arrays.

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A Seven-Level Inverter Topology for Medium-Voltage Applications

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Abstract— **In this work, a novel 7-level voltage source inverter (VSI) topology is proposed for high power medium-voltage (MV) applications. The proposed circuit has a fewer number of components compared to the existing advanced 7-level configurations. All the switching devices possess the same voltage rating. Sinusoidal modulation (SPWM) technique is developed for the proposed topology to control the flying capacitor voltages. The behavior of the proposed converter is tested in both steady-state and dynamic conditions in MATLAB/Simulink.**

Keywords— *multilevel inverter, seven-level, pulse width modulation*

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Design and Implementation of VSI for Trinary Sequence

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Abstract— **This paper introduces a multilevel inverter (MLI) circuit that uses trinary sequence of the dc sources. It gives maximum number of output voltage levels with minimum number of dc source and switch count. This is due to the fact that the trinary sequence generates all of the additive and subtractive combinations of input dc levels in the output voltage waveform. This concept is implemented on a nine-level asymmetric MLI using only four switching devices. Multicarrier pulse width modulation technique is implemented to generate the switching pulses. The proposed concept is gated in performed in a MATLAB/Simulink environment and the simulation are presented.**

Keywords— *multilevel inverter, trinary sequence, pulse width modulation*

1. Introduction

Multilevel inverters (MLI) are attracting greater recognition as a predominant solution for power electronics in the integration of renewable energy sources (RESs) integration, flexible ac transmission system (FACTS), electric vehicles, motor drives, and other high power inverter applications [1].

MLIs can be classified as asymmetric and symmetric based on the magnitude of the DC sources. MLIs with hybrid arrangement are another alternative to increase the voltage levels. For example, hybrid MLI topology composed of FC and CHB has considered. However, the utilization of FC has obvious disadvantages as it requires large electrolytic capacitors and complicated control method to get rid of the capacitor voltage balancing issue [2]. Based on this aspect, many configurations have been evolved in both symmetric [3-5] and asymmetric types [6-8]. Symmetric topology has dc sources of equal magnitude, while the asymmetric utilizes dc sources of different magnitudes. In [9], a switched ladder MLI has been developed for producing the maximum level with the help of lesser component count. In [10], a square T-type has been developed by combing the two back to back T-type converters and few extra switches.

Based on this observation, a nine-level MLI circuit that can accommodate the trinary dc source sequence is proposed in this work with the ability to produce all additive and subtractive combinations of input dc sources in the output voltage waveform. Moreover, it eliminates redundancy switching states, reducing the control complexity for switching pulses generation. Also, the proposed topology operates at unipolar PWM, which compared to bipolar switching, reduces the carrier count by half.

2. System Configuration

Fig. 1 shows the nine-level inverter using switching devices, and dc-sources. All the switching devices used in the proposed configuration are of bi-directional conducting devices with uni-directional voltage sustaining ability. The dc supplies can be obtained either from rectifier circuits, battery banks, or pv arrays. To produce the 9-level output across the load terminals the dc-source voltage magnitudes are chosen as $V_{dc1} = 3V_{dc}$ and $V_{dc2} = V_{dc}$.

Wideband Characteristics of Antenna: A Succinct Study

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ABSTRACT

Antenna with wideband and Ultra High frequency characteristics utilized for Television Broadcasting, data transfer to the devices located remotely. The earlier Yagi-Uda Antenna supports bandwidth of 0.62GHz to 2.13 GHz with a gain of 10dBi. Due to the physical dimension and carrying comfort there is necessity to design the antenna with fewer dimensions like patch antennas without the penalty of several applications. Antennas with High gain and wideband characteristics are achieved by cutting notch opposite to the feeding plane. The front and back side ground plane slopes are created to improve the bandwidth. The proper impedance matching along with the prior methods helped to obtained better response. The final Antenna has achieved a band width of 0.4 GHz to 3.06 MHz which covers entire UHF band with peak gain of 2.73 dBi to 6.09dBi. At operating frequency, the antenna achieved with a peak gain of 4.62dBi.

Keywords: Television Broadcasting, ultra high frequency, wideband antenna, Dipole antenna.

INTRODUCTION

Nowadays, Portable device applications are more dependent on wireless communication technologies. The Television broadcasting, Cellular, Wireless LAN (2.40 GHz to 2.484 GHz), Wi-MAX (2.50 GHz-2.690 GHz), Global system for Mobile communications (GMS 900) etc... Falls on UHF band applications. A multiband antenna fulfils the all unique features for different applications in a single antenna. But, for practical applications antenna with high gain, less weight and dimensions are preferred. The planar micro strip patch antenna would support wide band frequencies [1-5]. Due to large ground plane physical features some antennas may not operate over whole UHF band [6]. The planar monopole antenna supports wide range of frequencies along with high data transmission.

As more band width and high data rate required for solitary antenna in different applications up to 1.6Gbps. This wideband planar monopole antenna covers the all-out UHF band. So, it can receive all frequencies [7-12]. In this paper, a statistical review and analysis of micro strip antenna for Television and UHF band applications have been studied. A wideband monopole antenna continued by the executive bolstered coplanar waveguide is discussed. The coplanar waveguide is a type of electric planer transmission line. On a smaller scale, we use the coplanar waveguide. It is used to convey the microwave frequency. It has an advantage that it has stability on the transmission line waveguide. Using a Triangular shaped patch, adding Notch at the top we get high gain and large bandwidth. This antenna is achieved the enhanced characteristics.

Performance Study of Efficient Hybrid Architecture of 1-bit Full Adder Circuit

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ABSTRACT

In this paper, each complementary metal chemical compound semiconductor logic and transmission gate logic hybrid one-bit full adder style. It's designed for one bit and so extended to thirty-two bit. It is implemented by the 180nm and 90nm technology. during this given performance of the parameters like power, delay, style, and layout space are compared with the enduring styles like complimentary pass junction transistor logic, transmission gate adder, transmission perform adder, hybrid pass-logic with output drive then on for 1.8v offer at 180nm technology. The planned full adder design achieves the 50%and 80% increase in speed and PDP in contrast to the standard C-CMOS FA. When it operated at the low voltages, FA exhibits glorious increases the quality of signal and no. of I/p's of gate. In novel, low power FA operates with low voltage the MOS capacitors (MOSCAP) structure is employed and therefore the circuit is optimized for energy potency at zero. 18 CMOS process technology and this adder St Martin's Day power saving over typical twenty-eight junction transistor CMOS adder and it consumes half-hour less power than transmission operate adder (TFA) and one.11 times quicker. Any the 5 hybrid full adders are styles are planned for low power parallel multipliers. By mistreatment, ALL-NAND array number attain 16.2% also reductions in 7.8% of power consumption and junction transistor count 7% increase in time delay contrast to plain array selector. The ALL NAND tree number to reveal the low power utilization and electronic No. of transistor by12.5% and 8% and the time delay is 4% compared to the standard tree number.

Keywords: Power, Delay, CMOS (Complementary Metal Oxide Semiconductor), TGA, TFA, CPL, HPSC.

Analysis of security avoidance by using the Internet of Things Devices

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ABSTRACT

Internet of things (IoT) is the most trending and enormous technology. The IoT networks consist of sensors and wireless networks. By using these networks, we can lead our life comfortably. Nowadays the generation depends on the internet and smartphones, so people are interested to do smart work instead of doing hard work. By using these things, we can secure our private data. The installation cost is also not much high, we can save time, power and efficiency, etc. Security of it comprises many areas example: privacy, attacks, and countermeasures, trust, access control. Standard internet presents a few security challenges because most of the web innovations and conventions were not support to help IoT. This paper gives brief information about the present world facing a lot of challenges and issues on the internet of things. It also gives information about secured IoT, IoT architecture, IoT applications, and it explains several types of threats how they affected to the internet of things.

Keywords: IoT, Security, Web services, Cloud services, challenges, and issues.

INTRODUCTION

Internet of things was an emerging technology. It is more secure and we can implement it in offices and cities etc to protect our data from others. Considering these systems are wireless and self-designing and needn't bother with any prior foundation and have a huge unusual hub development. Security assumes a significant job in most fundamental issues to be raised into the record. By utilizing it we can protect our information secure from programmers [11].

This innovation has discovered application in numerous fields like human services, homes, learning and preparing asset the board, and so forth. An arrangement of things is every one of them embedded with remote sensors and related through around the world. In all the sensors connected to the internet and operated by smart devices like smartphones, remotes. As per logical expectations, the complete number of wireless sensors deployed is expected more than 70trillion at the end of the year 2022 [13].

The other technologies like smart mobility or smart technology can be linked to a particular topological area, such as parks, streets. Various services that are provided by IoT are implemented by internet service technology, and there are so many internet services that are there and they offer much identical functionality. The future lies in the overall detecting gadgets in an imparting inciting system that makes the internet of things.

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A Systematic Review on Glaucoma Detection by using Various Modern Techniques

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Abstract

In this paper, we are mainly discussing Glaucoma and various types of glaucoma and also the symptoms and the detection methods of glaucoma. Mainly, glaucoma is a severe disease caused to the eye. Glaucoma is a visual neuropathy which is detrimental to the cause of the optic nerve. We cannot find the symptoms of glaucoma at the early stage.so, everyone can prefer eye checkups for once in a year. Without proper treatment, glaucoma gradually leads to "vision loss". There are many types of glaucoma. There is a way to detect glaucoma by analyzing the fundus image or by calculating it. It's the "Cup to Disc Ratio (CDR)". Glaucoma is also known as "Sneak thief of sight".

Firstly, glaucoma is a chronic disease when glaucoma is affected it does not show any painful symptoms and it mainly attacks the loss of ganglion cells and their axons in the retina. And finally, it changes the characteristics of optic disc signs. By using super pixel segmentation concepts, we can detect the abnormalities present in the optic disc

Keywords: Glaucoma, Neuropathy, Open-angle glaucoma, Fundus, Cup to Disc Ratio (CDR), Ganglion cells.

1. Introduction

In, this paper we are mainly concentrating on human eye disease which is called "Glaucoma". And also, how to detect glaucoma in the early stage. If a person is affected by glaucoma and the person is neglected, gradually it leads to "loss of vision". Mainly glaucoma is affected If the optic nerve head or optic disc is damaged. Which is in the form of round or an oval form. Neutral rim or neuroretinal rim is the tissue between the cup and the disc margin [1]. For finding the health of the optic nerve clinicians commonly use a "Cup to Disc Ratio (CDR)" as an identification. Especially, when there is a large disc to cup ratio is obtained that declares there is damage to the optic nerve [2]. When the age increases gradually the cup size also increases and this is the first sign of glaucoma. And also, when the "Intraocular Pressure (IOP)" is also one of the factors which increases glaucoma that is the fluid pressure inside the eye increases [2] [7] [6]. Glaucoma consists of mainly two types. 1) open-angle glaucoma 2) closure angle glaucoma. Open-angle glaucoma is obtained when there is damage to the "optic nerve" and the person who affected can face a lot of risks. Subsequently, if the person is having high IOP, BP which is turn glaucoma increases gradually finally, it leads to a "vision loss"[6][4]. The "neuroretinal rim" is composed of "ganglion cell axons". Ganglion cells are equal to the disc area subtracted in cup area. When glaucoma is affected it will mainly lead to damage or there may be a structural change to the Optic Nerve Head (ONH) which results in slowly change the function failure of the visual field. So, glaucoma is also called as a "Chronic Eye Disease".

There is another way to detect glaucoma that is by using the retinal fundus image of the eye. Mainly, optic nerve head or the optic disc are the main parts in the diagnosis of the chronic disease.so, by using the segmentation of optic disc is difficult toward computer-aided diagnosis. By using appropriate screening techniques, we can avoid glaucoma [6][7]. Day by

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Performance analysis of Fused Add-Multiply (FAM) architectures

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ABSTRACT:

In DSP Complex operations in arithmetic play an important role. To increase performance, we mainly focus in boosting the designing of the Fused Add-Multiply operator. A modal and effective method is introduced and three different ways are explored for implementing that technique in the FAM design. On comparison in the designs of FAM using pre-recoding schemes the FAM designs with this technique results in the lowering of delay in the crucial path and multiplicity in the hardware and the power intake levels of units in FAM.

KEYWORDS: Arithmetic operations, FAM, MB form, Partial products, Multiplier, Adder

I. INTRODUCTION:

Many complex components can be integrated with a lot of freedom by the designer using advanced VLSI technology. In recent times different types of high-speed multipliers have been realized and proposed [1]. The fundamental operation in scientific and engineering applications is Addition-Multiplication. Unified floating-point (MAF) multiply-add-fused unit has been included as the main characteristic in commercial processors. By the implementation of MAF have two advantages: 1) the function A+ (B*C) is processed with only single round off which decreases total error and delay of MAF 2) Reduction in hardware equipment. Binary multipliers are used in microprocessor designing and embedded systems. Generally, multipliers have 3 stages which consist of multiple forming circuits, partial product reduction tree, and redundant binary converter [4]. The modern implementations of FAM do not include addition and rounding.

The arrival of Very Large-Scale Integration (VLSI) made it possible for the designers for designing a greater number of transistors with the help of simple chips. Multipliers with higher clock frequencies play a major role in the processing of signals. A computational algorithm is a basis for the plan of the floating-point multiplier. This is executed using a floating-point multiplier and subtraction using 32 bits [6]. The drawbacks are delay and latency. In these present days, the research effort is focussed on enhancing the pattern of encoding or limiting the next step in addition to enhance the speed of the multiplier. This whole process in

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Utility Impact Study of Bionic Communication System

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Abstract

In this paper we discuss the various techniques of engineering used in medical field for human progress. We discuss here the latest developments made by scientists to in the medical fields like making an arm using lightweight but strong and durable material such as carbon fibre, with foam padded covering or plastic materials which appears like flesh-coloured. And also making of a wireless electronic nervous system by providing necessary conditions are discussed in the paper. Neuro bridge method to move paralysed limbs, Larynx speech method to make a dumb person to talk by using bionic method.

1. Introduction

A bionic system can be made to make some damaged body parts to work by providing necessary conditions. For example, we can make a dumb person to talk, a spinal cord damaged person to move paralysed limbs and make an artificial wireless nervous system. We can also use this in insects to make them act as per our requirement to make the act as a spy. This can be achieved by using BIO-MEDICAL ENGINEERING. Bio medical engineering is nothing but to electrical techniques in medical field to make for effective working of some parts. By using different technique, we can do this. For example, Galvanic Coupling Communication Receiver for bionic arms [1], a 1000+ Channel Bionic Communication System for wireless nervous system [2], Bionic Electronics for Larynx Speech [3], Neuro bridge Technology to move paralysed limbs [4].

2. System Description

1000+ CHANNEL BIONIC SYSTEM –

This channel is used to create a wireless network system. This is also called as functional electronic simulation by battery powered bion system. This experiment is developed in Alfred Mann Foundation. The method used here is a multichannel Communication System. This is especially intended for bi-directional communication between an external MCU

A Modulation Method for DC-Link VoltageBalancing Control of a T-Type Converter

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Abstract— In this paper, an innovative method for DC-link voltage balancing in a T-type converter is proposed. The proposed method uses a single voltage sensor to sense one of the capacitor voltages. This method possesses the advantages of lesser number of auxiliary components to balance the DC-link capacitor voltages. A T-type H-bridge circuit is adopted to implement the proposed balancing technique. The gate pulses to generate the five-level output are obtained by employing sine-triangle comparison technique. Finally, the simulation results are presented to cope up with the proposed balancing scheme.

Keywords— T-type converter, voltage balancing, pulse width modulation

1. Introduction

Multilevel converters are attracting more attention in high-voltage and high-power electronic applications, since an improved high output voltage can be obtained with a respective harmonic content reduction [1]-[5]. A lot of multilevel topologies have been proposed in the past thirty years. The most common topologies are the diode-clamped, capacitor-clamped and cascaded types. In order to operate the switches in the above-mentioned topologies, switching schemes such as pulse width modulation (PWM), space vector pulse width modulation (SVPWM), selective harmonic elimination pulse width modulation (SHEPWM), nearest level modulation (NLM) and so on are effective solutions [6], [7]. To satisfy specific application requirements or to improve the operating performance, modifications and combinations of common topologies have been suggested. One of them is a T-type converter [8]-[12]. It is known that the T-type converter is more efficient than other multilevel converter topologies up to the medium switching frequency range.

The proposed method offers high degree of flexibility to operate in any range of modulation index (m_a). The benefits of a reduced number of switching devices, a reduced number of dc power supplies enables the T-type converter to suit for various industry applications. This script is detailed as follows: IInd Section explores the operation of the proposed inverter, and its operating modes, in Section III, the modulation scheme is presented, in IVth Section, the DC-link voltage balance problem is addressed. Simulation results are presented in Vth Section, Section VI discusses the conclusion.

2. System Configuration

Fig. 1 shows the proposed single-phase T-type inverter. It consists of four IGBTs (T1-T4) with anti-parallel diodes. The DC-link consists of single DC source parallel to two series-connected dc capacitors. The mid-point terminal of the DC-link is connected to the H-bridge circuit through a branch consisting of four diodes and an IGBT. This mid-

Closed Loop operation of the Boost Converter

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Abstract— Boost converters are popularly been used in various applications. In some of the applications, its closed-loop control is desired to obtain the required output. This paper introduces the operation of boost converter and proposes a method of closed loop operation. A proportional-integral (P-I) control along with a hysteresis band is employed to perform the closed-loop operation of the boost converter. The P-I values are chosen based on trial and error method. Finally, the proposed technique is simulated in MATLAB/SIMULINK environment and the results are presented.

Keywords— boost converter, P-I control, closed-loop

Analysis and Simulation of a Novel H-Bridge based Multi-Level Inverter with reduced DC sources

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Abstract— In this manuscript, a seven-level inverter topology using novel bridge structure with the minimum component count is presented. This configuration is gifted to enhance the number of output voltage levels by using a fewer number of power electronic evices such as switches, power diodes, driver circuits, and dc voltage sources that lead to saving of installation space and cost of the topology. In addition, in the proposed cascaded multilevel inverter, not only the number of required power electronic devices is reduced, but also the amount of the blocked voltage by switches, and the number of different voltage amplitudes of the used sources is decreased. The operating modes of the proposed inverter are analyzed in detail during zero, positive, and negative levels. The proposed topology is gated using sinusoidal Pulse Width Modulation in MATLAB/Simulink environment.

Keywords— multilevel inverter, seven-level, pulse width modulation

1. Introduction

Conventional multilevel topologies, such as the neutral point clamped converter (NPCC), flying capacitor converter (FCC), cascaded H-bridge converter (CHBC), as well as the modular multilevel converter (MMC), have been well studied and commercialized in the past decades [1-3]. However, when the voltage levels increase, the number of clamping diodes in the NPCC and flying capacitors (FCs) in the FCC rises tremendously [4,5]. Furthermore, the NPCC suffers from indirect clamping of the inner devices when the voltage level is higher than three [4]. The CHBC and MMC are easier to expand the voltage levels due to their modular design [5]. But the CHBC needs a phase-shifting transformer to provide isolated DC sources, which results in substantial investment and volume [6-9]. The MMC shows good prospects for HVDC transmission. But the complex controls (e.g., capacitor voltage balancing control and circulating current suppression control) and relative high primary investment make the MMC less attractive in medium-voltage applications [10-12].The proposed converter offers the benefits of a reduced number of switching devices, a reduced number of dc power supplies, and lower off-state voltage stress across the switching devices. This script is detailed as follows: IInd Section explores the operation of the proposed inverter, and its operating modes, in Section III, the modulation scheme with improved spectral performance is shown, in IVth Section, the simulation results at different values of modulation indices are discussed and Vth Section, discusses the conclusion.

2. System Configuration

Fig. 1 shows the proposed single-phase seven-level inverter using switching devices, and dc-sources. All the switching devices used in the proposed configuration are of bi-directional conducting devices with uni-directional voltage sustaining ability. The dc supplies can be obtained either from rectifier circuits, battery banks, or pv arrays. The proposed topology consists of two dc sources V_{dc1} and V_{dc2}.In order to produce the seven-level output, the dc source magnitudes are to be chosen as $V_{dc1} = V_{dc}$ and $V_{dc2} = 2\ V_{dc}$. It should be noted that the dc sources are aligned in opposite direction w.r.t each other.

A Seven-Level Quasi Z-source Inverter

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Abstract— A seven-level inverter with quasi Z-source boost converters is proposed in this paper. The proposed topology employs a packed U-cell asymmetrical type multilevel inverter along withfront end quasi Z-source networks. The quasi networks provides high gain compared to a conventional boost converter. This topology is most suitable photovoltaic multi-string applications. The proposed topology has the potential to supply both the DC and AC type loads. The inverter structure has lower number of active switches which helps in reduction of losses and improvement in efficiency. In this paper, theoperation principle of quasi network and inverter circuit are explained in detail. In addition,the simulation results for various modulation indices are presented.The proposed topology is gated using sinusoidal Pulse Width Modulation in MATLAB/Simulink environment.

Keywords— quasi network, multilevel inverter, seven-level

1. Introduction

The evolution of Z-source inverters(ZSIs) [1] in the area of power electronics has seen a significant rise in the lastdecade due to its wide range of applications in major areas like uninterruptible power supply (UPS), facts, hybrid electrical vehicles [2],and distributed generation (DG). The limitations of voltage source inverters (VSIs) and current sourceinverters (CSIs) are addressed through flexible control of output voltage by allowing overlap of switches for a part ofswitching cycle, which eliminates the need of dead band between the switches, thus reducing the waveform distortionand enhancing reliability. In addition, it provides single-stage power conversion with buck-boost capability, thusimproving the efficiency of the system compared with two-stage conversion due to reduced component count.A comprehensive survey on differentZ-source topologies and their advancements is reported in [3].

In contemporary, multilevel inverter (MLI) is becoming popular for low-voltage and low-power applications. It offerssignificant advantages of lower device ratings, low dv/dt, low total harmonic distortion (THD), and reduced filter size.Some well-known and popular topologies are neutral-point-clamped MLIs (NPC MLIs), flying capacitor MLIs (FCMLIs), and cascaded H-bridge MLIs (CHB MLIs). Among these, CHB is most preferred due to its modularity feature [4].Moreover, several topologies are developed in recent years in terms of reduced component count, capacitor voltagebalancing, control complexity, and the number of direct current (dc) sources. However, the switch count remains amajor constraint in developing new topologies. Despite the various advantages, the output gain of MLI is buck innature, which is a limitation. This necessitates a suitable power conditioner to be upgraded with MLI in order toimprove input voltage regulation as well as output voltage gain. Therefore, MLI is upgraded with impedance source network with features of improved output voltage gain, enhanced reliability, enhanced input voltage regulation, and quality output waveforms for the increase in levels.

The proposed converter offers the benefits of higher voltage gain and seven-level AC output with a reduced number of switching devices, a reduced number of dc power supplies, and lower off-state voltage stress across the switching devices. This script is detailed as follows: II[nd] Section explores the operation of the proposed inverter, and its operating modes, in Section III, the

Study of IoT and Cloud-based smart farming approaches

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ABSTRACT

The biggest economy of India is Agriculture. Everyone depends on it directly or indirectly. Nowadays, agriculture is done by using very new modern methods. One of those methods is by using IoT (Internet of Things). Magnificent agriculture means Smart agriculture. In the present paper, we are going to see how the sensors have been a part of modern agriculture and then discuss how the technology has been upgraded in small farms at home and at large businesses which can increase the ability to produce food in the world. Using IoT and embedded systems now we are going to cultivate our crops by sensing the soil condition by using various sensors like PH Sensor, Humidity Sensor, Temperature sensor. By this system, farmers will be able to understand their farm, preserve their resources by using them without wastage and also maintain a safe environment. Practically implementation of this kind of operation is difficult but by using IoT we can create smart systems using the Internet and Wi-Fi.

INTRODUCTION

Agriculture is the primary occupation of India. By making use of evolution in technology we can develop a smart irrigation system. Water is the main for agriculture. To use water sensibly we have come across a technology called IoT (Internet of Things) [1-2]. Because water is the basic need of every organism in the world. We have to conserve it for the growing population, food demand and future generations. for this, we have designed an Automatic Irrigation System (AIS). Now a day's water is completely contaminated. Because of this reason, everyone is disturbed including plants and animals.

The entire ecosystem gets affected because of this contaminated water. Agriculture needs 85% of freshwater. If water gets contaminated, the agriculture sector is also affected. If measures were not taken to preserve water further centenaries may be affected by severe water-related complications.

Analysis of Channel coding performance for wireless communications

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Abstract: In this paper, we discuss the Channel Code, including a few developments in potential wireless communication. Channel cryptography is also known as the "Leading Fault Management Catalog." In digital communication systems, it is a way of exposing and amending bit deceptions. Course coding is practiced on both transmitters and receivers. Its handouts the might and key to the receiver to discern and rectify miscues, if they betide all the time the transference due to noise, trespassing, and paling. Shannon has made clear the trajectory coding and trots out the actuality of the error correction codes (ECCs) that have been set up to be completely cognizant of true transmission. In the phase, the certainty of any admeasure shines brighter than the capacity. Scads analysts pick up an application to scrutinize the emergence of imminent ECCs, on the other hand, has no success. Because it is capable of significantly raising the degree of various communication mechanisms including connecting lessness, evacuation, perceptibility, sub-astral aural, and propaganda processing compliance, the connecting ECCs have been more apprehensive.

Keywords: Channel coding, Wireless communication, Capacity, Power, Noise, Interference, Bit-error.

1. Introduction

Coding is a blueprint that could alter the ideas of resolutions in digital media. There are two types of channel coding commonly used to track the dispatch soundness arising from the duct uncertainty. The aberrations while transmitting in the medium could be observed using the Syndrome Detection Catalog. In the case of delinquency correction codes, errors can be corrected without re-siphoning the note. Syndrome discovery tabulation patterns Model Syndromes while transmittance is managed to be encountered. Thus, the code word authorized shall be forsaken while the breakdown of the transport is reported; otherwise, the receiver shall turn the tail and the request to the transmitter for re-transmission. In the error correction of the

Development of FFT Processor: A Succinct Study

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Abstract

In 1965, Cooley and Turkey have proposed an algorithm which is a "Fast Fourier transform (FFT)".It possibly will diminish the computational multifaceted nature of"Discrete Fourier transform(DFT)"fundamentally. The developmentof FFT is well thought-out as milestone advancement in the research area of wireless communication such as "Digital Signal Processing (DSP)". Since it might speed up the DSP algorithms fundamentally with the end goal that ongoing computerized signal handling could be conceivable.Also, the quick development in remote interchanges has achieved another time of remote mixed media applications and administrations, for example in the broadcasting of information, picture, and video above remote broadband access systems. As requires are"Orthogonal Frequency Division Multiple Access (OFDMA)". The "Time Division Duplex (TDD)" plot based regulatory strategy is a fascinating remote correspondence innovation with a multi-channel genuine sound system for high data rate remote access. We additionally portrayed the models and the direct signal for the planned TIR23 SDF. The exploratory outcomes demonstrate that the FFT dependent processors on TIR23 SDF lessen concerning 43.3% of the equipment multifaceted nature in the FPGA execution.

Keywords:FFT, DFT, OFDM, Digital signal processing, FFT/IFFT processor

1. Introduction:

The increase of development in the area of wireless technology has been improved, for this development, one of the main components used is IFFT/FFT processor.The IFFT/FFT processor is used in the OFDM system used for transmission in wireless communication systems. This processor performs baseband multi-carrier modulation and demodulation. The IFFT/FFT processor is mainly used in "SISO-OFDM" and "MIMO-OFDM" systems. This processor is more efficient in the "MIMO-OFDM" systems when compared to the "SISO-OFDM" systems but the MIMO-OFDM system requires more than one IFFT/FFT processor [1]. In the "MIMO-

Study on Key Logger: Challenges and Solutions

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Abstract

Key logger is one of the open issues in the present society. A keylogger is a program that record all key stick entered on the keyboard, in another word key loggersare the sort of the spywares that take the information of the clients by following their keyboards.Detecting the key loggers is the troublesome undertaking to perform because generally they hide their presence using technology like root-kit so they don't get detected from antivirus and other system protections. The primary work of this program is that they will catch the keystrokes squeezed by the client and store them in a log file. Either this log file can be store on the same system or send to other system using internet or other communication method. we all know how important it is to protect our password and other important data, this keylogger had the protection task difficult so in this paper we are going to talk about various type of keylogger and their preventionmethods

Keywords: Key Logger, DMA(Direct Memory Access), Keystroke, GPU.

1. Introduction

We live in the world where we are surrounded by the technology, EARLY morning when we wakeup we grab our phone or some other devices, These technology have saved our time and made our life easier, we even make bank transection from our handset as we trust our technology But the question arises how secure we are with it ?.With the increase in benefit of technology the threat has also increased. Cracking, hacking, Cyberbully, Cybersquatting, Creating Malware, Espionage, Identity theft, phishing, spoofing is some of the evil action that are done with the use of technology. Among these keystroke logging(known as key logger) is one of the most used technique to abstract the useful data,criminals found it as most effective method.

The word key logging mean "the action of recording (logging) the keys struck on a keyboard"A key logger is programming that tracks or logs the keys struck on your keyboard, ordinarily in a

A Review Paper on Ultra-Wide Band CMOS Low Noise Amplifier Using 0.18µm Technology

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ABSTRACT

In the field of VLSI, the circuits can be easily fabricated into the small area and with less cost. Due to the advancements in VLSI different technologies are introduced. A low noise amplifier is a device which amplifies the given input signal with less added noise so that the signal can be processed further without any errors. An "Ultra-Wide Band Low Noise Amplifier (UWB-LNA)" is an amplifier which can be operated in the wide range of frequencies. Here we fabricate the integrate circuit using CMOS because the CMOS has three main advantages over non CMOS technologies. The CMOS consumes very less static power and these devices are having high noise immunity. So as we require the less amount of noise in the output signal we prefer to fabricate the low noise amplifier using CMOS fabrication. Compared to other technologies in the CMOS IC fabrication the 0.18-µm technology reduces the operating voltages by 20% to 30% there by reducing the power consumption and increases the battery life of applications. In this paper we are focusing on the efficient way to fabricate a CMOS ultra wide band low noise amplifier of CG-CS model. The proposed model has a high gain of 12.8 dB and operates in the wide range of frequencies from 0.4-10 GHz with noise figure of 4.4-6.5 dB and consumes 12mW of power with an area of 0.42 mm2.

Keywords:"Low Noise Amplifiers (LNA)", "Ultra-Wide Band (UWB)", CG-CS (Common gate-common source) amplifier

1. INTRODUCTION

This paper has been implemented with the "Distributed Amplifier (DA)" which uses 0.18-µm CMOS technology. The amplifiers distributed are large-band circuits, which have a substantial improvement in product bandwidth over the unit gain rate of the transistor. This can be increased by stopping active system output and input power (transistors, diodes).Compared to previously published papers on CMOS distributed amplifiers[2], the

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"It is with a heavy heart that IGI Global announces the passing of Dr. Dharma P. Agrawal of the University of Cincinnati, USA, who served in a number of capacities with IGI Global, including as co-Editor-in-Chief of the International Journal of Cloud Applications and Computing (IJCAC). Dr. Agrawal has also served as a guest editor for various journals of IGI Global as well as a co-editor of several book publications including casebooks, handbooks of research, and edited monographs. We offer our deepest condolences to his friends, colleagues, and family.

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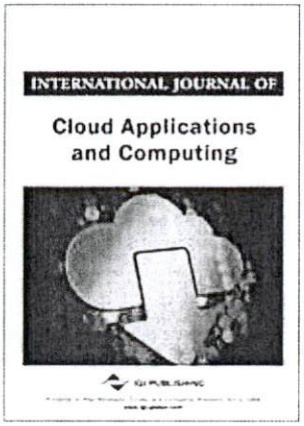

Multi Factor Two-way Hash-Based Authentication in Cloud Computing

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Abstract

The expansion of Cloud computing is influencing various domains such as education, the banking sector, industries, government, health informatics, and individuals. The characteristics of an easy interface, on-demand access, scalability, and low infrastructure investment have to lead to the fast adaptation of Cloud computing based upon their needs. Despite the advantages, Cloud computing is open to more security risks and attacks especially in terms of communication due to the lack of secure authentication and privacy. In this article is presented a novel hash-based multifactor secure mutual authentication scheme that includes mathematical hashing properties, certificates, nonce values, traditional user ids, and password mechanisms that resist MITM attacks, replay attacks, and forgery attacks. We implemented our proposed method in the Microsoft Azure cloud and the results are evaluated. The security analysis is done by using the Scyther tool and with a formal analysis by using GNY belief logic. The results indicate the proposed scheme is capable of providing strong secure authentication.

Related Work

Existing studies indicate that general authentication mechanisms like password based authentication schemes, nonce based mutual authentication scheme with smart cards, time stamp based authentication schemes(Awasthi et al., 2003, Chan et al., 2001 Chen, et al., 2002, Shen, et al., 2003) are considered as traditional algorithms to access the services from the remote

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Soft beverages as an alternative to TAE buffer in agarose gel electrophoresis

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Abstract

Background: The pH of carbonated drinks is known to be low and have, therefore, been implicated in the increasing incidence of acidity.

Aim: Here we report on an efficient approach for rapid analysis of nucleic acid characterization by varying a cost-effective running buffers for agarose gel electrophoresis.

Material and Methods: Commercial DNA is used in electrophoretic analysis using various soft beverages by optimizing its pH value and gel bands were quantified using Image.

Results: Red bull energy drink revealed that concentration, time and voltage do not have any effect in analysis of nucleic acids, while fizz revealed high concentration and sensitivity in characterization of nucleic acids.

Conclusion: This approach was fast, easy and cost-effective than use of TAE or TBE as running buffers in agarose gel electrophoresis.

Keywords: Thumsup, Fizz, Red bull, Pepsi, TAE, Electrophoresis

Introduction

Since the adoption of agarose gel in the 1970s for the separation of DNA, it has proven to be one of the most useful and versatile technique in biological sciences research [1]. Agarose's high gel strength allows for the handling of low percentage gels for the separation of large DNA fragments [2]. Molecular sieving is determined by the size of pores generated by the bundles of agarose in the gel matrix [3]. Properties of electrophoresis buffers such as pH, ionic strength, and composition affect performance [4]. Choice of novel buffers seem more likely to be widely adopted when researchers do not have to commit to purchasing expensive machines [5]. Buffer systems of a positive polarity function normally over the entire pH range, whereas nucleic acids with negative net charge are retarded at the gel surface in buffer systems with negative polarity [6]. New methods were also developed by embedding several agarose gels as multiple gradient-slab gel electrophoresis each of a different agarose concentration, within a single gel slab [7]. Difficulties also hinders the use of organic solvents in the running buffer has an extremely low buffering capacity, necessitating buffer changes or the use of a buffer recirculation system [8]. In comparison to TAE and TBE, soft beverages buffers provide higher voltage and current stability, lower working concentration and lower voltage, resulting in less heat generation.

Material and methods

Determination of pH in soft beverages

Various soft beverages like Pepsi, Fizz, Sprite, Red bull and Thumsup were selected based on the convenience and availability at KL University campus, Andhra Pradesh, India. Ten ml of each sample were checked for initial pH and adjusted with either 1M NaOH or HCl to attain usually to pH 8.3. The buffer was diluted to 100 times using double distilled water or milli Q water and store at 4^0C until further use [9].

Agarose gel electrophoresis

Wide mini-sub cell from Genei (10 X 12 cm) was used for agarose gel electrophoresis and carried out using soft beverages as running buffer for characterization of nucleic acids [10]. Commercial DNA (Salmon sperm DNA, SRL) of 1ug in concentration is used as loading sample along with tracking dye. Soft beverages as buffers were tested with 300ml volume, voltage, current, and power were recorded with an DC-300 power supply (Genei Apparatus). Fifteen microliters of sample were loaded, gel was stained with ethidium bromide for UV photography by a CCD camera (UVI-Tech, Germany).

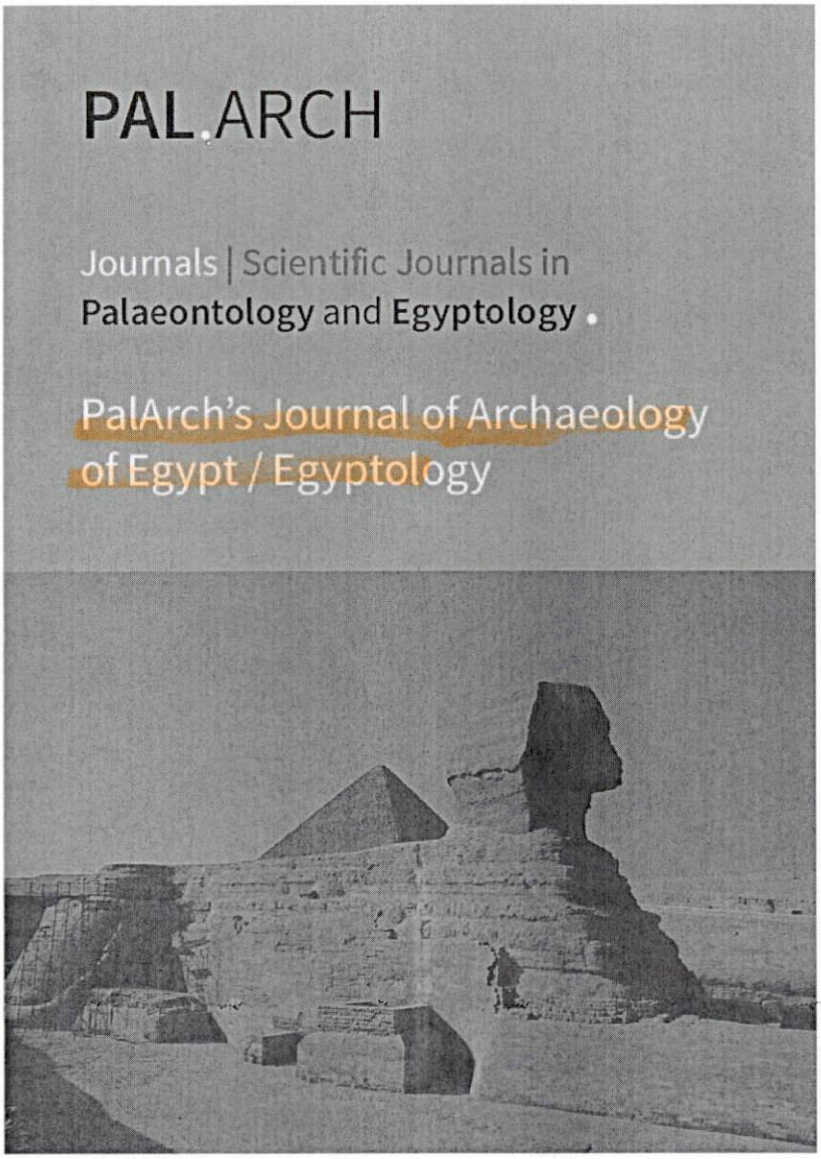
Quantification of gel band

For analysis of the gel images Image J 1.38 (Windows version of NIHImage, http://rsb.info.nih.gov/nih-image/), is used as tool for quantification of band intensity on the agarose gel. Gel is stained with ethidium bromide and analysed on UV-trans illuminator for the confirmation of bands. Gels were placed in gel doc (UVI-Tech, Germany) and photographed. Image J is used for density profile measurement, peaks height as well as peak intensity or volume of the band of the expected molecular weight [11].

Results and discussion

Determination of pH in soft beverages

Soft drinks are the most acidic beverages according to Real Water Health. In fact, their acid content is in the same range as vinegar. Initial pH of all selected beverages was determined using pH meter (Eu Tech, Germany) after the



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INFORMATION

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PalArch's Journal of Archaeology of Egypt / Egyptology

INFLUENCE OF STEMMING MATERIAL ON PERFORMANCE OF BLASTING

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Keywords: Stemming, Blasting, Muckpile Profile, Mean Fragment Size, Throw of Material

ABSTRACT
This paper discusses the application of 3 types of stemming materials used in road metal quarry for blasting. During blasting, stemming plays a key role in confining the explosives and making effective utilisation of blasting energy. In our case study, we had used 3 types of stemming materials that are drill cuttings, crushed aggregate, and clay. The trial blasts were conducted in a basalt stone quarry situated at Malkapur village in Medak district of Telangana state. The uniaxial compressive strength of the rock in consideration, i.e., basalt is 300MPa. Post blast examination was done by using image photography. Keeping all other parameters unchanged(spacing, burden, depth of the hole, type of explosive, and stemming height), influence of stemming material on muck pile profile, mean fragment size, and throw of material were studied in this research work.

1. INTRODUCTION

Blasting is an important part of mining work. It accounts for 20% of the cost of production of the minerals or rocks. [1]. In open cast mines, blasting can be classified as bench blasting and secondary blasting. Bench blasting, which is also called as primary blasting, aims at fragmenting the minerals or rocks. In order to meet the appropriate blast result, the mineral or rock fragments should meet the mean fragment size. If the fragmented minerals or rocks are less than that of the mean fragment size, then, the blasting operation can be considered to be well executed, whereas, the rock or mineral fragments, bigger than the mean fragment size, are responsible for the formation of boulders, which leads to secondary blasting, to bring the size of fragmented blocks below the mean fragment size [2]. Blasting is considered to be the cheapest way of fragmentation in open cast mines,

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Combined adjustment of injection timing and compression ratio for an agricultural diesel engine fuelled with Nahar methyl ester

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ABSTRACT

This study investigates the effect of compression ratio (CR: 16, 17, standard 17.5, 18) and injection timing (IT: 21°CA, standard 23, 25°CA) of a single cylinder direct injection diesel engine having power output 3.5 kW at rated speed 1500 rpm fuelled by an optimal Nahar methyl ester blend (NME40). For NME40/CR18, the BTE is improved by 1.09% and EGT is lowered by 2.98% compared to NME40 at standard engine settings, at full load. The HC, CO, and smoke emission decreased for NME40/CR18 by about 15.38%, 21.5%, and 0.5% compared to NME40 at standard setting, whereas it is reduced by 25.45%, 23.73%, and 3.4% compared to diesel respectively at full load. At full load, the NO_x emission for NME40/CR18 lowered by 4.73% compared to diesel. Combustion analysis reveals that higher CR has positive impact on cylinder peak pressure. Lower ID observed for higher CR and retarded IT operation.

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KEYWORDS
Nahar methyl ester (NME); compression ratio (CR); injection timing (IT); diesel engine; performance

Nomenclature

°CA	Degree crank angle
aTDC	After top dead centre
B40	Blend of 40% (NME) with 60% petroleum diesel
BD	Biodiesel fuel
BP	Brake power
aTDC	After top dead centre
bTDC	Before top dead centre
BTE	Brake thermal efficiency
CP	Cylinder pressure
CR	Compression ratio
CT	Cylinder temperature
CO	Carbon monoxide
DF	Diesel Fuel
EGT	Exhaust gas temperature
HC	Hydrocarbon
HRR	Heat release rate
ID	Ignition delay
IT	Injection timing
NOx	Nitrogen oxides
PCP	peak cylinder pressure
PEC	Performance, emission, and combustion
PHRR	Peak heat release rate
TDC	Top dead centre

1. Introduction

From the evolution of time, energy has been an important ingredient for the progress and development of mankind. However, over-exploitation of finite fossil resources among nations for energy supremacy had adversely affected the entire ecosystem with the popular 'twin crisis' (depletion of fossil fuel and environmental pollution), the twenty-first century is witnessing. Learning this, scientists and researchers are making attempts to switch to various alternative sources of energy. Traditional zones on demand are being replaced by quick growing emerging markets. The energy mixing is shifting towards low carbon sources driven by technological advancements and environmental pollutions ('BP Energy Outlook' 2018). Recently, biodiesel (BD) prepared from plant oils, waste oils and animal fats, which satisfies the sustainability criteria set by the respective nations, has become popular in the market as an alternative diesel engine fuel. Diesel engines have evolved over time and are far more efficient than its counterpart petrol engines and its demand is increasing in an unprecedented manner in developing economies as a result of rapid surge in population and industries (Ciatti 2015). Investigations revealed BD contributed to the reductions of many pollutant emissions such as unburned hydrocarbon, carbon monoxide, smoke and particulate matter (Suresh, Jawahar, and Richard 2018; Dhana Raju et al. 2018; Ashok, Nanthagopal, Mohan, et al. 2017; Nanthagopal et al. 2018; Xue, Grift, and Hansen 2011; Barik and Vijayaraghavan 2018). However, researchers opined contradictory views on NO_x emissions for engines powered with BD fuels (Xue, Grift, and Hansen 2011; Varatharajan and Cheralathan 2012; Lapuerta, Armas, and Rodríguez-Fernández 2008; Chen et al. 2018). With the technological progression of the twenty-first century and development of several agreements on climate change and environmental pollution, engine manufacturers are now more concerned with stringent emission norms to alleviate environmental imbalance with taking care of energy efficiency.

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Research Article

Circular Slotted Antenna with CPW feed for GSM and UWB Applications

Author(s): Sanjeev Kumar*, Ravi Kumar and Durgesh Nandan

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Abstract

Background & Objective: The circular slotted monopole microstrip antenna with Coplanar Waveguide (CPW) feed for unified GSM and Ultra-Wideband (UWB) applications have been presented in this article. Circular shaped slots have been embedded in the radiating patch. Less surface area has been found due to slots etching and the overall antenna size is reduced by 45%.

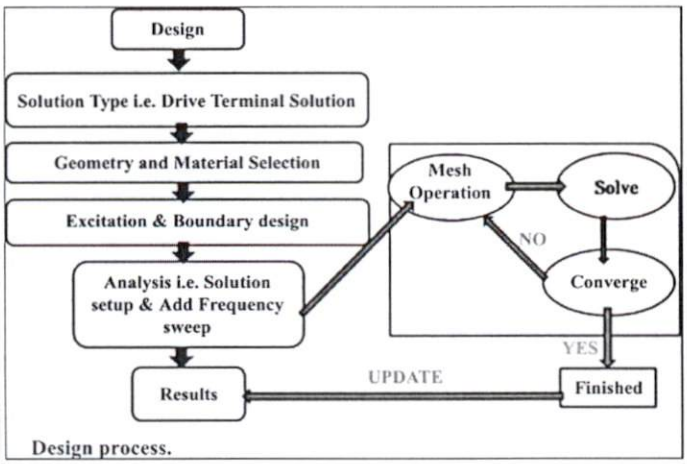
Results: The proposed antenna demonstrates a double band operation wrapping 883.6-1206 MHz (GSM band) and 2.75-18.30 GHz (UWB, X, and Ku) frequency band with VSWR of less than 2 and fractional B. W. of 30.8 % and 147% respectively. The pattern of radiation presented by the antenna is nearly omnidirectional in H-plane and directional in E-plane within the GSM and UWB band.

Conclusion: There is a variety of applications nowadays using these UWB antennas such as modern civil and military applications, wireless and radar communications, etc. Measured results are presented to validate the proposed antenna structure, which shows that the proposed designed antenna structure has a stable radiation pattern both at the GSM and UWB band ranges.

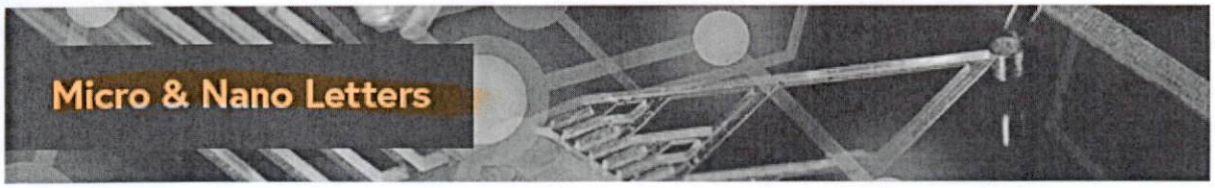
Keywords: Monopole antenna, GSM, UWB, wireless, CPW, radar communications

« Previous Next »

Graphical Abstract



Design process.



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Facile regulation of cuprous oxide microcrystal morphology and planes for visible light photocatalytic degradation

Xiaoyan Li, Chaoliang Zhang, Qi Yang, Rui Zhao, Hongfang Li

First Published: 3 August 2022

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LETTER

Study of the magnetic properties of Mn-doped iron titanate nanoparticles fabricated using natural mineral

1 | INTRODUCTION

Iron titanate is a wide bandgap semiconductor with an energy gap in the range of 2.58–2.9 eV [1–4] and has applications in various fields such as spintronics, photoelectrochemical, humidity sensing, gas-sensing, optoelectronics, and high-temperature integrated circuits [1–10]. Owing to its commercial and scientific interests, iron titanate (FT) has been considered as a potential candidate for applications, such as pigments [11], Li-ion battery anodes [12], non-linear optics [13], photocatalysis [14], UV fabrics [15], electrochemical energy storage [16], photoelectrode for electrolysis of water [17–19], radiation-hardened electronics, microelectronics, and spintronics technologies, in numerous studies [20]. In recent years, there has been a growing interest in developing new materials based on magnetic as well as semiconductor materials for spintronics applications [5, 6, 19, 20], for which FT acts as a potential candidate.

In previous reports, FT nanoparticles and thin films were prepared by fabrication techniques such as solvothermal method [19], ball-milling, and hydrothermal processes [12, 21], sol–gel method [22], co-precipitation method [23], and ceramic method [24]. Talebi et al. [25] synthesised polycrystalline and spherical FT nanoparticles using wet chemical methods, and the prepared nanoparticles were paramagnetic in nature. Enhessari et al. [26] prepared polycrystalline, quasi-spherical, and paramagnetic-ferrimagnetic FT nanopowders via a solution-based approach. Guo et al. [27] fabricated amorphous FT nanotube arrays by anodization of the FeTi alloy, and their magnetic properties decreased as a result of disordered magnetic moments when the annealing temperature increased to 500 °C. Tang et al. [28] prepared FT composite particles using in situ hydrogen–thermal reduction method. The method used high-temperature treatment (650 °C), and the processing time was high (24 h) for fabricating crystalline nanoparticles. Further, the prepared composite particles were soft magnetic, and some of the iron metal particles were inlaid into titania, which led to superparamagnetic behaviour. Hessian and colleagues [29] synthesised ferrimagnetic pseudobrookite particles with unusual morphology of thin strings of joined particles using high temperatures starting from 900 °C. The synthesised material showed a weak ferromagnetic ordering and paramagnetic behaviour. Srinivas et al. [23] and Raghavender et al. [22] fabricated a soft ferromagnetic nanocrystalline FT through the co-precipitation technique and multistep process, respectively. Mahmoud and colleagues [30] prepared nanocrystalline pseudobrookite powder using inexpensive ilmenite ore obtained from the Abu Ghalaga region, Red Sea, Egypt. The synthesised FT had a weak magnetic system with ferromagnetic-paramagnetic behaviour. The preparation procedure involved a complicated process and required a high temperature treatment of 1000 °C.

Considering the issues such as complex process, multi-step approach, and high-temperature treatment, the present study aimed to prepare FT nanoparticles using a simplistic approach from an abundant natural source, ilmenite. Besides, the effect of Mn doping on the magnetic and semiconducting properties of FT was studied. The transition metal manganese (Mn) was chosen as a dopant material as the semiconducting property of these magnetic FT nanoparticles can be tuned by varying the concentration of the Mn dopant. The appearance of energy levels of Mn at different concentration narrows the band gap at different levels and enhances the magnetic as well as semiconducting property of the resultant materials. Such Mn-doped FTs have a significant impact on emerging technologies such as spintronics, magnetoelectronics, and rad-hard electronics [31].

2 | MATERIALS AND METHODS

Ilmenite sand used in this work was collected from coastal regions of Kanyakumari, Tamil Nadu, India. Polyvinyl alcohol (PVA, $(C_2H_4O)_n$, MW: 86.09 g mol^{-1}, 98% purity; Merck), manganese (II) nitrate hydrate ($Mn(NO_3)_2{\cdot}xH_2O$, MW: 178.95 g mol^{-1}, 98% purity; Merck), sulphuric acid (H_2SO_4, 99.999% purity; Sigma-Aldrich) and all other solvents used were of analytical grade.

2.1 | Experimental procedures

First, the collected sand was subjected to a double-digestion process using concentrated sulphuric acid at 200 °C for 3 h in a muffle furnace. The weight ratio between the ilmenite sand and the concentrated sulphuric acid required for digestion process was 3:1. The resulting mixture was cooled to room temperature

TABLE 2 Four-probe resistivity measurements for FT and various concentration of Mn-doped FT samples

Analyte sample	Resistance (KΩ)	Resistivity (KΩ-cm)
FT	4.47–4.53	19.37–19.63
0.2MFT	0.42–0.50	1.82–2.17
0.8MFT	0.48–0.54	2.08–2.34
2MFT	0.59–0.67	2.56–2.90

natural source ilmenite have not been reported. An essential aspect of optimizing the properties of the transition metal elements/compounds is an understanding of the nature and quantity of the dopant. It has been observed that the concentration of Mn strongly influences the electrical properties of Mn-doped metal oxide nanostructures. In some instances, an increase in Mn concentration resulted in an increase of resistivity and a decrease of magnetization [47].

In the present work, the semiconducting properties such as resistance and resistivity of the fabricated FT and MFT nanoparticles, determined using four-probe method, are shown in Table 2. The pristine iron titanate nanopowders without an addition of the dopant Mn demonstrated higher resistance and resistivity values comparing to the MFT samples. This implicated that the as-fabricated pristine nanopowders were devoid of carrier concentration. Adding a low concentration of Mn in the pristine samples, the resistivity of the 0.2MFT sample decreased by nine-fold, thereby improving the electrical conductivity. It is presumed that the addition of Mn ions contributed additional electrons to the conduction band. Thus incorporation of Mn in FT significantly decreased the resistivity values.

It can also be observed that the resistance and resistivity values increased with an increase in the dopant concentration, even though the values are lower than the pristine FT sample. The reason for this behaviour is ascribed to the incorporation of Mn^{2+} ions resulting in hole doping, which aids in the recombination of electrons in the sample, thus reducing the carrier concentration. This decrease in the carrier concentration resulted in an increase in resistivity, on increasing the concentration of Mn doping [48]. These results are also supported by XRD results. It can be explained by the fact that the decrease of crystallite size increased the total grain boundary fraction, which in turn enhances the grain boundary scattering, thus, results in an increase of electrical resistivity [49]. Eventhough doping of Mn^{2+} ions is highly desirable for improving the magnetic properties, which in turn it increase the resistivity values.

4 | CONCLUSION

A cost-effective methodology has been proposed for the large-scale production of FT nanoparticles using a natural source, ilmenite. It was found that doping with the transition metal manganese exerts a considerable effect on the structural, magnetic, and electrical properties on FT nanoparticles. The crystallite size decreased gradually on increasing the Mn content, due to lattice distortion caused by Mn and FT atoms. This work demonstrated that an ionic radius of Mn favours grain growth, which is necessary to achieve ferrimagnetic property. With an increase in the dopant concentration, M_s value decreased, which is attributed to the pairing of the nearest dopant ions. Though the addition of Mn was responsible for higher magnetic moments, it essentially reduced the carrier concentration and increased the resistivity values. Thus, a combination of magnetic and semiconducting properties of MFT could be used in applications such as spintronics, semiconductor device, magnetic recording, memory devices, and sensors.

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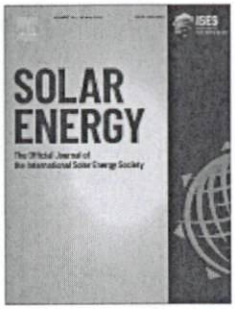

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Radial movement optimization based parameter extraction of double diode model of solar photovoltaic cell

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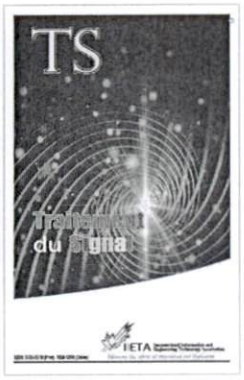
Abstract

A new swarm-based stochastic radial movement optimization (RMO) algorithm is proposed for extracting unknown solar photovoltaic (PV) cell parameters. The explicit modelling of a solar PV cell is shown to be very influential in the performance assessment of maximum power point tracking methods. The performance of the Single-Diode Model (SDM) and Double-Diode Model (DDM) of a Kyocera KC200GT 200 W panel was verified and validated under different test conditions in the MATLAB Simulink environment. The objective of this study was to validate the accuracy of solar PV cell modelling and determine the best optimization algorithm among the RMO, particle swarm optimization (PSO), and differential evolution technique (DET). The RMO-based I-V and P-V curves were compared with those obtained by the DET and PSO methods. Additionally, statistical and error analyses were carried out to calculate the relative error (RE), individual absolute error (IAE), and root mean square error (RMSE) of the proposed method for better analysis. With the RMO method, the IAE and RE for the DDM of the solar PV cell was 0.0224 and 0.0509, respectively. For the DDM, the fitness function value of the RMO was $3.01E^{-4}$. The performance of the RMO method was superior to that of the PSO and DET methods based on curve fitting for the SDM, DDM, and datasheet values. Curve fitting with the RMO strongly fitted the datasheet curve, which resembled the RMO curve, and is possibly a suitable optimization approach for extracting the parameters of the DDM of the solar PV cell.



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An Efficient Antilogarithmic Converter by Using Correction Scheme for DSP Processor

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antilogarithmic converter, computer arithmetic, DSP processor, error analysis, FIR filter, logarithmic converter, logarithmic multiplication

ABSTRACT

Digital Signal Processing (DSP) applications demand error-free and compact hardware architecture of arithmetic operations. A logarithmic operation provides an efficient option in place of binary arithmetic. In this paper, it is suggested that 11-region and 17-region error correction schemes for developing an efficient antilogarithm converter. It is used for developing the most accurate and compact logarithm multiplier which is used in the DSP processor. Implementations of reported and proposed designs are investigate based on accuracy and hardware overhead and it found outperform in comparisons of previously reported designs. The proposed 11- region converter involves 61% less Area Delay Product (ADP) and 49.82% less energy in comparisons of the reported 11-region antilogarithmic converter and 17-region converter involves 48.02% less ADP and 32.53% less energy in comparisons of the reported 14-region antilogarithmic converter. The proposed antilogarithmic converter achieves 1.697% and 1.084% error for 11-region and 17-region designs respectively than of reported designs of 1.876% and 1.351% for 11-region and 17-region respectively.

1. INTRODUCTION

Many handheld and portable signal-processing devices are parts of our daily life. The Digital signal processor and image processor have required accurate and efficient arithmetic operations for performing fast and efficient real-time applications [1-9]. As its well-known thing, that multiplier is the most utilized component in arithmetic operations. Many researchers' efforts have been directed to develop an accurate and efficient multiplier design [6-13]. Nowadays filters applications required an efficient multiplier design. Especially, FIR, FFT and DCT techniques want an efficient multiplier design for performing well.

Traditional or reported multiplication was limiting performance in terms of accuracy as well as hardware overhead. Logarithm multiplier must have the potential to become an option of a traditional multiplier for real-time digital signal processor [14-19].

Logarithm multiplication operation can be performing in three steps: (1) Conversion of any format numbers into logarithmic numbers, (2) then performed addition on logarithmic numbers, and then (3) convert back into initial format numbers [8]. The pictorial representation of logarithm multiplication is shown in Figure 1. Many methods regarding binary to logarithmic conversion and vice versa have been discussed in the last few years [18-35]. Error creates at the time of logarithmic and antilogarithmic conversion [10]. It shows the utility of an efficient and accurate logarithmic and antilogarithmic conversion process. The frame of remaining paper is as like: Systematic growth of literature is discussed in Section 2. Proposed methodology and possible hardware construction are discussed in Section 3. Results and comparative analysis of reported and proposed design are exploring in Section 4. At last, the pros corns of design are concluded in Section 5.

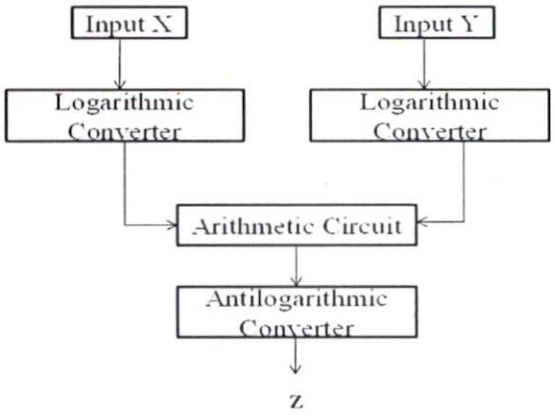

Figure 1. Pictorial representation of logarithm multiplication

2. SYSTEMATIC GROWTH OF LITERATURE

From 1962, researchers were trying continuously to propose error-free and hardware efficient approaches to get efficient and accurate antilogarithm [5, 10, 27, 29-35]. The entire antilogarithm converter process was adopted broadly in three categories of methods. The first is called the polynomial approximation-based method, second is called Read Only Memory (ROM) based method and the third is called shift-and-add based method. The general architecture of the antilogarithm converter with a correction circuit is shown in Figure 2. Mitchell's proposed logarithmic and antilogarithmic

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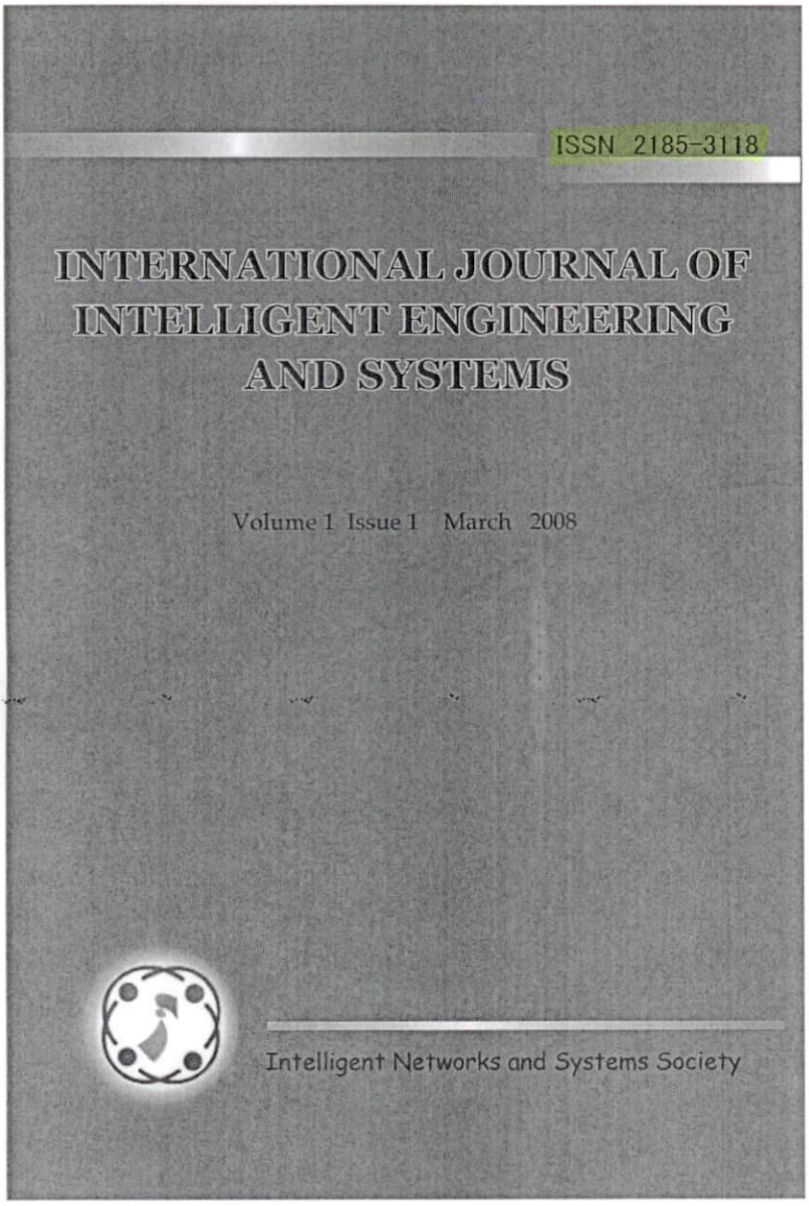

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Multifocus Color Image Fusion Based on Walsh Hadamard Transform and Sum-Modified-Laplacian Focus Measure

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Abstract: Multi-focus image fusion objective is to add relevant information from multiple images of the same scene but with different focuses into a sharper image that is more suitable for visual sensor networks. Natural and artificially obtained multifocus color images are considered for fusion. The existing fusion methods like multi scale and multi-resolution transforms are proved to be good in Multi-focus Image Fusion. However, they suffer from computational complexity in kernels calculation. In this paper, Multi-focus color Image Fusion based on Walsh-Hadamard Transform and sum-modified-Laplacian focus measure is proposed. Walsh-Hadamard Transform is a non-sinusoidal, orthogonal transform with symmetry, seperability and orthogonal properties. These properties make it more apt for image fusion than other transforms. And the sum-modified-Laplacian focus measure helps to get sharper image. Proposed method performance is evaluated in terms of reference and non-reference measures. The experimental results indicate that proposed method not only produces sharp details in fused image but also reduces the computational complexity.

Keywords: Walsh Hadamard transform, Multi-focus color image fusion, Sum-modified-Laplacian focus measure.

1. Introduction

In visual sensor networks, it became difficult to derive an image with all important objects in focus due to the restricted depth of focus of optical lenses in charge coupled devices (CCD) imagers. The solution to this is multi-focus image fusion, which adds multiple images of diverse focusing levels of the same scene into a sharper image which is more apt for visualization and detection. Multifocus image fusion has several applications in the areas of electronic circuit design and inspection, defence, computer vision, visual sensor networks and surveillance.

The multi-focus image fusion algorithms are classified into spatial and transform domain fusion methods. The spatial domain techniques [1, 2] use local spatial features such as gradient, spatial frequency, and standard derivation to fuse source images. However, the spatial domain techniques introduce undesirable effects such as image blurring and contrast reduction. For the transform domain methods, source images are projected onto localized bases which are generally made to denote the sharpness and edges of an image. In literature, various transform domain techniques involving multi scale decomposition were developed like Laplacian pyramid [3], Contrast and Gradient pyramids [4 - 6], principle component analysis (PCA) [7], multi-resolution transform methods such as multi-resolution singular value decomposition (MSVD) [8], discrete wavelet transform (DWT) [9], stationary wavelet transform (SWT) [10], lifting stationary wavelet transform (LSWT) [11], Daubechies complex wavelet transform (DCWT) [12], Shearlet Transform (ST) [13], double density discrete wavelet transform (DDDWT) [14] and discrete cosine harmonic wavelet transform (DCHWT) [15]. The major problem with pyramid based methods in [3-6] is lack of spatial orientation selectivity, which results in blocking effect in the fused image. PCA based method in [7] acquaint

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Strengthening of Reinforced Concrete Rectangular Columns by using FRP Sheets

P Urmila, A S Kumar, A L P Kumar, N Haripavan

ABSTRACT: Strengthening of columns is needed now a days because of various reasons. Upgrading existing strength of columns, rectifying inadequacies due to poor construction practices or due to degradation or due to environmental effects are may be some reasons.

In the present study the strength behavior of RC short axially loaded columns(100x00x500) strengthened with FRP sheet strips and the effect of edge rounding (sharp edges are made round) on load carrying capacity are studied. The Column is wrapped with strips of different FRP sheets at different spacings of constant FRP sheet material area. Columns are reinforced with 4#10mm diameter steel bars. The columns are designatedas CC,SG83.33,SG50,SB83.33,SB50,SC83.33,SC50,RG83.33,RG50, RB83.33,RB50,RC83.33,RB50. Here CC column is of control column without FRP sheet sticked S stands for sharp edge columns. R stands for rounded edge columns .G,B and C stands for Glass, Basalt, Carbon FRP sheets respectively. Here numerical indicates the width of the FRP strips in mm. The percentage increase in the capacity (load) of FRP strengthened columns compared with control column(CC) For SG83.33 is 20.7% ,for SG50 is 49.1% , for SB83.33 is 6.7% , for SB50 is 13.3%, for SC83.33 is 29.49% ,for SC50 is 65% , for RG83.33 is 43.1% , for RG50 is 63.33% ,for RB83.33 is 24.9% ,for RB50 is 40.3%, for RC83.33 is 54.85% ,for RC50 is 67.26%.

Keywords:-FRP, CC Column, Strengthening, Number of Wrap

1. INTRODUCTION

The maintenance and rehabilitation by means ofstrengthening of the existing structures is one of the major problem of present day civil engineering practices. This is because, many structures which were constructed earlier with then design codes throughout the world are structurally not safe when checked with the present code of practices. Since the replacement of the structural members which are not safe involves a lot of economy and time. So retrofitting of the structural members by means of strengthening the existing members is the best way of improving the capacity(load) and the service life of the structure. Infrastructural damage of the structure by the premature deteriorations resulted in the initiation of the investigation of several repairing and strengthening processes of the existing structures. Strengthening of concrete structures put upon a challenge in selecting the appropriate method which will enhance the strength and service life of the structure with limitations of constructability, type of building operations and the economy involved. Improving the strength of the structure is required depending on the situation and the need for instance, additional strength may be needed to increase the capacity of structure in terms of load. This is generally required when there is change in purpose of the structure or higher capacity(load) is required. This change in purpose of a structure comes into play when additional mechanical equipment, construction equipment are required to place on the structure.

Strengthening of a structure is required when there is a need to resist additional imposed loads that were not considered in actual design. This is possible when a structure a subjected to some unexpected loads like wind load, earthquake force etc., which act in the lateral direction with very high intensities, in such situations strengthening is required.

Additional Strength is required as there is deficiency in the structure to carry the design loads. The possible deficiencies include the deterioration of members by corrosion, spalling of the concrete, damage due to the vehicular impact, excessive loading, fire, damage caused by the errors in building without following the actual proposed design.

Natural disasters like earthquakes, tsunamis, cyclones, etc., resulting a lot of disturbance to the infrastructural design and the service life of the structures. The majority of the reinforced concrete buildings and bridges constructed in India before 1970s typically does not have the required capacity (load) to resist the such above disasters. In order ensure the the structural safety efficient methods to be developed for structural repair and strengthing. For this FRP strengthening is one of the essential requirement among different strengthening techniques.

1.1 STRENGTHENING TEQNIQUES FOR RC COLUMNS

- Jacketing of Concrete
- Jacketing using Steel
- Concrete Jacketing (Precast)
- External Pre-stressing
- Wrapping a column with a high strength fibre reinforced polymer(FRP) composites

1.2 INTRODUCTION TO FIBER REINFORCED POLYMERS (FRP)

Fiber Reinforced Plastics (FRP)is well known generic term, which is used to define a versatile composites family which is being used in all types of industries like chemical plants, power plants, luxury power boats etc. The structure of the FRP is very typical which consists of an unsaturated

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Evaluation of Drainage and Surface Water Resources of Brahmayyalingam Lake in Agiripalli Mandal, Krishna District, A.P., India Using Geo-Spatial Technologies

G.T.N.Veerendra, A.V. Phani Manoj, Adari Satish Kumar, Pallepamula Urmila

ABSTRACT--- The water assets preservation and management assumes an essential part in the financial advancement of a country. In view of water need and the idea of improvement of water assets on watershed evidence has picked up significantly over the most recent two decades. The expanding request set on them has empowered examinations, situated towards the assessment of the assets, which is the reason for the detailing of plans for its investigation, administration, and preservation. The protection, improvement, and administration of surface water assets raise the generation level and maintain the same, it is conceivable through watershed-based projects. The Brahmayyalingam Lake is the geohydrological framework is a vital piece of Budameeru waterway of Kolleru basin. It is exceptionally impossible to miss to take note of that this geohydrological structure is subjecting to visit flooding amid rainstorm and intense water shortage issues amid whatever remains of the year. The principal target of the present paper is to create spatial data on water and surface water assets in Brahmayyalingam lake watershed. Geospatial advancements that incorporate Remote sensing and GIS will be utilized for creating data base on water and surface water bodies, the required information consolidates satellite pictures and other subordinate information as Survey of India (SOI) toposheets, reports, small scale maps, ground truth/field information and so forth.

Index Terms—
GIS - Geographical Information Systems, SOI- Survey of India, SRTM - Shuttle Radar Terrain Mapper

I. INTRODUCTION

According to recent studies it was identified that, globally, natural resources are going under severe threaten the present circumstances [Bronmark.C et.al, 2002]. The increasing anthropogenic activities pose severe pressure on various natural resources, together with forest and water resources [Bonell.M et.al, 2004]. The running down of these resources have an impact on micro climate state of region transforming the existing natural landscapes into undesirable land structures unsuitable for use [Hofer.T et.al,1993].The fall and loss of water storage potentialities like tanks, canals etc., are at the same rate at which forests are dishonored since water is noted as the crucial & critical constituent necessary for individual utilization also with agricultural usage, safety, management and protection of these assets are decisive for the sustainability of habitants .[Johnson et.al,2001].

1.1 Remote Sensing:

Remote sensing is the acquiring of information about an surface object without having physical contact with the object and thus in difference to on site study.

PROCESS OF RS

Remote sensing is another category of geography. In present technology usage, the term generally refers to the use of above ground sensor technologies to spot and categorize objects on Earth by means of disseminated signals (e.g. EMR). It may be split into active remote or passive (e.g. sunlight) when information is purely witnessed.

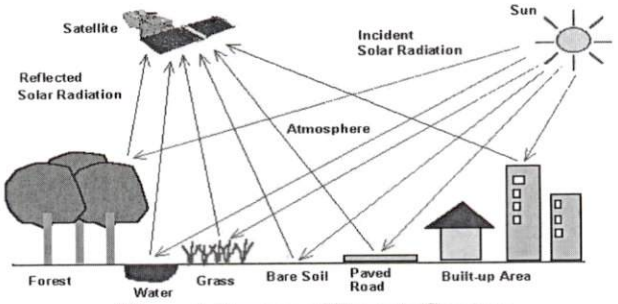

Figure 1 Process of Remote Sensors

Passive sensors assemble radiation that is emitted or reflected by the entity or neighbouring vicinity's. Reflected sunlight is the most familiar resource of radiation measured by the sensors, examples consist of infrared and radiometers.

1.2 Geographic Information System:

A GIS is an automated based tool for mapping and evaluating features on earth. GIS innovation amalgamates across the board database methods, for example, enquiry and factual examination, with maps. GIS oversees area based data and gives instruments to show and examination of different measurements, including populace qualities, monetary advancement openings, and vegetation composes. GIS enables you to connect databases and maps to make dynamic showcases. Additionally, it provides tools to visualize, certainty, and overlay of those databases in certain ways that are not possible with conventional spreadsheets. These abilities differentiate GIS from other information systems, and make it valuable to an extensive choice of

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Assessment of Godavari River Water Quality in and Around Rajamahendravaram

P.Lakshmi

Abstract: Surface water is by far the most important nutrient for the human body next to oxygen. Rivers plays an important role in the development of our country and sustenance of life, which are being polluted due to development activities like rapid industrialization, urbanization, etc. The main objective of this work is to analyse and classify water quality of river Godavari in and around Rajamahendravaram in order to determine the degree of pollution and ascertain the required treatment level before usage. The samples are collected from Pushkarghat, Gowthami ghat, Kovvur, Katheru, Katheru oxidation ponds integrated samples from top to bottom in the middle of river. Parameters of the Godavari river water determined include pH, ammonia, total dissolved solids (TDS), turbidity, total alkalinity, salinity, total hardness, electrical conductivity,etc. using both in in-situ and standard laboratory procedures. The samples are analysed, then results of the water parameters are compared with the prescribed Pollution Control Board standards. If the parameters are exceeding the prescribed standards then suitable methods of treatment are suggested for the eradication or minimization of pollution. From the present study we came to know that Turbidity, Total Alkalinity, Total Hardness, Calcium, Magnesium, Iron, Ammonia parameters are found to be in excess. So treatment methods like coagulation followed by Flocculation, Softening techniques like lime soda process and reverse osmosis, Oxidation ponds, De-nitrification techniques are used in order to preserve the quality of the river water for Drinking, Industrial and Agricultural purposes. Based on the Water Quality Index(WQI) calculated for the samples, it is found that Sample 3 (WQI-17.84) can be classified as 'Excellent' quality of water to be used for drinking, irrigation and industrial consumption. Sample 1 (WQI-32.43) & Sample 2 (WQI-28.63) can be designated as 'Good 'quality' of water which can be used for various above said purposes. Coming to Sample 4 (WQI-205.4) - the various parameters concentration is beyond the permissible limits specified by IS-10500 as well as CPCB and is classified as water 'unfit for human consumption'. Sample 5(WQI-70.93) - in spite of treatment measures taken by the industry, it is designated as water is'Fair' in quality and still needs to be treated carefully to bring down the concentration of various parameters within the concentration of limits and make it suitable for consumption. In order to observe the effect of pollutants in the sample-5 (WQI=70.93) on growth of plants and in order to know the extent of care taken by paper mill to remove pollutants, growth in a small plant is observed by watering the potted plant continuously for 15 days with the treated effluent. The plant is observed to show the normal growth indicating that the industrial management is taking care of the treatment of the effluent waste water. Finally, it is observed that in the study area, the impact of human activities on the river is existing even though the magnitude may be less, there is a danger in the near future, if proper care is not taken by respective authorities.

Index Terms: Analyse, Degree of Pollution, Treatment, Water Quality Index

I. INTRODUCTION

The quality of drinking water is an environmental determinant of health. Drinking-water quality management has been key work for over 150 years and it continuous to be the foundation of prevention and control of waterborne diseases. Safe drinking-water, as defined by the Guidelines, does not represent any significant risk to health over a lifetime of consumption. The nature and form of drinking-water standards may vary among countries and regions. There is no single approach that is universally applicable. It is essential in the development and implementation of standards that the current or planned legislation relating to water, health and local government is taken into account and that the capacity of regulators in the country is assessed. The main objective of this study is to assess and characterize the quality of Godavari river water in and around Rajamahendravaram Municipal water supply.

By collecting the samples from different locations and analysing the various parameters in the laboratory, the impact of human activities on the quality of water can be identified. The results of analysis are compared with IS standards and the quality of water is classified at various points of Godavari River. The River Godavari is the second largest river in the Indian Union. Starting from a trickle from the lips of a cow at Triambak, the width of the river grows till it is nearly 6.5km wide at Dowleswaram. It is always spoken of as the Southern Ganga and Vriddha Ganga. At Papikonda, it is narrow as 200-300 m for about 3 km. The Godavari rises in the Western Ghats at Triambak near Nasik, about 113 km northeast of Bombay and only 80 km from the Arabian Sea. After descending the Western Ghats, it takes a south easterly course across the southern part of Indian peninsula and flows through 1,230 km and falls into the Bay of Bengal about 80km east of Rajahmundry. The total catchment area drained by the river is 312,812 km, or nearly one tenth of India. The catchment in Maharashtra is about 152,199 km. The average annual flow (50% dependable flow) of the Godavari basin has been estimated as 110.5 km., whereas the utilizable flow (75% dependable flow) is about 76.3 km. The present utilization is only about 39 km3, which is hardly 50%. The annual rainfalls are moderate, from 700 mm at Nasik to 1,000 mm at Nizamabad.

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Original Article | Published: 02 May 2019

Nonlinear transient analysis of delaminated curved composite structure under blast/pulse load

Chetan Kumar Hirwani & Subrata Kumar Panda

Engineering with Computers **36**, 1201–1214 (2020)

Abstract

The nonlinear time-dependent displacement values of the curved (single/doubly) composite debonded shell structure are examined under different kinds of pulse loading in this research. The structural curved panel model is derived mathematically using the higher-order displacement theories containing the thickness stretching effect, whereas the sub-laminate approach is adopted for the inclusion of delamination between the subsequent layers. The structural geometry distortion under variable loading has been included in the current theoretical analysis through Green–Lagrange type of strain kinematics. Further, the governing differential equation order has been reduced with the help of 2D finite element formulation via the nine-noded isoparametric Lagrangian elements with variable degrees of freedom (eighty-one and ninety) for two different

Original Article | Published: 05 August 2019

Optimal deflection and stacking sequence prediction of curved composite structure using hybrid (FEM and soft computing) technique

Nitin Sharma, Anil K. Lalepalli, Chetan K. Hirwani, Arijit Das, Subrata K. Panda ✉, Umut Topal & Tayfun Dede

Engineering with Computers **37**, 477–487 (2021)

Abstract

The bending deflections and the corresponding optimal fiber angle sequences of the subsequent layers have been predicted in this article using a hybrid technique. The structural static responses are computed numerically via the isoparametric finite element steps in association with Reddy's higher order mid-plane theory. The final stacking sequences of individual layers are further predicted through two types of soft computing techniques (particle swarm optimization, PSO; teaching–learning-based optimization, TLBO). The responses (deflection and optimal angle) are obtained via a customized computer code (MATLAB) using the current mathematical model in association with two different optimization algorithms. The accuracy of the currently derived higher order hybrid model is established by conducting a few numerical

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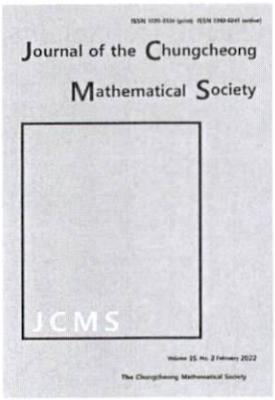

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CLOSED AND DENSE ELEMENTS OF BE-ALGEBRAS

M.Bala Prabhakar*, S.Kalesha Vali**, and M. Sambasiva Rao.***

Abstract. The notions of closed elements and dense elements are introduced in BE-algebras. Characterization theorems of closed elements and closed filters are obtained. The notion of dense elements is introduced in BE-algebras. Dense BE-algebras are characterized with the help of maximal filters and congruences. The concept of D-filters is introduced in BE-algebras. A set of equivalent conditions is derived for every D-filter to become a closed filter.

1. Introduction

The notion of BE-algebras was introduced and extensively studied by H.S. Kim and Y.H. Kim in [5]. These classes of BE-algebras were introduced as a generalization of the class of BCK-algebras by K. Iseki and S. Tanaka [4]. Some properties of filters of BE-algebras were studied by S.S. Ahn and Y.H. Kim in [1] and by J.L. Meng in [6]. In [10], A. Walendziak discussed some relationships between congruence relations and normal filters of a BE-algebra. In [3], Gispert and Torrens defined the Boolean center and the Boolean skeleton of a bounded BCK-algebra and they used the Boolean skeleton to obtain a representation of bounded BCK-algebras. In [7], C. Muresan studied some properties of dense elements and the radical of residuated lattices. Later in 2011, D. Piciu and D. Tascau [8] developed a theory of localization for bounded commutative BCK-algebras.

In this paper, the notions of closed elements is introduced in BE-algebras. A set of equivalent conditions is derived for every element of a BE-algebra to become closed. The notion of closed filters is introduced in BE-algebras. Closed filters are characterized in terms of closed elements

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Constrained Optimization of Linear Antenna Arrays using Novel Social Group Optimization Algorithm

Jyothi Budida, Sanjai Kumar Mortha, Sreerama Lakshmi Narayana

Abstract: *Antenna array optimization is a major research problem in the field of electromagnetic and antenna engineering. The optimization typically involves in handling several radiation parameters like Sidelobe level (SL) and beamwidth (BW). In this paper, the linear antenna array (LAA) configuration is considered with symmetrical distribution of excitation and special distribution. The objective of the design problem considered involves in generating optimized patterns in terms of SLL and BW and check the robustness of the social group optimization algorithm (SGOA). The analysis of the design problem is carried out in terms of radiation pattern plots. The simulation is carried out in Matlab.*

Keywords: *Antenna array, optimization, SGOA*

I. INTRODUCTION

The antenna array configuration (AAC) has several advantages over single element antenna. It is possible to obtain high gain and directivity using AAC. It is also possible to direct the beam to any direction of interest using the AAC [1-6]. In addition to beam steering capabilities, it is also possible to shape the radiation pattern in the desired form in order to compete with several applications. Some of the typical applications are the RADAR, cellular and mobile, and several other personal communication systems. All these applications need a variety of radiation patterns which are generally not possible with the single element antenna configuration. Hence, the AAC is preferred to solve such electromagnetic problems. The AAC can be of several geometrical forms like linear, planar as one dimensional and two dimensional respectively along with three dimensional structures. The synthesis of antenna arrays is an optimization problem as it involves in handling several conflicting parameters of antenna arrays which have to either minimised or maximised [2]. This minimisation or maximization of antenna parameters in the presence of some constraints is always a challenging problem since the inception of the AAC. Several conventional and highly complex numerical methods are suggested to handle the synthesis problem. However, all the conventional problems are typically local search methods. They often have the tendency to give local optimization solution rather than global competent solution [2,4,5]. Considering the above issues with conventional and traditional numerical methods, several evolutionary computing algorithms are proposed to antenna array optimization (AAO) problems.

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Earlier the most famous genetic algorithm, Taguchi method, and particle swarm optimization algorithms are applied successfully to produce optimum sidelobe level (SL) with several constraints. In the recent past, several nature inspired algorithms like flower pollination, firefly, ant colony and bacterial foraging are applied to AAO problems. All the algorithms have produced excellent solutions to the AAO problems. In this paper, a more recent algorithm known as social group optimization algorithm (SGOA) is used for AAO and design. The algorithm is applied to linear array optimization using amplitude-spacing (AmpSp) technique. Further, the paper is written in four Sections. The Section-2 gives a brief introduction to the problem formulation and the description of the algorithm is given in Section-3. The results and discussions are mentioned in Section-4. Overall conclusions of the work are presented in Section 5.

II. PROBLEM FORMULATION

The geometrical representation of the structure of the linear array is given in Fig.1. The presented geometry of the linear array has a symmetrical structure. According to the symmetry the linear array has similar distribution of amplitudes of current excitation and spacing between the elements on either sides of the array.

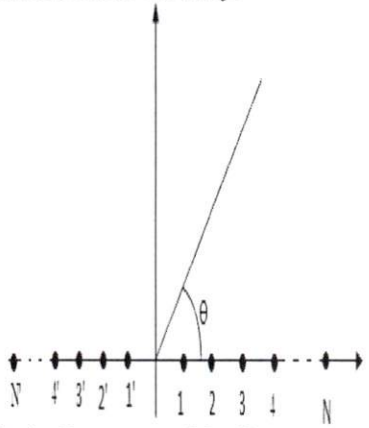

Fig 1: Geometry of the linear array

The formulation of the array factor is given as [1]

$$AF = \sum_{:0}^{1} e^{jm\psi} \quad \sum_{:0}^{1} e^{jm\psi} \qquad (1)$$

Here

$$\psi = \beta d\cos\theta + \alpha$$

and $\beta = 2\pi/d$

d= inter-element spacing

θ=look angle

α= phase

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Heat transfer augmentation techniques in forced flow V-trough solar collector equipped with V-cut and square cut twisted tape

A. Saravanan [a], S. Jaisankar [b]

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Highlights

- The forced flow V trough solar collector are investigated using square cut and v cut twisted tape inserts.
- The heat transfer rate of V trough collector is 8.4% higher than flat plate collector.
- The performance of v cut twisted tape inserts with twist ratio 3 is better than the twist ratio 5.
- Empirical correlations are developed based on the experimental results.

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Integrated features and GMM Based Hand Detector Applied to Character Recognition System under Practical Conditions

Songhita Misra & R. H. Laskar

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Abstract

Detection of bare-hand under non-ideal conditions is a challenging task. Most of the existing hand detection systems are developed under limited environmental constraints. In this study, a robust two-level bare-hand detector is integrated with a 58 keyboard characters recognition model. At first, the Gaussian mixture model (GMM) based foreground detector is used to segment the region of interest (ROI), which is further classified using Color-texture and texture based models to detect the actual fist. The detected hand is tracked using modified Kanade–Lucas–Tomasi (KLT) tracker to generate the required trajectory points of the character. The feature space for character recognition consists of existing features and three new features, namely, Local Geometrical Area Ratio (LGAR), Area of two

proving the authors with equipments for carrying out the research work.

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Improving performance of a trapezoidal-trough thermosyphon solar collector using peripherally wing-cut swirl generator

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ABSTRACT

In this present study, the performance of a newly modified solar collector named trapezoidal-trough solar collector (Tra-trough) has been examined using peripherally wing-cut swirl generator (PSG). The experiment has been executed at Government College of Engineering, Salem, Tamilnadu, India (Latitude: 11°66′N and Longitude: 78°15′E) with three different wing shapes including PSG with triangular wings (PSG-Tri), rectangular wings (PSG-Rec) and trapezoidal wings (PSG-Tra). The obtained results are contrasted with plain tube Tra-trough (TT-plain) solar collector under the same working condition. The experimental trials are made by keeping swirl ratio (Y = 3), wing-span ratio (b/W = 0.3) and wing-chord ratio (d/W = 0.4) as constant. The results obtained from the TT-plain are verified with the fundamental equations and found the deviations within ±11.21% for Nusselt number and ±8.24% for friction factor. From the experimental result, the PSG provides higher heat transfer rate over the TT-plain with/without typical swirl generator (TSG). The results also exposed that the PSG with trapezoidal wings (PSG-Tra) offers higher heat transfer rate and thermal efficiency than those given by other type of wing shapes. The thermal performance of trapezoidal wings (PSG-Tra) is enhanced up to 137% over the TT-plain. In addition, correlations for predicting the Nusselt number and friction factor have been developed. The deficiency of the predicted value for Nusselt number and friction factor are within ±10.31% and ±11.21%, respectively.

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KEYWORDS
Tra-trough; peripherally wing-cut; trapezoidal wing; rectangular wing; triangular wing; typical twist

1. Introduction

Due to the scarcity of nonrenewable energy sources, the utilization of renewable energy extends day by day. Solar energy becomes the most promising source of energy than all other energy sources. This solar energy may be transformed into valuable energy either as electricity by photovoltaic cells or as heat energy by means of solar collectors and solar ponds. The solar collector's performance can be enhanced by several augmentation techniques like type of receiver, coating materials, insulation type and reflecting material, etc. The placing of twisted tapes in a flow passage is one of the simplest, lowest cost, and zero maintenance passive techniques for augmenting the convective heat transfer. In the past decades, lot of research works by both experimentally and numerically were being carried out to examine the effects of modification in twisted tape geometry in terms of Nusselt number and friction factor. When compared to heat exchangers, only a few experiments have been carried out with modified swirl generator geometry in solar collector fields.

An experiment in a horizontal double-pipe heat exchanger using conventional twisted tape has been conducted (Naphon 2006). The influences of serrated twisted tape in a circular tube under turbulent condition (Chang, Jan, and Liou 2007) have been examined to evaluate the system performance. The heat transfer properties of straight full twist insert in a tube with various spacer distances were experimentally analyzed (Krishna, Pathipaka, and Sivashanmugam 2009). An experiment has been conducted (Eiamsa-ard et al. 2009) using short-length and full-length twisted tape in a round tube. The experimental results indicated that the performance of the full-length tapes was greater than the short-length tapes. In order to enhance the rate of heat transfer (Eiamsa-ard et al. 2010), delta-winglet twisted tape was used.

The viscosity and thermal conductivity of Al_2O_3 nanofluid were determined experimentally (Syam Sundar and Sharma 2010) at various temperatures and volume concentrations. The insertion of peripherally-cut twisted tape with alternate axis (PT-A) in a uniform heat flux circular tube (Seemawute and Eiamsa-ard 2010) has been illustrated to study the heat transfer characteristic. They concluded from their results that the heat transfer rate in the tube equipped with the PT-A tape was 184% greater than that the result obtained from the plain tube. In order to augment the rate of heat transfer (Eiamsa-ard et al. 2012), helically twisted tapes (HTTs) have been used. The experiment was conducted using HTTs with three various twist ratios (2, 2.5,

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Nonlinear thermal free vibration frequency analysis of delaminated shell panel using FEM

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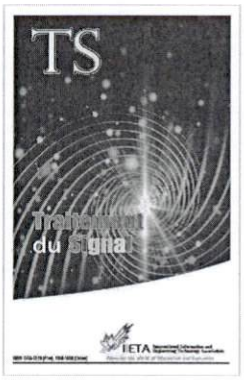
Abstract

The current research reported the thermal free vibration characteristics of the debonded composite shell structure considering the large geometrical deformation. The delaminated composite panel structural model is derived using two different higher-order polynomial kinematics. The nonlinear structural geometry has been modeled via Green-Lagrange relations in conjunction with temperature loading. The separation between the adjacent layers of the composite has been incurred through a sub-laminate approach and the corresponding displacement continuity imposed at the boundaries (laminated and delaminated). Moreover, the isoparametric Lagrangian type of element (eighty-one and ninety degrees of freedom) is adopted for the discretization of the physical shell structure. The nonlinear governing equation of motion



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Statistical Analysis of Lower and Raised Pitch Voice Signal and Its Efficiency Calculation

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acoustic feature, statistical analysis, feature extraction, SVM classifier, speaker identification

ABSTRACT

The voice signals of human are a type of acoustic signal that transfers the information about the message or word delivered in the form of speech. The speech of each person has its unique acoustic features. The statistical analysis of such features is critical to the speech recognition. Therefore, this paper aims to identify the speaker through statistical analysis of acoustic features of voice signals. First, the data collection method for speech samples was introduced, the voice signals were divided into three categories, namely, normal voice (NV), lower pitch (LP) and raised pitch (RP), and the effects of the LP and RP on speech were discussed. Then, a feature extraction method was coupled with several classifers to identify the LP and RP for speaker identification. Next, the MFCC, ΔMFCC and ΔΔMFC were adopted to extract the acoustic features. Finally, the proposed method was verified through a speaker identification experiment. The results show that our method can accurately capture the acoustic features of each speaker, and correctly differentiate between the NV, LP and RP. The research results are of great significance to speech recognition and speaker identificaiton.

1. INTRODUCTION

Speech communication is the basic mean of communication. Speaker identification in speech signal processing is a process to identify a particular person's voice for verification of identity. In the speaker, identification identifies the particular word or message who is speaking [1]. In speech signal processing, speech is classified into two categories as voice speech and unvoiced speech which depends on the vocal cords on speech in speech production technique [2]. Voiced speech produced when vocal cords inactive like /a/e/i/o/u/, unvoiced voice produced when vocal cords are inactive like /s/f/l/ these are produced only when vocal cords vibrate. Other classes of sounds are nasal sounds and plosive sounds. In this research work, the different speaker speaks the same string of words/sentences that deliver the same information but results are different in some dialect like length, pitch, frequency and oscillation [3].

In this area of research speech signal processing that includes speech coding, speaker recognition, speech analysis and synthesis, speech enhancement, etc. The most important applications of speech identification are used in the forensic department for speaker identification in the speech recognition area as illustrated in Figure 1.

This method mostly used in forensic speaker recognition in which determining individual speaker voice that is tracing in different physical moments. In the speech signals, speech recognition in different ways as for example speech recognition, language recognition and speaker recognition [4]. Speech recognition, recognize a particular text or word as for example "my name is Mahesh" means recognize a particular text. In language recognition, recognize a particular language as an example of English/Russian [5]. In the speaker recognition process, the identification of the speaker means that a particular sentence who is speaking. The detail recognition process is shown in Figure 2.

In Figure 2, this is shown the different steps of voice recognition. This paper is consisting of the speaker identification process that is marked in dotted lines that means a particular text/sentence deliver by a particular person [6]. In this research work, a normal voice (NV) is used for reference purpose and analysis of the voice tone of a speaker by different method lowered pitch (LP) and raised pitch(RP) [7].

Calculation of acoustic analysis of different speech signals In non-electronic disguised methods there are some changes in the frequency spectrum of speech signal MFCC, ΔMFCC, and ΔΔMFCC coefficients are used to specify the frequencies spectral property of speech signal [8]. Identification of speaker and feature extraction are calculated by the MFCC, ΔMFCC, ΔΔMFCC of all types of speech signals [9]. The acoustic feature and its statistical moments, correlation coefficient, mean and are calculated for normal voice (NV) for reference purpose as well as raised pitch and lower pitch voice signal by MFCC algorithm [10]. Using this approach the mean value and the correlation coefficients are essential for identification of voice signal. In this approach, the mean value and the correlation coefficient are essential for the identification of all types of voice signals. The speaker identification task is segmented into two stages: training stage and testing stage. In the testing and training stage, speakers enroll by providing voice samples to the system [11]. A speech model is formed with the extraction of speaker-specific details from these voice samples of the speakers. In the testing stage, the system compares the speaker's normal voice with the lowered and raised voice to make a decision. Speech samples are taken in the form of normal voice, lowered pitch and raised pitch [12]. In the feature extraction

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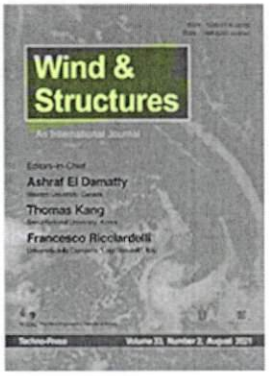

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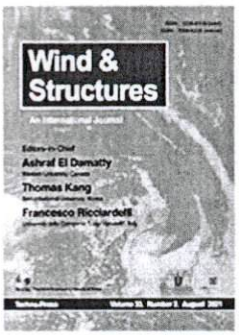
Theoretical and experimental modal responses of adhesive bonded T-joints

Mani Chandra Kunche, Pradeep K. Mishra, Hari Babu Nallala, Chetan K. Hirwani, Pankaj V. Katariya, Subhransu Panda and Subrata K. Panda



Abstract

The modal frequency responses of adhesive bonded T-joint structure have been analyzed numerically and verified with own experimental data. For this purpose, the damped free frequencies of the bonded joint have been computed using a three-dimensional finite element model via ANSYS parametric design language (APDL) code. The practical relevance of the joint structure analysis has been established by comparing the simulation data with the in-house experimental values. Additionally, the influences of various geometrical and material parameters on the damped free frequency responses of the joint structure have been investigated and final inferences discussed in details. It is observed that the natural frequency values increase for the higher aspect ratios of the joint structure. Also, the joint made up of Glass fiber/epoxy with quasi-isotropic fiber orientation indicates more resistance towards free vibration.

Key Words

ANSYS APDL; fiber orientation; free vibration; glass/epoxy composite; T-joint, FEM

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A Comparison of Fuzzy Game Matrix Solutions using Defuzzification Methods with a New Method

D.V.L.Prasanna, R.Subba Rao, A.V.S.N. Murthy, G.V.Ramana

Abstract: In our present research work, a fuzzy game matrix is solved using PM technique.The solutionof fuzzy game matrix using PM technique is compared with the solutions using first maximum, first minimum, centroid and centroid of centroid methods of defuzzification.

Index Terms: Saddle point,Principle of dominance, Arithmetic method, Method of Subgames, Fuzzy matrix game, Defuzzification, Centroid method,Centroid of centroid method.

I. INTRODUCTION

Game theory is "the study of mathematical models of conflict and cooperation between intelligent rational decision-makers." Game theory studies the general principles that explain how people and organizations act in strategic situations. It is an important tool used in economics, political science, and psychology, as well as logic, computer science, and biology [3,4]. Fuzzy logic is used to deal unclear situations. It is not connected with fixed or exact value but generally it deals with approximate or probabilistic value. In this, the situation lies possibly between 0 and 1 which is known as membership function. This came into existence by the extension of Boolean logic in which the situation is either true or false i.e., 1 and 0 respectively [5,7]. A fuzzy matrix is a matrix where elements of it lies in the closed interval [0,1]. The concept of a fuzzy matrix was introduced by Kim and Roush[1].In recent times Fuzzy matrices (FMs) remains as a broad subject in modeling, uncertain situations occurred in science, automata theory, logic of binary relations, medical diagnosis etc[2].The method of creating a crisp quantity fuzzy is called as Fuzzification. Defuzzification is the change of a fuzzy quantity to a specific quantity. R. Senthil kumara and D. Keerthana are discussed the solution of fuzzy game matrix using first maximum method of defuzzification in [7].L.N.PradeepkumarRallabandi et al studied the improved consistency ratio for pairwise comparison matrix in analytic hierarchy process(2016).

In this paper we presented the preliminary concepts/existing methods for defuzzification and the new approach established by the authors known as PM technique is given in section 2. Three examples are considered and the solutions are evaluated using all the methods mentioned in section 3.A table of comparison between all the methods given in section 4 with the suitable graphs.

II. PRELIMINARIES AND PM TECHNIQUE

2.1 Definition: The saddle point of a payoff matrix is defined as the position of an element in the payoff matrix which is minimum in its row and maximum in its column and the value of the game is the gain at this point.

2.2 Definition: Principle of dominance is if one pure strategy of a player is better or superior than another.one (irrespective of the strategy employed by his opponent), then the inferior strategy may be simply ignored by assigning a zero probability while searching for optimal strategies.

2.3 Arithmetic method: It is a technique for obtaining optimal strategies for each player in 2×2 games without saddle point.

The steps involved in this method are 1. Find the difference of two numbers in column I and put it under the column II, neglecting the negative sign if occurs. 2. Observe the difference of two numbers in column II and put it under column I, neglecting the negative sign if occurs. 3. Similarly repeat the above two steps for rows also. The values that are obtained from the above steps are called oddments. These are the frequencies with which the players must use their courses of action intheir optimal strategies.

2.4 Method of sub games: This method is used for $2 \times norm \times 2$ games. This method subdivides the given $2 \times norm \times 2$ game into a number of 2×2 subgames, each of which is then solved and optimal strategies are determined. While solving subgames first check for saddle point. If saddle point exists that will be the value of the game. If saddle point doesn't exist, then solve the subgame by arithmetic or algebraic method.

2.5 Theorem[6]: For any 2×2 two- person zero –sum game without any saddle point, having payoff matrix for player A as

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An Efficient Method for Segmentation of Noisy and Non-circular Iris Images Using Optimal Multilevel Thresholding

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Abstract - The richness and stability of the iris patterns make it a robust biometric attribute for recognition of individuals. Segmentation of the noisy and non-circular iris images is a challenging task now a day. In this paper, a new approach has been proposed to isolate iris from the unwanted portions of eye images. An evolutionary algorithm Improved Differential Search (IDS) based Otsu multilevel thresholding (OMT) has been introduced as a pre-segmentation process in the iris recognition framework. The resultant images are then segmented using Geodesic Active Contours (GAC) incorporated by a novel stopping function. The experimental results are validated by comparing the proposed method with the well existing methods. The proposed method has been tested on the databases that are available publicly such as CASIA v3 Interval, UBIRISv1, and MMU1.

Keywords: Integro-Differential Operator, Optimal multilevel thresholding, Differential search algorithm (DSA), iris segmentation, Circular Hough Transform.

1. Introduction

Segmentation is the crucial stage in any biometric authentication because the presence of noise such as specular reflections, occlusions of eyelid/eyelash, inhomogeneities in intensity levels and non-circular iris boundaries will affect the features of the iris patterns resulting in very poor segmentation accuracy. A significant number of authors have been proposed algorithms in the literature for segmentation of iris images captured under noisy environment[1]–[5]. Recently, the literature is focused on pre-segmentation of noisy iris images[6]–[12]

Authors in [3] proposed a robust and accurate pre-segmentation algorithm that combines hard clustering algorithm and an improved Hough transform for segmentation of very noisy images. A combination of integro-differential operator (IDO) and Random sample consensus (RANSAC) is then employed for detection of upper and lower eyelids. Authors in [2], proposed an algorithm for images captured under visible wavelength, which employs the K-means clustering algorithm as a pre-segmentation step, to estimate the iris boundaries circular Hough transform is then employed. Another method is due to Frucci et al.[10], which employ watershed transformation to partition grayscale images by employing region growing to a suitable set of seeds. The Taubin circle fitting algorithm is then applied on binarized watershed transform.

Multilevel thresholding of an image for segmentation process has recently emerged as a powerful tool. It is based on the fact that the objects in an image are expected to have a similar range of intensity values in the image histogram. One classification of thresholding techniques is bi-level (one threshold), in which image is segmented into two regions. In multilevel thresholding (more than one threshold) technique image is segmented into several distinct regions. Two popular histogram based thresholding methods are Otsu's and Kapur's methods[13]. In Otsu's method, thresholding of real images is chosen by maximizing the between-class separability. Whereas in Kapur's method, thresholding of real images is chosen by maximizing the entropy of the histogram.

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An Effective Software Effort Estimation based on Functional Points using Soft Computing Techniques

Rama Sree S, Ramesh S.N.S.V.S.C, Prasada Rao Ch

Abstract: Still in this 21st century, it is a great challenge for the Project Managers to make the software projects successful. The success of software projects relies on how accurately the estimates of effort, cost and duration can be made. Most of the standard surveys stated that only 30-40% of software projects are successful and the remaining are either challenged, cancelled or failed. One of the key reasons for failure of projects is inaccurate estimations. Effort Estimation should be carried out in the early stage of Software Development Life Cycle (SDLC) and it is an essential activity to establish scope & business case of software project management activities. Over estimation or under estimation leads to failure of the software projects. Many of the stakeholders are expecting the estimation of development effort in early stage for their better bidding. There are many methodologies like KLOC, Use Case Points (UCP), Class Points, Story Points, Test Case Points, Functional Points (FP), etc. to estimate effort in the software development. To estimate the effort in the early stage of software development, UCP, Story Points and FP are more preferable. The methods for estimation may be adopted based on the project complexity, functionality, approaches etc. In order to achieve an efficient and reliable effort estimate and thereby have a proper execution of software development plan, Soft Computing Techniques can be adopted in the various organizations and different research domains. In this paper, Functional Points have been selected for effort estimation and implemented using soft computing techniques like Neural Networks and Neuro Fuzzy techniques. After examination the results are evaluated using different error measures like VAF,MMRE,RAE, RRSE and PRED. Basing on results it is observed that the Neuro Fuzzy techniques provided better effort estimates

Keywords : SDLC, Soft Computing, KLOC, FP, Story Points, Neural Networks, Neuro-Fuzzy, PM..

I. INTRODUCTION

Now a days, the biggest challenge for the stakeholders who are involved in the development of software products is to provide the early and accurate effort estimations. Most of the projects fail due to inaccurate effort estimation. The Standish Group Report Chaos published in 2015 states that only 30% projects are delivered in time, 40% projects are more challenged and gets delayed and remaining 30% projects are cancelled after some amount of time. Either over estimations or under estimations leads to failure of the software projects [1]. The main reasons for inaccurate estimations in the software industry are unable to identify the functional requirements and non-functional requirements requested by the customer in the early stage of the SDLC. The capability of the Project Manager (PM) also influences the estimation of accurate and efficient software development effort as shown in Fig1. The PM is one who identifies the software development team's capability to deploy the requested software product within the schedule and budget[3]. Identifying the Risk factors in the early stage of the SDLC also can be a part of accurate software predictions.

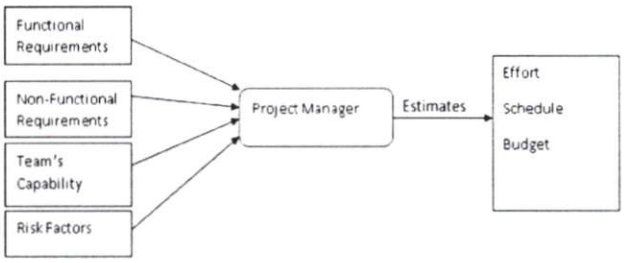

Fig 1: Project Managers Activity

Once these issues are resolved and known, the effort required to deploy the software product can be more accurately predicted. Functional Point Analysis (FPA) developed by IFPUG provides more precise measurements of software size and cost to develop quality software

A. *Functional Points*

Alan Albrecht while working for IBM, recognized the problem in measuring the size of the entire software product in the early stage of SDLC [2]. The basic idea of Albercht is that "the amount of services provided by system to the end user" can be evaluated by the data used by the product and transactions through which the services are delivered to the user [4]. In 1970, he developed a technique called Functional Point Analysis which appeared to be a solution to the size measurement problem. Function Point metrics are now widely used in determining the taxable value of software when industries are bought or sold. Function Points (FPs) measures the software product by quantifying the requested requirements of the user. Function Point Analysis (FPA) is a method of determining the size and complexity of the system in terms of the services provided

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Role of Heuristic Algorithms in Minimizing the Makespan of Fuzzy Flow shop Scheduling Problem

N.Selvamalar, V.Vinoba

Abstract : In this paper, the three fuzzy heuristics namely fuzzy Campbell-Dudek-Smith algorithm(FCDS), fuzzy Nawaz-Enscore-Ham(FNEH) algorithm and fuzzy Rapid Access(FRA) algorithm has been subjected to a comparative study to evaluate and assess the efficiency of the fuzzy models in various problems of random size.A sample data is chosen and 14 problems are generated with different job and machine size.The makespan is evaluated,compared and depicted using ORIGIN software.The worst case solution of every problem is compared with the heuristic schedule obtained in order to show the improvement in the solution when the above heuristics are applied.It is noticed that the FNEH algorithm stand tall above the remaining procedures adopted in this work except a few instances where the FRA procedure excels.

Keywords:Fuzzy flowshop,Octagonal fuzzy numbers,Fuzzy heuristic algorithms ,Comparison of makespan

I. INTRODUCTION

Flow shop scheduling has its own library of exact and heuristic methods namely Johnson algorithm[6],branch and bound method[5],Campbell-Dudek-Smith algorithm[1],Nawaz-Enscore-Ham algorithm[9], Rapid Access algorithm[2] etc., to solve the n-jobs m-machines problems.When fuzziness comes into picture ,the same methods are fuzzified by triangular,trapezoidal and octagonal fuzzy numbers to an extent[3,4,7,8,10,11,12].Since many heuristic procedures are available,it is advisable to have comparative study between the results obtained by these procedures for the future use. Section 2 deals with the comparison of the three heuristics fuzzy CDS,fuzzy NEH,fuzzy RA algorithms and their results from a sample data. Section 3 gives the conclusion.

II. COMPARATIVE STUDY

In this work, 14 different random fuzzy flow shop scheduling problems are considered. The processing times are octagonal fuzzy numbers. The various sizes of the problems are:

3 J 6 M	4 J 5 M	4 J 6 M	4 J 7 M	5 J 3 M	5 J 4 M	5 J 5 M
6 J 4 M	6J 5 M	7 J 3 M	8 J 3 M	6 J 4 M	4 J 4 M	6 J 3 M

The sample data is constructed in such a way that it includes the octagonal fuzzy numbers which are non-negative both symmetrical ,asymmetrical and their generalized mean values are ranging between 8 and 164.The problems are chosen randomly from the sample data given in the following table.The description of the algorithms which are found in Selvamalar et al.,[10,11,12] are applied to each and every problem one by one to get the optimum schedule.

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The makespan is evaluated in each case and is compared . In each case, all the three fuzzy heuristics are executed and the makespan is evaluated.The comparative study is done by increasing the machine size from 3 machines to 7 machines as well as the job size from 3 jobs to 8 jobs.The results obtained in the problems by applying the three fuzzy heuristics are tabulated based on their classification and the same has been depicted in bar charts.The difference between the solutions of the three methods is also studied.A comparison between the heuristic solutions and the worst case makespan is also done.

2.1.SampleData

The sample data consisting of the fuzzy execution times for jobs on each machine is tabulated in table 9. From the sample data , various size problems are identified and exposed to the three heuristics in the order FNEH,FCDS and FRA .

'*' in the tables represent the least makespan obtained by the respective method.As well once the heuristic schedule and the corresponding makespan is obtained , the generalized mean value of the makespan(GMV) is evaluated using the ranking of octagonal fuzzy numbers found in [10].Then the GMV's of the makespans due to three heuristics has been depicted into barcharts to clearly explain the outcome of these three methods.

2.2 Problems and their Solutions from three fuzzy heuristics

Table 1:**4-jobs problems**

	Heuristic	Makespan
4J 4M	2-1-3-4	(248,258,267,280,305,320,336,352)
	2-1-3-4	(248,258,267,280,305,320,336,352)
	2-1-3-4	(248,258,267,280,305,320,336,352)
4J 5M	1-4-2-3	(125,137,151,169,175,192,204,215)*
	1-4-2-3	(125,137,151,169,175,192,204,215)*
	1-4-3-2	(125,137,151,169,175,192,204,215)*
4J6 M	4-3-1-2	(159,168,178,193,206,216,227,237)*
	4-3-1-2	(159,168,178,193,206,216,227,237)
	3-4-1-2	(172,181,193,208,221,231,241,253)
4J 7M	3-1-4-2	(165,176,189,205,218,229,241,253)
	3-1-4-2	(165,176,189,205,218,229,241,253)
	1-3-4-2	(167,178,196,212,224,234,245,257)

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An Intelligent IOT Mechanism for Collision Detection and Prevention at Railway Level Crossing

Raja Sekhar Kummari, Phani Sridhar Addepalli, Krishna Mohana Tenneti

Abstract: With the rapid growth of things connected to Internet leading to the massive scale on increase of devices for automation and control. An explosive demand adds the strength to ubiquitous computation and the device interaction over cyber physical systems. This commendable support is taken in to practice for giving an automated IOT solution for the railway level crossing problems faced across the countries. Especially in populated countries like India the size of traffic on roads and railways is happening in a short time at a great rate. The situation is always alarming at the exchange of transport between these mechanisms at a common point called railway level crossing. In this paper we are providing a novel, cost effective and intelligent IOT solution using Raspberry Pi outfitted with sensors, RFID tags and load cell to predict the arrival or crossing of trains, also controlling the gates to get rid the problems arising manually by restricting the vehicles not to face the disasters. It enhance the effectiveness, trustworthy of the railways in the community of passengers.

Index Terms: CPS, Load Cell, MQTT, RFID, Sensors, Ubiquitous Computing, Raspberry Pi.

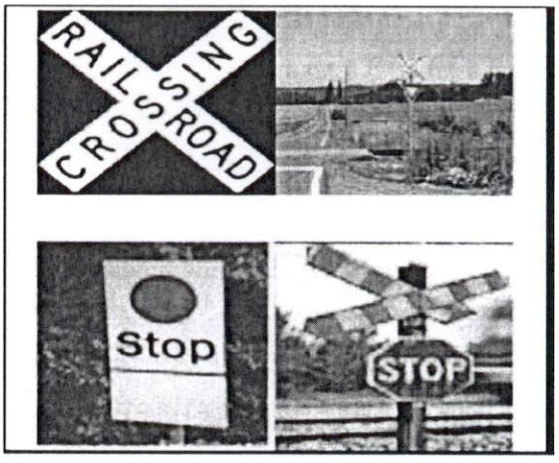
I. INTRODUCTION

Railway is considered as one of the cheapest and safest mode of transport worldwide. Therefore, safety is the crucial aspect in railway operation everywhere. With the ever increasing population, the railway industry always encounters separate problems due to technical and human errors, especially at level crossings. The Level crossing is a cross-sectional area where rail track and roadway intersect each other. In most cases, level crossing remains unattended mostly in rural and remote areas. Hence, such intersection requires constant human coordination and monitoring on regular basis. The level crossing is divided into two types namely manned and unmanned. Almost every year there are accidents/collisions reported at level crossing. Nearly 5,800 unmanned railway crossings are a key cause of rail accidents in India. As per a report 109 rail accidents have occurred at unmanned crossings during the past years. As per the report from Times of India 66% of accident fatalities occur at level crossings due to carelessness of road users and the gatekeepers. Of all the road infrastructures, level crossing is considered as one of the most dangerous spot. Actually, 29% of mishap happens in railroad framework occur at level

intersection. Much of the time, mishaps occurred because of lack of regard of street clients and vehicle administrators towards detached street signs or presumably due to awful climate conditions. From the investigation of the reason for the mishap Indian Railways found was that of the considerable number of mishaps 87.78% were because of the human disappointment. Subsequently, there is a critical need to dispense with these components. To wipe out these variables we have to cause things to speak with one another and consequently the M2M innovation goes to the image [1].

Indian Railways was formulated for a period of ten years (2003-2013) entailing multi-pronged strategy, laying emphasis on prevention by reducing human dependence and mitigation of consequential effect in case of an accident. The Corporate Safety Plan envisages reduction of accidents on IR by the year 2012-13, substantially by bringing down the accident rate and is better than many of the advance Railways of the world.

The Road Traffic crosses the Railway Track either on "Grade Separated Crossing" (different Levels of rail and road) or at "Level



Crossing" (Road and rail are at same levels). The level crossings are made to facilitate the smooth running of traffic in a regulated manner governed by specific rules and conditions.

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Stationary Wavelet Transform based Image Fusion using fusion rules

Nainavarapu Radha, Tummala Ranga Babu

Abstract: Multifocus image fusion is a current research topic in the area of image processing for visual sensor networks. Discrete wavelet transform based fusion algorithms suffer from unintended effects like smoothing of edges, loss of contrast and artifacts. To overcome these problems, Stationary Wavelet Transform based algorithm using fusion-rules is proposed and applied to multifocus images. Stationary Wavelet Transform well preserves the edges and avoid artifacts with its shift-invariance property. Entropy and spatial frequency based fusion rules in this work can effectively characterize the intensity variations in an image there by loss of contrast is minimized. Simulation results show that the proposed method can amply preserve the edges and also avoid artifacts with no loss of contrast.

Keywords: Stationary Wavelet Transform, Entropy, Image Fusion, Spatial Frequency, Fusion rules.

I. INTRODUCTION

In visual sensor networks (VSN), the sensors are cameras which can capture, process and transmit a large number of images in surveillance, traffic and industrial applications [1]. However, an entire focused image is not captured by the cameras in visual sensor networks (VSN). This makes it difficult for VSN to analyze and understand the images. To address these issues, fusion techniques are desirable for fusing two or more images with divergent focus levels into a focused fused image.

II. LITERATURE REVIEW

The fusion techniques using Laplacian pyramids [2], Discrete Wavelet Transform (DWT) [3], discrete cosine transform [4], Walsh Hadamard Transform [5], multiresolution singular value decomposition (MSVD) [6], Wavelet based methods [7-12] are existing in the literature. The discrete wavelet transform (DWT) based method had been verified to be an effective image fusion technique. However, shift-variance property of DWT introduces unintended effects. The shift-invariant stationary wavelet transform (SWT) eliminates the unintended effects of DWT. Fusion rules are also essential to get a sharper fused image from source images considered for fusion. Hence, in this paper stationary wavelet transform and fusion rules based algorithm proposed for fusion.

III. PROPOSED METHODOLOGY

(a) Multi-focused source images are considered for fusion.

(b) Perform RGB to YCbCr color Transform on source images.

(c) Apply 1-level SWT on source images to get low and high-frequency sub- bands using Eq. (1).

$$cA_{j+1,k_1,k_2} = \sum_{n1}\sum_{n2} F_0^{\uparrow 2^j}(n_1-2k_1)F_0^{\uparrow 2^j}(n_2-2k_2)cA_{j,n_1,n_2}$$

$$cD^h_{j+1,k_1,k_2} = \sum_{n1}\sum_{n2} F_0^{\uparrow 2^j}(n_1-2k_1)G_0^{\uparrow 2^j}(n_2-2k_2)cA_{j,n_1,n_2}$$

$$cD^v_{j+1,k_1,k_2} = \sum_{n1}\sum_{n2} G_0^{\uparrow 2^j}(n_1-2k_1)F_0^{\uparrow 2^j}(n_2-2k_2)cA_{j,n_1,n_2}$$

$$cD^d_{j+1,k_1,k_2} = \sum_{n1}\sum_{n2} G_0^{\uparrow 2^j}(n_1-2k_1)G_0^{\uparrow 2^j}(n_2-2k_2)cA_{j,n_1,n_2} \quad (1)$$

(d) Spatial frequency based fusion rule is used to fuse low frequency coefficients in low- frequency sub- bands using Eqs. (2)-(4).

$$RF = \sqrt{\frac{1}{N\times N}\sum_{i=1}^{N}\sum_{j=2}^{N}\left[I(i,j)-I(i,j-1)\right]^2} \quad (2)$$

$$CF = \sqrt{\frac{1}{N\times N}\sum_{j=1}^{N}\sum_{i=2}^{N}\left[I(i,j)-I(i-1,j)\right]^2} \quad (3)$$

$$SF = \sqrt{(RF)^2+(CF)^2} \quad (4)$$

(e) Entropy based fusion rule is used to fuse high frequency coefficients in high - frequency sub- bands using Eq. (5).

$$E = \sum_{j=0}^{G} p(i)\log_2 p(i) \quad (5)$$

(f) Get composite fused image by applying 1-level inverse SWT on low- and high-frequency sub-bands using Eq. (6).

$$cA_{j,n_1,n_2} = \frac{1}{4}\sum_{i=0}^{3}\left\{\sum_{k_1}\sum_{k_2} F_1(n_1-2k_1-i)F_1(n_2-2k_2-i)cA_{j+1,k_1,k_2}\right.$$
$$+\sum_{k_1}\sum_{k_2} F_1(n_1-2k_1-i)G_1(n_2-2k_2-i)cD^h_{j+1,k_1,k_2}$$
$$+\sum_{k_1}\sum_{k_2} G_1(n_1-2k_1-i)F_1(n_2-2k_2-i)cD^v_{j+1,k_1,k_2}$$
$$\left.+\sum_{k_1}\sum_{k_2} G_1(n_1-2k_1-i)G_1(n_2-2k_2-i)cD^d_{j+1,k_1,k_2}\right. \quad (6)$$

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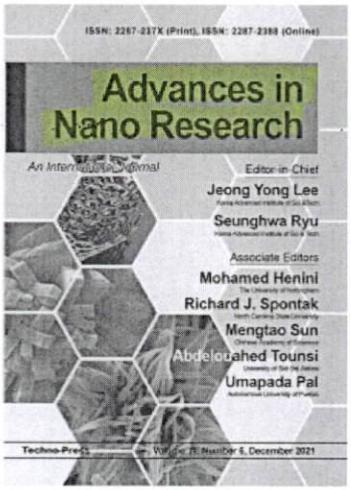

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Full Text PDF

Effect of nano glass cenosphere filler on hybrid composite eigenfrequency responses - An FEM approach and experimental verification

Harsh Kumar Pandey, Chetan Kumar Hirwani, Nitin Sharma, Pankaj V. Katariya and Subrata Kumar Panda

Abstract

The effect of an increasing percentage of nanofiller (glass cenosphere) with Glass/Epoxy hybrid composite curved panels modeled mathematically using the multiscale concept and subsequent numerical eigenvalues of different geometrical configurations (cylindrical, spherical, elliptical, hyperboloid and flat) predicted in this research article. The numerical model of Glass/Epoxy/Cenosphere is derived using the higher-order polynomial type of kinematic theory in association with isoparametric finite element technique. The multiscale mathematical model utilized for the customized computer code for the evaluation of the frequency data. The numerical model validation and consistency verified with experimental frequency data and convergence test including the experimental elastic properties. The experimental frequencies of the multiscale nano filler-reinforced composite are recorded through the impact hammer frequency test rig including CDAQ-9178 (National Instruments) and LABVIEW virtual programming. Finally, the nano cenosphere filler percentage and different design associated geometrical parameters on the natural frequency data of hybrid composite structural configurations are illustrated through a series of numerical examples.

Key Words

modal responses; nano glass cenosphere; hybrid composite; FEM; experimental analysis

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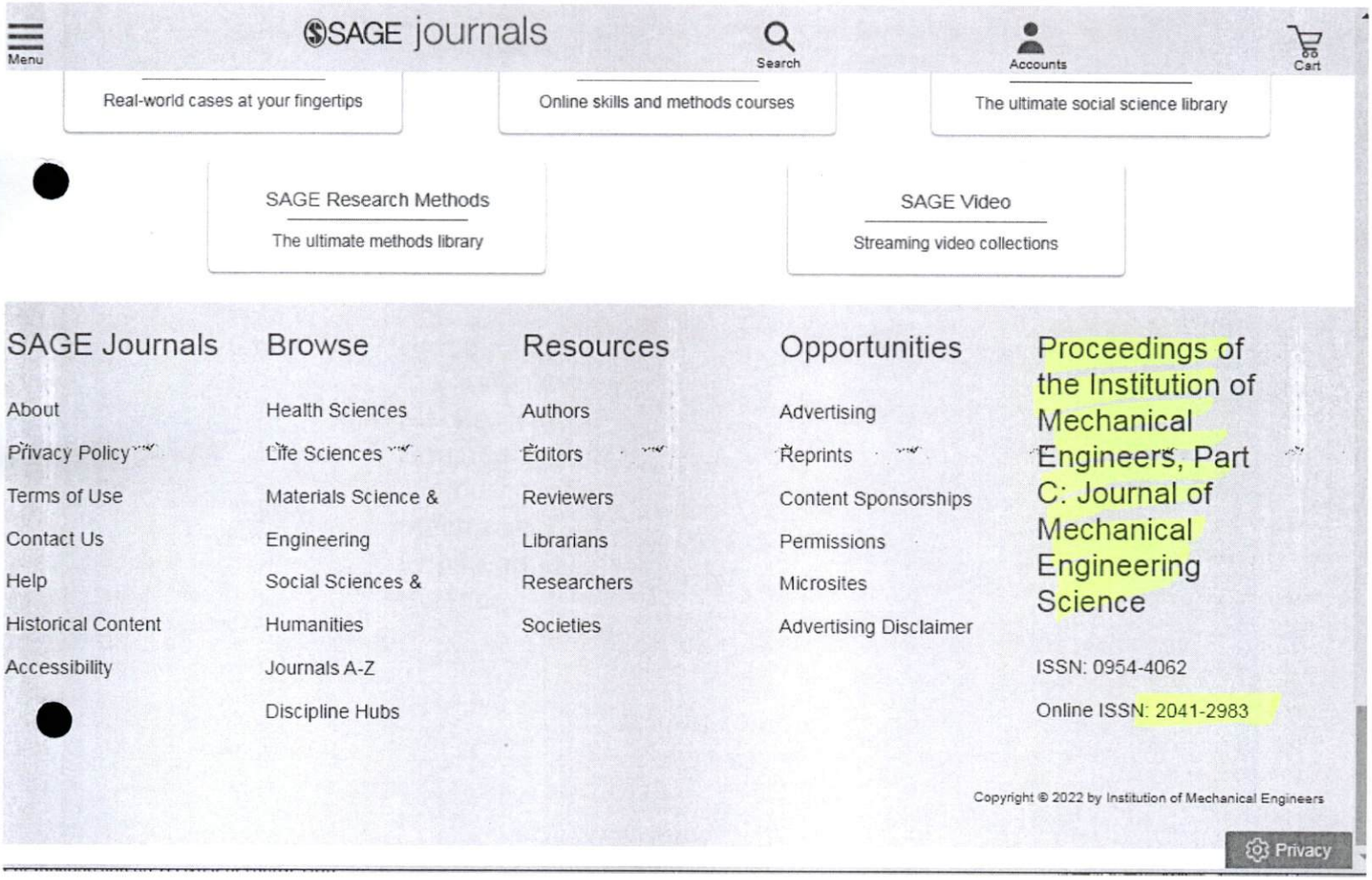

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Investigation of optimal process parameters for laser cutting of Inconel-718 sheet

Prashant Kumar Shrivastava, Bhagat Singh, Yogesh Shrivastava, Arun Kumar Pandey, Durgesh Nandan

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Abstract

Precise machining of advance material like Inconel-718 is an emerging need. Selection of an appropriate optimal range of cutting parameters is quite essential to achieve the high-quality cut and is a challenging task within this domain of study. The aim of this research is to develop a robust prediction model, which can suggest the desired range of cutting parameters for accomplishing better cutting quality, precision, and geometrical accuracy. Experiments have been performed on a 300 W (CNC-PCT 300) pulsed Nd: YAG laser cutting system at various levels of input cutting parameters, namely gas pressure, standoff distance, cutting speed, and laser power. Thereafter, response surface methodology has been adopted to develop mathematical models in terms of aforementioned input cutting parameters for geometrical quality characteristics: top kerf width and bottom kerf width. These developed models have been validated by comparing the predicted values wi

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Journal of Heat Transfer

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In this present work, the influence of corrugated booster reflectors (CBR) in a centrally finned twist (CFT) inserted solar thermal collector (SC) on heat transfer and thermal performance characteristics has been approached experimentally. The experimental trials have been made with two different twist ratios (Y = 3 and 6) for typical twist (TT) and CFT under same working conditions. The results were compared with the plain tube SC with CBR plain and also with the plain tube SC with flat booster reflectors (FBR plain). The experimental result of the CBR plain has been verified with the standard equations and found the deviations within ±10.05% for Nusselt number and ±9.42% for friction factor. The CBR has 1.6% higher effective reflection area than the FBR. Hence, the CBR augmented the Nusselt number around 8.25% over the FBR. When compared to the CBR plain, the CFT of minimum twist ratio (Y = 3) offered 10.09% higher thermal efficiency. In addition, empirical correlations have been derived for predicting the Nusselt number and friction factor. The deviations of the predicted value from the experiment value fall within ±10.62% for Nusselt number and ±11.28% for friction factor.

Issue Section: Heat and Mass Transfer
Topics: Friction, Heat transfer, Optical mirrors, Solar collectors

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Journal of Heat Transfer

RESEARCH-ARTICLE

Influence of Corrugated Booster Reflectors in a Centrally Finned Twist Inserted Solar Thermal Collector on Heat Transfer and Thermal Performance Characteristics

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Image Inpainting Based on Fractional-Order Nonlinear Diffusion for Image Reconstruction

G. Sridevi & S. Srinivas Kumar

Circuits, Systems, and Signal Processing **38**, 3802–3817 (2019)

Abstract

Image inpainting, image deblurring, and noise removal are influential concepts in the field of digital image processing. Second-order diffusion-based image restoration models suffer from staircase effects and connectivity principle, while fourth-order models suffer from speckle artifacts. In this article, a robust image inpainting model using fractional-order nonlinear diffusion driven by difference curvature is proposed and fractional-order variational model is utilized to remove the noise and blur. Fractional-order derivatives can deal well with edges and attain good trade-off between edges preservation and elimination of staircase and speckle artifacts of an image. Difference curvature is a feature descriptor which can effectively characterize the intensity variations in the image. In this work, difference

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Additional information

Publisher's Note

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Image Fusion using Eigen Features and Stationary Wavelet Transform

S.B.G.Tilak Babu, K.H.K.Prasad, Jyothirmai Gandeti, Devi Bhavani Kadali, V.Satyanarayana, K.Pavani

Abstract: *Image fusion is a technique of fusing multiple images for better information and more accurate image compared source images. The applications of image fusion in modern military, multi-focus image integration, pattern recognition, remote sensing, biomedical imaging etc.In this paper discussed, pros and cons of various newly arrived existing techniques in spatial and transform domain image fusion techniques. The individual advantages of Stationary Wavelet Transform (SWT) and Principal Component Analysis (PCA) is become great advantage to the proposed method.Standard dataset is used to evaluate the performance of proposed method, the obtained results are compared with exiting methodologies and shows robustness in terms of entropy, standard deviation and Peak Signal to Noise Ratio (PSNR).*

Key Words: *Fusion, multi-focus image integration, SWT, PCA, PSNR, standard deviation.*

1. INTRODUCTION

Image fusion helps to extract more information from a single composite image over two separate images. The image fusion method having many applications likemulti-modality (e.g., visible and infrared) image fusion, multi-focus image integration, multi exposure image fusion, remote sensing, biomedical imaging etc.Proper design of fusion rule for specific application like multi-modality is very important task in research. Very few articles are identified in literature on a fusion rule applied on multiple image fusion applications[1], more over efficient design of a fusion rule that is applicable to multiple fusion applications is much needed to present industries.

The image fusion can be achieved in spatial domain or frequency domain. Jiayi Ma et al., proposed a technique of fusing infrared image and visible image [15]. The fusion of two images is depended on Gradient Transfer Fusion (GTF), GTF is a combination of gradient transfer with minimization of total variation. Jiayi Ma et al., are succeeded image fusion without any registration of source images [5]. Yanfei and Nong [6] proposed a multi sensor image fusion technique based on hierarchical multi resolution along with attention. Important areas are identified by using visual attention model and maximum entropy. Based on adoptive weighing rules, first level of fused image is obtained from visible image and infrared image. Finally,Non-Subsampled Counterlet Transform (NSCT) is used to obtain final fused image. Huafeng Li [7] also proposed for the fusion of multi sensor image combination based on NSCT. Jun Lang and Zhengchao image fusion technique [8] provides less spectral distortion and good spatial resolution based onadaptive pulse coupled neural network (PCNN) anddiscrete fractional random transform.Various datasets are available to test fusion algorithm thoroughly, example source images are shown in table1. Usually, infrared and visible images are fused to extract more information from images.

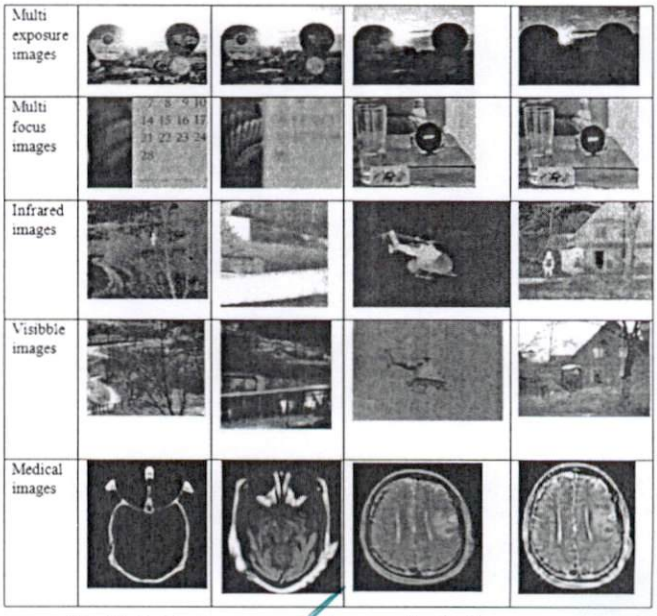

Table1. Various source images for fusion

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Effect of Penetration of Solar DGs on Transient Stability of Captive Power Generation Units

Ramachandra Murthy K. V. S. , Bhimaraju P. S. D. , Ravindra K

Abstract : In this work, transient stability analysis of industrial generator units is carried out using rigorous simulation study. The effect of Solar Distributed Generator Units on transient stability of captive power units is studied in this work. Industrial system with 39 Buses is considered with one utility bus, and nine captive generation units. The total active power load of the system is 121.57 MW and reactive power demand is 56.6 MVAr. The work is carried out in two stages. In the first stage, Critical Clearing Times (CCTs) are obtained without introducing any DG. In the second stage, CCTs are obtained with four Solar Power DGs at four different load buses. Triple line to ground faults at 9 Generator buses and 7 load buses are considered for obtaining Critical Clearing Times (CCT). It is observed that transient stability of system is improved by placing DGs. For the faults on Generator buses, CCTs are improved by 14.6% with DGs on average. For the faults on load buses, CCTs are improved by 27% with DGs on average. The detailed results are tabulated in this paper.

Keywords : Critical Clearing Time, Transient Stability, Distributed Generators.

I. INTRODUCTION

The transient stability analysis is an important area of research in power system assessment and deals with electro-mechanical oscillation of generators when they are subjected to perturbations. The variation of the rotor angle with respect to time is studied to verify and assess the stability. For any given perturbation, if the swinging of the rotor is gradually damped and rotor angles settle within the safe operating zone of the system, the power system is said to be transiently stable. Fault is simulated at a particular bus or on a line and Critical Clearing time (CCT) is evaluated for making the transient stability analysis of power system. CCT is the maximum allowable time for clearing the fault, for which the system remains stable.

In the case of a faults occurring on transmission line, faulted line is separated from the healthy part of the system and then reclosed. If the time taken for separation and reclosing power system is below a threshold value, the power system remains stable. If the time taken for separation and reclosing is greater than the threshold time, the power system becomes unstable. Thus, the determination of CCT is an important task in the transient stability assessment for a given fault condition.

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Distributed generation is relatively smaller power generation units of Solar, Wind and Mini Hydro. Olulope et al worked on how hybrid DGs effect transient stability of power system [1]. All the countries in the world are now going for DGs because of various benefits [2]. Tiam et al studied the result of installation of large scale Solar PV on the transient stability [3]. Azmy studied the outcome of installing fuel cell on transient stability of power system [4]. Reza analyzed the effect of installation of huge number and capacity of DGs on transient stability [5]. It is found that penetration level of DGs is an important parameter in studying the effect on system stability. Systems with more number of sources can provide more reliability and better quality power [6]. Several researchers worked with single DG source [7-10]. The system inertia for solar PV or fuel cell is very low [11]. DGs output depends on weather conditions.

Arutchelvi and Joanne worked on power supplied to residential load from the hybrid system consisting of PV and wind system connected to power grid [12, 13]. Dali studied an isolated system which works at low voltage with energy storage facility, PV and wind for better energy management [14].

Within an year, the percentage of penetration of DGs in USA may increase by 25% than that of 2012 [15]. The relays and Circuit Breakers might not be able to operate in bi-directional power flow which would be the result of DG connection in radial networks. The controllers need to be redesigned in the present scenario to offer reliable services to remote villages. Price of electricity depends on the demand at that time of the day in countries like US. DGs can be used at peak hours. [16].

In this work, without DGs, CCTs were obtained considering faults at 17 locations. Keeping the load constant, 4 Solar DGs were introduced by reducing the active power generation on industrial generator units and grid. Again CCTs were obtained for the same number of faults and same locations. Results were compared for the two cases. Section 2 presents system modelling, Section 3 and 4 present results and conclusions respectively.

II. SYSTEM MODELLING

In this section, General Structure of the Power System, Generator Modeling and Load modeling are presented. The power system consists of transmission network and various motors and generators of wide ranges connected to it. Transmission network which is static contains, transmission lines, shunt/series fixed reactance and transformers. The dynamics associated with these components are relatively fast and therefore

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Retrofitting Measures of Guntupalli Caves, West Godavari District, Andhra Pradesh, India, using Reinforced Rock Technique

S.R.K.Reddy, A.Satish Kumar, P.Urmila

Abstract— India is known for its rich, diversified and cultural properties. Assessment, evaluation and maintenance of ancient and historical monuments is a major concern today. Most of the historical structures which were built in earlier 1950s are now found unsafe if cheeked by present codes. Disintegration / deterioration due to continuous weathering processes and bitter failure examples from recent natural hazards reveal the importance of restoration / retrofitting measures.

In this paper, a case study on Guntupalli Caves, one of the finest testimonials of Buddhist Heritage, located in eastern ghat region of A.P. state, India, is taken up. The important monuments located in the study area are rock cut temples, monasteries and ruined Mandapa. Rock samples of different monuments are collected and tested in the laboratory and from test results, it is observed that the compressive and bending stress values are low and found vulnerable against any further loading. A new retrofit concept "Reinforced Rock" technique is adopted by introducing steel flats / bars in tension zone of rock samples. Test results have shown that compression and bending stress values are increased by two to four times compared with the results of those obtained in rock samples without reinforcement.

Index Terms— Rock cut monument, retrofit technique, Reinforced rock, bending stress.

I. INTRODUCTION

India is possessed with one of the oldest civilizations in the world and its past heritage and cultural wealth have been the subject of interest of the entire humanity. The spirit of Antiquarianism in India was best represented by the Asiatic Society of Bengal, founded in 1784 by William Jones. In 1861, the Archaeological Survey of India (ASI) was established and started as a mission and functioning towards the cause of protection, preservation and conservation of built heritage and antiquarian remains of India. India is an active member on world heritage from 1977 and has been working in close co-operation with various international agencies from different parts of the world.

Besides ASI, State Governments, Universities, Research Organizations and District local administrations are also working in these conservative programs.

Cave monuments claim their due share in the heritage properties as they were in the form of shelters/dwellings for human beings right from stone-age to hermitage. Throughout the history, primitive people have made use of caves for shelter, burials such as rock – cut – tombs or as religious sites.

Cave heritage can be broadly categorized into natural caves, temples/ monuments built in natural caves and rock-cut built caves / monuments along low level hill slopes. The present study of Guntupalli Caves [1] falls under the category of rock – cut caves.

Rock – Cut caves are built only by generations of religious nature and mostly confined to East and Southeast Asian countries.

The heritage properties are exposed to natural weathering actions and man- made disasters which threaten their integrity and values. Since these are on the verge of extinction due to hostile conditions of weather, encroachments in the name of development works, it is now the sacred duty of anybody to safe guard them from all odds.

The real challenge is to identify the protective measures and conservation of such historical monuments [2]-[4] with a view to assure the survival of these cultural heritage for centuries to come, with a little change as possible, but without altering the authenticity of their original appearance and character.

Project Outline

Guntupalli Caves are widely acclaimed as one of the finest and beautiful sites in the Eastern ghat region. The archaeological site under study is located about 45Km north of Eluru, West Godavari District, Andhra Pradesh, India. The location map of the study area is presented in Fig.1

The beautiful conglomeration of these monuments is constructed with great reverence by Buddhist community in the oldest centuries. The epigraphical records mention that these caves dates back to the ancient periods of 3^{rd} – 2^{nd} century to $5^{th}$to 6^{th} century A.D. The main significance of these sites is that the age of some of the monuments pre-dates even world heritage sites of Ajanta and Ellora caves of Maharashtra. The display of superb craftsmanship of these antiquities is also termed as "Ajanta of Andhra Pradesh". These caves were excavated along the slopes of the fragile sand stone hills of upper Gondwana formations.

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Influence of Sisal Fibers on the Properties of Rammed Earth

M Eswar Kumar Yadav, P R Kishore, A S Kumar, A S Swetha Sri

Abstract— The use of rammed earth has been increasing widely during recent years in many countries as an alternative material for building houses due to its valuable characteristics such as affordability, environment friendly, comfort, strength and durability. This thesis presents the result of an experimental study to evaluate the compressive strength and bond strength properties of untreated, treated bamboo splints and steel reinforced cement stabilized rammed earth blocks. To overcome the deficiencies of blocks, sisal fibers are added to improve the performance of CSRE blocks. Fibers are secondary reinforced materials and acts as crack arresters which improves the strength of cement stabilized rammed earth blocks.

In this experimental study, red soil is mixed by adding four different percentages (5%, 10%, 15%, and 20%) of OPC and sisal fiber with 0.2%, 0.4%, 0.6%, 0.8%, and 1.0% by weight of soil respectively. The bamboo splints were treated by soaking them in chemical solution of boric acid, Copper -Sulphate and Potassium Di-chromate (1.5:3:4).The resin-based adhesive with coarse sand will be applied to the top of bamboo splints. After 28days of curing period the cubes were tested for compressive strength, pull-out test is done for a series of CSRE blocks in which Bamboo splints and steel bars are embedded to find out its bond strength.

KEYWORDS:— Rammed Earth, Cement Stabilised Rammed Earth (CSRE), Sisal Fiber, Compressive Strength, Bond Strength.

1. INTRODUCTION

a) Rammed Earth: As demand for housing construction increases with affordable materials, it is best for us to choose the rammed earth, and the earth is an ancient form of monolithic earth wall construction. The use of mudguards for the application of load bearing and no-load bearing can be seen all over the world. The properties of the rammed earth can be enhanced by physical, chemical and mechanical stabilization. Physical stabilization is achieved by the proper mix ratio material of gravel, sand and clay. Mechanical stabilization is achieved by dynamic compression using a manual hammer (or) pneumatic hammer. Chemical stabilization can be achieved by mixing chemicals such as cement and lime to improve soil properties.

Rammed district construction can be classified into two groups: stabilized rammed earth and unstable rammed earth. In an unstable buried land, the soil consists of a mixture of sand, gravel, silt and clay. On the other hand, stabilized soil can be obtained by adding cement, lime, etc. to the soil. The mixture is wetted with the optimum moisture content before sanding between the molding operations. China's Great Wall of China, built about 3000 years ago, has a wide area based on Japanese Horyuji temples and rammed earth, just like the wall of the earth built about a year ago.

b) Sisal Fiber: Sisal fiber is one of the most widely used natural fibers and grows very easily. This plant starts with teeth and gradually grows, making roses with sword-shaped leaves. Each leaf contains several long, straight fibers. While peeling, the leaves are suitable to leave behind rough fibers and to remove pulp and plant material. The fibers can be spun for the production of yarns and fabrics or can be pulped to make paper products. The sisal fiber is completely biodegradable and the green complex is made of soy protein resin modified with gelatin. Commercial use of sisal in composites has increased due to strength, low density and environmental friendliness and cost effectiveness.

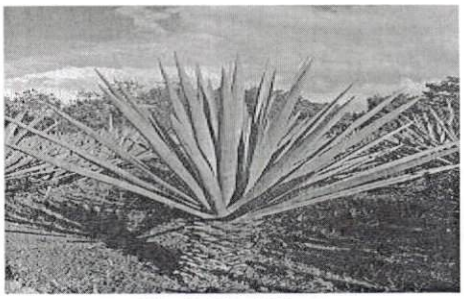

Fig 1. Sisal Plant.

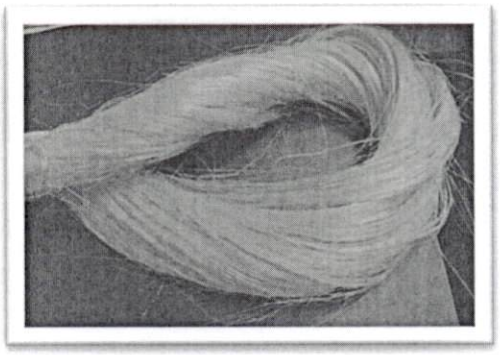

Fig.2 Sisal Fiber.

2. OBJECTIVE

- To identify various materials that can be used in construction as a replacement of concrete materials.
- To make the construction works eco-friendly.
- To enhance the strength of CSRE blocks by adding the Sisal fiber.

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Evaluation of Drainage and Surface Water Resources of Brahmayyalingam Lake in Agiripalli Mandal, Krishna District, A.P., India Using Geo-Spatial Technologies

G.T.N.Veerendra, A.V. Phani Manoj, Adari Satish Kumar, Pallepamula Urmila

ABSTRACT--- The water assets preservation and management assumes an essential part in the financial advancement of a country. In view of water need and the idea of improvement of water assets on watershed evidence has picked up significantly over the most recent two decades. The expanding request set on them has empowered examinations, situated towards the assessment of the assets, which is the reason for the detailing of plans for its investigation, administration, and preservation. The protection, improvement, and administration of surface water assets raise the generation level and maintain the same, it is conceivable through watershed-based projects. The Brahmayyalingam Lake is the geohydrological framework is a vital piece of Budameeru waterway of Kolleru basin. It is exceptionally impossible to miss to take note of that this geohydrological structure is subjecting to visit flooding amid rainstorm and intense water shortage issues amid whatever remains of the year. The principal target of the present paper is to create spatial data on water and surface water assets in Brahmayyalingam lake watershed. Geospatial advancements that incorporate Remote sensing and GIS will be utilized for creating data base on water and surface water bodies, the required information consolidates satellite pictures and other subordinate information as Survey of India (SOI) toposheets, reports, small scale maps, ground truth/field information and so forth.

Index Terms—
GIS - Geographical Information Systems, SOI- Survey of India, SRTM - Shuttle Radar Terrain Mapper

I. INTRODUCTION

According to recent studies it was identified that, globally, natural resources are going under severe threaten the present circumstances [Bronmark.C et.al, 2002]. The increasing anthropogenic activities pose severe pressure on various natural resources, together with forest and water resources [Bonell.M et.al, 2004]. The running down of these resources have an impact on micro climate state of region transforming the existing natural landscapes into undesirable land structures unsuitable for use [Hofer.T et.al,1993].The fall and loss of water storage potentialities like tanks, canals etc., are at the same rate at which forests are dishonored since water is noted as the crucial & critical constituent necessary for individual utilization also with agricultural usage, safety, management and protection of these assets are decisive for the sustainability of habitants .[Johnson et.al,2001].

1.1 Remote Sensing:

Remote sensing is the acquiring of information about an surface object without having physical contact with the object and thus in difference to on site study.

PROCESS OF RS

Remote sensing is another category of geography. In present technology usage, the term generally refers to the use of above ground sensor technologies to spot and categorize objects on Earth by means of disseminated signals (e.g. EMR). It may be split into active remote or passive (e.g. sunlight) when information is purely witnessed.

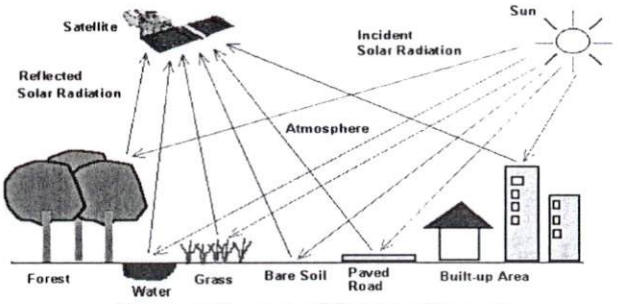

Figure 1 Process of Remote Sensors

Passive sensors assemble radiation that is emitted or reflected by the entity or neighbouring vicinity's. Reflected sunlight is the most familiar resource of radiation measured by the sensors, examples consist of infrared and radiometers.

1.2 Geographic Information System:

A GIS is an automated based tool for mapping and evaluating features on earth. GIS innovation amalgamates across the board database methods, for example, enquiry and factual examination, with maps. GIS oversees area based data and gives instruments to show and examination of different measurements, including populace qualities, monetary advancement openings, and vegetation composes. GIS enables you to connect databases and maps to make dynamic showcases. Additionally, it provides tools to visualize, certainty, and overlay of those databases in certain ways that are not possible with conventional spreadsheets. These abilities differentiate GIS from other information systems, and make it valuable to an extensive choice of

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A Review on Surface Modifications and Coatings on Implants to Prevent Biofilm

P. S. V. V. S. Narayana & P. S. V. V. Srihari

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Abstract

Bacterial infections associated with biomaterials are currently regarded as the most severe and devastating complications for their use as implants and medical devices. Biofilm is the major cause of bacterial infections associated with biomaterials. This review presents the biofilm formation, associated infections, and their current prevention strategies. The loss of efficacy of conventional antibiotic therapies leads to the development of antibacterial surfaces and coatings. Multifunctional surfaces and coatings can prevent biofilm formation and can become a novel strategy to fight biofilm. In this review, attention is focused on different surface modification techniques, surface coatings, and their current manufacturing methods to produce antibacterial biomaterials using surface engineering and nanobiotechnology.

Lay Summary

Organs. 2008;32:167–74. https://doi.org/10.1111/j.1525-1594.2007.00530.x.

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Ethics declarations

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Full Length Article

Performance and emission characteristics of variable compression ratio CI engine fueled with dual biodiesel blends of Rapeseed and Mahua

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Highlights

- Dual biodiesel was prepared by mixing Rapeseed and Mahua biodiesel by equal volume.
-

Original Research Articles

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Development of Therapeutic Food for Adolescent Girls

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Abstract:

Adolescents constitute over 21.4 % of the population in India. This age group needs special attention as is a period of rapid transition from childhood to adulthood that normally is characterized by important psychological and social changes in the age group of 10 -19 years. The adolescents number is expected to reach 1.13 billion by the year 2025. It is during the period of adolescence that nutrient needs are the greatest. Hence, the specific objectives of our study are to identify the key nutritional problems that affect adolescents and to develop a therapeutic food fulfilling their requirements. The present study was undertaken for the preparation and evaluation of a therapeutic food for Adolescent girls formulated with Bengal gram, Soya bean, Barley, Green gram, wheat and Ragi. Experiments were carried out in the Quality control lab, Andhra Pradesh Foods Pvt. Ltd. to study their chemical composition and overall acceptability. All the formulations were prepared according to the RDA requirements for adolescent girls. The therapeutic food formulated with Soya bean, Ragi and Green gram of 16g, 18g, and 30g respectively has attained the high levels of nutritional properties values but lower organoleptic properties. The formulation with composition of 17g of soya bean, 18g of barley and 30g of green gram has attained good nutritional values and highest acceptability in terms of hedonic rating. This formulated sample is highly preferable to adolescent girls suffering from anemia, stomach pain and nerves weakness patients as the food contains high amount of iron and the soya bean acts as the nutritional supplement to the growing adolescents.

Keywords: Therapeutic food, RDA (Required Dietary Allowances), Adolescents, Soya bean, High protein etc.

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Touchdown PCR combined with semi degenerate primers for rapid amplification of HOXD9 loci in humans

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Abstract

Higher eukaryotes possesses a large genome with a high level of gene sequence identity from other genomic DNA and is therefore difficult in assessment and time-consuming. Here we report on an efficient approach for rapid isolation and amplification of HOXD9 loci of human genome via touchdown PCR using semi degenerate primers. For the semi degenerate primers,they were designed based on conserved gene coding regions of consensus sequences. The effects of the universal primer-template matches on the efficiency of standard PCR amplification were investigated after assembly of sequences from different primers matches amplifying the same HOXD9 loci. Touchdown PCR increased both specificity and yield by high and low annealing temperatures in two consecutive amplifications on various gel concentrations. This approach was fast, easy and cost-effective for amplification of consensus sequences in very large gene sequences.

Keywords: Touchdown PCR, degenerate primers, HOXD9 loci, DNA, Genome, Consensus sequences.

INTRODUCTION

Most animal homeotic genes encode transcription factor proteins that contain a region called the homeodomain and are called Hox genes [1].HOXD9 proteins belong to a superfamily that regulates the development and control of many cellular processes [2], including proliferation [3] apoptosis [4], cell shape [5] and cell migration [6]. HOXD9 can also function as an oncogene in several cancer cells [7]. Besides their role in organizing structures along the main body axis, HoxA and HoxD cluster genes are required for proper development of both limbs and external genitalia [8]. PCR is probably the single most important methodological invention in molecular biology to date that tracks the polymorphism and evolutionary process [9]. Since its conception in the mid-1980s, it has rapidly become a routine procedure in every molecular biology laboratory for identifying and manipulating genetic material, from cloning, sequencing, mutagenesis, to diagnostic research and genetic analysis [10]. The fast and easy availability of these genes isessential for the study of functional genomics, gene expression, protein structure–function relationships, protein–protein interactions, protein engineering, andmolecular evolution [11].Primers with degeneratenucleotide positions every third base may be synthesized in order to allow for amplification of targets where only the amino acid sequence is known [12]. In this case, earlyPCR cycles are performed with low, less stringent annealing temperatures, followedby later cycles with high, more stringent annealing temperatures [13].One potential drawback to touchdown PCR is complexity of the programming on thermal cyclers and optimization of primer concentration [14]. Because of the numerous annealingtemperatures used, a large segment of the programming capacity of conventional thermal cyclers can be encumbered. Also, attempts to adjust the annealing temperaturerange can involve considerable reprogramming. Most housekeeping genes, tumor-suppressor genes, and approximately 40% of tissue-specific genes contain G+C sequences in their promoter region that were very difficult to amplify[15]. Some newer thermalcyclers avoid these problems by permitting the programming of automatic incremental temperature changes in progressive cycles [16].

MATERIAL AND METHODS

Isolation of DNA

Genomic DNA from whole blood is extracted with a combination of Proteinase K and SDS followed by protein degradation with organic reagent such as phenol and chloroform[17].Additional purification steps such as precipitation with a saturated solution of sodium chloride, rinsed in 70% ethanol and air-dried briefly and resuspended with 0.2-0.5 ml of TE buffer. DNA concentrations were determined by absorbance readings at 260 nm. All genomic DNA stocks were stored at 4^0C until further use.

Analysis of template integrity

Single-stranded integrity of a template DNA preparation is qualitatively assessed using alkaline agarose gel electrophoresis in 50mMNaCl, 1mM EDTAwith 0.3–0.5% agarose gels to visualize from 2 to > 30-kb single-stranded DNA.Gel is kept for presoak in 1X alkaline running buffer for 30 min to ensure pH equilibration. Gel is run at 0.5–1.8 V/cm (e.g., 3.5–5 h) and neutralized by gently shaking in 0.1 M Tris-HCl, pH 8.0, 1mM EDTA for 30 min, and then stained with 0.5 µg/mL ethidium bromide in TAE buffer.

T_m Predictions

The temperature at which half the molecules are single-stranded and half are double-stranded is called the $T_m$of the complex[18]. Because of the greater number of intermolecular hydrogen bonds, higher G+C content DNA has a higher $T_m$than lower G+C content DNA. Often, G+C

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Laboratory Investigation on the Strength Property of Field Collected Coal Samples

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Abstract - *The compressive strength of coal is a most troublesome property to examine by exploratory methods. This comes about not only because of coal's variability laterally as well as vertically in the seam but also because invariably it will have one set of cracks or planes of weakness and often three sets of cracks or planes of weakness approximately normal to each other, namely, face cleavage, butt cleavage and bedding planes. The knowledge of compressive strength of coal helps in the efficient extraction of coal. Since, coal belongs to the family of hard rock therefore its impact strength can be determined by the* Protodyaknov Strength Index *test. In order to perform this test in the laboratory the coal samples were collected from the field and its compressive strength was determined. In this experimental investigation it was observed that the coal having maximum compressive strength of 0.24 MPa and minimum of 0.12 MPa for the number of blows of 25 and 5 in* Protodyaknov Strength Index test set-up.

Key Words: Coal, Protodyaknov Strength Index, Compressive strength, Hard rock

1. INTRODUCTION

Rock is an aggregate of various minerals constituents which are naturally occurring. Every rock constituent having a fixed chemical composition and molecular structure. In general, the rock is composed of grains of varied polycrystalline and non-crystalline materials which are connected together either by some kind of glue or mechanical bonding [1]. Thus, we can say that rock is a firm and coherent substance which is having a non-homogenous property and it cannot be extracted by manual operation. Therefore, there is a need of an appropriate engineering principle which can help in the proper extraction of the rock mass. The principle which involves in rock engineering is called as rock mechanics.

The term rock mechanic can be described as the theoretical and applied science of the behaviour of rock. It is the that branch of mechanics which deals with the response of the rock under the force field of its environment [2-3]. In rock mechanics, the rock is not only considered as the engineering material but also the rock mechanics deals with changes in mechanical behaviour of rocks which occurred due to the engineering activities. The problems of rock mechanics are also associated with the design and stability of the rocks by determining the strength property of the rock samples. The strength property of the rock sample is called as the mechanical property of the rock sample. The strength of the rock is one of the most important mechanical property which helps in deciding the failure criteria of the rock mass during the any excavation operation.

The determination of rock mechanical property such as strength will helps the rock mechanics engineers to design the appropriate structure. There is various method available to determine the strength property of the rock. These methods may capable for measuring the different types of rock strength such as impact strength, uniaxial compressive strength (UCS), tensile strength, shear strength, point load strength etc. In the mining scenario, rock suffers mostly under the action of compressive load [4]. Due to this, the determination of compressive strength in mining scenario becomes the necessary task designing any underground or surface mines project. In this paper, an attempt has been made to study the strength of the rock samples by indirect approach. In order to determine the strength of rock by indirect approach the Protodyakonov strength index apparatus was used. In this method, the impact strength of the rock samples was determined under the laboratory environment condition [5].

Moreover, due to the impact loading on the structure the stain rate increases under the same amount of applied strength. This phenomenon affects the strength, stiffness, ductility and failure mode of the rock sample. Further, under this condition the inertia is also activated which influences the resistance and failure mode of the supporting and parent structures. The impact strength of the rock mass is the capability of the rock to withstand against the sudden applied load. The impact strength of the rock can be considered as an energy, which defines the amount of energy required to break the fracture the rock [6-7]. The impact strength of the rock depends on the type of the rock mass and it varies based on the rock type. The harder rock type having the higher amount of strain energy and vice versa. In order to determine the strength of the rock against its fracture the impact strength analysis of the rock samples becomes much necessary.

In the present study, the coal as a type of rock sample was considered for impact strength analysis. Coal is a hard rock which is the family of sedimentary rock formed from peat by the pressure of rock laid down later on top. In this paper, the impact strength analysis of both the selected rock was carried out by Protodyakonov strength index test apparatus.

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Bio-Active Phenylacetic Acid Complexes: Synthesis, Structure And Antimicrobial Activities

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ABSTRACT

Cu(II) complexes due to their coordination properties and their biological activity these act as good chelating agents and have high pharmacological potential. Cu (II) with phenyl acetic acid and azide have been synthesized and characterized by IR, LC-MS, TG-DTA and UV confirms the coordination of ligands by oxygens of phenyl acetic acid and nitrogens of azide ligands. Complex is screened for anti microbial activity.

KEY WORDS: Phenyl acetic acid, Antimicrobial Activity.

1. INTRODUCTION

Coordination of metal with organic compounds causes drastic change in the properties of metal and ligand. Phenyl acetic acid and its derivatives are of much interest because of their biological activities. Phenyl acetic acid a type of plant hormone, and an active auxin molecule which plays a vital role in coordination of many growth and behavioural processes in the life cycle of plants. They have antibacterial activity against micro organisms. Pseudo halide ions like azides, thiocyanates, isocyanates are versatile ligands that can bind divalent metal ions (Cu^{2+}, Mn^{2+}, Co^{2+} and Ni^{2+}) in a variety of ways of connecting transition metals in the solid state.Coordination of organic comopounds with metal causes drastic change in the biological property of the ligand and also the metal moiety.

2. MATERIAL AND METHODS

IR spectra are obtained with a Shimadzu IR Prestige 21 FT-IR spectrophotometer. Electronic spectra are recorded on LABINDIA UV3000$^+$ UV /VIS spectrophotometer. LC-MS spectra are recorded on AGILANT QQQ (ESI-MS). Massspectrometer. TG-DSC spectra are obtained using SDT Q600 V20.9 BUILD 20.

Synthesis of [Cu $(PAA)_3(N_3)_2$] (1): An aqueous (5 ml) solution of Copper perchlorate hexahydrate (0.185g, 0.5 mmol) is added to an methanolic solution (10ml) of Phenyl acetic acid (0.068g, 0.5 mmol) under stirring conditions at 60^{0}C, blue solution is formed and then aqueous solution (5 ml) of NaN_3 (0.03 g, 1.0 mmol) is added which turned to parrot green solution. After constant stirring at 60^{0}C temperature for 30 minutes, the solution turned to greenish blue. The solution is filtered off, greenish blue precipitate is formed. The precipitate was washed with methanol to remove uncoordinated ligands. Yield is 0.168 g (59.4%). Anal.expt $C_{26}H_{24}CuN_6O_6$, Mol.Wt. 580.05, C 53.84, H 4.17, N 14.49 (observed) C 53.62, H 4.12, N 14.20 (calculated). Important IR bands (KBR disc cm^{-1}) 3569, 2145, 1634, 1298 cm^{-1}. Mass Peak (m/z): 416, 485, 551, 617.

IR Spectrum of [Cu$(PAA)_3(N_3)_2$]: The Infrared spectrum exhibited bands in regions 3344, 3450cm^{-1} due to C=O of the free ligand. These bands are shifted to higher frequency 3569 cm^{-1}on complexation with Cu(II). The C=O stretching in the infrared spectrum ofPhenylacetic is assigned to the very intense infrared band observed at 1634cm^{-1} another intense band observed at 660cm^{-1} in the IR spectrum of Phenylacetic acid is assigned to a ring stretching deformation. However the $\nu_{as}(N_3)$ modes appeared as strong peaks at 2051cm^{-1} respectively. The shift to higher frequencies of $\nu_{as}(N_3)$ bandat 2145cm^{-1} indicates the end-on bridging mode of azide. In addition, the$\nu_s(N_3)$ modes appeared as a weak band at 1298 cm^{-1} also indicates the terminal nature of azido group. Important peaks reported in table.1.

Table.1. IR Spectrum of [Cu$(PAA)_3(N_3)_2$]

Complex	ν C=O	$\nu_{as}(N_3)$	Terminalazido group
	3344,3450cm^{-1}	2051cm^{-1}	1298 cm^{-1}

LC-MS Spectrum of [Cu $(PAA)_3(N_3)_2$]: Peak at 416 (m/z) is complex bound to two Phenylacetic acid and two azideions refer to [Cu$(PAA)_2(N_3)_2$]. Peak at 485(m/z) at complex bound to fragments of two Phenylacetic acid and two azideions. Peak at 551 (m/z) is complex bounded to three Phenylacetic acid and two azide ions refer to [Cu$(PAA)_3(N_3)_2$]. Peak at 617(m/z) corresponds to Cu bound to fragment of four PAA fragment and azide ions.

Electronic Spectrum of [Cu $(PAA)_3(N_3)_2$]: The UV-VIS spectrum of the metal complexes is recorded in DMSO solution in the wavelength range 200–800 nm.The UV-VIS spectrum of Cu(II) complex displays a broad band at 360nm attributable to d-d transition, which is compatible with complexes having square pyramidal structure. Important absorption band reported in table.2.

Table.2. Electronic Spectrum of [Cu$(PAA)_3(N_3)_2$]

Complex	Absorbance	μ/cm^{-1}	Assignment
	360	320	d-d

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COMPARATIVE STUDY OF THE STRENGTH PROPERTIES OF THE CONCRETE WITH PARTIAL REPLACEMENT OF THE COARSE AGGREGATE WITH PUMICE AND OVER BURNT BRICKS

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ABSTRACT

Concrete is the universally accepted material for its adverse properties with high usage of the concrete for all type of the works in the world, it leads to depletion of natural resources like river sand, and granite. Which are the components of the concrete as fine aggregate and coarse aggregate in this project M30 grade concrete is taken in which 10%,20%&30% of coarse aggregate is replaced with over burnt bricks and 10%,20%and 30% of coarse aggregate replaced with pumice by volume. And the compressive, flexural and split tensile strength properties at 7,28& 56 days and the unit weights of the concrete compared. In order to safe guard the natural resources, alternate material like over burnt bricks, pumice considered in the present project.

INTRODUCTION

Light weight concrete

Structural lightweight concrete has an internal density (unit weight) of 1440 ~ 1840kg / m3 compared to normal weight concrete with density of 2240 ~ 2500kg / m3. For structural use, the concrete strength must be at least 17.0 MPa. The concrete mixture is made of lightweight coarse aggregate. In some cases, some or all of the micro aggregates may be lightweight products. Lightweight aggregate used in structural lightweight concrete is a lightweight shale, clay or slate pumice material usually fired from a rotary furnace to develop a porous structure. Other products such as air-cooled blast furnace slag and hematite are also used. There is a different class of unstructured lightweight concrete made from other aggregate materials and with higher air voids in cement paste matrices (eg cellular concrete). These are typically used for insulation properties. The main use of structural lightweight concrete is to reduce the dead load of concrete structures, and structural designers can reduce the size of pillars,

foundations and other load bearing elements. Structural lightweight concrete mixtures can be designed to achieve similar strength to normal weight concrete. The same is true for other mechanical and endurance performance requirements. Structural lightweight concrete provides more efficient strength-to-weight ratio of structural elements. The mild cost of most lightweight concrete is offset by a reduction in the size of the structural members, reinforcement of the steel and reduction in the volume of concrete, thus reducing overall costs.

Over burnt bricks

Bricks are the most important part of development work and are used by humans for a long time. Its history dates back to the earliest times of human civilization. Many world-renowned archaeological excavations provide a wealth of information on brick usage in many parts of the world. A few years ago, bricks were made in warm places and hardened with simply sunlight. The sun-dried mud-brick hand was made and used in pre-porcelain neolithic times. The oldest brick use case was first discovered in southern Turkey. The Sumerian palace in Kish, Mesopotamia, is another excellent example of the use of ancient bricks.

The brick burned in the 5th century BC was used as part of the city of Babylon. The ancient Egyptians also used sun-dried clay bricks in world-famous sites. During the Roman Empire, the use of bricks spread throughout Europe spreading to Italy and the Byzantine area. 11th

In the development work, the use of blocks spread from this land. After the great fire in London in 1666, the city was rebuilt with most of the block structures. Bricks in the United States have been used in Virginia since 1611, and Sundried bricks have been made and used

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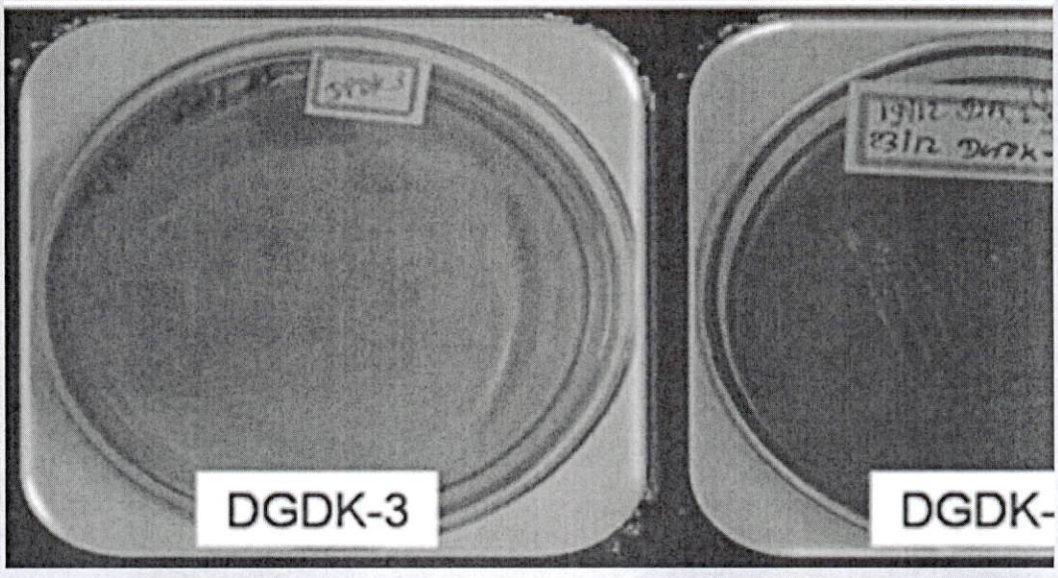

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Image Automatic Categorisation using Selected Features Attained from Integrated Non-Subsampled Contourlet with Multiphase Level Sets

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ABSTRACT

A framework of automatic detection and categorisation of breast cancer (BC) biopsy images utilising significant interpretable features is initially considered. Appropriate efficient techniques are engaged in layout steps of the discussed framework. Different steps include : (a) To emphasise the edge particulars of tissue structure; the distinguished non-subsampled contourlet (NSC) transform is implemented. (b) For the demarcation of cells from background, k-means, adaptive size marker controlled watershed, two proposed integrated methodologies discussed. Proposed Method-II, an integrated approach of NSC and multiphase level sets is preferred to other segmentation practices as it proves better performance. (c) In feature extraction phase, extracted 13 shape morphology, 33 textural (includes 6 histograms, 22 Haralick's, 3 Tamura's, 2 Graylevel Run-Length Matrix) and 2 intensity features from partitioned tissue images for 96 trained images. Lastly, *K* nearest neighbourhood and multi-class support- vector machine are implemented for categorisation of images into normal and cancerous categories using six key features. The results of methodology were tested for 24 image and analysed with pathologist results. It's analysed that proposed method-II achieved better classifier accuracy over literature techniques.

Keywords: Contour let transform; Adaptive marker controlled watershed approach; Multiphase level sets; MC-SVM classification; Biomedical and defence applications

1. INTRODUCTION

Breast cancer (BC) identification and diagnosis has for all time been a foremost concern for the pathologists and even for medical practitioners. 32 per cent of Indian inhabitants get cancer at some time in their life[1]. For Precise detection of BC, experts and medical practitioners prefer microscopic biopsy images collected under the microscope. In histopathology, BC biopsy images will be characterised into cancerous one or normal one[2,3]. Highly (40 x/100 x) magnified biopsy image provides consistent information about abnormal and normal tissues. Later the segmentation and categorisation application can be continued with other defence and military applications where we considered IRS satellite images for segmentation of required areas.

Plissiti[4], *et al.* proposed color gradient watershed transform using 90 pap-stained cervical images of resolution 1536 × 2048 pixels and obtained 6 shape, 8 texture and 3 intensity features. They utilised maximum-relevance with minimum-redundancy (MR-MR) criterion for feature selection. They handled cell level diagnosis using image Processing methodologies. Bergmeir[6], *et al.* presented a model for obtaining the local histograms and GLCM texture features. Huang and Lai[7] explained a methodology for segmentation and categorisation methods for histology images basing on texture features and with help of SVM the highest Categorisation accuracy obtained is 92.8 per cent.

Adem Kalinli[8], *et al.* considered otsu thresholding approach with the classifiers namely *k*-nearest neighbours, radial basis neural networks, support vector machines and *k*-means clustering, naive bayes and functional trees for object extraction followed by classification. Kasmin[10], *et al.* obtained the features of BC tissue images possessing area, perimeter, solidity, convex area, orientation filled area, major axis length, ratio of cell and nucleus area, eccentricity, mean intensity of cytoplasm, and circularity. The efficacy of other classifiers such as SVM, random forest, and fuzzy *k*-means is also examined. Proposed work uses Ductal Carcinoma (DC) BC images, as > 80 per cent of BC is because of ducts. Also 40 X magnified Hematoxylin & Eosin (HE) DC images were chosen for clear cell segmentation.

Ali[5], *et al.* considered Active contour models using multiple level sets for segmentation of 14 BC histology images with resolution 512 × 512 pixels and generated shape features to obtain an accuracy more than 90 per cent. Fatakdawala[9], *et al.* proposed expectation maximisation driven geodesic active contour (EMaGAC) without and with overlap resolution using 100 breast histology images with resolution of 200 × 200

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Performance enhancement of centrally finned twist inserted solar collector using corrugated booster reflectors

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Highlights

- Use of corrugated booster reflectors in solar collector fields is proposed.
- Effective reflector area of CBR is 1.6% higher than FBR.
-

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Characterization, optical and luminescence features of cobalt ions in multi-component $PbO-Al_2O_3-TeO_2-GeO_2-SiO_2$ glass ceramics

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Highlights

- $PbO—Al_2O_3—TeO_2—GeO_2—SiO_2$: CoO glass ceramics were prepared by melt quenching and heat treatment.
- Prepared samples were characterized by XRD, SEM, EDS and DTA.
- Absorption bands of the samples indicated the cobalt ions exist in Co^{2+} and Co^{3+} state.

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Optical Materials
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Influence of Bi^{3+} ions on optical and luminescence properties of multi- component P_2O_5—PbO—Ga_2O_3 —Pr_2O_3 glass system

G. Chinna Ram [a], T. Narendrudu [b], N. Veeraiah [a], C.K. Jayasankar [c], D. Krishna Rao [a]

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Highlights

- P_2O_5-PbO -Ga_2O_3-Pr_2O_3: Bi_2O_3 glasses were prepared by melt quenching technique.
- Amorphous nature of the prepared glasses was confirmed by XRD pattern of the samples.
- Maximum energy transfer occurs from sensitizer Bi^{3+} ion to activator Pr^{3+} ion in B5Pr sample.
- Chromaticity coordinates of prepared samples lie within reddish–orange region.
- Broad emission band due to $^1D_2 \rightarrow {}^1G_4$ transition covers most of the telecommunication windows

Abstract

Glasses with composition (70-x) P_2O_5—17.5PbO —10Ga_2O_3—2.5Pr_2O_3:xBi_2O_3 ($0 \leq x \leq 7$) were prepared by conventional melt quenching technique. The prepared glasses were characterized by their XRD patterns. Various spectroscopic studies like FTIR, optical absorption and

Synthesis, biological and liquid crystalline evaluation of new substituted flavones

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Abstract

Flavones constitute a group of oxygen heterocyclic compounds which have shown significant biological activities. On the other side fatty acid esters of flavones exhibit liquid crystalline properties. 7,2',3',4' – tetrahydroxy flavone was synthesized as antibacterial agent and a series of fatty acid ester analogues of the parent flavones were prepared. All the derivatives were screened for phase transition temperatures and mesophases.

Keywords: Flavones, fatty acid esters of flavones, biological activity, phase transition temperatures, mesophases.

Introduction

The major group of plant poly phenols is represented by flavonoids and a review has estimated their number as 6500 in the plant kingdom[1]. The family members of flavonoids include flavones, flavanes, flavonols, anthocyanidines and catechins. They possess a wide spectrum of biological activities. Some flavonoids have been found to possess antioxidant, anticancer and anti-inflammatory properties[2-4] and several other activities. The antioxidant activity of these polyphenolic compounds, was due to their high propensity to transfer electrons, to chelate ferrous ions and to scavenge reactive oxygen species[5].

Liquid crystals (LC's) are conventionally known as fourth state of matter. The characteristic orientationally order of the liquid crystal state is between the traditional solid and liquid phase and this is the origin of the term "mesogenic state" used synonymously with liquid crystal state. Approximately 5% of all organic compounds exhibit LC behavior and have important characteristic properties like anisotrophy, magnetic and electric susceptibility[6].

We report the synthesis of new flavones as antibacterial agents and its fatty acid ester analogues as liquid crystals. Flavone ester systems may possess quasi planarity with a rigid aromatic core which is necessary for LC behavior. Based upon earlier research,[7-9] esterified flavones may exhibit the properties of discotic liquid crystal materials. Hence it was proposed to synthesize new flavonoid compounds surrounded by paraffinic esters and study the liquid crystallinity of the molecules. To achieve this objective, 7,2',3',4' – tetrahydroxy flavone derivatives (XI – XV) were selected as target molecules to study the liquid crystallinity.

Material and Methods

The flavone esters were obtained via the synthesis route shown in scheme I. Appropriately protected resacetophenone was coupled to 2,3,4-tribenzoyloxy benzaldehyde to give the corresponding chalcones[10-12]. The benzoyl group was our group of choice for the protection of the hydroxyl groups because of its stability under various reaction conditions and ease of deprotection. The chalcone showed red colouration with $SbCl_3/CCl_4$, a positive test for chalcones. The presence of olefinic protons in ^1H NMR spectrum at δ 6.9-6.4 (dd, 2H, -CH=CH-) confirms the chalcone formation. The benzoyl groups were deprotected and the chalcone was subjected to the Iodine-DMSO treatment to give the corresponding 7,2',3',4' – tetrahydroxy flavone[13-15].

The presence of a singlet at δ 6.4 in the ^1H NMR spectrum is assigned for C_3 Hydrogen. I.R. spectrum showed adsorption bands at 3320 cm^{-1} (OH str.), 1687 cm^{-1} (C=O str.). In ^{13}C NMR spectrum the presence of δ 112.057, 111.088, 123.145, 123.450 (aromatic carbons), 148.518, 152.835 (olefinic carbons) and 167.431 (carbonyl carbon) further confirmed the formation of flavone (IX).

In the next step flavone was treated with long chain fatty acid chlorides (RCOCl where $R=C_nH_{2n+1}$, n=7, 11, 13, 15 and 17) in dry pyridine at reflux temperatures and yielded 7,2',3',4' – tetraacyloxy flavones derivatives. All the flavone esters were purified by column chromatography with n-hexane: ethylacetate (99.5 : 0.5) as eluent. All these compounds were re-crystallized from methanol. HPLC analysis of all these compounds showed purity >99.87 %. I.R. and NMR spectral data are in good agreement with the structure of the compounds (table I).

Biological evaluation: The flavone (IX) was tested for antibacterial activity against gram-positive bacteria and gram- negative bacteria at concentrations of 20,50,100 and 200 µg/ml. The cultures of organisms grown overnight at 37°C were used for testing the antibacterial activity which was checked by employing cup plate method[16]. Test solutions of different concentrations of flavones were prepared in DMSO. The plates were incubated at 37°C for 24hrs. and the diameter of inhibition zones was measured. Solvent DMSO alone was kept as control, which do not have any inhibition zone. The activities were compared with standard antibiotic benzyl penicillin.

Liquid Crystal evaluation: All the newly synthesized compounds exhibited liquid crystalline properties which

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Research paper

Controllability, Observability and Stability of Volterra Type Non-Linear Matrix Integro-Dynamic System on Time Scales

G.V. Ramana[1], G.V. S. R. Deekshitulu[2]*

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Abstract

This paper investigates the controllability, observability and stability of the solution of Volterra type non linear matrix integro dynamic system on time scales.

Keywords: *Controllability; non-linear Volterra type matrix integro-dynamic system; observability; stability; time scales.*

1. Introduction

In many engineering problems, one may desire to have a system that follows a preassigned behaviour. In other words, necessary steps have to be taken to avoid unwanted behaviour in a system and to compel the system to follow a desired behaviour. The origin of control theory stems from determining these steps called controls. After R.E. Kalman introduced general control theory in 1960, many engineers and mathematicians got attracted by this theory [7, 9, 10, 11, 12, 13, 16]. The importance of control theory in mathematics and its applications in diverse areas such as adoptive controls [9], communication networks [10], switching systems [14], dynamic programs [15], are well established.

The theory of time scales, introduced by Hilger [3, 8] at the end of the twentieth century as a means to unify the difference and the differential calculus, is now a well-established subject.

In [7], J.M. Davis, Ian A. Gravagne, Billy J. Jackson, R.J. Marks discussed the controllability, observability realizability and stability of linear dynamic system on time scales.

On the other hand, the theory of Volterra integro-dynamic equation has drawn the attention of many mathematicians in the last decade [6]. In [1], Adivar derived principal matrix solution using variation of parameters formula for integro-dynamic equations on time scales. In [2], Becker investigated the solution using variation of parameters formula for a integro-dynamic equations and its adjoint. Burton and Mahfoud discussed the various stability properties of integro-dynamic equations in [4, 5, 6].

Controllability, observability and stability of Volterra integro dynamic system on time scales were studied Awais Yonus and Ghaus ur Rahman [16] . They considered linear integro dynamic system of the form

$$x^{\Delta}(t) = A(t)x(t) + \int_{t_0}^{t} K(t,s)x(s)\Delta s + B(t)u(t).$$

Anyhow, much of contribution on controllability, observability and stability of non-linear integro dynamic systems on time scales is not available in literature. With this motivation, in this paper, we establish some new results on controllability, observability and stability of non linear matrix integro dynamic system on time scales.

2. Preliminary Results

Throught this paper $\mathbb{T}$ denotes time scale(an arbitrary nonempty closed subset of the real numbers).

Definition 2.1: ([3]) The mappings σ and $\rho : \mathbb{T} \to \mathbb{R}$ where $\mathbb{T}$ is any closed subset of reals, are defined as $\sigma(t) = inf\{s \in \mathbb{T}: s > t\}$ and $\rho(t) = sup\{s \in \mathbb{T}: s < t\}$.

Definition 2.2:([3]) A non-maximal element t in $\mathbb{T}$ is called right dense if $\sigma(t) = t$; right scattered if $\sigma(t) > t$; left dense if $\rho(t) = t$ and left scattered if $\rho(t) < t$.

Definition 2.3:([3]) If $\mathbb{T}$ has a left scattered maximum M, then $\mathbb{T}^k = \mathbb{T} - \{M\}$, otherwise, $\mathbb{T}^k = \mathbb{T}$. If $\mathbb{T}$ has a right scattered minimum m, then $\mathbb{T}^k = \mathbb{T} - \{m\}$, otherwise, $\mathbb{T}^k = \mathbb{T}$.

Definition 2.4:([3]) The function $\mu^*: \mathbb{T}^k \to \mathbb{R}^+$ defined by $\mu^*(t) = \mu(\sigma(t), t)$ for $t \in \mathbb{T}$ is called graininess. If t is right dense, then $\mu^* = 0$ and if t is right scattered, then $\mu^* = \sigma(t) - t$.

Definition 2.5:([3]) A mapping $f: \mathbb{T} \to \mathbb{R}$ is said to be differentiable at $t \in \mathbb{T}^k$, if there exists an $\alpha \in \mathbb{R}$ such that for any $\varepsilon > 0$ there exists a neighbourhood Q of t satisfying $|f(\sigma(t)) -$

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Resonance Propagation and Elimination in Integrated and Islanded Microgrids

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ABSTRACT

In this paper, a micro grid resonance propagation model is investigated. To actively mitigate the resonance using DG units, an enhanced DG unit control scheme that uses the concept of virtual impedance is proposed. It can be seen that a conventional voltage-controlled DG unit with an LC filter has a short-circuit feature at the chosen harmonic frequencies, whereas a current-controlled DG unit presents an open-circuit characteristic. The application of underground cables and shunt capacitor banks may introduce power distribution system resonances. This paper additionally focuses on developing a voltage-controlled DG unit-based active harmonic damping technique for grid-connected and islanding micro grid systems. An improved virtual impedance control method with a virtual damping resistor and a nonlinear virtual capacitor is proposed. The nonlinear virtual capacitor is used to compensate the harmonic dip on the grid-side inductor of a DG unit LCL filter. The virtual resistance is principally answerable for micro grid resonance damping. The effectiveness of the proposed damping method is examined using each a single DG unit and multiple parallel DG units.

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1. INTRODUCTION

The increasing application of nonlinear loads can lead to significant harmonic pollution in a power distribution system. The harmonic distortion might excite complicated resonances, particularly in power systems with underground cables or sub sea cables [1]. In fact, these cables with nontrivial parasite shunt capacitance will form an LC ladder network to amplify resonances. In order to mitigate system resonances, damping resistors or passive filters can be placed in the distribution networks. However, the mitigation of resonance propagation exploitation passive components is subject to some well understood problems, like power loss and additional investment [2]. Moreover, a passive filter might even bring extra resonances if it's designed or installed without knowing detailed system configurations. To avoid the adoption of passive damping equipment, numerous types of active damping methods are developed [3-6]. Among them, the resistive active power filter (R-APF) is often considered as a promising way to understand better performance. Conventionally, the principle of R-APF is to emulate the behavior of passive damping resistors by applying a closed-loop current-controlled method (CCM) to power electronics converters [7-8]. In this management category, the R-APF will be simply modeled as a virtual harmonic resistor if it's viewed at the distribution system level, in addition, many changed R-APF [9-13] ideas were additionally developed in the

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A Study on Asphalt Pavements by using RAP, Sand & UFS Mixtures as Replacements

K. NagaRajesh, B. Girish Kumar, G. Jagadeesh, R. Srinivasa Rao

Abstract: The centre of this study is concentrated on introducing the lean ideas in asphalt pavement construction particularly in the Quality control (QC) process in HMA. HMA comprises of nearly 95% of aggregate, gravel or sand, filler and these ingredients are binding together with bitumen a by-product from crude oil industry. The aim of the present study is to compare the strength in terms of stability and flow value of Conventional & Non-conventional mix by Marshal Stability test. The present study relates Usage of RAP to reduce the fresh aggregate in the proposed Mix without influencing the properties of mix, from the test results we are adopting 10 % RAP with 90 % fresh aggregate for NCM mixes.VG 30 grade bitumen is used as binder and Maximum aggregate size (MAS) 23.0 mm and Nominal Maximum Aggregate size (NMAS) 19.0 mm. Cement is used as filler for conventional mixes, while UFS, Sand is used as filler for NCM-II and NCM-III respectively. And finally, 1 % lime in the weight of bitumen used as antistripping agent to minimise moisture susceptibility or to increase the resistance to moisture sensitivity of the proposed mix. From this study we are observed NCM –II shows better results than other Non-conventional mixes, the stability values are slightly lesser than conventional mix, other Marshall properties are far better than conventional ones. The optimum binder content (OBC) is 5.68 for NCM – II, which is lesser than Conventional mix 5.72

Keywords: Bituminous concrete, Reclaimed Asphalt Pavement (RAP), Optimum Binder Content (OBC), Used Foundry Sand (UFS), Non-Conventional Mix (NCM).

I. INTRODUCTION

Hot mix asphalt consists of aggregates, binders and air voids. Out these aggregate having nearly 90-96 percent in total weight of the mix, most of the loads carried by the skeleton of aggregate structure. It is also noted that the amount of asphalt binder is 4-6% in the total weight of mix. Due to viscos-elastic property of bitumen it acts like adhesive and bind together all ingredients in the mix. Fillers are fine materials which are passed through 75-micron sieve having lot of advantages in HMA mix. They are not only reducing the voids but also increases the bond between aggregate and bitumen, increases the resistance to moisture susceptibility.

1.1 Lime in HMA

Hot mix Asphalt (HMA) mixtures containing lime having some benefits. Lime improves the resistance to moisture susceptibility and reduces the water damage [15].Lime acts as an-active filler and anti oxidant and also improves durability at low temperatures [20]. It reduces the plasticity of clay fines. Thus, hydrated lime is an additive with a purpose to increase pavement life and performance via multiple mechanisms [20].

1.2 RAP in Pavement construction

RAP is a scarified Asphalt pavement layer which is used as a pavement material with proper inspection [3].By Using RAP we can optimize the usage of Natural resources by partial replacement of aggregate which is a scarce commodity in some regions and can reduce the binder content in mix, since always some binder content present in the RAP [18].Studies proven that Pavements constructed with less than 30 % RAP having same performance compared with the Conventional pavements [18].

1.3 Used foundry sand as mineral filler in pavement construction

Used foundry sand as mineral filler in pavement creation Filler materials in asphalt concrete combinations have a whole lot of advantages. In addition to filling the voids, they decreasing moisture susceptibility, developing the bond of aggregate and asphalt and end result to increase the stiffness through which includes of inflexible materials in much less rigid matrix [10].

However, having too much filler in HMA mixture can lessen the cohesive among aggregates and binder as coating of the aggregates by way of way of fillers will growth the quantity of binders within the mix eventually weakening the aggregate [8]. High content material of fillers will stiffen the combination to a extremely good amount and the workability of the mix can also reduce. Foundry sand is uniform silica sand that is used to make moulds and cores for ferrous and nonferrous metal castings [25].

Recycling of used foundry sand can keep strength, lessen the need to mine new substances, and can lessen expenses for both producers and quit customers. Use of foundry sand as a excellent aggregate and filler in production applications offers task managers the ability to enhance green sustainable creation. Studies have established that used foundry sand can be used between eight to 25 percent in region conventional fillers in asphalt mixes [25].

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Image Super Resolution by Interpolation and Edge Modification

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Abstract— Image Super-Resolution is transforming Low Resolution Image (LRI) into High Resolution Image (HRI). The proposed color image super-resolution method is composition of combining individual advantages of bicubic interpolation and Stationary Wavelet Transform (SWT). Red, green, blue planes are separately given to bicubic interpolation to obtain high resolution planes. The problem in obtained in high resolution planes is blurred edges, these blurred edges are modified with the help of SWT, boosting value. Performance of the proposed method calculated, compared with existing techniques it is effective in terms of PSNR.

Index Terms— Image Super Resolution, LRI, HRI, Bicubic Interpolation, SWT.

I. Introduction

Image super resolution is converting LR image into HR image with the help one or more low resolute images. In Broad classification, super-resolution methods are based on interpolation, example, and regularization [4]. In interpolation based super-resolution methods [1][2][3], on basis of smooth kernel and piecewise smooth the upscale algorithms are useful to reduce degradation of image. Regularization based super-resolution methods [5][6][7][8], local or nonlocal based regularization construction used to deblur the image. Example based super-resolution methods [9], with the help of machine learning algorithms the Low Resolution (LR) patches converted into High Resolution (HR) patches, the problem here is conversion process depends on trained images (knowledge base).

Peitao Cheng [4] achieved single image SR, the high resolution and low resolution patches are matched with the help of Gaussian process regression and Dirichlet process. The method can able to handle large and complex distributed data. Min-Cheng Pan [10] proposed a concept on super resolution of global one dimensional motion blurred images. It is also known to restore spatial-frequency distorted images using linear algorithms and it frequently decrease the sharpness features in the image. This model also proposes a method to estimate the extent of motion blurring directly from the motion blurred image. The gray image super resolution [11] is obtained by using bicubic interpolation then to modify edges, the gray high resolute image is given to SWT. The subbands of SWT are multiplied by boosting value in between 1 and 3, then applied to inverse SWT to get edge modified gray high resolute image. The method has its own drawbacks.

The proposed color image super resolution method uses the individual advantages of bicubic interpolation, SWT. The LR color image is split into three different planes i.e., Red (R), Green (G), Blue (B), and these three planes given to bicubic interpolation separately to obtain high resolute R, G, B planes. The high resolute R, G, B channels are individually given to SWT, results approximation and detail subbands (total four subbands) of each channel. The detail subbands are modified with help of boost value. The modified subbands and approximation subband given to inverse SWT of each channel separately, to obtain edge modified high resolute channels. Finally all three edge modified channel are combined to get high resolute color image. The remainder of the paper is configured as follows. In section 2, the proposed methodology for color image super resolution delineated. Results are presented in section 3, conclusions and future directions are given in section 4.

II. Proposed Methodology

The proposed color image super resolution algorithm has great advantages by combining individual advantages of bicubic interpolation, SWT. In the first step the input low resolute RGB image is separated into R, G, and B channels. The channels are separately applied to bicubic interpolation to obtain high resolute channels. The high

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An Approach to Support for Data Aggregation to Reduce the Hot Spot Problem

A. Vanathi and Dr.M. Naga Malleswara Rao

Abstract:

Many data aggregation, and hotspot handling techniques have been proposed in the wireless sensor networks. However, As of now, there is no work has been undertaken to extend the conventional cluster-based aggregation techniques to DODAG structure of the RPL routing protocol. Moreover, the direct extension of data aggregation techniques in WSN to IoT may not provide several appealing benefits such as energy efficiency, data aggregation, longitivity of network lifetime, and a provision of solution to solve the hot spot issue in IoT network. The extension of data aggregation in IoT has to be considered as a multi-objective function to provide an energy efficient data aggregation without reducing the advantages of DODAG structure. The gateway node should reorganize its routing strategy, considering the global network traffic in providing an optimized in-network data aggregation topology structure to avoid hot spot problem in IoT. Also, a parent candidate selection mechanism should be extended without enabling the communication loops and increasing the number of routing hops. The adaptive extension of data aggregation schemes assists in bridging the research gap between RPL routing protocol and energy efficient data aggregation in IoT.

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Research paper

Asymptotic Stability of Solution of Lyapunov Type Matrix Volterra Integro-Dynamic System on Time Scales

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Abstract

This article emphasizes the characteristics and nature of asymptotic stability of solution of Lyapunov type matrix Volterra integro-dynamic system on time scales.

Keywords: *Asymptotic stability; Lyapunov; integro systems; time scales.*

1. Introduction

Integro-differential equations occur as mathematical models in mechanics, mathematical biology and many other diverse disciplines quite frequently. The origin of the study of integral and integro differential equations may be traced back to the works of Lotka, Fredholm, Volterra etc [9]. From these initial steps, the theory and applications of integro-differential equations have emerged as new area of investigation. Later the study of qualitative properties of Integro-differential equation has drawn the attention of many mathematicians. Burton studied the stability theory of Volterra integro-differential equations [2, 3]. Grossman and Miller observed the asymptotic behaviour of solutions of Volterra integro-differential system [4].

The theory, proposed by Hilger [5], of time scales as a tool to unify the discrete and continuous calculus, is now a well established subject. For further study on dynamic equations, inequalities, linear system of equations on time scales, one can refer [1] and reference there in. In [7], basic properties of quantitave and qualitative results for Volterra integral equations on time scales were introduced by Kulik and Tindell.. Recently, Lupulescu, Ntouyas and Younus have discussed the asymptotic stability and boundedness of Volterra integro-differential equations on time scales [8]. The importance of lyapunov type system is useful in many branches of Science and Technology and particularly in Control theory and Systems Engineering. Inspired by the quite interesting nature of this problem, an effort, to study the asymptotic stability for the system given below, is made.

$$\begin{aligned} X_3^{\Delta}(t) &= A(t)X_3(t) + X_3(t)B(t) \\ &\quad + \int_{t_0}^{t} [K_1(t,s)X_3(s) + X_3(s)K_2(t,s)]\Delta s + F(t), \\ X_3(t_0) &= X_{3_0}. \end{aligned} \tag{1}$$

where $0 \le t_0 \in \mathbb{T}^{\kappa}$ is fixed, A, B and F are an $(n \times n)$ continuous matrix functions on $\mathbb{T}$, $K_1(t,s)$ and $K_2(t,s)$ are an $(n \times n)$ continuous matrix functions on $\Omega = \{(t,s) \in \mathbb{T} \times \mathbb{T} : t_0 \le s \le t < \infty\}$

2. Preliminary Results

Throught this paper $\mathbb{T}$ denotes time scale(closed arbitray and nonempty subset of the real numbers).

Definition 2.1: ([1]) The mappings σ and $\rho : \mathbb{T} \to \mathbb{R}$ where $\mathbb{T}$ is any closed subset of reals, are defined as $\sigma(t) = \inf\{s \in \mathbb{T} : s > t\}$ and $\rho(t) = \sup\{s \in \mathbb{T} : s < t\}$.

Definition 2.2: ([1]) A non-maximal element t in $\mathbb{T}$ is called right dense if $\sigma(t) = t$; right scattered if $\sigma(t) > t$; left dense if $\rho(t) = t$ and left scattered if $\rho(t) < t$.

Definition 2.3: ([1]) If $\mathbb{T}$ has a left scattered maximum M, then $\mathbb{T}^{\kappa} = \mathbb{T} - \{M\}$, otherwise, $\mathbb{T}^{\kappa} = \mathbb{T}$. If $\mathbb{T}$ has a right scattered minimum m, then $\mathbb{T}^{\kappa} = \mathbb{T} - \{m\}$, otherwise, $\mathbb{T}^{\kappa} = \mathbb{T}$.

Definition 2.4: ([1]) The function $\mu^* : \mathbb{T}^{\kappa} \to \mathbb{R}^+$ defined by $\mu^*(t) = \mu(\sigma(t), t)$ for $t \in \mathbb{T}$ is said to be graininess. If t is right dense, then $\mu^* = 0$ and if t is right scattered, then $\mu^* = \sigma(t) - t$.

Definition 2.5: ([1]) A functions $f : \mathbb{T} \to \mathbb{R}$ is said to be differentiable at $t \in \mathbb{T}$, if there exists an $\alpha \in \mathbb{R}$ such that for any $\varepsilon > 0$ there exists a neighbourhood N of t satisfying $|f(\sigma(t)) - f(s) - (\sigma(t) - s)\alpha| \le |\sigma(t) - s|$ for all $s \in N$.

Theorem 2.6: ([1]) If A is differentiable at $t \in \mathbb{T}^{\kappa}$, then $A^{\sigma}(t) = A(t) + \mu(t)A^{\Delta}(t)$.

Theorem 2.7: ([1]) Suppose A, B and C are differentiable $(n \times n)$

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Articles

Influence of helix twisted tape on heat transfer and friction factor in forced circulation V-trough solar water heater

A. Saravanan, J. S. Senthilkumaar, S. Jaisankar & J. Ananth

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ABSTRACT

The effect of helix twisted tape with several twist ratios (Y = 3, 4, 5 and 6) in a V-trough solar water heater for enhancing heat transfer, thermal performance and the friction factor has been examined experimentally in forced circulation with the Reynolds number ranging from 3000 to 23,000. The experimental results of plain V-trough solar collector (PVT) fitted with the standard equations and the variation in the Nusselt number are ±7.23% and the variation in friction factor is about ±5.91%.

The PVT has been compared with plain flat plate (PFP) collector. The obtained result shows that the average Nusselt number of PVT performs better than PFP by 8.4%.

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Research Article

Application of fuzzy entropy for the rating of epicyclic gear trains

Srinivasa Rao Vallem, Mallikarjuna Rao Kuchibhotla & Balaji Srinivasa Rao Annambhotla

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Abstract

A Planetary gear train (PGT) is a system containing a total of three or more gears where a *ring* gear encircles the entire system. There are three main parts to planetary gear systems, often called *sun*, *planet* and *ring* gears. High power density in a lesser volume is the main advantage of a PGT. Due to high bearing loads and design complexity of planetary gear train and its inaccessibility for the operator to check, it is necessary to rate the planetary gear trains quantitatively. Planetary gear trains can be modelled as fuzzy systems, so that fuzzy logic can be applied. It is shown that fuzzy entropy can be utilised to compare many planetary gear trains in the enumeration stage from the viewpoint of rigidity and compactness. Graph

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Research Article

Application of fuzzy entropy for the rating of epicyclic gear trains

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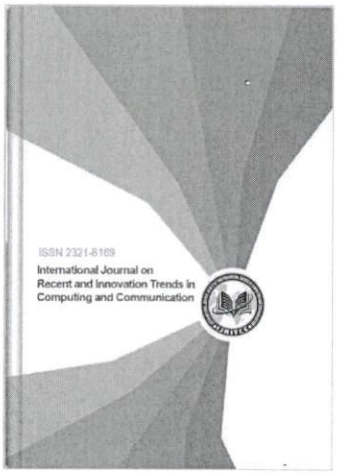
Abstract

A Planetary gear train (PGT) is a system containing a total of three or more gears where a *ring* gear encircles the entire system. There are three main parts to planetary gear systems, often called *sun*, *planet* and *ring* gears. High power density in a lesser volume is the main advantage of a PGT. Due to high bearing loads and design complexity of planetary gear train and its inaccessibility for the operator to check, it is necessary to rate the planetary gear trains quantitatively. Planetary gear trains can be modelled as fuzzy systems, so that fuzzy logic can be applied. It is



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LNA for UWB transceiver using 0.18µm CMOS Technology

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Abstract— An Ultra WideBand CMOS Low Noise Amplifier (LNA) is presented. Due to really low power consumption and extremely high data rates the UWB standard is bound to be popular in the consumer market. The LNA is the outer most part of an UWB transceiver. The LNA is responsible for providing enough gain to the signal with the least distortion possible. CMOS 0.18µm TSMC technology has been chosen for the design of the LNA at the transistor level. As many as five on chip inductors are implemented for the proper gain shaping over the frequency range of 3.1GHz to 10.6GHz. A noise figure of 3.98 dB is achieved to make sure noise contribution of the amplifier is as low as possible.

Keywords-*Ultra Wideband(UWB), Low Noise Amplifier, Noise Figure.*

*****

I. INTRODUCTION

Ultra Wide-Band (UWB) technology has been designed to bring convenience and mobility of high speed wireless communication to homes and offices. It is specifically designed for short range Wireless Personal Area Networks (WPANs). UWB will play an instrumental role in freeing people from wires and enabling video transmission or other high bandwidth data transmission that is rarely possible with a conventional wireless connection. The short range UWB technology will also complement other wireless standards such as Wi-Fi and Wi-Max. It can transmit data within the radius of 10 meters from the host device. UWB technology is designed to provide a short range, very low power connection with much more bandwidth than cable. Since UWB communicates with short range pulses, it can be used for tracking various objects. It has been shown that a UWB device can successfully transmit data at a rate of 110 Mbps at a distance of 10 meters [1]. This bandwidth is 100 times faster than Bluetooth and twice as fast as Wi-Fi. This bandwidth is large enough to accommodate three concurrent video streams over a single connection. Designers are promising UWB products that have speeds of up to 1 Gbps [2].

A basic block diagram of the UWB transceiver, including a transmitter and a receiver, is shown in Figure 1. The baseband Digital Signal Processing (DSP) unit controls the messaging and signaling of information. The DSP unit also synchronizes the system clock. The main function of the receiver is to amplify the signal without amplifying the noise. The principal role of the transmitter is to boost up the signal using some line drivers in order to send high energy signals.

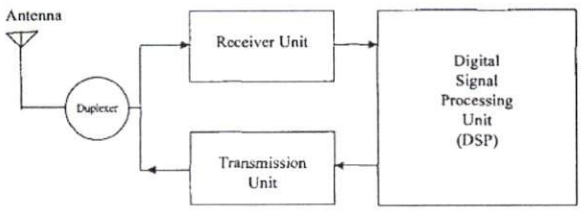

Figure1. Block diagram of UWB transceiver

The block diagram of a UWB receiver is shown in Figure 2. The receiver features a Low Noise Amplifier (LNA) followed by a mixer (demodulator). The mixer removes the carrier from the received radio frequency signal. Usually there is an automatic gain control block between the mixer and the Analog to Digital Converter (ADC). The purpose of this block is to balance the amplification or attenuation of the received signal in a way that it utilizes the maximum range of the ADC. The analog to digital converter then converts the analog signals to digital data which is fed to the DSP to process the transmitted data. The signal is then fed to the DSP block for baseband processing.

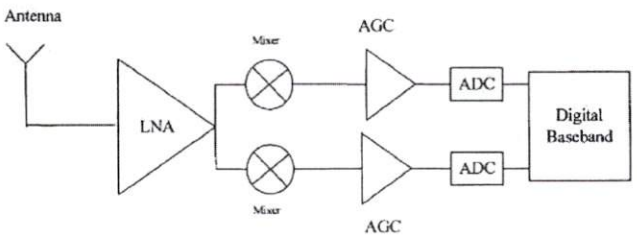

Figure 2. Block diagram of UWB receiver

In this context it is clear that an ultra wideband LNA should pass all the frequencies between 3.1 to 10.6 GHz. Such an amplifier must feature wideband input matching to a 50 Ω antenna for noise optimization and filtering of the out-of-band interferers. Moreover, it must show flat gain with good linearity and minimum possible noise figure over the entire bandwidth.

The LNA is an instrumental component of a UWB receiver. The LNA's noise figure has a major impact in deciding the system's overall noise figure, therefore this thesis deals with various aspects of the LNA design for a UWB device.

II. SYSTEM DESCRIPTION

Design Specifications

The field of UWB technology is of high demand these days because of the huge desire for data rates and speed which it

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Vital Investigation of Data in Hybrid Cloud

K Pavan[1], N Nalini Krupa[2], N Madhuri[3]
[1, 2, 3]*Computer Science And Engineering*

Abstract: ***In terms of computing, data Is essential however by the inclusion of redundant data may consume much storage space. To save the bandwidth we must remove the data which is the replicas of original, to achieve this we have so many techniques of compressing data in that deduplication is one. It is important to have the protection to maintain the secrecy of the sensitive data of the peer groups. To proceed with this, we must maintain some cryptographic standards. In our paper we are implementing a typical approach that must provide security to our data and must eliminate the redundant copies of the data. To achieve this, we are going to scan the copies of the data and another main issue associated with this is the security to go through with some convergent cryptographic techniques. All in all, this approach is going to give the proof of idea on various security investigations of our definitions. Also, we execute a model of copy check &leads some successful results.***
Key words: token, s-csp, public cloud, sensitive, confidential

I. INTRODUCTION

Cloud computing is one of the emerging technologies in today's modern computing. It provides an illusion of accessing infinite amount of resources to the user by hiding the accessing mechanisms as a service over internet. These can provide high quality storage space, accurate and reliable computing results at an affordable price. As it is having much fame user also willing to place larger data on it also can manage and share the data to the other users. While providing the unlimited high-quality storage to the user the first question rises weather is it able to manage that, large volumes of data? To achieve this, we need to have efficient management mechanisms.

Without wasting the storage space of abandon space, we have well known and simple de-duplication techniques to achieve it, which is most popular in recent times and gets the most concentration of the users of storage management.

It is the popular compression technique to remove the replicas of the content stored in the cloud. The basic mechanism why we elect this is, while participating in the communication with the network there is a chance to do interchange of data from the user to data repository, the integration of multiple number of bytes transferred to the repository will increase the utilization of the data store, our motto is also the same i.e. to improve the utilization of the data store management.

Unfortunately, somehow, we are storing the replicas of original contents in the storage space, by implementing the de-duplication mechanism which eliminates the duplicate copies of the data. It is also capable of checking the de-duplication in block level as well file level. If it is the case of block level it can check the block of data that is generated in the dissimilar bunch of files. If it is the case of file level it eliminates the replicas of the same file name or contents.

De-duplication of data provides so many advantages, but it can also get some flaws, that the data of the users is able to get attack in terms of security or private concerns. Past security mechanisms provide secrecy to the data but there is no de-duplication and compatibility. In traditional standards of cryptography data encryption and decryption is done through keys of you want to encrypt the data you need another user to do it. Then there is a possibility to place multiple cipher texts in the cloud, which making the space with redundant copies of information to the plain original text by having in multiple places.

The other is convergent mechanism which can achieve data confidentiality. It can encrypt and decrypt the data based on some cryptographic hash values given to perform computing on the data. By performing key generation to encrypt the data user preserves it and place the cipher text in the cloud. Encryption is a finite operation, it is done from the data, same key is generated to the same data which results same cipher texts. To restrict the access, a protocol is needed as a proof which was detected by the own or same file. After placing this no other user is able to place the same file into the store, the server won't give the permission to do. Later the user who wants to decrypt the data, the key which is given by the owner of the data is used and can be downloaded from the server then performs the decryption of the cipher text.

II. LITERATURE SURVEY

1) Distributed file system allows replicating the files over multiple computers, this uses significantly vast storage space and gets back the used space is crucial thing. J.R.Douceur [2] proposes a method to get the space over duplication for controlled file replication. It even includes convergent security measures with multiple keys of different users.

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A Study on Asphalt Pavements by using RAP, Sand & UFS Mixtures as Replacements

K. NagaRajesh, B. Girish Kumar, G. Jagadeesh, R. Srinivasa Rao

Abstract: *The centre of this study is concentrated on introducing the lean ideas in asphalt pavement construction particularly in the Quality control (QC) process in HMA. HMA comprises of nearly 95% of aggregate, gravel or sand, filler and these ingredients are binding together with bitumen a by-product from crude oil industry. The aim of the present study is to compare the strength in terms of stability and flow value of Conventional & Non-conventional mix by Marshal Stability test. The present study relates Usage of RAP to reduce the fresh aggregate in the proposed Mix without influencing the properties of mix, from the test results we are adopting 10 % RAP with 90 % fresh aggregate for NCM mixes.VG 30 grade bitumen is used as binder and Maximum aggregate size (MAS) 23.0 mm and Nominal Maximum Aggregate size (NMAS) 19.0 mm. Cement is used as filler for conventional mixes, while UFS, Sand is used as filler for NCM-II and NCM-III respectively. And finally, 1 % lime in the weight of bitumen used as antistripping agent to minimise moisture susceptibility or to increase the resistance to moisture sensitivity of the proposed mix. From this study we are observed NCM –II shows better results than other Non-conventional mixes, the stability values are slightly lesser than conventional mix, other Marshall properties are far better than conventional ones. The optimum binder content (OBC) is 5.68 for NCM – II, which is lesser than Conventional mix 5.72*

Keywords: Bituminous concrete, Reclaimed Asphalt Pavement (RAP), Optimum Binder Content (OBC), Used Foundry Sand (UFS), Non-Conventional Mix (NCM).

I. INTRODUCTION

Hot mix asphalt consists of aggregates, binders and air voids. Out these aggregate having nearly 90-96 percent in total weight of the mix, most of the loads carried by the skeleton of aggregate structure. It is also noted that the amount of asphalt binder is 4-6% in the total weight of mix. Due to viscos-elastic property of bitumen it acts like adhesive and bind together all ingredients in the mix. Fillers are fine materials which are passed through 75-micron sieve having lot of advantages in HMA mix. They are not only reducing the voids but also increases the bond between aggregate and bitumen, increases the resistance to moisture susceptibility.

1.1 Lime in HMA

Hot mix Asphalt (HMA) mixtures containing lime having some benefits. Lime improves the resistance to moisture susceptibility and reduces the water damage [15].Lime acts as an-active filler and anti oxidant and also improves durability at low temperatures [20]. It reduces the plasticity of clay fines. Thus, hydrated lime is an additive with a purpose to increase pavement life and performance via multiple mechanisms [20].

1.2 RAP in Pavement construction

RAP is a scarified Asphalt pavement layer which is used as a pavement material with proper inspection [3].By Using RAP we can optimize the usage of Natural resources by partial replacement of aggregate which is a scarce commodity in some regions and can reduce the binder content in mix, since always some binder content present in the RAP [18].Studies proven that Pavements constructed with less than 30 % RAP having same performance compared with the Conventional pavements [18].

1.3 Used foundry sand as mineral filler in pavement construction

Used foundry sand as mineral filler in pavement creation Filler materials in asphalt concrete combinations have a whole lot of advantages. In addition to filling the voids, they decreasing moisture susceptibility, developing the bond of aggregate and asphalt and end result to increase the stiffness through which includes of inflexible materials in much less rigid matrix [10].

However, having too much filler in HMA mixture can lessen the cohesive among aggregates and binder as coating of the aggregates by way of way of fillers will growth the quantity of binders within the mix eventually weakening the aggregate [8]. High content material of fillers will stiffen the combination to a extremely good amount and the workability of the mix can also reduce. Foundry sand is uniform silica sand that is used to make moulds and cores for ferrous and nonferrous metal castings [25].

Recycling of used foundry sand can keep strength, lessen the need to mine new substances, and can lessen expenses for both producers and quit customers. Use of foundry sand as a excellent aggregate and filler in production applications offers task managers the ability to enhance green sustainable creation. Studies have established that used foundry sand can be used between eight to 25 percent in region conventional fillers in asphalt mixes [25].

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Field Evaluation of Dynamic PCU under Heterogeneous Traffic Conditions

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Abstract: ***In the present paper, dynamic nature of passenger car unit (pcu) values are analyzed under heterogeneous traffic conditions on two-lane urban roads in three unique locations of andhra pradesh state, india. The estimation of pcu values are based on speed and vehicle's projected area on the ground. Speed equations are developed to estimate the speed of vehicles for given traffic volume and composition. Later the acquired pcu values are compared with indian road congress recommended values. Finally the effect of carriageway width on pcu factors is also estimated.***
Keywords: PCU, Heterogeneous traffic, Speed Equations, Carriageway width.

I. INTRODUCTION

Traffic on roads in India is termed to be highly heterogeneous in nature comprising of many variety of vehicles like cycles, cycle rickshaws, two-wheelers, three-wheelers, cars, trucks, bullock carts etc., mostly sharing the same space of the road. Heavy vehicles consume more space and more importantly they have lower performance comparing to the rest of the vehicles. Similarly smaller vehicles like two wheelers move in between heavy vehicles occupying less space. Hence major varying aspects such as speed, size, maneuverability, acceleration, spatial zone influence of various types of vehicles etc., makes harder to examine the traffic characteristics and to estimate the parameters like roadway capacity, density, level of service (LOS) etc., which are the essential fundamentals for design, planning, operation and layout of road sections. The analysis of the heterogeneous traffic is simplified by converting all the vehicle categories in the traffic stream into traffic stream consisting of only one type of vehicle. The most accepted type of vehicle is a passenger car. A particular sort of vehicle category in the traffic stream is converted into passenger cars by multiplying the number of vehicles of that particular category with a factor known as Passenger Car Unit.

Speed portrays the traffic performance measure of the roads and highways. It gives the basic fundamental relationships of traffic flow theory. In the mixed traffic, speed of one type of vehicle is affected by other vehicles in the traffic stream. Hence, speed equations for individual sort of vehicles were developed using traffic composition and spot speed values. In the present study, PCU values are calculated by using the methodology proposed by Chandra. S [1, 2], which is best suitable for the Indian traffic conditions.

In the first edition of Highway Capacity Manual, the term PCU was not utilized. Rather, two cars were considered in place of a single truck. Later in the second edition of HCM (1965) [3], the concept of PCU was first introduced as a measure to convert all different types of vehicles in traffic into equivalent number of passenger cars which helped in converting non uniform traffic stream into uniform traffic stream consisting only of passenger cars. Since then, research is being carried out till date throughout world for the evaluation of PCU factors. Different factors were considered for the calculation of passenger car equivalents. But till now, permutations and combinations of all different factors couldn't satisfy the value of PCU as no value fits the curve of regression perfectly.

Greenshields et al., (1947) [4] suggested a procedure known as basic headway method for the calculation of PCU. Webster & Cobbe (1966) [5] used headway method and obtained PCE value of 1.75 for medium and heavy goods vehicles. Miller (1968) [6] estimated PCE value by measuring additional time required by heavy vehicles over a passenger car to cross an intersection in which, he obtained a value of 1.85 for trucks. Werner & Morrall (1976) [7] suggested that headway method is best suited for the calculation of PCEs on low terrain level and at low level of service. John & Glauz (1976) [8] considered the percentage of grade, truck volume to capacity ratio and mixed vehicle flow and calculated the PCU values. Craus et al., (1980) [9] suggested equivalent delay method for the estimation of PCU values in which they considered that difference between delay caused by heavy vehicle to standard passenger cars and delay caused by slower passenger cars to standard passenger cars. The equivalent delay method assumes that faster vehicles are always resisted by slower vehicles causing queue formation. The proposed equation considered as the ratio of average delay time caused by one truck to average delay time caused by one passenger car. Hu & Johnson (1981) [10] described how to use 1965

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Research Article

EFFECT OF ARABICA AND CANEPHORA COFFEE BEAN EXTRACTS TOWARDS MODIFICATION OF RED BLOOD CELL SURFACE ANTIGENS

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ABSTRACT

Introduction: ABO and RhD variants are the most studied blood group in India. Progress is being made towards modification of red blood cell surface antigens from A and/or B to blood group O. Objective: The objective of this study is a comparative analysis of the changes observed on the red blood cell antigens which differ in a short glycoprotein chain difference, by the effects of a *Coffea arabica* and *Coffea canephora* bean extracts. Methods: The heamatological effect of the coffee bean extract was prepared and evaluated using blood group analysis on haematological indices. Results: Agglutination was clearly observed initially for 5 min for all the eight blood types. Specifically, for the O+ blood group there is a time lag for agglutination to take place for the incubation period of 15 min for *Coffea arabica*, while agglutination occurred after 7 minutes of adding blood group antibodies with *Coffea canephora*. Conclusion: These results, as well as the possibility of adapting this method to a fully automated system, could be an important contribution to the field of immunohematology.

KEYWORDS: *Coffea arabica*, *Coffea canephora*, RBC, Coffee bean, Glycoprotein, Agglutination

INTRODUCTION

Coffee bean extracts has been reported as antioxidant, anti-obesity and hepatoprotective activity[1]. In this study, coffee seed extracts showed stimulatory effect on the immune functions. Globally, blood is an essential part of modern healthcare. In the United States alone, nearly 5 million patients receive approximately 14 million units of red blood cells donated each year according to estimates by the American Association of Blood Banks and the National Blood Collection and Utilization Survey[2]. Morgan in UK and Iseki in Japan discovered that some bacterial enzymes from *Clostridium tertium, Clostridium welchii, Bacillus cereus* and *Trichomonas foetus* specifically destroyed A, B or H antigens[3]. Enzymatic conversion of type B blood using purified or recombinant coffee bean (*Coffea canephora*) α-galactosidase has been achieved using 100-200 U/ml[4]. Glycine max has been proposed to convert B cells in a more efficient way, but these protocols have not been completely evaluated by routine blood-typing tests or clinical trials[5]. The researchers homed in on two enzymes; of which one from a gut bacterium called *Bacteroides fragilis*, removes the B antigen[6]. WBC counts was also increased significantly ($p < 0.001$) in all doses of the plant extract. *Coffea arabica* extract elicited a significant ($p < 0.001$) increase in the DTH response at doses of 50 and 150 mg/Kg, but the change at higher dose of 250 mg/Kg was not statistically significant[7]. Many these plants and their isolated constituent have shown beneficial therapeutic effects, including antioxidant[8], anti-inflammatory[9], anticancer[10], antimicrobial[11], and immunomodulatory effects[12]. In present study, we have been undertaken to explore the effect of *Coffea arabica* and *Coffea canephora* coffee bean extract towards modification of red blood cell surface antigens.

MATERIAL AND METHODS

PREPARATION OF COFFEE BEAN SMOOTHIE

Extraction was carried out by grinding seeds of the plant with a pestle and mortar in the presence of liquid nitrogen and or made into smoothie[13]. The material was transferred to a vial and 500µl of lysis buffer (HiMedia) was added and the sample was vortexed. Later, the suspension was mixed for one hour at 37^{0}C and filtered. The filtrate was spin at 14,000 rpm (Thermo, MicroCL 21 Microcentrifuge) in cold conditions for 10 min and supernatant was removed and stored at 4^{0}C until further analysis.

BLOOD SAMPLE COLLECTION AND PROCESSING

Blood samples were obtained from eight healthy individuals (males and females) aged 18 to 20 years. Informed consent was obtained from everyone before collection of blood, and the procedures followed were in accordance with the ethical recommendations (23/IEC/IG/2017) of our institution[14]. The samples were kept at 4^{0}C and divided into groups, based on blood typing, using ABO diagnostic kit (Span Diagnostics).

Effect of Tyre Rubber Pieces on Strength of Ordinary Concrete

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Abstract- *The use of scrap tyre rubber in the preparation of concrete has been thought as an alternative disposal Solid waste management has gained a lot of attention to the research community now-a- days. Out of the various solid waste, accumulated waste tires, has become a problem of interest because of its non- biodegradable nature. Most of the waste tire rubbers are used as a fuel in many of the industries such as thermal power plant, cement kilns and brick kilns etc. Unfortunately, this kind of usage is not environment friendly and requires high cost. It can't be released off effortlessly in nature as its deterioration takes much time and furthermore creates ecological contamination of such waste to ensure the earth.*

In this context a part of 20% of cement is replaced with silica fume and varying amounts of 5, 10, 15, and 20% of coarse aggregate is replaced by pre-treated scrap tyre pieces. The concrete is molded to desired shape, solidified, and cured. The variations in the rubber content show variations in the mechanical properties of the concrete specimen, which are recorded. Its different properties like compressive strength, split tensile strength and flexural strength will be investigated and compared with ordinary concrete.

The results show that increase in rubber content in the concrete mixture decreases the strength, the strength of the concrete when compared to rubber concrete increases due to addition of silica fume.15% of rubber replacement provides strength to concrete, increase in percent decreases the strength of concrete.

Keywords- Silica Fume, Waste Tyre Rubber, Compressive Strength, Split Tensile Strength, Flexural Strength.

I. INTRODUCTION

Concrete is a composite material made up of coarse aggregate held together in cement and fine aggregate matrix. In a concrete mix, cement and water forms a paste called matrix which fills the voids of the fine aggregate, coats the surface of fine and coarse aggregates, and binds them together. The scarcity and availability at reasonable rates of sand and aggregate are now giving anxiety to the construction industry. Rubber aggregates from discarded tyre rubber in sizes 20-10 mm, 10-4.75 mm and 4.75 mm down can be partially replaced natural aggregates in cement concrete construction

1.1.1 Tyre waste management

Accumulation of solid waste management has become a major environmental problem. Out of the various solid waste, accumulated waste tires is non- biodegradable in nature. Scrap tires are discarded when they are of no use. These waste rubber tires are generally called black pollution, as they take much time to deform, posing a potential threat to environment and also to the living beings.

This process generally is more harmful to the environment and requires high cost. The scrap tires must be reused in the most effective way possible. The use of scrap tire rubber in the preparation of concrete is an alternative way to dispose tire waste to protect the environment. This kind of concrete may be used where elasticity, tensile strength should be achieved. This study is an attempt to identify the various properties of concrete mix with the coarse tire rubber chips as a coarse aggregate.

In this experimental study, a part of coarse aggregate is replaced with chopped waste car tire pieces and a part of cement is replaced with silica fume.

Figure 1.2 Accumulated Scrap tyres

1.1.2 Source of silica fume

Design of Ship Propeller by Using Macros Technique and Analysis with Materials

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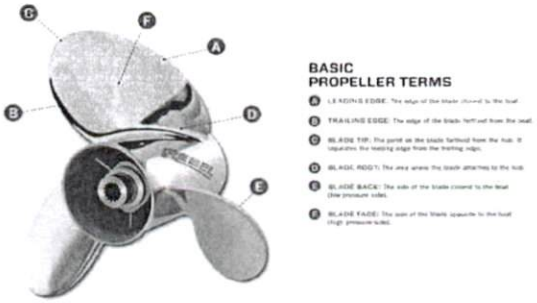
Abstract - In this paper, the ship propeller is designed using macros and the materials are compared. Expanded use of lightweight materials in the marine applications the epoxy composites was chosen which has high performance characteristics and a lightweight thermosetting matrix resin. Propeller is an essential component for underwater vehicles such as ship, submarines etc. This supports the vehicle to move at its operating speed. This works on the Bernoulli's principle and Newton's third law. In this paper, the propeller geometry is designed using macros. The solid model was created in CATIA software. The simulation and modal analysis are performed in ANSYS workbench. Then the material results are compared with the previous material. Finally, the better material for ship propeller is determined.

Keywords: ***Propeller design, Macros, Catia, Ansys workbench, Structural analysis.***

I. INTRODUCTION

For the past few years there have been critical innovative work in the field of propeller designs in order to protect the safety of goods, travellers and the crew and in the mean time reducing the expenses and by improving the efficiency. Ship Propeller is used for propulsion regardless of their sort and size.

A propeller is a sort of whirling fan, which is used to move the ship or aircraft forward by utilizing the power created by the engine. The transmitted power is changed from rotational movement to produce a push or thrust which imparts energy to the fluid (i.e. water or air), bringing about a force that follows up on the ship and drives it forward. The pressure variation between the front and aft side of the blade creates acceleration in the water present behind the blade, which makes the ship start sailing. Propellers continually turn at a steady velocity, which increases the efficiency of the engine. Propellers create push through the generation of lift by their rotating blades. The propeller whose name originates from the Latin word "propeller". A proficient screw propeller was innovated at the start of the nineteenth century as an efficient power source for the steam engine.



A Novel Algorithm to Find Distinct Mechanisms of a Planar Kinematic Chain

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Abstract— In the structural synthesis of kinematic chains development of distinct mechanisms is an important task to be analysed. After finding the distinct kinematic chains resolving the problem of isomorphism, it is necessary to find distinct mechanisms. Earlier, many researchers developed methods based on topological characteristics based on link and joint connectivity. In this paper, a novel algorithm is proposed based on adjacency of each link mixed with the 'degree of vertex' concept in Graph theory. Distinct kinematic mechanisms or inversions are found for 8-link 1-degree of freedom kinematic chains. All the results are in agreement with earlier results. The proposed method can be extended to higher linkages and degree-of-freedom.

Keywords— **kinematic chain, inversion, link, joint, adjacency**

I. INTRODUCTION

In structural synthesis of kinematic chains it is important to find distinct mechanisms. Earlier many researchers [1-11] developed several methods to find distinct mechanisms or inversions. In this paper, 8-link 1-dof planar kinematic chains are studied to find distinct mechanisms.

II. FUNDAMENTAL CONCEPTS

In a planar kinematic chains, distinct kinematic mechanisms are found by fixing one of the link as ground link. If input is given to one of the other links output will be found at another link in movement. This mechanisms are developed for each link fixed. Some of the mechanisms behave similar, are found to be same mechanisms or same type of inversions. Any of those links when fixed results the same inversion or mechanism.

LINK CONNECTIVITI INDEX

Link connectivity index is defined as the summation of degree of vertices of pair of links. For a pair of links 'i' and 'j', if 'i' is a ternary link and 'j' is a binary link, 'link connectivity index' will be 3+2 =5.

TOTAL LINK CONNECTIVITY INDEX

Total link connectivity index is defined as the summation of link connectivities of all pairs of primary link concerned.

NET CHAIN CONNECTIVITY INDEX

Net chain connectivity index is defined as the summation of total link connectivity indices of all the links.

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ISOMORPHISM IN PLANAR KINEMATIC CHAINS-A CASE STUDY IN GRAPH THEORY ALGORITHM

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ABSTRACT

In structural synthesis of Planar kinematic chains(PKC), Detection of isomorphism is an interesting area since many years. Enumeration of planar and geared kinematic chains becomes easy only when isomorphism problem is resolved effectively. Many researchers proposed algorithms based on topological characteristics, code based, genetic algorithm, fuzzy logic, graph theory etc. which need lot of computations and comparisons.
Graph theory is an effective tool in dealing with the structural synthesis of planar kinematic chains in an effective manner. In this work, 'net distance' based algorithm developed recently is tested for the distinct kinematic chains of 8-link single degree of freedom. All the results obtained justified the validity of the 'net distance' algorithm.

Keywords: Kinematic chain, Isomorphism, Net distance, Graph

I. INTRODUCTION

In the structural synthesis of planar kinematic chains, detection of isomorphism is a critical area to be studied. Various researchers proposed methods to identify isomorphism. Many attempts have been made in the past to solve this problem using the graph theory. Woo presented all the 230 isomers of 10-link 1-DOF K-chains [1]. Mruthyunjaya developed computerized methods for structural synthesis of K-chains. In addition, he presented a complete review of kinematic structure of mechanisms [2-4]. Other approaches are theory of finite groups by Tuttle [5], link's adjacent chain table by Kui and C.W.Qing [6]. Ambekar and Agrawal proposed the Max Code and Min Code methods for the detection of isomorphism [7, 8]. Yadav et al. presented 'distance' concept in modified version in checking K-chains for isomorphism and finding inversions [9, 10]. Rao A.C and his co-researchers contributed many concepts in testing isomorphism and structural synthesis of kinematic chains, namely, hamming number approach [11], pseudo hamming values [12], fuzzy logic [13], loop based methods in multi-degree of freedom K-chains to check isomorphism and finding distinct inversions [14]. Bedi and Sanyal had presented Joint connectivity approach for detection of isomorphism and distinct inversions of planar kinematic chains [15-17]. Xiao et al. proposed novel evolutionary algorithms for isomorphism detection [18]. Ashok Dargar et al. used link adjacency values – first and second to identify the distinct inversions. The method has the potential of identifying the isomorphic kinematic chains also [19]. Jaspal Singh Bal et al. [20] used link invariant functions based on distance matrix and kinematic chain loops to detect isomorphism and inversions.

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Enhanced Oil Recovery by using Polymer Flooding in Oil and Gas Industry in Tertiary Recovery Process

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Abstract: ***In very early days of the oil industry, the general practice in land-based shallow reservoirs was to produce oil by primary depletion. In this method, the compression al energy of the reservoir was used to force oil to the producer wells, with a consequent drop in the reservoir pressure. However, it was recognized that reservoirs would ultimately drop below bubble point pressure, such that dissolved gas would be released from the oil. As a result of the appearance of this extra phase, production impairment would occur. In order to maintain reservoir pressure and also to sweep out oil in a more efficient displacement process, water flooding became the standard practice in many reservoir formations and still finds a wide application. When water is injected under pressure, it would seek the path of least resistance to point of lowest pressure, which is generally producing well. If the mobility ratio is one or less, the displacement of oil by water is found to be efficient. In effect, the displacement occurs in a piston like fashion. On the other hand if mobility ratio is greater than one, the more mobile water fingers through the oil leaving it in place in the reservoir.***

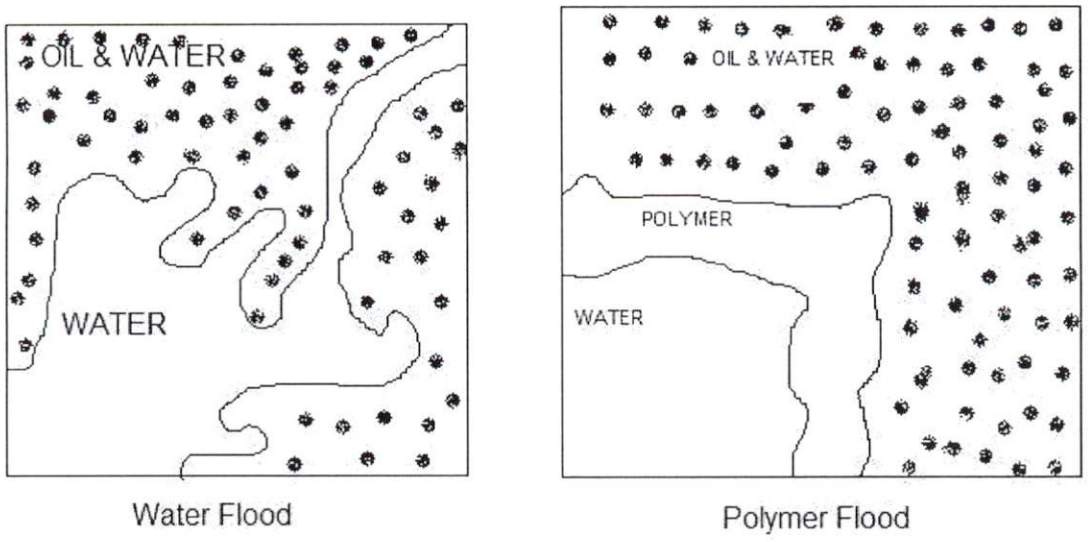

Figure 1.1: Water Flooding vs. Polymer Flooding Sweep Efficiency

I. INTRODUCTION

By polymer flooding a poor sweep efficiency may be improved, because the polymer solution of course first follows the paths prepared by water and then because of its high viscosity tends to —blockl these parts of the reservoir, so that oil that was previously immobile starts flowing. The pressure gradient in the reservoir and especially in those zones where oil was immobile becomes higher in a polymer flood than it was during water drive. Polymer improves the mobility ratio by its high viscosity solution and thereby increases the displacement efficiency.

A. Where Polymer Flooding

There are several broad guidelines which can be used to eliminate reservoirs as poor candidates for polymer flooding. These guidelines have been developed largely on the basis of past mistakes in field tests, (Jennings 1977).

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Present and Future Potentiality of Coal Bed Methane Gas Exploration and Production in Indian Coal Fields

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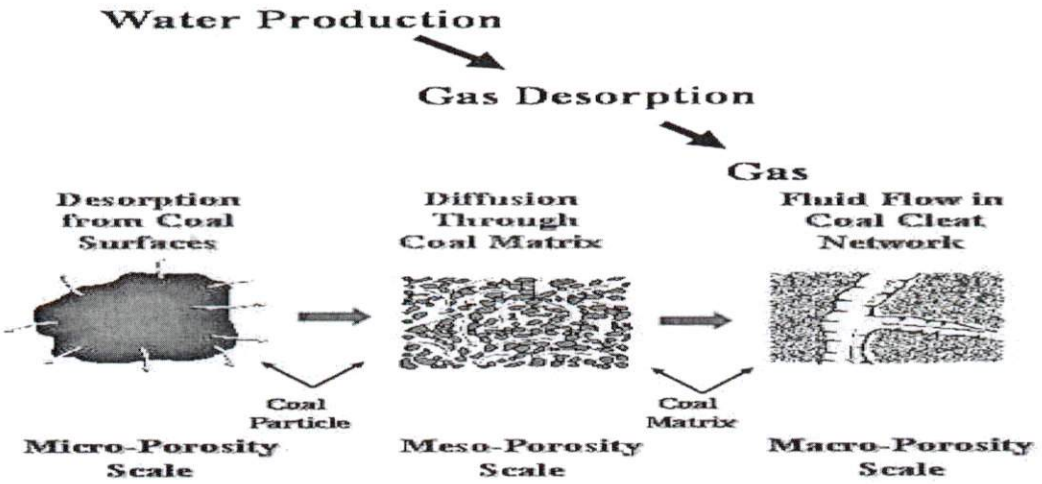
Coal bed methane is produced commercially in the United States, and it has attracted worldwide attention as a potential source of cost competitive natural gas. Since the beginning of the coal bed methane industry in the mid1970s, operators have modified and applied petroleum industry technology to improve the operation of their fields. However, conventional oil and gas technology does not always work effectively for producing coal bed methane.

Because coal geology is so different from that of typical gas formations, you must use a different approach that takes into account:
The composition of the rock. Coal is 90 per cent organic, whereas conventional gas formations are nearly 100 per cent inorganic.
The different mechanical properties of coal. Coal is brittle and weak, and it tends to collapse in the wellbore.
Coal's naturally occurring fractures, or cleats. These fractures, called face cleats and butt cleats, are extensive in coals. Most coal Coal's gas storage mechanism. Gas is adsorbed or attached onto the internal surfaces of the coal, whereas gas is confined in the pore spaces of conventional rocks. The large volumes of water present in the coal seams. Water must be pumped continuously from coal seams to reduce reservoir pressure and release the gas. The low pressure of coal reservoirs. Backpressure on the wellhead must be kept low to maximize gas flow. And all produced gas must be compressed for delivery to a sales pipeline. The modest gas flow rates from coal reservoirs. Capital outlays and operating expenses must be minimized to produce an economical project. field requires prudently managing the technical as well as the economic aspects of the project. To develop techniques for economically producing coalbed methane fields, Gas Research Institute (GRI) and Taurus Exploration, Inc. designed The Rock Creek Methane from Multiple Coal Seams Completion Project. This field research site is located in the Black Warrior Basin southwest of Birmingham, Alabama. The overall objective of this project, initiated in 1983,is to develop technology for more cost-effective production of methane from shallow, thin multiple coal seams using single vertical wellbores. Ile project has specifically focused on determining the best combination of drilling, completing, stimulating, and operating techniques to economically produce these wells. The Rock Creek project and the work of other operators in the Black Warrior Basin have produced many practical techniques and guidelines for developing coalbed methane fields. The cooperation and open communication between operators and service companies in the Black Warrior Basin have been necessary to advance both basic knowledge and applied experience in producing methane from coal seams.

1.2 FORMATION OF COAL BED METHANE



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Petroleum and Gas Exploration and Production by Extended Reach Drilling (ERD) Wells

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The term "vertical well" has always been an oxymoron in the petroleum industry. The simple fact, known almost from the advent of drilling, is that all wells deviate at some point from a true vertical line. The more egregious examples of this were referred to as "crooked holes" and it quickly was recognized that wells in certain areas were prone to being crooked holes. Early crooked holes were identified by production engineers who noticed issues with rod wear and geologists who had difficulty correlating formation tops. API's "Straight Hole Drilling Practice" in the year (Dodge 1929; Lahee 1929), at that time almost all production wells were being planned as vertical wells and drilled with no recorded instances of attempts to control deviation from vertical.

I. WELLBORE DEVIATION

Prior to the mid-1920's, most exploration companies did not quantify the extent of deviation in their wells. Mining companies, particularly diamond miners in South Africa, had been using wellbore surveying techniques beginning in the early 1900's. However, the use of survey techniques was not common in the oil and gas industry. This began to change as oil companies recognized the issues that arose with unintentionally deviated wellbores. In some cases, operators began putting deviation limits and drilling parameter limits in turnkey contracts in order to control deviation. The reasons for controlling deviation were explained in the first large study of well deviation, conducted by Alex Anderson. The first recorded instance of controlled deviation of a wellbore was in 1928 in the Signal Hill field by John Eastman and the Kuster Company. Kuster The inventor of the technology, actually drilled several planned horizontal wells in the Big Lake Field the following year in 1929.

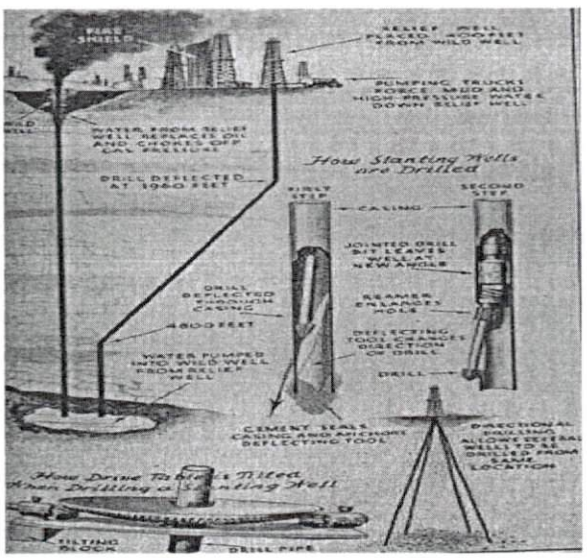

Fig. 1 - First significant use of directional drilling technology: control of 6000 bop blowout in Conroe Field in 1934(Gleason 1934).

On November 12, 1933 the relief well was spudded and the target was reached on January 7,
1934. Eastman had drilled the well to 5135' using single-shot surveys and whip stocks and intersected the oil producing formation close to the original flowing wells (Fig. 1). This was the first significant use of directional drilling in the oilfield and made quite an impact on those who observed it. Popular Science Monthly called it "Brilliant work" and that "...Eastman caused the bit to swerve like a living thing..." summing up the sense of wonder concerning this technology (Gleason 1934). From this point on the practice

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Role of Artificial Lift Techniques in Oil and Gas Production with Respect to Gas Lift System in Tertiary Recovery

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Abstract: ***When a self-flowing oil well ceases to flow or it is not able to deliver the required quantity to the surface, the additional energy is supplemented by means of mechanical or by injecting compressed gas to lift required quantity of oil to the surface is called as artificial lifting. The main purpose of artificial lift is to create or maintain a required low bottom hole pressure against the formation sand so that the well fluid can flow continuously from reservoir to the well bore and there to surface. This is the fundamental basis for the design of artificial lift.***

I. PATH – SECTORS

The path sector influencing design and analysis of ALT can be classified into 4 sectors. The first component includes reservoir drainage area to around the well bore and second from around the well bore to the well. I.e. the first and second one represents the wells ability to bring fluids from reservoir to the well. The third component of flow path is the entire tubing in the vertical /inclined / horizontal path which includes all systems like, down hole artificial lift equipment, sub – surface safety valves, non return valves etc. The fourth component includes the surface flow path which consists of length and diameter of flow line, valves, bends, wellhead, chokes, manifold, separator etc. Any change in the parameters in any of the four sectors, will affect the parameters of other sectors.

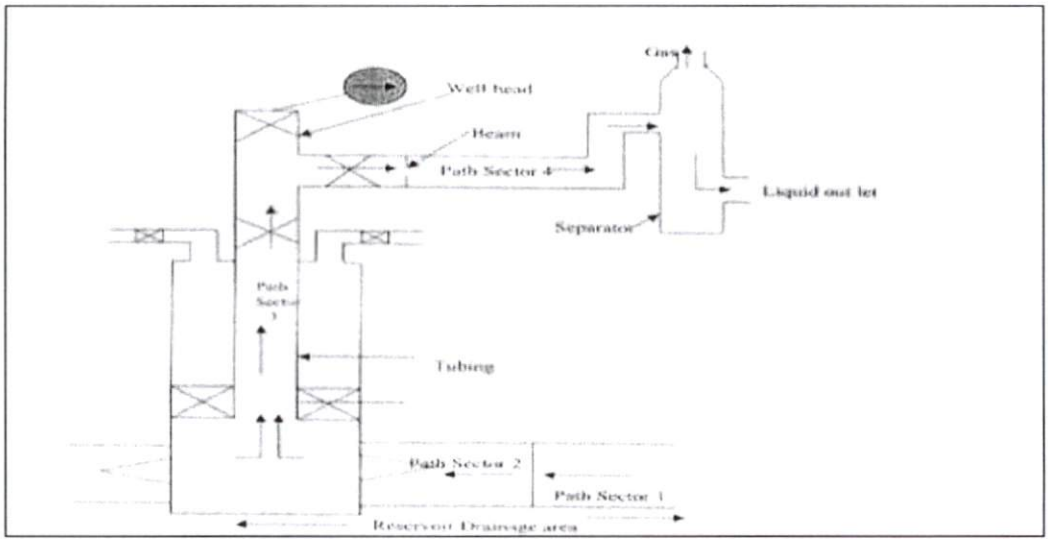

Fig.1.1. Schematic diagram of different path sectors of fluid from reservoir to surface

The four main sectors can be simplified into two categories naming Inflow and outflow performance. The fluid flow from the reservoir up to the wellbore can be termed as inflow performance and similarly flow from wellbore up the tubing to surface equipment can be termed as outflow performance. So the outflow system must be designed in such a way to exploit the well"s inflow capability. For any given well, outflow performance and inflow performance must be equal. In other words, we can produce no more fluid from the reservoir than we can lift to the surface and vice versa.

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Well Logging Importance in Oil and Gas Exploration and Production

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I. INTRODUCTION

Logging is a continuous recording of the physical properties of rocks in the well with respect to depth. These physical properties are porosity, resistivity, density, conductivity, saturation etc. Logging was started with simple electric logs measuring the electric conductivity of rocks, but it is now a technically advanced and sophisticated method. Logging plays a crucial role in exploration and exploitation of hydrocarbons.

Well logging in oil industry has its own meaning; log means "record against depth of any of the characteristics of the rock formations traversed by a measuring apparatus in the well bore". The value of the measurement is plotted continuously against depth in the well (Fig1). For example, the resistivity log is a continuous plot of a formation resistivity from the bottom of the well to the top.

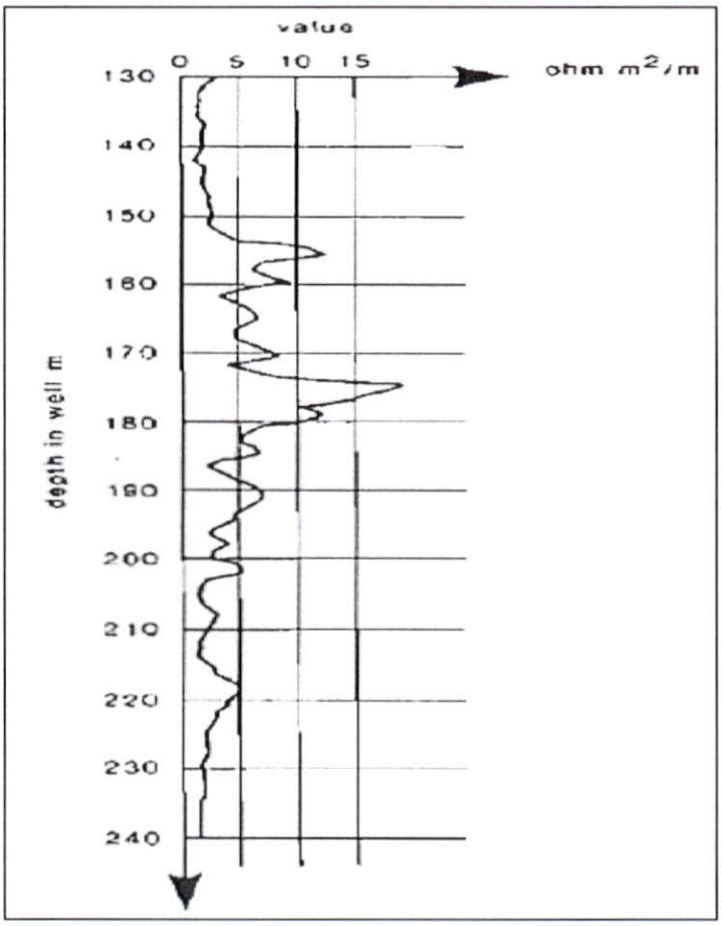

Fig- 1: A well log

The most appropriate name for this continuous depth related record is a wire- line geophysical well log, conveniently shortened to well log or log.

Socio-Economic Data Acquisition Using Mobile GIS Technology (EPICOLLECT)

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Abstract- *The present study focuses on the socio-economic profiles of households in Rayalaseema region through the collection of sample tanks data using Epicollect (open source mobile GIS software) application. Comprehensive improvement of household's economy was studied by surveying tank systems including restoration, improvement of catchment areas and ground water recharge etc. It considers the farmers and landless households, the socio-economic features such as class and community composition, literacy and employment, income, expenditure and asset structure. Sample tanks data was collected and analyzed using Epicollect, which is the mobile GIS software application compatible with android mobiles. A classification of sample households according to land holding sizes showed that nearly 31% fall in the category of marginal farmers. The small and medium farmers vary from 20% and 6% respectively. The large farmers are very less in number i.e., 4%. The landless households in the project area constitute nearly 39%. It can be seen that the small and marginal farmers together form a little above 51% of the total farmers in sample tanks, whereas large farmers are less in number. The farmers in the medium class are significant in sample tanks. The ratio of females to males is 0.88.*

Keywords- Mobile GIS, Epicollect, Sample Tanks, Rayalaseema, GIS, Farmers

I. INTRODUCTION

In India, tanks/ponds and lakes have traditionally played an important role in irrigation, drinking water supply, hydropower, ecology, tourism/culture and domestic use. Relative importance of some of these water bodies has wanted due to a number of reasons such as shifting away from community based tank system to individual beneficiary oriented ground water dependent system, encroachments, silting, population pressure, multiplicity of agencies responsible for their upkeep, etc. Epicollect is an open source and freely available software based on Android frame work for mobile applications. It provides the data collection facility from the field through smart phones (Aanensen et al., 2009). The Design of Epicollect is generic and can be used to modify it, according to our own requirements. It communicates with its web application located at Epicollect.net (Epicollect.net) provides a map interface for display and analysis of data, including, Google Maps and Google Earth. Keeping in view of the generic structure, authors encourage to modify the program including the parameters for selected tanks e.g. villages using irrigation tanks, number of people to living and other information about tanks. The study area selected is Rayalaseema region of Andhra Pradesh (India), which is shown in Figure 1. Rayalaseema is a geographic region in the Indian state of Andhra Pradesh. It includes the four southern districts of Ananthapur, Chittoor, Kadapa and Kurnool. As of 2011 census of India, the region with four districts has a total population of 15,184,908 and covers an area of 67,526 km^2.
Interaction among different components of Epicollect is shown in Figure 2. This section explains about the proposed smart phone based solution for post disaster activities. The proposed framework is based on Android operating system, which is open source software from Google (Asif et al., 2012). Open source software (OSS) is technically defined as programs whose licenses give users the freedom to run the program for any purpose, modify the program, and redistribute either the original or modified program without any limitations (www.opensource.org). An increasing number of organizations have chosen and deployed software in order to fill their informational needs (Jing et al., 2008; Adamala et al., 2016).

Figure 1 Study area

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PHYTOCHEMICAL SCREENING, ANTI-OXIDANT AND ANTI-MICROBIAL ACTIVITY OF *HEMIDESMUS INDICUS* (INDIAN SARASAPARILLA)

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ABSTRACT

Alternative medicine has become popular these days as it is gaining practices across the globe. The field of alternative therapies is diverse: It encompasses practices spanning diet and exercise changes, hypnosis, chiropractic adjustment, and acupuncture. Ayurvedic medicine is one of the important forms of alternative medicine that was widely available in India.The present study mainly focuson the identification of therapeutic properties of *Hemidesmus indicus*. The ethanolic extract of *Hemidesmus indicus* roots are used for its anti-oxidant and antimicrobial activity. *Hemidesmus indicus* dried roots shown good anti-oxidant and anti-microbial properties. The ethanolic extract of *Hemidesmusindicus*was checked for anti-microbial activity against pathogenic bacteria such as *E.coli, Staphylococcus aureus, Pseudomonas*.

KEYWORDS: *Hemidesmus indicus*, Antioxidant activity, Anti-microbial activity, phytochemical screening.

INTRODUCTION

The medicinal plants find application in pharmaceutical, cosmetic, agricultural and food industry. The use of the medicinal herbs for curing disease has been documented in history of all civilizations. Man in the pre-historic era was probably not aware about the health hazards associated with irrational therapy. With the onset of research in medicine, it was concluded that plants contain active principles, which are responsible, for curative action of the herbs.[1-3] Before onset of synthetic era, man was completely dependent on medicinal herbs for prevention and treatment of diseases. With introduction of scientific procedures, the

Effect of Process Parameters on the Mechanical Behavior of FDM processed PLA Parts

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Abstract- *Fused Deposition Modeling (FDM) is a fast growing rapid prototyping technique used to create functional prototypes as well as end use components.The mechanical behavior of FDM processed parts is studied earlier by various researchers and depends on the process variables like % infill, layer thickness and build orientation, raster angle etc. In the present work, mechanical properties of the FDM parts were studied varying three main parameters i.e., layer thickness, build orientation in XY plane, % infill. The geometry of the specimen is taken as per ASTM D638 standards. A total of 16 specimens are fabricated using Taguchis L_{16} orthogonal array approach. The Surface Roughness and Ultimate Tensile Strength (UTS) of the specimens were measured using Talysurf and Universal Testing Machine. Statistical analysis is performed using ANOVA and Multiple Regression to find out the relationship of process parameters on UTS, elongation at failure, Surface Roughness values. It has been observed that build orientation has more effect on R_a, Elongation at failure, UTS and layer thickness has more effect on R_a, R_q.*

Keywords-- *FDM, UTS, Surface Roughness, ANOVA, Multiple Regression*

I.Introduction

Rapid prototyping is a process in which material is solidified to create a solid object, with material being added together in layer by layer. FDM is one such process in which a filament of thermo plastic or other material is fed into an extrusion nozzle head, which heats the material and is deposited on the part bed surface. FDM uses a .STL file of a model which is sliced by a slicing software into layers .Slicing software generates the tool path in X,Y and Z axes and is given as input to the FDM Machine. The extruder and part bed are maintained at a particular temperature so that the thermo plastic material is heated to semi liquid state. The extruder directs the solidified material based on the geometry of the object until the part is completely built up.

The quality of the FDM parts depends on different factors like process parameters, material used, working environment etc. A lot of research is done to improve the mechanical properties of the FDM processed parts.Farhad et al., [1] studied the effect of process parameters on the mechanical properties of FDM Parts using Taguchi method. They concluded that increase of infill density and layer thickness increases the mechanical properties, while the strength is high at 45^0 and less at 0^0 and 90^0 build orientations.A study on behavior of the mechanical performance of the printed part with respect to three process variablesviz. raster angle, raster width

Surface Scattering and Quantized conduction in semi conducting nano materials

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Dr.K.L.Narasimham ,Professor (A.U.Retired)

Abstract

Electronic configurations of nano materials make changes in the density of electronic energy levels which will cause strong variations in the optical and electrical properties with size. The effects of size on electrical conductivity of nanostructures play a major role in several new technologies. The electronic properties of ultrafine wire structures are studied theoretically. If the scattering probability of such size-quantized electrons is calculated for Coulomb potential then it is suppressed drastically because of the one-dimensional nature of the electronic motion in the wire. For this material In this paper I want to study few mechanisms responsible for enhanced electrical conductivity in semi conducting nano materials.

1.Introduction

Semiconductor nano crystals are tiny crystalline particles that exhibit size-dependent optical and electronic properties. With typical dimensions in the range of 1-100 nm, these nano crystals bridge the gap between small molecules and large crystals, displaying discrete electronic transitions reminiscent of isolated atoms and molecules, as well as enabling the exploitation of the useful properties of crystalline materials. Bulk semiconductors are characterized by a composition-dependent band gap energy (E_g), which is the minimum energy required to excite an electron from the ground state valence energy band into the vacant conduction energy band . With the absorption of a photon of energy greater than E_g, the excitation of an electron leaves an orbital *hole* in the valence band. The negatively charged electron and positively charged hole may be mobilized in the presence of an electric field to yield a current, but their lowest energy state is an electro statically bound electron-hole pair, known as the exciton. Relaxation of the excited electron back to the valence band annihilates the exciton and may be accompanied by the emission of a photon, a process known as radiative recombination.

1.1 Significance of the study

Nanotechnology is a field of science and technology of controlling matter on a nano scale. It is a highly multidisciplinary field, including electrical and mechanical engineering, physics, chemistry, and biosciences. Nanotechnology will radically affect all these disciplines and their application areas . It is commonly attributed for the technologies leading to produce nano-scaled materials (10-9 m) at nanometer dimension. This feather of nano-particles provides a larger surface space per unit mass than those which are not in nano size . To create nano-structured materials there are two commonly routine techniques can be used, top-down technique and bottom-up technique, which their main difference is based on the size of primary entities applied to build nano components with or without atomic level control . One of the main applications of nanotechnology and therefore a driving force for nano science

CONGESTION CONTROL IN NOVEL ENERGY EFFICIENT CLUSTER BASED PROTOCOL FOR HIGHLY DENSE MANET

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Abstract : Due to highly dynamic nature of Mobile ad hoc networks (MANET), predictability and design of efficient protocols and methodology to handle congestion proves to be a tedious task. Since issues and architecture of mobile ad hoc networks are very much different from their counterparts, so are its congestion control strategies due to frequent changes in network's topology. A noted congestion control mechanism is to notify source for the congestion in the network so that either it may pacify the transmission rate or look for an alternative option. It must be noted down that all the existing methodologies are capable to tell the source about the congestion problem as they use TCP. But in case of MANET, the packet losses due to link failure (due to its dynamic nature) are misinterpreted as packet losses due to congestion, and in the snapshot of a timeout, backing-off its RTO. This results in needless reduction of transmission speed due to which throughput of the whole network degrades. In this paper we implemented hierarchical tree alternative path algorithm for congestion control in Fish-eye state routing algorithm , Order-One Manet Routing Protocol (OOMRP)and novel energy efficient cluster based protocol for highly dense MANET. The comparative results shows that congestion control is very good in proposed cluster based protocol. The throughput is high and packet loss is less and finally energy is saved.

Index Terms - MANET, Congestion control, OOMRP, Fish-eye state routing algorithm.

1. INTRODUCTION

MANET is a short-lived self-organizing network of cordless mobile nodes with no existing facilities. It enables various tools to form a network in the locations where no required facilities exists. Albeit, there are numerous problems and also difficulties that need to be resolved prior a large facility of a MANET, tiny and medium-sized MANETs can be easily established [1] In this paper the problem of congestion control in MANETs is considered. In a lot of cordless situations utilized, the tools connect via some networking foundation in the form of base stations. On the other hand, an ad-hoc network does not have any type of infrastructure. Mobile ad-hoc networks are used in circumstances where no framework is readily available, of which a very typical instance is, disaster alleviation circumstance much research initiative has actually been put into the ad-hoc network location. Various approaches have been suggested to carry out transmitting in MANETs. It has also been noticed that the functions of transportation layer needs to be adjusted to the specific buildings of MANETs. Specifically the congestion control approach applied in the transport protocol used nowadays, i. e., TCP; do not deal properly with the particular effects taking place in MANETs [2] Because of this, ideal Congestion control is taken into consideration to be a crucial concern for mobile ad-hoc networks. Several Congestion related problems determined, consists of drastic throughput failure and also other troubles. They have actually been shown to advance from the Tool Accessibility Control layer, network, as well as transport layers, as discussed, in [1], [2] and also [3] There is a big variety of ideas on just how to overcome the problems. In this survey paper, we give a short of existing attempts to address the congestion trouble in mobile multi-hop ad-hoc networks. There is no attention paid in the direction of methods focused on improvising congestion control or TCP performance. Congestion control works very well in TCP over Net. Yet impromptu network display some homes that very impacts the design of proper methods in general, and of specifically Congestion control device. As a result of the dynamic actions,

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DOCKING STUDIES OF BCL-2 WITH *HEMIDESMUS INDICUS* COMPOUNDS FOR ANTI-CANCER STUDIES

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ABSTRACT

Medicinal plants have wide spread properties due to the presence of phytocompounds and are the alternative medicines available for thosewho cannot be helped by conventional medicine. In this work we have selected bioactive compounds from *Hemidesmus indicus* medicinal plant extracts. Gas chromatography and Mass Spectrum studies were studied to identify the compounds present in the ethanolic extracts based on the retention time and area. The identified compounds were used for anti-cancer activity by insilico method with BCL-2 which plays prominent role in causing cancer. Out of twenty selected compounds, docking results showed Methyl-1-Cyclo Hexane carboxylate and 1,2-diacetoxy-5-idohexane as best docked to the BCL-2.

KEYWORDS: Anticancer, BCL-2, Docking studies, *Hemidesmus indicus,* Insilico studies.

INTRODUCTION

Cancer is a global health problem with high morbidity and mortality and poses both economic and psychological challenges. Cancer cure and prevention therefore remain a high priority for the scientific community across the world. Insight gained into the etiology of cancer through various epidemiological studies encompassing various parameters such as geographical location, ethnicity, sex, age and trans-migratory populations have collectively revealed that lifestyle is one of the major influencing factors,[1-2] Other factors include environmental aspects such as automobile exhaust pollutants, solar UV radiation, occupational exposure to carcinogens[5] and mutagens, bacterial/viral infection, and genetic susceptibility[4,5] Lifestyle factors are usually classified as modifiable risk factors and include diet intake, smoking, caspase-3 activity[4] alcohol consumption, and physical activity and body mass. In general, physical activity instead of inactivity, abstinence from smoking and alcohol consumption, low body mass, and diets low in fat/calories are usually recommended for overall good health and have a positive influence on reducing the risk of cancer, especially breast and colorectal cancers.[2,6] Because all these factors can be modified, they also provide us with leverage to use them as interventive/preventive measures. Accordingly, the American Cancer Society has suggested guidelines on nutrition and physical activity for the prevention of cancerand early detection/screening for cancers of certain sites.[7]

From the epidemiological data indicating that dietary habits influence cancer risk, considerable scientific interest has been generated in developing various preventive measures based on diet,[1] especially those involving fruits and vegetables.[8-10] Fruits and vegetables, along with probiotics[3] belonging to plant kingdom, represent a vast source of phytochemicals of varied chemical structure; many of them have already been studied extensively for their potential anticancer or chemopreventive efficacy.[10] As such, interventions based on fruits and vegetables are not only "more natural" in lowering cancer risk without posing "any side effects" but also in maintaining good general health based on the fact that they are major sources of vitamins, minerals, and fiber. The presumptive results may also lead to cloning of the compounds for detailed studies in yeast model systems like Pichiapastoris.[2] In this work, we have focused our discussion on recent advancements largely in Hemidesmus indicus root extract regarding their cancer chemopreventive and anticancer efficacy and associated molecular mechanisms.

METHODOLOGY

GC-MS method for identification of compounds

GC-MS analysis was carried out on a GC CLARUS 550 PerkinElmer system comprising a gas chromatograph interfaced to a mass spectrometer (GC-MS) instrument employing the following conditions: Column Elite-1 fused silica capillary column (30×0.25 mm ID×1EM df, composed of 100% Dimethyl poly siloxane), operating in electron impact mode at 70 eV; helium (99.999%) was used as carrier gas at a constant flow of 1ml/min and an

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DESIGN AND IMPLEMENTATION OF 32-BIT INEXACT FLOATING POINT ARITHMETIC UNIT

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Abstract - In computing, floating-point format is an arithmetic formulaic representation of real numbers as an approximation so as to support a trade-off between range and precision. For this reason, floating-point computation is often found in systems which include very small and very large real numbers, which require fast processing times. In general floating point format is denoting as a mode of representing numbers as two sequences of bits, one representing the digits in the number called mantissa and the other an exponent which determines the position of the radix point. The traditional method of floating point arithmetic involves accurate computation for all applications. This traditional method of computing on floating point arithmetic requires high power. But power has become a key constraint in nano scale integrated circuit design due to the increasing demands for mobile computing and higher integration density. As an emerging computational paradigm, an inexact circuit offers a promising approach to significantly reduce both static and dynamic power dissipation for error tolerant applications. The objective of this project is to implement an inexact 32 bit binary floating point arithmetic which includes floating point adder, subtrctor and multiplier with improving performance. Here pipelined architecture is used in order to increase the performance and to increase the operating frequency. At the same time, the related logic includes both normalizer and the rounder according to the inexact mantissa and exponent parts. Floating point arithmetic is handled by the FP add, FP sub, FP mul. FPadd adds the value in the floating point accumulator to the floating point accumulator. FPsub subtracts the value in the floating point operand from the floating point accumulator. FP mul multiplies the value in the floating accumulator by the floating point operand. In this project,the proposed architecture is simulated and synthesized by Xilinx ISE 14.7.

Keywords - Floating Point adder, Floating Point subtractor, Floating Point multiplier, Dadda multiplier

I. INTRODUCTION

Floating point numbers are one possible way of representing real numbers in binary format, the IEEE 754[1] standard presents two different floating point formats, Binary interchange format and Decimal interchange format. Multiplying floating point numbers is a critical requirement for DSP applications involving large dynamic range. This paper focuses only on single precision normalized binary interchange format. It consists of a one bit sign (S), an eight bit exponent (E), and a twenty three bit fraction (M or Mantissa). An extra bit is added to the fraction to form what is called the significand. If the exponent is greater than 0 and smaller than 255, and there is 1 in the MSB of the significand then the number is said to be a normalized number. Multiplying two numbers in floating point format is done by adding the exponent of the two numbers then subtracting the bias from their result,and multiplying the significand of the two numbers, and calculating the sign by XORing the sign of the two numbers. This is invaluable tools in the implementation of high performance systems, combining the reprogramability advantage of general Purpose processors with the speed and parallel processing. At some point, require general purpose arithmetic processing units which are not standard components of fpga devices [10].

More recently, the increasing size of fpga devices allowed researchers too efficiently Implement operators in the 32-bit single Precision format .Single precision format, the most basic format of the ANSI/IEEE 754-1985 binary floating-point arithmetic standard. Double precision and quad precision described more bit operation so at same time we perform 32 and 64 bit of operation of arithmetic unit. Floating point includes single precision, double precision and quad precision floating point format representation and provide implementation technique of various arithmetic calculation. Normalization and alignment are useful for operation and floating point number should be normalized before any calculation [3].

II. FLOATING POINT FORMAT REPRESENTATION

Floating point number has mainly three formats which are single precision, double precision and quad precision. Single Precision Format: Single-precision floating-point format is a computer number format that occupies 4 bytes (32 bits) in computer memory and represents a wide dynamic range of values by using floating point .As mentioned in Table 1 the single precision format has 23 bit for significand (1 represent implied bit), 8 bit for exponent and 1 bit for sign. The IEEE standard specifies that Single precision floating-point numbers are comprised of 32 bits, i.e. a sign bit (bit 31), 8 bits for the exponent E (bits 30 down to 23) and 23 bits for the fraction f (bits 22 to 0). E is an unsigned biased number and the true exponent e is obtained as e=E–Ebias with Ebias=127 the leading 1 of the significand, is commonly referred

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A Matlab Implementation of "Standard Deviation Pooling based Gradient Magnitude Similarity Deviation (GMSD) FR-IQA Model"

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***Abstract*— Image Quality Assessment (IQA) is one of the emerging area in the field of Image Processing especially in the area of digital image photography, image compression, pseudo and full colour image processing. When an image was captured using a digital camera or created using imaging software, the captured or created image perceptual quality is easily judged by human beings. If the logic behind the human judgement is understood, the same can be implemented as a quality measure in digital image processing. And this idea was presented by Zhou Wang[1] in the year 2004. Since the area IQA is emerged in various ways. In this paper we modelled the idea of FR-IQA using Gradient Magnitude Similarity Deviation (GMSD). The gradients of an image are very sensitive at abrupt changes in a given image, and different local structures will degrade at different levels. This idea motivates us to explore the use of global variation of gradient based local quality map for overall image quality prediction. Here we considered an original image and a degraded image from CSIQ [14] image database and implemented the idea of GMSD using Matlab.**

***Keywords*— Error Visibility, Full reference IQA, GMSD, Human Visual System (HSV), Image Quality Assessment, IQA, Pooling Strategy, Quality Map, Quality Score, SSIM, Structural Similarity, Similarity Function.**

I. INTRODUCTION

In the areas of digital image processing such as image acquisition, compression, restoration the "processed image" is observed by humans. Humans can judge the quality of the image and can classify the image based on quality. It is an ever truth that, developing an algorithm which suits the human intelligence is nearly impossible. But research found that the classical measures in image quality like peak signal to noise ratio(PSNR) or mean square error (MSE) cannot replace the human judgment in image quality assessment. Hence researchers developed advanced quality perception algorithms[2-4]. Image quality assessment (IQA) algorithms are classified[1] into full reference (FR), reduced reference (RR) and no reference (NR) or Blid. A brief comparison of the three classifications are summarized in the following table:

TABLE I
IQA ALGORITHMS CLASSIFICATION

IQA Algorithm	Methodology
Full Reference (FR-IQA)	The degraded image is available along with the knowledge of the original Image.
Reduced Reference (RR-IQA)	The degraded image is available along with the knowledge of the part of the original Image.
No Reference (NR-IQA) or Blind IQA	The degraded image is only available without the knowledge of the original image.

This paper is implemented based on full reference IQA (FR-IQA). FR-IQA Model will provide a good scope for developing various algorithms at various optimization levels. There will be two strategies for implementing FR-IQA Model:

Strategy 1: Bottom-up frame work which simulates various parts of Human Visual System (HVS) including visual masking effect, contrast sensitivity and just noticeable differences. But the HVS model is too complex to implement.

Strategy 2: Top-down framework which will model the entire HVS model with the help of some global assumptions. Most of the FR-IQA Models will follow this strategy. Structural Similarity Index (SSIM), Multi-Scale SSIM [5] and Weighted SSIM [6] are some of the algorithms based on this strategy.

Many IQA models will follow a common two-step implementation [6]. The first step comprises of evaluating a Local Quality Map (LQM) by comparing distorted image with the original image via some similarity function. Then, the second step comprising of calculating a Quality Score via some pooling strategy. The two steps are summarized in the following table and illustration.

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A Comparative Study on Optimization of Coagulant dose in Treating Godavari water with Different Coagulants

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ABSTRACT

Kakinada town in coastal Andhra Pradesh with a population of about 18,000 in 1870 has grown to about 300,000 by 1991 and at present according to census 2011 of about 5,43,000, is expected to touch 1,000,000 by 2040. In this project the municipal water supply system of Kakinada is studied with special reference to chemical treatment of raw water supply from a surface water source from Samalkot near Kakinada. The main objective of this project is to optimize coagulant dose by using chemicals like alum, copperas and compare with natural coagulants/aids like Nirmali seed extract, Moringa oleifera seed powder in the treatment of Godavari water, which may help in minimizing the negative impacts of excess usage of chemicals on the Environment. The usage of natural coagulants not only reduces cost of chemicals but also reduces the potentiality of exposure of individuals to these dangerous chemicals if used in excess. Environmentally the chemical coagulants pose the exposure of dangerous ions like Al^{3+} and Iron causing diseases like Dementia or Alzheimer's disease in humans consuming this water containing more quantities of these ions. The improper disposal of the sludge containing more concentration of these ions into the Environment also results in Bio-magnification in Ecosystem.

Key words: ***Bio-magnification, Chemical Coagulants, Natural coagulants, Godavari water, Water treatment.***

I.INTRODUCTION

Water is the most important natural resource which forms an essential nutrient for the survival of life on the earth. Man can survive for 5 weeks without food but for less than five days without water. It is the only inorganic fluid in this universe and has a relative density of unity. Water is essential for digestion, dissolving nutrients and distributing them to cells, regulating the body temperature, removing the wastes in the body through tears, perspiration, urine and faeces and for lubricating the joints. Public water or drinking water must be palatable and wholesome. It must be attractive to senses of sight, taste and smell and must be hygienically safe. Man needs water for domestic purposes such as cooking, cleaning utensils, gardening, washing clothes and above all for drinking. He also needs it for commercial, industrial and recreational purposes. The water used by him should be of good quality. Polluted water is one which is unsuitable for its intended use. Urbanization and industrialization have directly or indirectly polluted most of the water sources on a global scale. The impurities in water are to be removed to such an extent, so that it is not harmful to public health. The concentrations of different substances are expressed in mg/l or ppm. The term 'wholesome water' or 'potable water' is used to

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DESIGN OF SHIP PROPELLER BY USING MACROS TECHNIQUE

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ABSTRACT

In this paper, the ship propeller is designed using macros and the materials are compared. Expanded use of lightweight materials in the marine applications the epoxy composites was chosen which has high performance characteristics and a lightweight thermosetting matrix resin. Propeller is an essential component for underwater vehicles such as ship, submarines etc. This supports the vehicle to move at its operating speed. This works on the Bernoulli's principle and Newton's third law. In this paper, the propeller geometry is designed using macros. The solid model was created in CATIA software. The simulation and modal analysis are performed in ANSYS workbench. Then the material results are compared with the previous material. Finally, the better material for ship propeller is determined.

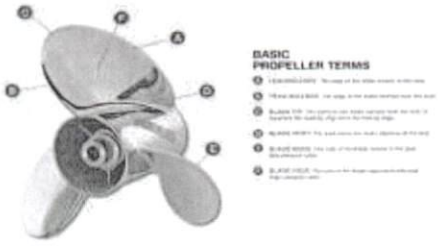
Keywords: Propeller design, Macros, Catia, Ansys workbench, Structural analysis.

I.INTRODUCTION

For the past few years there have been critical innovative work in the field of propeller designs in order to protect the safety of goods, travellers and the crew and in the mean time reducing the expenses and by improving the efficiency. Ship Propeller is used for propulsion regardless of their sort and size.

A propeller is a sort of whirling fan, which is used to move the ship or aircraft forward by utilizing the power created by the engine. The transmitted power is changed from rotational movement to produce a push or thrust which imparts energy to the fluid (i.e. water or air), bringing about a force that follows up on the ship and drives it forward. The pressure variation between the front and aft side of the blade creates acceleration in the water present behind the blade, which makes the ship start sailing. Propellers continually turn at a steady velocity, which increases the efficiency of the engine. Propellers create push through the generation of lift by their rotating blades.

The propeller whose name originates from the Latin word "propeller". A proficient screw propeller was innovated at the start of the nineteenth century as an efficient power source for the steam engine.



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A Secure Distributed Code Discovery in Wireless Sensor Networks

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ABSTRACT

A wireless sensor network (WSN) consists of little sensor nodes, that is capable of assembling information from the surroundings and communicating to the controller via wireless transceivers. Limited battery energy is employed to control the detector nodes and is extremely troublesome to exchange or recharge it, once the nodes die. It is often difficult or not possible to exchange the batteries of the detector nodes. On the opposite hand, the Base station or Sink is often rich in energy. Since the detector energy is that the most precious resource within the WSN, effective utilization of the energy to improve the network period has been the main focus of abundant of the analysis on the WSN. This can have an effect on the network performance. In most of existing protocols authors considered only on the centralized data dissemination methods without more security and energy consideration. We have a tendency to establish the safety vulnerabilities in previously planned protocols and that we extend the secured and distributed information delivery system with energy concerns. It's the first distributed information discovery and dissemination protocol that permits network owners and approved users to collect information items from detectors without base station and with network life time management. The existing did rip [1] protocol is only concentrating on the security point. In this paper, we propose an enhanced dissemination protocol, which is used to improve the quality of service issues. In the enhanced work, the proposed solution is to enhance the energy efficiency in distributed wireless sensor.

I. INTRODUCTION

The communications within the Wireless Sensor Network (WSN) has the many-to one property, in this data items from a large number of Sensor nodes tend to be targeted into one sinks. Since multi-hop routing is usually required for distant Sensor nodes from the sinks to save huge amount of energy, the devices close to a sink are often loaded with relaying an over-sized quantity of traffic from different nodes. Sensor nodes resources affected in term of energy, processor and memory and dynamic behaviour of ad-hoc communication. The Sensor nodes are commonly expected to work with batteries and they are usually deployed to not easily-accessible or hostile surroundings, generally in large quantities. Routing is a crucial issue in information gathering WSN, whereas on the opposite hand sleep/wake maintenance is that the main problems for event detection networks. Even though, we cannot avoid the failure of nodes, so in our research work, further we added the enhancement with the failure rectification techniques. Our ultimate aim of this project is to provide the energy efficient distributed security system for WSN. And more importantly, all previous data discovery &

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Schedule Organizer for Educational Institutes

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ABSTRACT

Generating a schedule for every course in educational institutes involves a lot of work, as number of permutations that need to be tested are high. Manually carrying out such works involves a lot of overhead and in some cases, clashes among subjects are almost impossible to be prevented due to various constraints.
So, an automated scheduler would reduce this overhead by verifying every possibility of generating a clash free time table.

I.INTRODUCTION

The basic idea behind generating an automated scheduler is that comparisons among two entities can be done by a machine easily and it would be more efficient than a human doing the same work.

Here, the two entities are the time table that is being generated and already existing time table. We perform comparisons between these two entities so that there would not be any risk of clash if same faculty were allocated to both old and new time tables.

So we take care such that if there is an entry "a" at position "x" in existing time table, then there would be the same entry "a" in newly generating time table at any position other than "x". "a" cannot be at the same position in both the schedules.

In this way we try to create schedules for multiple sections of the same course where faculty can be same among different sections but there would not be any clash among two subjects of same class nor same subject for different classes.

II.EXISTING SYSTEM

At present schedules are being made by using pen and paper, where a person has to manually check all the possibilities of placing a subject at a particular time slot for a day where comparisons are very high.

Some Institutes also use spread sheets for allocating schedules, which is in a way better than doing it on a paper, but still all the comparisons need to be performed manually, the only advantage of this method is that a change can be undone easily, whereas the number of permutations are still the same.

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Journal of Mechanical Design

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Journal of Mechanical Design

RESEARCH-ARTICLE

Topological Synthesis of Epicyclic Gear Trains Using Vertex Incidence Polynomial

Vinjamuri Venkata Kamesh, Kuchibhotla Mallikarjuna Rao, Annambhotla Balaji Srinivasa Rao

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Journal of Non-Crystalline Solids
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Optical absorption and luminescence properties of Pr^{3+} ions doped P_2O_5-PbO-Bi_2O_3-R_2O_3 (R = Al, Ga, In) glasses

G. Chinna Ram [a], T. Narendrudu [a, b], S. Suresh [a, c], A. Suneel Kumar [a], M.V. Sambasiva Rao [a], Ch. Tirupataiah [a], D. Krishna Rao [a]

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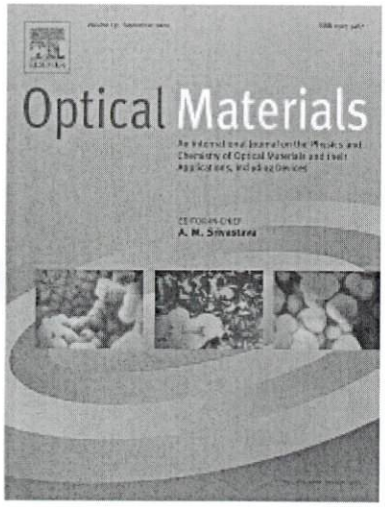
https://doi.org/10.1016/j.jnoncrysol.2017.07.009

Highlights

- PPBAlPr, PPBGaPr and PPBInPr glasses were prepared by melt quenching technique.
- Absorption and luminescence studies were carried out in both visible and NIR regions.
- Higher value of Ω_2 indicates more covalent environment around Pr^{3+} ions in PPBGaPr glass.
- Color coordinates of prepared glasses in CIE diagram lie within reddish orange region.
- Emission band at 1490 nm indicates these glasses are suitable for broad band signal amplification.



Optical Materials

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Optical Materials
Volume 73, November 2017, Pages 7-15

Influence of valence state of copper ions on structural and spectroscopic properties of multi-component $PbO–Al_2O_3–TeO_2–GeO_2–SiO_2$ glass ceramic system- a possible material for memory switching devices

Ch. Tirupataiah [a], T. Narendrudu [a, b], S. Suresh [a, c], P. Srinivasa Rao [d], P.M. Vinaya Teja [e], M.V. Sambasiva Rao [a], G. Chinna Ram [a], D. Krishna Rao [a]

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Highlights

- $PbO – Al_2O_3 – TeO_2 – GeO_2 – SiO_2$: CuO glass ceramics were synthesized by heat treatment.
- Prepared glass ceramics were characterized by XRD, SEM and DTA.
- Absorption spectra of these ceramics exhibited a broad band in the range 650–950 nm.
- EPR spectrum exhibited a strong signal at $g_\perp = 2.072$ and a shallow quadruplet at $g_\parallel = 2.386$

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Journal of Mechanical Design

RESEARCH-ARTICLE

An Innovative Approach to Detect Isomorphism in Planar and Geared Kinematic Chains Using Graph Theory

Vinjamuri Venkata Kamesh, Kuchibhotla Mallikarjuna Rao, Annambhotla Balaji Srinivasa Rao

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EXPERIMENTAL STUDY OF BAGASSE ASH AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE

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ABSTRACT

*Our project is about use of Sugarcane Bagasse Ash which is a byproduct extracted from sugarcane industry. When juice is extracted from sugar pulp, the bagasse is packed in graphite crucible air tight and placed inside electric control furnace burnt at temperature of 1200C for 5hours to obtain black ash. The composition is Siliceous Oxide and Alumina. Bagasse Ash is light material and high oxidation compound compared with cementing compounds. We have taken M30 grade concrete, for this grade we have casted cubes of size 150mm*150mm*150mm and cylinders 150mm*300mm. We have replaced cement with sugarcane bagasse ash of 2%, 4%, 6% and conducted tests for obtaining compressive strength for cubes and split tensile strength for cylinders. We obtained an optimum percentage of 2% it is that from locally available cheap materials like sugarcane bagasse ash, we obtained high workability and strength unlike cement sugarcane bagasse ash is environmental friendly too.*

Key words: Bagasse Ash, Cement in Concrete, Sugarcane Bagasse

Cite this Article: G Dinesh and G. Swathi, Experimental Study of Bagasse Ash as Partial Replacement of Cement In Concrete, International Journal of Civil Engineering and Technology, 8(10), 2017, pp. 1739-1748.
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International Journal of Mechanical Engineering and Technology (IJMET)
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ANALYSIS OF MULTIPLE SERVER FUZZY QUEUEING MODEL USING α – CUTS

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ABSTRACT:

In the present research paper, it is worked with fuzzy queueing models with single and multi-servers with triangular fuzzy numbers with the help of α – cut method. Both arrival rate and service rate are supposed to be of fuzzy nature. Also, it is presumed that the arrival rate follows Poisson distribution and service rate follows Erlang –k (E_k) *distribution. Fuzzy queues are more vivid than the discrete queues which are generally considered in reality. In addition, extension of queues associating with fuzzy logic increases their practicability. Various performance measures of the queueing models are interpreted in triangular fuzzy numbers. Also the efficacy of the model is projected by making use of DSW algorithm in various situations.*

Keywords: Triangular fuzzy numbers, α-cuts, DSW algorithm, Erlang–k distribution.

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1 INTRODUCTION:

Queueing models have wider range of applications in service organizations as well as in manufacturing firms, where customers receive service by different kinds of servers in accordance with the queue discipline. In particular, the inter arrival times and service times are restricted to follow specific probability distributions.

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IMPROVING THE QUALITY OF TRADITIONAL CONCRETE BY UTILIZING FLYASH AND WASTE GLASS POWDER WITH ADDED SUBSTANCE NYLON FIBER

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ABSTRACT

The progression of concrete innovation can diminish the utilization of characteristic assets and vitality sources and reduce the impact of toxins on the earth. By and by a lot of fly fiery debris are produced from warm power plant with a negative effect on nature. This fly fiery remains can be utilized as a part of concrete as a supplementary cementatious material and the incomplete substitution of sand by waste glass is generally conceivable.

In this project, 15% of cement is mostly supplanted with fly fiery remains and waste glass powder is utilized as fractional substitution of sand in M20 grade concrete with 0.3% addition of nylon filaments to the volume of concrete. Concrete cubes, cylinders and beams were casted with 0% 10%, 20%, 30%, 40% and 50% of sand by glass powder for testing of compressive quality, split rigidity and flexural quality of concrete. Cubes, cylinders and beams are tested at 7 and 28 days of curing period for compressive quality, split elasticity and flexural quality. The test outcomes gotten for the designed concrete mixes are contrasted and that of traditional concrete.

Key words: Fly Ash, Waste Glass Powder, Nylon Fibre, Super Plasticizer, Compressive Strength, Split Tensile Strength and Flexural Strength.

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p-Laplace Variational Image Inpainting Model Using Riesz Fractional Differential Filter

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ABSTRACT

In this paper, *p*-Laplace variational image inpainting model with symmetric Riesz fractional differential filter is proposed. Variational inpainting models are very useful to restore many smaller damaged regions of an image. Integer order variational image inpainting models (especially second and fourth order) work well to complete the unknown regions. However, in the process of inpainting with these models, any of the unindented visual effects such as staircasing, speckle noise, edge blurring, or loss in contrast are introduced. Recently, fractional derivative operators were applied by researchers to restore the damaged regions of the image. Experimentation with these operators for variational image inpainting led to the conclusion that second order symmetric Riesz fractional differential operator not only completes the damaged regions effectively, but also reducing unintended effects. In this article, The filling process of damaged regions is based on the fractional central curvature term. The proposed model is compared with integer order variational models and also Grunwald-Letnikov fractional derivative based variational inpainting in terms of peak signal to noise ratio, structural similarity and mutual information.

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1. INTRODUCTION

Image inpainting, is an art of implementing untraceable modifications on images. It is used to restore the damaged regions of an image based on the pixel information from the known regions. It is not only used to recover the damaged parts but also used to discard the overlaid text and undesired objects. Inpainting is most useful in recovering the old photographs and images in fine art museums. It can be used as a pre-processing step for other image processing problems like image segmentation, pattern recognition and image registration. In this work, image inpainting model for text removal and scratch removal are demonstrated.

The image inpainting techniques are mainly classified into three categories: textural inpainting, structural inapinting and hybrid inpainting (combination of two approaches). Textural inpainting is mainly connected with the texture synthesis. Many texture inpainting methods have been proposed since a famous texture synthesis algorithm was developed by Efros and Leung [1]. Many other texture synthesis algorithms are proposed with the improvement in speed and effectiveness of the Efros-Leung method.

Structure inpainting is the process of introducing smoothness priors to diffuse (propagate) local structured information from source regions to unknown regions along the isophote direction. It uses partial differential equations (PDE) and variational reconstructions methods. Marcelo et al. [2] introduced first PDE based digital image inpainting. These models produce good results in restoring the non-textured or relatively smaller unknown regions. Navier-stokes equations of fluid dynamics were used by the same authors, to inpaint the unknown regions by considering the image intensity as a stream and isophote lines as flow of streamlines. However, these are slow iterative processes. In order to minimize the computational time a fast marching technique is described in [3], which fills the unknown region in

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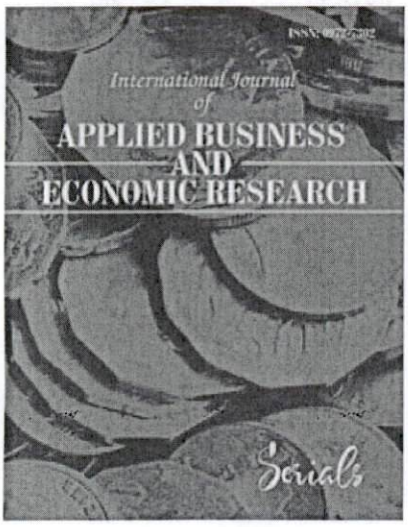

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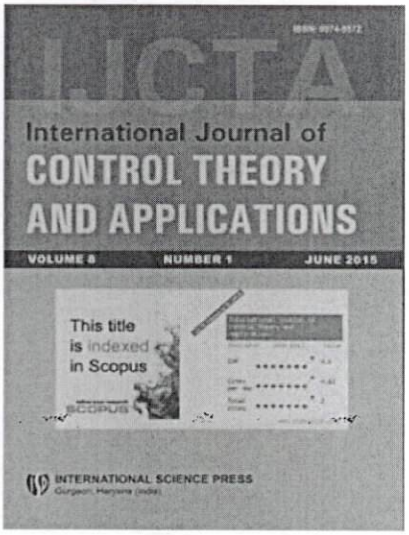

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Optimal Capacitor Placement in Distribution System with Random Variations in Load

Ajay Babu B*, M. Ramalinga Raju and K.V.S.R. Murthy*****

Abstract: Capacitor placement is carried out in Distribution Systems for loss reduction and improving the voltage profile. In this work, random variations in load are considered for determining the capacitor placement. Sensitivity analysis is carried out for determining optimal locations and modified direct search algorithm is used for determining the sizes of capacitors.

The algorithm is tested on a practical distribution system. The system consists of 42 buses belonging to Tallarevu Mandal of East Godavari District of Andhra Pradesh. Random variations for 24 hours are considered on all 41 load buses for the analysis. For every hour, sensitivity analysis is done to determine the optimal locations for placing the capacitors. It is observed that the optimal locations are insensitive to load variations. Modified direct search algorithm is used for determining the sizes of capacitors. Optimal sizes are chosen in such a way that, it would result in best possible reduction in active power loss for all random load variations. Discrete sizes of capacitors are used for designing the capacitor placement.

Index Terms: Capacitor placement, Radial Distribution System, Power Flow, Modified Direct Search Algorithm.

1. INTRODUCTION

Capacitor banks connected to distribution systems helps in reducing the active power loss and improves the voltage profile. The Load flow techniques used in Transmission Systems like Gauss-Siedel and Newton-Raphson techniques cannot be applied to the Distribution Systems because of high R/X ratio. The design of compensation systems for radial distribution system is modeled as non-linear optimization technique.

Ramalinga Raju et. al., [1] have developed direct search algorithm for capacitive compensation in radial distribution system. Wang et. al. implemented integer programming technique [2], and Tabu search was used by Huang et. al., [3] for optimal capacitor placement. Grainger implemented Equal area criterion [4] and Genetic Algorithm applied to capacitor placement by Delfanti [5] for determining optimal sizes of capacitors. D. Das applied Fuzzy-GA method for capacitor placement problem [6]. Sydulu et. al., applied Index Vector to capacitor placement problem [7], Prakash et. al., applied Particle Swarm Optimization for Optimal capacitor placement problem [8]. Carpinelli et. al., implemented non-linear programming technique for capacitor placement [9] on three phase unbalanced system.

The new two stage algorithm has been proposed for capacitive compensation in this work by combining the sensitivity analysis and direct search algorithm. Sensitivity analysis is used to identify optimal locations with random variations in load. Direct search algorithm determines the suitable sizes of capacitors resulting in minimum active power loss. Dependency of optimal location for capacitor placement on variations in load is addressed for the first time in this paper.

1.1. Objective Function

Minimization of total cost is considered as Objective function for optimization. The first part of it is cost of energy loss and second part is the purchase cost of capacitor. The objective is to minimize the total cost, S [6].

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Rating Of Kinematic Chains Using Genetic Algorithm

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***Abstract*— Structural synthesis of kinematic chains is more interesting area for researchers since many years. In the analysis of kinematic chains for various industrial applications especially Robotics and Automation, it is necessary to rank the various kinematic chains on the basis of its capability in transmitting the input energy towards optimizing the energy resources. Enumeration of kinematic chains and detection of isomorphism plays a very important role in the synthesis. Earlier, many researchers' evolved methods to rate the kinematic chains based on computational algorithms. All these methods more or less involved in large amount of computations in the algorithms. In the present paper, genetic algorithm is applied for the detection of isomorphism and rating of kinematic chains by taking 8-link 1-dof kinematic chains (16) as a specific case.**

***Keywords*— kinematic chain, fitness, generation, isomorphism, rating**

I. INTRODUCTION

In structural synthesis of kinematic chains, detection of isomorphism, finding distinct mechanisms, rating play a major role. Earlier many researchers [1-8] developed several methods applied to Kinematic chains and planetary gear trains in these parameters. Much research was not carried out by the researchers in the field of Genetic algorithms. In this paper, 8-link 1-dof planar kinematic chains are studied for the rating using Genetic algorithm developed earlier.

II. FUNDAMENTAL CONCEPTS

Rao A.C.[2] developed a Genetic algorithm for topological characteristics of kinematic chains. In that concept, fundamentals of 'genetics' are followed in a broad sense applied in kinematic chains' structural synthesis. Each links of K-chain is said to have a 'fitness' which is equal to its connectivity. For each links, all other links are said to be 'Environment'. Formation of a closed loop K-chain is possible by 'mating' or joining of links. Direct joining of links is considered to be 'first generation'. Joining the links with '1' link in between is said to be 'second generation' and the concept extends to all other generations.

DEVELOPMENT OF ADJACENCY MATRIX FOR FIRST GENERATION

Adjacency matrix is the matrix representation of all the linkages in a kinematic chain. If a link A is connected to link B, it is represented by '1' else '0'. Also the connectivity of any link with itself is also considered to be '0'. Each kinematic chain of 8-link 1-dof (16 no.) is tested and adjacency matrices are prepared. Each row of the adjacency matrix consists of '0's and '1's, which can considered as 'fitness' values of that link in K-chain.

MATING OF LINKS

All the fitness values or strings of links of a kinematic chain are compared with all other linkages in that K-chain. The relative value of the mating is expressed as a 'numerical measure' in such a way that the 'off-spring' results are used to compare the characteristics of K-chains effectively. The result between two digits of two links are said to be 'off-spring'. The off-spring is generated by following the rules as:

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OPTIMISATION OF PROCESS PARAMETERS IN RAPID PROTOTYPING FOR NYLON POLYAMIDE MATERIAL

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ABSTRACT

Rapid Prototyping (RP) is finding applications in diverse fields in the industry today, with prototypes used for form, fit and function. Design Engineers around the world use Rapid Prototyping to pre-estimate product characteristics like shape, manufacturability and finish. Due to the excellent advantages of rp, it is fast catching the fancy of large number of people. A functional part of any manufacturing technique possess quality characteristics and they largely depend on process parameters. For the rapid prototyping technique, Selective Laser Sintering, process parameters and their interactions are optimized to gain quality characteristics.

I INTRODUCTION

Rapid Prototyping (RP) can be defined as a group of techniques used to quickly fabricate a scale model of a part or assembly using three-dimensional computer aided design (CAD) data. What is commonly considered to be the first RP technique, Stereolithography, was developed by 3D Systems of Valencia, CA, USA. The company was founded in 1986, and since then, a number of different RP techniques have become available.

Rapid Prototyping has also been referred to as solid free-form manufacturing; computer automated manufacturing, and layered manufacturing. RP has obvious use as a vehicle for visualization. In addition, RP models can be used for testing, such as when an airfoil shape is put into a wind tunnel. RP models can be used to create male models for tooling, such as silicone rubber molds and investment casts. In some cases, the RP part can be the final part, but typically the RP material is not strong or accurate enough. When the RP material is suitable, highly convoluted shapes (including parts nested within parts) can be produced because of the nature of RP.

There is a multitude of experimental RP methodologies either in development or used by small groups of individuals. This section will focus on RP techniques that are currently commercially available, including Stereolithography (SLA), Selective Laser Sintering (SLS), Laminated Object Manufacturing (LOM), Fused Deposition Modeling (FDM), 3D printing, and Ink Jet printing techniques.

II SELECTIVE LASER SINTERING

2.1. Introduction

Among the different RP processes the SLS process has gained traction in the manufacturing industry due to its capability to produce complex parts of any geometry without the need for special tooling and support structures.

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Load Flow Solution for Radial Networks with Composite and Exponential Loads

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ABSTRACT: A network-topology-based method is used to solve the load-flow problem of radial distribution networks in this Thesis. Power flow equations in matrix form are developed based on the topology. The technique requires line data in such way that the receiving end node must be in an ascending order. The implemented method requires building of two matrices: BIBC and branch-current to bus-voltage (BCBV) matrix. The bus-injection to branch-current (BIBC) is built by assigning unity to the nodes of the discovered paths. The method requires less number of iterations i.e., maximum of 3 iterations for convergence. In this Thesis, constant power load, constant current load, constant impedance load, composite and exponential loads have been considered for load flow solution. Load flow is obtained for 15 Bus, 33 Bus, 69 Bus and 85 Bus Systems. Load flow results are presented for various systems and also presented in graphical form. Results obtained for various types of loads are compared with the established results in the literature. They are found to be accurate to the third digit. Load flow algorithm is implemented in MATLAB.

KEYWORDS: Radial networks, Load flow, Bus system, Topology, MATLAB.

I.INTRODUCTION

Load flow analysis of distribution systems has not received much attention unlike load flow analysis of transmission systems. However, some work has been carried out on load flow analysis of a distribution network but the choice of a solution method for a practical system is often difficult. Generally distribution networks are radial and the *R/X* ratio is very high. Because of this, distribution networks are ill-conditioned and conventional Newton-Raphson (NR) and fast decoupled load flow (FDLF) methods are inefficient at solving such networks. Many researchers have suggested modified versions of the conventional load flow methods for solving ill-conditioned power networks. Recently researchers have paid much attention obtaining the solution of distribution networks. In India, all the 11 kV rural distribution feeders are radial and too long. The voltages at the far end of many such feeders are very low with very high voltage regulation. In this project, the main aim has been to implement a load flow technique for radial distribution networks. This method involves construction of two network matrices based on topology and matrix operations. Computationally this method is very efficient. Another advantage of this method is that it requires less computer memory. Convergence is always guaranteed for any type of practical radial distribution network with a realistic R/X ratio while using this method. Loads, in the present formulation, have been represented as constant power. However, this method can easily include composite load modeling if the break up of the loads is known. This load flow technique has been implemented using MATLAB. Several practical rural radial distribution feeders in India have been successfully solved using this method. In this paper, only 10 bus unbalanced system is considered. Relative speed and memory requirements of this load flow method are better than method proposed by Baran and Wu as per the literature.

Distribution system provides a final link between high voltage transmission systems and consumer services. The power loss is significantly high in distribution systems because of lower voltages and higher currents, when compared to that in high voltage transmission systems. Studies have indicated that as much as 13% of total power generated is consumed as I^2R losses in distribution level. Reactive currents account for a portion of these losses. Reduction of total loss in distribution systems is very essential to improve the overall efficiency of power delivery. The pressure of improving the overall efficiency of power delivery has forced the power utilities to reduce the loss, especially at

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SCOPE OF THE JOURNAL

This is a multi-disciplinary journal which receives research articles on advanced topics from various application areas, with theoretical, numerical, and practical studies.

KEYWORDS

Attribute-Based Access Authentication, Smartphone, Malicious code, Keylogger. Cloud computing, searchable encryption, privacy-preserving, keyword search, ranked search Cloud storage, data sharing, key-aggregate encryption, Public Key Encryption. Cryptography, Key Management, Group Key Agreement, Broadcast Encryption. Data alignment, data annotation, web database, wrapper generation Data alignment, data annotation, web database, wrapper generation. Data deduplication, Confidentiality, Hybrid cloud, Authorized duplicate check, Authorization. Data deduplication, authorized duplicate check, confidentiality, hybrid cloud. Digital

PMSG BASED VARIABLE-SPEED WIND TURBINE GENERATING SYSTEMS WITH HYBRID ENERGY STORAGE

Santhosh Kumar Kapaganti, Karri P Sarathi Reddy

ABSTRACT

Independent activity of a breeze turbine creating framework under fluctuating breeze and variable load conditions is a troublesome assignment. Also, high responsive power request makes it all the more difficult because of the constraint of receptive capacity of the breeze producing framework. A Remote Area Power Supply (RAPS) framework comprising of a Permanent Magnet Synchronous Generator (PMSG), a half breed vitality stockpiling, a dump stack and a mains stack is considered in this task. The cross breed vitality stockpiling comprises of a battery stockpiling and a supercapacitor where both are associated with the DC transport of the RAPS framework. A vitality administration calculation (EMA) is proposed for the half breed vitality stockpiling with a view to enhance the execution of the battery stockpiling. A synchronous condenser is utilized to give receptive power and inertial help to the RAPS framework. By utilizing svpwm system better smoothning and less contortion was seen in the wave shapes. An organized control approach is produced to deal with the dynamic and receptive power streams among the RAPS parts. In such manner, singular controllers for every rap part have been created for compelling administration of the RAPS segments. The proposed technique is fit for accomplishing: a) vigorous voltage and recurrence direction (as far as their adequate data transfer capacities), b) successful administration of the cross breed stockpiling framework, c) receptive power ability and inertial help by the synchronous condenser, and d) most extreme power extraction from wind. The outcomes will be helped out through Matlab/simulink R2009a condition.

KEYWORDS

Attribute-Based Access Authentication, Smartphone, Malicious code, Keylogger. Cloud computing, searchable encryption, privacy-preserving, keyword search, ranked search Cloud storage, data sharing, key-aggregate encryption, Public Key Encryption. Cryptography, Key Management, Group Key Agreement, Broadcast Encryption. Data alignment, data annotation, web database, wrapper generation Data alignment, data annotation, web database, wrapper generation. Data deduplication, Confidentiality, Hybrid cloud, Authorized Duplicate check, Authorization. Deduplication, authorized duplicate check, confidentiality, hybrid cloud. Digital signature, digital signature algorithm (DSA), Enhanced Adaptive ACKnowledgment (AACK) (EAACK), Mobile Ad hoc NETwork (MANET).

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Direct Torque Control Scheme For A Four Switch Inverter Fed Induction Motor Using Fuzzy Controller

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Abstract— This work implements a new approach of fuzzy logic based space vector regulation with respect to the immediate torque controlled acceptance engine bolstered by four switch three stage inverter (FSTPI) to conquer the downside of high torque swell. This methodology offers superior as far as torque swell lessening partnered to control of inverter exchanging misfortune. The three level hysteresis controller in the torque circle is supplanted by a two level hysteresis controller, with the goal that no zero voltage vector is associated with the proposed DTC plot. This technique depends on the imitating of the operation of the traditional six switch three stage inverter (SSTPI). The FSTPI produces four lopsided voltages intrinsically. With the best possible blend of four lopsided voltages prompting the union of six adjusted voltage vectors of the SSTPI. In the execution of this approach the outline of vector choice table partitions the Clarke plane into six zones. In the actualized DTC conspire enlistment engine is reenacted in stationary reference edge and its outcomes are drawn. Recreation aftereffects of the proposed DTC methodology, FSTPI sustained acceptance engine drives shows fascinating execution.

Index Terms— **Balanced voltage vectors, direct torque control (DTC), four-switch/six-switch three-phase inverter (FSTPI/SSTPI), induction motor (IM) drive, vector selection, Table, Fuzzy controller.**

I. Introduction

Over the previous decades DC machines were utilized widely for variable speed applications due to the decoupled control of torque and flux that can be accomplished by armature and field current control separately. DC drives are favorable in numerous viewpoints as in conveying high starting torque, simplicity of control and nonlinear execution. Be that as it may, because of the real downsides of DC machine, for example, nearness of mechanical commutator and brush get together, DC machine drives have turned out to be out of date today in modern applications.

The benefits of asynchronous motor such as the robustness, low cost, the high performance and easy maintenance made utilized as a part of numerous modern applications. Among a wide range of electric motors squirrel case inductance motor(SCIM) are broadly utilized as they have every one of the benefits of AC engines and less expensive in cost when contrasted with slip ring induction motors. In the absence of slip rings, brushes and cost connected with the wear and tear of the brushes are minimized

Numerous new techniques of control have been created in most recent couple of years to achieve the best performance of induction motor drive. Presently modern high switching frequency power converters, frequency, phase and magnitude of the input to an AC motor can be changed, subsequently the motor speed and torque can be controlled. Today it is conceivable to manage the axis control of machine drives with variable speed in low power applications for the most part because of joint advance of the power electronics and numerical electronics. The dynamic operations of the induction motor drive frames as a critical part on the overall performance of the system.

Thomas G Habetler, et al proposed a control conspire for direct torque and flux control of induction machines in view of the stator flux control of induction machines in view of the stator flux field introduction strategy [1]. In this prescient control plot an inverter obligation cycle has specifically ascertained each settled exchanging period in light of the torque and flux ripples, the transient reactance of the machine and an expected estimation of the voltage behind the transient reactance.Mauricio, CursinoThe common mode voltage generated by the four switch three phase inverter is evaluated and compared to that of the standard six switch three phase inverter.Khoa D Hoang, Z.Q.Zhu, and Martin P Foster in the paper presented direct torque control system for a four switch three stage inverter nourished changeless magnet brushless ac machine with reference to an ordinary six switch three stage inverter[3]. It has been observed that when gotten from routine voltage show flux estimation plot, the anticipated stator flux unevenness may might be brought about by unequal inverter voltage drop in the FSTP inverter, in which one stage winding is straightforwardly associated with dc-connect midpoint. Yongchang Zhang and JIanguo Zhu in the paper implemented a superior method to the existing methods in terms of simplicity and robustness by approximately

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THERMAL ANALYSIS ON NONMETALS SUBJECTED TO CONFINED SPACE

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ABSTRACT

A confined space is a space with limited entry. In case of concentric spherical shells heat transfer takes place. At present in this work Thermal analysis on non metals subjected to confined space, where air is taken as common confined gas. Whereas for the spherical shell two different shell materials has been chosen from the families of non metals. The outer shell and inner shell are maintained at several temperature sources namely335K, 364K, 395K & 424K. Diamond (C) and Silica Aero-Gel are considered as non metals. For analyzing thermal analysis ANSYS software is used.

***Keywords*: ANSYS, Confined gas, Non-Metals, Spherical Shell, Temperature**

I. INTRODUCTON

Convective heat transfer is the transfer of heat from one place to another place by the movement of fluids. Heat transfer by means of convection combines the processes of unknown conduction (heat diffusion) and advection (heat transfer by bulk fluid flow). To refer cumulative transport the term convection is used and to refer the transport due to bulk fluid motion the term advection is used. The properties of convective heat transfer can be evaluated at one convenient reference point, that point is called average fluid temperature or bulk temperature.

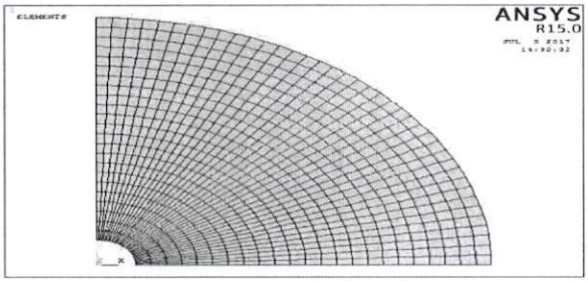

Fig No: 1 Mesh Geometry

S.No.	Materials	Thermal Conductivity (K) (W/m K)
1	Diamond	2000
2	Silica Aero-Gel	0.024

Table No: 1 K Values

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Research... ? Let's do it.

Design and Fluid Flow Analysis of Monolithic Wind Turbine Blade Constructed using NACA 4424, NACA 4421 and NACA 4418 Airfoils

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Keywords:

Airfoil, Blade, CFD, Drag Coefficient, Lift Coefficient, FEA, Simulation, Wind Mill

Abstract

The world vision for the sustainable power source assets and its usage is expanding step by step. Thus, scientists in the territory of sustainable power source assets additionally expanded particularly in the range of wind turbines. By 2030 each significant nation of the world is a dream to use wind energy by 35% for their electrical needs. Many sorts of difficulties are confronted in the development of wind power units, for example, topology, geology, building challenges, and so on. Keeping in mind the end goal to accomplish the world vision for wind energy and to give power even to remote territories, this paper goes for building up the monolithic wind turbine blade which can be introduced in the remote zones of the world including inhabitable islands, places and in remote ranges with less population density. The modeling of monolithic wind turbine blade is done in Solidworks Part Design and the fluid flow analysis is done in Solidworks Flow Simulation.

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Article Preview

RESEARCH ARTICLE OPEN ACCESS

An Overview on Image Retrieval Using Image Processing Techniques

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ABSTRACT
Data mining refers to the extracting of knowledge /information from a huge database. There are number of topics in data mining such as Clustering, Classification, Association, Decision Tree, Graph mining, Multimedia mining and Image Mining. In above topics Image mining plays a vital role in every aspect. Image mining is the process of searching and discovering valuable information and knowledge in large volumes of data. Image mining draws basic principles from concepts in databases, machine learning, statistics, pattern The demand of image mining increases as the need of image data is growing day by day. There are many techniques developed in the earlier researches and eventually these techniques can reveal useful information according to the human requirements, but Image Mining still require more development especially in the area of web images. Image mining contains different research areas like Space, remote sensing, medical diagnosis etc. These techniques include neural network, clustering, correlation and association. This writing gives a review on the application fields of data mining which is varied into telecommunication, manufacturing, fraud detection, and marketing and education sector. In this technique we use size, texture and dominant colour factors of an image. Gray Level Co-occurrence Matrix (GLCM) feature is used to determine the texture of an image.
Keywords :- Data Mining, Image Mining, Feature Extraction, Image Retrieval, Gray Level Co-occurrence Matrix (GLCM).

I. INTRODUCTION

1.1Preprocessing: In the image database, the spatial segmentation can be done at the region or edge level based on the requirements of the application. It can be done automatically or manually and it should be resemblance enough to retrieve the features that can reasonably capture the image content

Image Cleaning:

Image cleaning is the process of detecting and correcting (or removing) corrupt or inaccurate images from the set of images and refers to identify the unclear, incorrect, or irrelevant parts of the images and then replacing, modifying, or deleting the dusty or fouled image data.

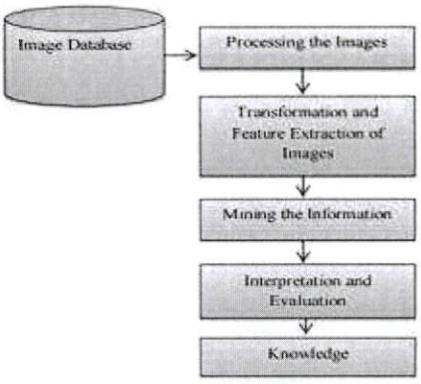

Fig 1: Image Mining Process

1.2Feature Selection and Extraction:

Feature selection and extraction a type of dimensionality reduction that efficiently represents the interesting parts of an image as a feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval.

RESEARCH ARTICLE OPEN ACCESS

An Overview on Multimedia Data Mining and Its Relevance Today

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ABSTRACT

Over the past few decades, data quarrying or mining has been an effective approach for extracting concealed knowledge from huge collections of regulated digital data stored in databases. Multimedia data mining (MULTIMEDIA DATAMINING) refers to the analysis of large amounts of multimedia information in order to find patterns or statistical relationships. Rapid changes in information technology have drastically changed the functions and activities of multimedia. It includes audio, video, speech, text, web, image and combinations of several types are becoming increasingly available and are almost unstructured or semi structured data by nature, which makes it difficult for human beings to extract the information without powerful tools.. This paper sight sees survey of the current state of multimedia data mining and knowledge discovery, data mining efforts aimed at multimedia data, current approaches and well known techniques for mining multimedia data.

Keywords:- Data Mining, Multimedia Data Mining, Data Warehouse, Architectures, Applications, Models.

I. INTRODUCTION

With the recent progress in electronic imaging, video devices, storage, networking and computer power, the amount of multimedia has grown enormously, and data mining has become a popular way of discovering new knowledge from such a large data sets The goals of Multimedia Data Mining are to discover useful information from large disordered data and to obtain knowledge from the information. . Extracting the required information from the multimedia database is not a simple thing. The solution is to develop mining tools to operate on multimedia directly.

1.1 What is Multimedia Data Mining:

Multimedia mining is a subfield of data mining which is used to find interesting information of implicit knowledge from multimedia databases. Mining of multimedia data requires two or more data types such as text and video or text video and audio. Mining in multimedia is referred to automatic annotation or annotation mining

1.2categories Of Multimedia Data Mining:

Multimedia data are classified into five types; they are (i) text data, (ii) Image data (iii) audio data (iv) video data and (v) electronic and digital ink. Figure 1 illustrates multimedia data mining, in particular, various aspects of multimedia data mining

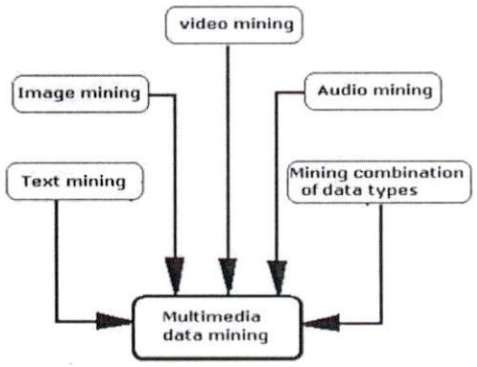

Fig 1: Categories of Multimedia data mining

Text mining

Text Mining also referred as text data mining and it is used to find meaningful information from the unstructured texts that are from various sources. Text is the foremost general medium for the proper exchange of information [3]. Text Mining is to evaluate huge amount of usual language text and it detects exact patterns to find useful information.

Image mining

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http://www.ripublication.com

Study on Developing Engineering Properties of Marine Clay by Using Tile Waste and Polyster Fibre

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Abstract

Subgrade soil stabilization is one of the primary and major processes in the construction of any highway; also environmental authorities are concerned about the growing amount of polyethylene (PET) bottles produced by household sectors. Presence of poor sub grade conditions and expansive sub grade is one such problematic situation. Marine soils, because of the specific physico-chemical makeup are subjected to volume changes with changes in their ambient environment. This research is intended to study on properties of marine clay with waste tile powder and reinforcing with polyster fibre. Especially shear strength and California Bearing Ratio (CBR). polyester fibers were mixed with soil in three different percentages 2.5%, 5% & 7.5% and combination with ceramic tile powder mixed with soil in three different percentages 5%, 7.5% & 10%. The shear strength, CBR, atterberg limits of treated samples were measured by direct shear test and CBR test and atterberg limits test. Experiments results show this fact that using of polyester and tile powder leads to increasing shear strength and CBR and reduction, plasticity index.

I. INTRODUCTION

Mainly in poor countries the economies in the construction lead to the development of the country. At the same time the durability aspect should also be kept in mind. Need to strengthen the rural economy by providing all weather resistant roads have been emphasized. In countries like India the biggest handicap is to provide a complete

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Efficient Dynamic Data Flow and Black Hole Detection in Manet

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Abstract: ***In Wireless networks, when data packets are being transferred between nodes from a specified node to destination, then source node checks for shortest path to reach destination. In this approach there may be a possibility of occurring attack called BLACKHOLE attack. In Black Hole attack, source node sends Route Request (RREQ) to its neighbor nodes to know which node contains shortest path to reach destination. So malicious node sends Route Reply (RREP) to source node that it has a valid route to destination and then responds with False Route Reply (RREP). Then Source node transmits data to the destination through this malicious node. Then the malicious node absorbs or drops the data packets that are destined for destination. In this, an approach is proposed to detect the malicious node along with Routing tables. It can also show the metric analysis like packets sent, packets Received, Dropped Packets etc. A Runtime frame work for dynamic data flow using Network Simulator2 (ns2) has been proposed to implement black hole attack.***
Keywords: MANET, AODV, Black Hole Attack, Network Simulator 2, AWK

I. INTRODUCTION

Wireless network is a computer network that connects one node to another node and allows wireless data connection. MANET (Mobile Adhoc Network) is one of the types in Wireless Network Environment.

A. Manet

[1] MANET is a collection of different types of nodes with different architectures connected to each other. There will be a constant change in network Topology. Each node in the network forwards the packet without the need of central administration as it is adhoc type so that it does not depends upon on the foregoing infrastructure i.e. no need to access routers and other routing devices. Each and every node in this network acts like a router or host.

B. Types of Manets[2]

MANETS are categorized into 2 types

1) Vehicular Adhoc Networks
2) Internet Based Mobile Adhoc Network.
3) *Vehicular Adhoc Networks* (VANETs): are used for transmission among transport system mostly in roadside equipment.
4) *Internet Based Mobile Adhoc Networks* (iMANET): links mobile nodes and established gateway nodes which are transmit or receive stoppages.

C. Challenges of Manet[3]

1) *Black Hole Attack:* Black hole is a node referred as a malicious node that absorbs data packets passed through it. In MANET, a malicious node acts like a Black hole that drops all data packets passing through it. A black hole is a malicious node that falsely sends response for a route request even though it doesn't have any correct route to destination.
2) *Gray Hole Attack:* It also drops DATA packets but node's malicious activity is depends upon specific targeted node from which packets are coming or based on time i.e sometimes it acts as malicious and sometimes as normal node.
3) *Jellyfish Attack:* Here, There may be a chance of packet delay when they are transmitted to destination or it may even change the order of packets in which they are received and sends it in scrambled manner.
4) *Worm Hole Attack:* Here, a link was established called as worm hole link between any two points in the network .As soon as the link is connected the attacker seizes data or may exchange.

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A Novel Customized Persuasive Cued Click-Point Password Authentication

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Abstract: ***Most of the authentication methods use alphanumeric characters and passwords. This type of method has several drawbacks as textual passwords are easy to guess and the password that is hard to guess will be difficult to remember. To avoid this Customized Persuasive Cued Click Point (CPCCP) based image authentication method is introduced where user selects two images which are scrambled from sixty five set of images to prevent unauthorized access from an intruder.***
Keywords: Graphical passwords, Password guessing attacks, CPCCP

I. INTRODUCTION

Authentication is the process which verifies the identity of a User who wishes to access a particular system or resource and most of the textual passwords are vulnerable to attacks. The passwords should be very much complex to prevent the attacks like brute force. But if the password is hard it becomes difficult to remember passwords over time. In order to remember password easily, a graphical password authentication is used where passwords are easy to remember and hard to guess by hacker [2]. This paper brings forward the concept of customized persuasive cued click point authentication with the technique of scrambling images by generating session password from user id.

II. RELATED WORK

Graphical password systems belong to the category of information related legalizations Such as

A. Cued Click-Based Graphical Passwords

In CCP, Rather than clicking five different points on a single image, Cued Click Point introduces single click over each five different images. The user needs to choose few regions to record their highly secured password. The major problem encountered regarding the concept of graphical password is Mouse logger.

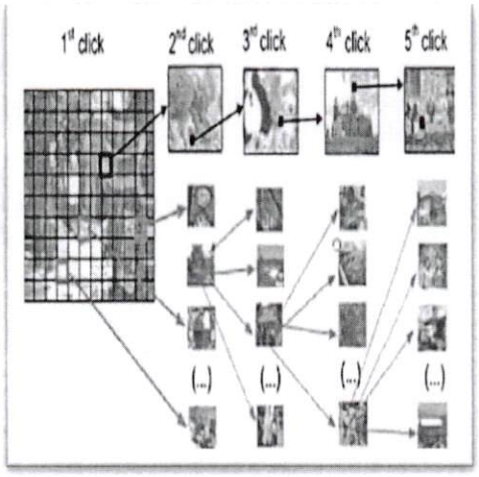

Fig 1:-Cued Click Point

B. Persuasive Cued Click-Points

When users generate a password in PCCP, the images will be little bit shaded except for the randomly chosen small block from the set of images given which is nothing but viewport as shown in Figure 2. Users need to pick out a click point from that small block. Users can make use of shuffle button to rearrange the viewport, if they are incapable to select a point from given viewport [3]. The

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An Automatic Form Monitoring System Using Arduino and Wireless Sensor Networks

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ABSTRACT: Irrigation has been the backbone of human civilization since man has started agriculture. As the generation evolved, man developed many methods of irrigation to supply water to the land. In the present scenario on conservation of water is of high importance. By knowing the status of moisture and temperature through GSM with the use of moisture, Raindrop and temperature sensors, water flow can be controlled by just sending a message from our mobile and also adaptively sprinkling water to simulate the effect of rainfall. Central to this design is an Arduino Uno microcontroller which monitors the farm condition and controls the distribution of water on the farm. Relays are controlled by the microcontroller through the high current driver IC and provided for controlling the system, which controls the flow of water to different parts of the field and also used to shut-off the main motor which is used to pump the water to the field. This irrigation system allows farmers to reduce runoff from over watering saturated soils, avoid irrigating at the wrong time of day and in effect improve the crop yield by ensuring adequate water supply when needed.

KEYWORDS: Arduino Uno, GSM module, Temperature, Moisture, Raindrop sensors.

I. INTRODUCTION

Water is a resource that all living species need. It is therefore very precious and has to be used with moderation to be preserved for the generations to come. Agriculture is an industry that uses a lot of water. Most of the time, this resource is not used efficiently and substantial amounts of water are wasted. In the near future, these wastes will represent a large sum of money. In this Paper, an Automated Irrigation System is suggested to minimize the water input and human intervention, while satisfying the plants' needs.

II. BLOCK DIAGRAM

The System consists of two sections, the transmitter section and receiver section. The entire transmitter section will be placed in the farm where as the receiver section is a mobile.

At Transmitter:

- Arduino Uno.
- Moisture sensors.
- Temperature sensor.

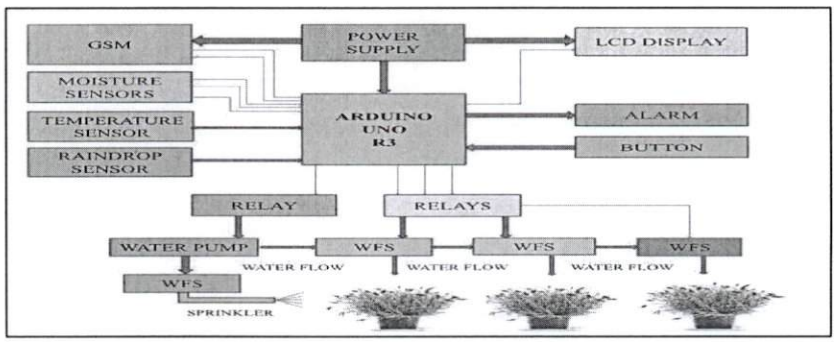

Fig 1: Block Diagram

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HEAT DISSIPATION ANALYSIS OF RUGGED SYSTEM USED IN DEFENCE APPLICATIONS

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ABSTRACT

A rugged system is a system specifically designed to operate reliably in harsh usage environments and conditions, such as strong vibrations, extreme temperatures and wet or dusty conditions. They are designed from inception for the type of rough use typified by these conditions, not just in the external housing but in the internal components and cooling arrangements as well. Typical end-user environments for rugged laptops, tablet PCs and PADs are public safety, field sales, Field service, manufacturing, retail, healthcare, transportation/distribution and the military. They are used in the agricultural industries and by individuals for recreational activities.

The rugged system is used for carrying the sensitive items for one place to other place without damaging. The products like computers, guns, medicine, walk talky etc. to withstand harsh conditions. The rugged system provides the good conditions while traveling, it keep the devices clean, protected from water, dust, vibrations, and fire to and environmental conditions and more.

This paper mainly focused on the better position for placing fans to cool the electronic system.

In this paper we designed a rugged casing using CREO-2.0 and CFD analysis for rugged box and inner part electronic component takes place with help of FLOEFD Software.

Keywords— Rugged ,Casing , Design

I. INTRODUCTION

Rugged is strongly made and capable of withstanding rough handling. A rugged system is a system specifically designed to operate reliably in harsh usage environments and conditions, such as strong vibrations, extreme temperatures and wet or dusty conditions. They are designed from inception for the type of rough use typified by these conditions, not just in the external housing but in the internal components and cooling arrangements as well. Typical end-user environments for rugged laptops, tablet PCs and PADs are public safety, field sales, Field

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Design of a Low Power and High Speed FIR filter based on Reusable MAC Unit

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Abstract : *Portable real-time Electrocardiogram (ECG) monitoring is a prominent technology enabling early diagnosis and increased ability of prevention of cardiovascular diseases. However, the ECG signal suffers from Power Line Interference (PLI) which corrupts the biomedical recordings. Low power and high speed filtering of the ECG signal is essential to eliminate the PLI and make the monitoring device portable. The Multiply-Accumulator (MAC) based FIR (Finite Impulse Response) filer is well suited for low power and high speed applications. In this paper, proposed an innovative concept of Reusable MAC (R-MAC) to improve the performance of the FIR filter. In which a single MAC unit is used instead of multiple MAC units to design an FIR filter by employing the time division multiplexing. The speed is almost improved by 11% and power consumption is reduced to 38% compared to existing regular MAC based FIR filters. The low power high speed FIR filter design is possible by Vedic multiplier-Carry Select Adder-R-MAC combination.*

Keywords: *ECG, FIR filter, PLI, R-MAC unit.*

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I. Introduction

The real time digital signal processing applications are greatly extended by the advancements in VLSI (Very Large Scale Integrated Circuit) technology. As a part of digital signal processing, the FIR (Finite Impulse Response) filter has so many applications especially it is well-suited for elimination of PLI [1]. Power line Interference is the most common type of noise in the ECG signal caused by absorbing the electromagnetic radiation by the human body from 50Hz frequency power lines [2]. Low power and high speed filtering is essential to eliminate the noise from biomedical raw signals and make the monitoring device portable. Basically the FIR filter consists of multiplier and an accumulator that contains the sum of the previous consecutive products [3]. A digital athematic unit called MAC can also perform the same operation of multiplication and accumulation. Therefore, the repetitive process of multiplication and addition in FIR filter is conveniently obtained by MAC unit as shown in Fig.1. This thesis presents an innovative FIR filter design based on R-MAC Unit. The performance of this filter largely depends on the speed and power of the MAC unit employed inside the filter. The effective architecture for FIR filter with given specifications may be designed by using MATLAB. The performance of the designed filter may be verified by using Xilinx.

The current work compares various MAC units on Power, Performance and Area (PPA) benchmarks. In this project, the MAC is designed by using Vedic multiplier and Carry Select Adder. Vedic multiplier is faster than the array multiplier and Booth multiplier. The area needed for Vedic Multiplier is very small when compared to other multiplier architecture and the higher order multipliers can also be designed easily from lower order multipliers [4]. Carry Select Adder (CSA) is mainly used due to its low power consumption in the MAC unit and it also occupies less area. CSA can also operate at more speed [5]. A Vedic multiplier-CSA MAC is used to design a FIR filter to meet the speed and power requirements. In the design of MAC based FIR filter, the each tap-summer is needed to replace by one MAC unit. By this way the design requires same number of MAC units as number of taps and consequently increases the utilization area and power consumption. The power consumption can be reduced by introducing the concept of reuse of a single MAC unit instead of multiple MAC units using multiplexing technique. The main goal of this project is to design a low power and high speed FIR filter based on R-MAC by employing the time division multiplexing. The entire FIR filter is coded in Verilog and synthesized in Xilinx for speed and power analysis.

The rest of the paper is organized as follows. In section II, the basic design of FIR filter based on MAC unit is presented. Section III, presents the proposed work that is how the FIR filters is designed using the concept of R-MAC. Section IV describes the validation and comparison of results. Section IV gives the conclusion and future scope of this work.

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Tremendous Changes in India after Paris Climate Change Conference

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Abstract

India is the first Nation in the Earth to have made provisions for the conservation, preservation and protection of environment in its constitution .On 5th June 1972 environment was first discussed as an item of U.N Conference on human environment development in Stockholm and thereafter our country took legislative steps for environmental protection. The Paris Climate Change Conference was successfully concluded with the Paris Agreement, which is a Turning Point for the world in Inclusively Oppose climate change. By Engage in **IPCC (Intergovernmental panel on climate change)** assessments, adopting new methods and conducting national climate change assessments, India has been increasing its understanding of the issue. Moreover, this participation indicates India's dedication to including climate changes in its ecological balance program, sustainable development and conducts a low-carbon Group and Affluence. The constructive involvement in global governance shows that India is a responsible power to both developed and under developing nations.

Keywords: Paris Climate Change Conference; Paris agreement; Carbon emission; sustainable development; Indian Government

1. Introduction

"Climate change is the average weather conditions like seasonal variations and extremes of weather in a region-at least 30 years of an area".

The Paris Agreement That Was Adopted On 13Th December 2015.

The negotiators of the Agreement however stated that the NDCs and the 2 °C depletion goal were inadequate, instead, a 1.5 °C Goal is required, noting "with concern that the estimated aggregate greenhouse gas emission levels in 2025 and 2030 resulting from the Calculated governmentally decided beneficiations do not fall within least-cost 2℃ scenarios but rather lead to a projected level of 55 gig tonnes in 2030", and Identify moreover "that much considerable discharge reduction performances will be needed in order to hold the increase in the global average temperature to below 2℃ by reducing emissions to 40 giga tonnes or to 1.5℃".

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Original Article

EFFECT OF SHRINK WRAPPING ON SHELF LIFE OF BANANAS

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ABSTRACT

Mature green locally available bananas (Chakkerkeli) were pretreated (hot water 50 °C; 10 min) and shrink wrapped in shrink films of polyolefin 15 μ and cryovac 9 μ and stored at ambient storage conditions (Temp = 33°C; RH 72%). An experiment was conducted, both for fingers and hands; periodical observation was recorded in % weight loss, firmness, colour, percent decay and the CO2 transmission rate of stored bananas. The PLW increased gradually in banana, during the storage period. Hands wrapped with polyolefin 15 μ, recorded the lowest weight loss of 1.72%, followed by hands wrapped with cryovac 9 μ. Unwrapped fingers recorded more weight loss (27.48%) compared with wrapped fingers by the end of storage period. The fruit firmness followed a declining trend because of the softening of fruit tissues. Hands wrapped in polyolefin 15μ recorded highest firmness (3.65 kg). The Colour of the fruits changed slowly from green to yellow. The highest colour change from green to yellow was recorded with unwrapped finger bananas and the lowest was observed with hands wrapped with polyolefin 15μ. Decay percentage increased gradually, during the storage period. But, the rate of decay was faster in unwrapped treatments. The CO2 transmission rate increased, with the increase in storage period with lowest in hands, wrapped with polyolefin 15μ. It was noticed that, shrink film increased the shelf life and maintained the quality of banana fruits for 14 days, under ambient conditions.

KEYWORDS: Chakkerkeli, Fingers, Hands, Physiological Parameters, Shrink Wrapping, Polyolefin 15μ & Cryovac 9μ

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INTRODUCTION

Banana (*Musa* sp.*)* is a large perennial herb with leaf sheaths that form trunk like pseudo stem. Banana is a globally important fruit crop with 97.5 million tons of production. Banana is a rich source of carbohydrate and vitamins. Banana powder is being used as one of the ingredients of baby food.

Bananas are generally harvested early in the season at a pre-mature stage to capture early market. Fruit production has increased but the post-harvest losses are not controlled. In a tropical country like India, these losses occur due to various reasons like lack of proper storage facilities, improper handling during long distance transport and rapid ripening due to high temperature followed by microbial spoilage. Banana being a highly perishable fruit, shows high post-harvest losses to the extent of about 20-30%, Sreenivasa *et al.* (2009).

The increased production of banana is supplemented with efforts to minimize post-harvest losses, by adopting a suitable technique with proper storage conditions. Shrink wrapping produces a micro atmosphere and retard ripening, by limiting the exchange of oxygen and carbon dioxide and can interplay with the physiological processes of commodity, resulting in reduced rate of respiration, transpiration and other metabolic processes of fruits, thereby allowing lower physiological weight loss, reducing decay incidence and maintaining retention of colour and texture of fruits, during extended shelf life, Sharma *et al* (2010).

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Image Inpainting and Enhancement using Fractional Order Variational Model

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ABSTRACT

The intention of image inpainting is to complete or fill the corrupted or missing zones of an image by considering the knowledge from the source region. A novel fractional order variational image inpainting model in reference to Caputo definition is introduced in this article. First, the fractional differential, and its numerical methods are represented according to Caputo definition. Then, a fractional differential mask is represented in 8-directions. The complex diffusivity function is also defined to preserve the edges. Finally, the missing regions are filled by using variational model with fractional differentials of 8-directions. The simulation results and analysis display that the new model not only inpaints the missing regions, but also heightens the contrast of the image. The inpainted images have better visual quality than other fractional differential filters.

Keywords: Fractional calculus; Image inpainting; PDE models; Variational model

1. INTRODUCTION

Digital image completion, or inpainting, is used to complete or replace the corrupted or missing zones of an image by using the knowledge from the known regions, such that a neutral observer would not notice any changes. There are diverse important applications of the digital image inpainting techniques, such as: damaged painting reconstruction, photo restoration, superimposed text removal, object removal, image compression and coding.

The image inpainting approaches are branched into the three groups: exemplar-based inpainting[1,2], diffusion-based inpainting[3-13], and hybrid inpainting[14]. Exemplar-based inpainting technique repeatedly synthesises the unknown area by a most identical patch in the known area. An influential exemplar-based inpainting approach was developed by Antonio[1], *et al.*. Many other innovations improving the speed and efficacy of the Antonio's proposal have been amplified[2].

Diffusion-based image inpainting refers to the technique of completing, which employs the information around the damaged region to estimate isophotes, and propagates information from outside region to inside region by propagation. It utilises the partial differential equation (PDE) based and variational based restoration methods. The PDE techniques follow isophote directions in the image to perform the restoration process. The first PDE-based image completion method was introduced by Bertalmio[6], *et al.*. The first variational method to the image completion was introduced by Nitzberg and Mumford[3], and the second variational model to image completion was proposed by Masnou and Morel[5], based on interpreting the level lines with minimal curvature. A famous variational model for image inpainting was introduced by Chan and Shen[7]. Their variational framework completes the damaged areas by minimising the total variation (TV), while retaining approximately the ground truth image in the source regions. This method adopts an Euler–Lagrange (E-L) equation and anisotropic (non-linear) diffusion which depends on the isophotes strength. It fails to connect broken edges. The same authors extended the TV model in curvature driven diffusion (CDD) model. It is based on the geometric information of the isophotes. It modifies the coefficient of conductivity to be stronger when the isophotes have large curvature. Quick curvature driven diffusion is proposed by Xu[10], *et al.* to reduce the computational complexity of the CDD model. Biradar and Kohir[11] applied a simple method based on a nonlinear median filter to diffuse median value from exterior to interior regions. Barbu[13] proposed a fast converging second order nonlinear diffusion to image inpainting.

Recently, fractional order PDEs have been studied in computer vision. The fractional derivative[15,16] finds a major role in digital image processing[16-23]. It is the generalised form of integer order derivative. Fractional derivative is defined by many mathematicians like Riemann-Liouville, Grunwald-Letnikov, and Caputo. It exhibits the non-local property, as the fractional derivative at a pixel depends on the whole image and not just the neighbourhood pixel values. It is very useful for edge preservation and enhancement of the image. Zhang[17,18], *et al.* proposed p-Laplace fractional order variational image inpainting based on Grunwald-Letnikov and Riemann-Liouville definitions. The inpainting process of these models is based on the fractional differential filter in four directions and the diffusion process is controlled by the p-Laplacian fractional

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Implementation of FIR Digital Filters for Odd Length using Power Reduction Technique

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Abstract: This paper proposes, a new parallel FIR filter structure based on clock gating method. The clock technique is used for reducing the unwanted clock signals. The proposed parallel FIR structures use symmetric property to reduce half the number of multipliers in subfilter section at the expense of additional adders in pre-processing and post-processing blocks. Exchanging multipliers with adders is advantageous because adders require less area than multipliers also the additional adders will not effect the length of the FIR filter. With the combination of fast FIR filtering and clock gating technique, a major reduction of multipliers is done. Overall, the proposed parallel FIR structures can lead to significant hardware savings for symmetric convolutions from the existing FFA parallel FIR filter, especially when the length of the filter is large. The FFA and proposed structures are implemented in Verilog HDL for an 27-tap linear-phase FIR filter with different word lengths, filter lengths N = 8,16 and 32. The work is carried out using MATLAB R2013a and Xilinx 14.7.

Keywords: Clock Gating, Digital Signal Processing(DSP), Fast Fir Algorithm(FFA), Parallel FIR, Symmetric Convolution, Xilinx System Generator.

I. INTRODUCTION

Digital signal processing (DSP) has many advantages over analog signal processing. Digital signals are more robust than analog signals with respect to temperature and process variations. The accuracy in digital representations can be controlled better by changing the word length of the signal. Furthermore, DSP techniques can cancel the noise and the interference while amplifying the signal. In contrast, both signal and noise are amplified in analog signal processing. Digital signals can be stored and recovered, Transmitted and received, processed and manipulated, all virtually without error. While analog signal processing is indispensible for systems that require extremely high frequencies such as the radio frequency transceiver in wireless communications, or extremely low area and low power such as micro machine sensors used to detect cracks and other stress-related material defects, many complex systems are realized digitally with high precision, high signal to noise ratio (SNR), repeatability, and flexibility. The finite-impulse response (FIR) filter has been and continues to be one of the fundamental processing elements in any digital signal processing (DSP) system. FIR filters are used in DSP applications that range from video and image processing to must be a low-power circuit, capable of operating at moderate frequencies. Parallel, or block, processing can be applied to digital FIR filters to either increase the effective throughput or reduce the power consumption of the original filter. Traditionally, the application of parallel processing to an FIR filter involves the replication of the hardware units that exist in the original filter.

There have been a few papers proposing ways to reduce the complexity of the parallel FIR filter in the past. In [1]–[4], poly phase decomposition is mainly manipulated, where the small-sized parallel FIR filter structures are derived first and then the larger block-sized ones can be constructed by cascading or iterating small-sized parallel FIR filtering blocks. In [5]–[7], the fast linear convolution is utilized to develop the small-sized filtering structures and then a long convolution is decomposed into several short convolutions, i.e., larger block-sized filtering structures can be constructed through iterations of the small-sized filtering structures. However, in both categories of method, when it comes to symmetric convolutions, the symmetry of coefficients has not been taken into consideration for the design of structures yet, which can lead to a significant saving in hardware cost. In this paper, we provide new parallel FIR filter structures based on FFA consisting of advantageous poly phase decompositions, which can reduce amounts of multiplications in the sub filter section by exploiting the inherent nature of the symmetric coefficients, compared to the existing FFA fast parallel FIR filter structure. Fast FIR algorithms (FFAs) introduced in [1]–[3] show that they can implement an L-parallel filter using approximately (2L −1) subfilter blocks, each of which is of length N/L. It reduces the required number of multipliers to (2N −N/L) from L ×N. In [5]–[9], the fast linear convolution is utilized to develop the small-sized filtering structures, and then a long convolution is decomposed into several short convolutions.

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Energy Efficient Environmental Monitoring System

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Abstract:

This paper presents the development of energy efficient environmental monitoring system that monitors the greenhouse gases such as CO, CO2, SOx, NOx, O2 in the environment, and environmental conditions or the ambient conditions in indoor spaces at remote locations. In order to achieve the target design goals, the communication module, the wireless smart transducer interface module, and ARM processor have to be used. The communication between the system's components is performed using the existent wireless infrastructure based on the IEEE 802.11 b.g standards. Visual basic is created to show the digital representation of the sensed data on user PC. The Gas sensor Will Sense the Gas and it will display in our LCD Module and System

***Keywords**: lpc 2148, Humidity, Temp, Gas, ZIGBEE.*

Introduction

The IMPORTANCE of environmental monitoring is undoubted in our age. This is the field where wireless sensor networks (WSNs) have been first used, their primary purpose consisting in the observation of the physical world and the recording of physical quantities characterizing it. WSNs are large networks of resource-constrained sensors with processing and wireless communication capabilities, which implement different application objectives within a specific sensing field. They can also be used for ambient monitoring, a topic of great interest nowadays as well,

indoor air quality representing an important factor affecting the comfort, health, and safety of building occupants. Finally, the use of wireless ambient sensors can lead to more energy-efficient buildings. The constant attempts of social and economic bodies for the development of technologies for improving energy efficiency and reducing pollution and for the more efficient use of national infrastructure along with the needs of decreasing the cost of computation, networking, and sensing had lead to the emergence of a new generation of digital systems, called environmental monitoring systems, less than a decade ago. These include embedded systems, sensor networks, actuators, coordination and management processes, and services to capture physical data and to act on the physical environment, all integrated under an intelligent decision system .

This paper presents a system for environmental and ambient parameter monitoring using low-power wireless sensors connected to microcontroller, which send their measurements to monitoring PC using the IEEE 802.11 b/g standards. Finally, data from all sensors can be remotely visualized from the PC connected to the microcontroller. This overcomes the problem of system integration and interoperability, providing a well-defined architecture that simplifies the transmission of data from sensors with different measurement capabilities and increases supervisory efficiency. Until recently, Zig bee technology has not been considered for implementing wireless sensing solutions because of its inability to meet the challenges in these types of systems, with the major drawback consisting in the unsatisfactory energy consumption. However, this has changed, since new power-efficient Zig bee devices have been developed and new solutions can benefit from several advantages offered by this technology, namely, the reduction of infrastructure costs, self configuring, long battery life, and high

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Automated Segmentation of Retinal Blood Vessels

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ABSTRACT

Digital image processing and the image analysis technology based on the advances in microelectronics and computer have many applications in biology. In clinical ophthalmology, study of blood vessels in retina is important for detection of the diseases. Diabetic retinopathy is one of the diseases which damages the retina and leads to blindness. Manual diagnosis of analyzing images from a patient with Diabetic Retinopathy increases the time. Automatic segmentation of retinal blood vessels could save workload of the ophthalmologists and may assist in characterizing the defected lesions and to identify false positives with high accuracy. The proposed algorithm uses optimized Gabor filter with local entropy thresholding. The blood vessel detection and segmentation is important for diabetic retinopathy diagnosis at earlier stage. The proposed method detects blood vessels with higher accuracy and sensitivity in the retinal images. The DRIVE database has been used to enable comparative studies on segmentation of blood vessels in retinal images.

Keywords

Retinal image, Blood vessels, Diabetic retinopathy, Optimized Gabor filter, Local entropy thresholding, DRIVE database

1. INTRODUCTION

Retinal blood vessel segmentation using fundus photographs plays a vital role in assessing the severity of retinal pathologies that can lead to acquired blindness such as retinopathy of prematurity, glaucoma, vein occlusions and diabetic retinopathy (DR). Automated blood vessel segmentation algorithms can be very useful in screening patients that are affected by such retinal complications and require regular follow-up by automated blood vessel segmentation systems. Thus, an accurate vessel segmentation algorithm that is robust to image variability and that has low computational complexity is desirable for such automated real-time detection and screening systems.

All existing algorithms for automated segmentation of blood vessels using fundus images can be broadly categorized as supervised and unsupervised. In the supervised category of algorithms, classifiers such as the k-Nearest Neighbor, Gaussian Mixture Model (GMM), Support Vector Machine (SVM), Neural Networks, Decision Trees and Ada-Boost have been applied to classify vessel pixels from the non-vessels. The unsupervised algorithms mostly apply matched filtering, line detectors, morphological transformations, model-based methods, or multi-scale vessel segmentation methods. While most supervised vessel classification methods are dependent on the training data and sensitive to false edges, the existing unsupervised methods are computationally complex and hence they are not viable for real-time portable DR screening systems.

Diabetic retinopathy (DR) is the result of damage caused by diabetes to the small blood vessels located in the retina. Blood vessels damaged from diabetic retinopathy can cause vision loss.

Computer based analysis for automated segmentation of blood vessels in retinal images will help ophthalmologists screen larger populations for vessel abnormalities. A wide variety of approaches have been proposed for retina blood vessels segmentation [1] [2] [3] [4] [5] [6] [7]. This paper is based on optimized Gabor filter with local entropy thresholding. Gabor filters have been widely applied to image processing and computer vision application problems such as face recognition and texture segmentation.

Optimized Gabor filter methods often produce false positive detections and fail to detect vessel of different widths. Also detection process is much more complicated when retinal image is in abnormal condition. This paper has been proposed a much robust and fast method of retinal blood vessels extraction using optimized Gabor filter with local entropy thresholding.

2. PROPOSED METHOD

The proposed method is one of the several ways of implementing the vasculature detection using fundus images. In this method, the green plane image is extracted from the fundus image which is the green color values from the fundus image obtained. The color image obtained from the

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Enhanced Novel Multilevel Secure User Authentication Scheme in Cloud.

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Abstract: ***Now a day, cloud computing is becoming more popular and the major problem in cloud computing is security. Many companies such as Amazon, Microsoft are developing cloud computing systems and provide services to large number of users on demand. When we store data in the cloud server some security and privacy issues may take place because many users may use the same server. Some unauthorized users may access the data while storing in the cloud. Unauthorized users may gain the passwords easily because users may not use complicated passwords or may not change the passwords to get multiple services. Hence security enhancement is required such as authentication is provided in this paper. Authentication is the process of checking the identity of the user who is logging on the network. The credentials of the user are compared with the details of authorized users stored in the database; if the user is authorized then he gets the permissions to access the data. Authentication allows the system to identify the user through user id and verify with password. In this paper to provide authentication different levels of authentication centers are available which generates keys to provide security. Encryption algorithm such as AES 256 is used to encrypt the file and store in cloud which provides high security. The evaluated results are implemented using Drive HQ cloud***

Keywords-Cloud computing, Authentication, Security, Authentication center,Sub Authentication centers,AES.

I. INTRODUCTION

Cloud computing refers to sharing and storing information in the cloud. Sharing resources, software and information over the internet. The data which is stored in the cloud server is maintained by cloud service provider. User can use the information stored in the cloud. There is no need to store the information on our own device. One can access files from any location. Users can download the files from the cloud server to any devices such as laptop, tablet or smart phone etc. The price will change depending upon the service used by the user. For example initial amount of 5Gb is free with icloud for storage of data. For additional storage need to pay fee. Cloud computing simply states delivery of computing resources such as servers, storage, databases, networking, software via internet as pay per use [1]. Advantages of cloud computing are world wide access, more storage, easy set up, automatic updates and reduced cost. Companies which provide the services required for the end users are called cloud service providers. Amazon Web Services, Microsoft Azure, Google Cloud Platform, Adobe, VMware, IBM Cloud, Sales force, Oracle Cloud, Verizon Cloud, Drop box are some of examples of cloud service providers. Microsoft Azure is an operating system of cloud and a platform to develop applications in cloud which is used to provide runtime environment for web applications and distributed applications. Google app engine is a scalable runtime environment used for executing web applications. Three delivery models of cloud computing are Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service which are offered based on different services.

A. Services of Cloud

1) *Infrastructure as a Service (IaaS):* This service provides the infrastructure in a virtual environment so that many users can access this service. Resources like Servers, Operating Systems, Virtual Machines, Networks, and Storage etc are provided (e.g. Amazon Web Service, Microsoft Azure).
2) *Platform as a Service (PaaS):* This service provides the environment in which users can compile and run the programs. This service is mainly used by developers.
3) *Software as a Service (SaaS):* It provides application software as pay per use to the end users. It is platform independent and not needed to install software on our own device. This service is available to many end users which makes cloud computing cheap (e.g. Google Applications, Sales force [2]).

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Digital security: an Model to work out Overall Network Security Risk Abuse Stochastic Process Strategy

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Abstract: ***There are numerous security measurements created to protect the pc systems. As a rule, normal security measurements have some expertise in subjective and subjective parts of systems lacking formal connected math models. Inside the blessing study, we tend to propose an arbitrary model to evaluate the threat identified with the system misuse method} process in conjunction with Common Vulnerability rating framework (CVSS) structure. The model we tend to created utilizes have get to chart to speak to the system climate. Using the created demonstrate, one will channel the huge amount of information offered by making a need rundown of defenceless hubs existing inside the system. Once a need list is prepared, arrange executives will make code fix choices. Increasing far reaching comprehension of the risk and need level of each host encourages individuals to execute choices like readiness of security stock and to style arrange topologies.***
Catchphrases: Attack Graph, Exploitability, CVSS

I. INTRODUCTION

PC organizes square measure undeniably helpless paying little respect to what level of equipment, programming framework or a blend of every assortment of security parameters square measure consolidated. As long in light of the fact that the system servers offer administrations on totally unique host servers, they rely on the server programming framework that will have security openings that makes them defenseless against vindictive assaults. To discover and additionally thwart the system open assets from suspicious assaults shifted business Intrusion Detection Systems (IDSs) [1]/Prevention Systems square measure available inside the market. This interruption identification/anticipation based for the most part apparatuses gives some sort of a sign that cautions the system head and gives them an incomplete picture of the system [2]. one among one among one in each the first essential difficulties on the present systems is to build up the instrument to blend the danger of all frameworks in a system to judge the general security chance. Keeping in mind the end goal to gage the danger of an outsized scale venture, relate degree director ought to examine not exclusively single defenselessness abuse however moreover the multi-organize and furthermore the multi-have powerlessness assault used by the aggressors. to incorporate this reality, relate degee assault diagram is developed to search out the consistent connection between different endeavors. Be that as it may, once size and intricacy of the system will build, 2 noteworthy issues happen. Initially, the assault diagram develops exponentially once the size of the system and algorithmic manage many-sided quality increment. Besides, fathoming the learning sent by the diagram winds up noticeably troublesome. In this way, the assault chart that tends to the issues specified before were picked and that we can put forth a defense for any inside the following area.

Almost no has been exhausted logical and investigation group to create connected science display that measure the general system security hazard. The vast majority of the work concentrates on subjective and subjective side of systems while not having formal factual model. to encourage forestall this disadvantage, we tend to present the connected science display that utilizations Markov chains in conjunction with CVSS system measurements to explore dangers identified with structures of grouped systems. The model might be utilized to recognize pivotal hubs inside the host get to chart wherever assailants could likewise be well on the way to center. bolstered that information, a system overseer will make fitting, organized determinations for framework settle. Further, an adaptable hazard positioning method is outline, wherever the choices made by relate miscreant might be balanced utilizing an inclination issue. The model might be summed up to be utilized with modern system conditions.

II. FOUNDATION AND TERMINOLOGIES OF CYBER SECURITY

In this segment, we've sketched out some of the fundamental dialect associated with digital security. we tend to conjointly legitimize the fundamental arrangement of the Markoff chain Mark off process that is upheld to build up the irregular model to understand our