ADITYA COLLEGE OF ENGINEERING

Approved by AICTE, Permanently Affiliated to JNTUK, Accredited by NBA & NAAC
Recognized by UGC under Sections 2(f) and 12(B) of UGC Act, 1956
Aditya Nagar, ADB Road, Surampalem - 533 437, E.G.Dist., Ph: 99631 76662.

3.3.2.1 Number of research papers per teachers in the Journals notified on UGC website during the year.

Aditya College of Engineering encourages the staff members to do quality research and produce research papers in journals of repute. The institute provides all the necessary facilities and also rewards the faculty member for publishing papers in various indexed journals.

Year	2021-2022
Number of Research Papers	72

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
Nanosilica-Based Teff Straw as an Eco-Friendly Substitute for Special Concrete	Dr V. Swamy Nadh	CE	Journal of Nanomaterials	2022	1687-4129	https://www.hindawi.com/journals/jnm/	https://www.hindawi.com/journals/jnm/2022/3742194/	SCOPUS
Effect of Nano Ground Granulated Blast Furnace Slag (GGBS) Volume % on Mechanical Behaviour of High-Performance Sustainable Concrete	Dr V. Swamy Nadh	CE	Journal of Nanomaterials	2022	1687-4129	https://www.hindawi.com/journals/jnm/	https://www.hindawi.com/journals/jnm/2022/7025059/	SCOPUS
Hybrid optimization algorithm for optimal designing of microstrip patch antenna	Dr.A.Ramesh	EEE	Concurrency and Computation: Practice and Experience	2022	1532-0626	https://onlinelibrary.wiley.com/journal/15320634	https://doi.org/10.1002/cpe.7603	SCIE

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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
An improved Grey Wolf algorithm for optimal placement of unified power flow controller	Mr.K.Manoz Kumar reddy	EEE	Advances in Engineering Software (Elseveir)	2022	1873-5339	https://www.sciencedirect.com/journal/advances-in-engineering-software	https://doi.org/10.1016/j.advengsoft.2022.103187	SCIE
RA 123 s: Three metaphor less Algorithms for Economic Load Dispatch Solution	Dr.M.Ravindra	EEE	Journal of Electrical Engineering &Technology(Springer)	2021	1975-0102	https://www.springer.com/journal/42835	https://doi.org/10.1007/s42835-021-00922-2	SCIE
Optimal Siting and sizing of of unified power flow controller using sensitivity constrained differential evolution algorithm	Mr.K.Manoz Kumar reddy	EEE	International Journal of Electrical and Computer Engineering	2022	2008-8708	https://ijece.iaescore.com/index.php/IJECE/index	http://doi.org/10.11591/ijece.v12i5.pp4680-4687	SCOPUS
Electric vehicles charging in India: Infrastructure planning and policy aspects	Dr.A.S.S.Veerendra babu	EEE	Energy Storage, Wiley Publications	2022	2578-4862	https://onlinelibrary.wiley.com/journal/25784862	https://doi.org/10.1002/est2.335	SCOPUS

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Improvement of power quality in residential home using FLC based multilevel inverter	Mr.Ch. U.P.Kumar,	EEE	International Journal of Emerging Technologies and Innovative Research	2021	2349-5162	https://www.jetir.org/index.html	https://www.jetir.org/papers/JETIR2112101.pdf	PEER REVIEWED
Power Factor Improvement in Rectifier Based Electric Vehicle Charger and Harmonic Reduction	Mr.M. Satyanarayana Raju	EEE	The International journal of analytical and experimental modal analysis	2021	0886-9367	https://ijaema.com/	https://drive.google.com/file/d/1P3WKJOU0xY02Q9oxgQfAQzCZp7-9dDO8/view	PEER REVIEWED
Design and Performance Analysis of 3-Phase Solar PV Integrated UPQC	Dr.M.Ravindra,	EEE	International Journal of Emerging Technologies and Innovative Research	2021	2349-5162	https://www.jetir.org/index.html	https://www.jetir.org/papers/JETIR2112122.pdf	PEER REVIEWED
Power Management and Control of Fuel Cell based Hybrid Microgrid with Interlinking Converter	Mrs.K.Lakshmi,	EEE	Science, Technology and Development	2021	0950-0707	https://journalstd.com/	http://journalstd.com/gallery/74-june2022.pdf	PEER REVIEWED

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
Optimal Capacitor Placement - A Bibliometric Survey	Dr.A.Ramesh	EEE	Library Philosophy and Practice (e-journal)	2021	1522-0222	https://digitalcommons.unl.edu/	https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=10857&context=libphilprac	SCOPUS
Load Flow Solution of Distribution Systems - A Bibliometric Survey	Mrs.K.Lakshmi	EEE	Library Philosophy and Practice (e-journal)	2021	1522-0222	https://digitalcommons.unl.edu/	https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=11203&context=libphilprac	SCOPUS
New Control Strategy Based Photovoltaic Water Pumping System Using BLDC Motor Drive	Mr.D.Tata Rao	EEE	International Journal of Emerging Technologies and Innovative Research	2021	2349-5162	https://www.jetir.org/index.html	https://www.jetir.org/papers/JETIR2112103.pdf	PEER REVIEWED
Energy management system for hybrid electrical vehicle using a bidirectional dc/dc converter using fuzzy logic controller	Mr. Ch.U.P.Kumar,	EEE	International Journal of Emerging Technologies and Innovative Research	2021	2349-5162	https://www.jetir.org/index.html	https://www.jetir.org/papers/JETIR2112100.pdf	PEER REVIEWED

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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
Investigation on Forestry Wood Wastes: Pyrolysis and Thermal Characteristics of Ficus religiosa for Energy Recovery System	Yarrapragada K. S. S. Rao	ME	Advances in Materials Science and Engineering	2022	1687-8442	https://www.hindawi.com/journals/amse/	https://doi.org/10.1155/2022/3314606	SCIE
Mechanical properties of Arecnut and GFR Hybrid polypropylene composites	Yarrapragada K. S. S. Rao	ME	Advances in polymer technology	2022	0730-6679	https://www.hindawi.com/journals/apt/	https://www.hindawi.com/journals/apt/2022/9633829/	SCIE
Biodiesel blends: a comprehensive systematic review on various constraints	Yarrapragada K.S.S. Rao	ME	Environmental Science and Pollution Research	2021	1614-7499	https://www.springer.com/journal/11356	https://link.springer.com/article/10.1007/s11356-021-13316-8	SCIE
An Improved Metaheuristic Method-Based Neural Network for Predicting Wind Turbine Power	D. V. S. S. S. V. Prasad	ME	Cybernetics and Systems	2022	1087-6553	https://www.tandfonline.com/journals/ucbs20	https://www.tandfonline.com/doi/abs/10.1080/01969722.2022.2145663	SCIE

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
Optimization of transesterification production of biodiesel from Pithecellobium dulce seed oil	Yarrapragada K. S. S. Rao	ME	Energy Reports	2022	2352-4847	https://www.sciencedirect.com/journal/energy-reports	https://www.sciencedirect.com/science/article/pii/S2352484722021643	SCIE
Parametric optimization in machining of GFRP composite by taguchi grey relational analysis	Yarrapragada K. S. S. Rao	ME	Journal of Ceramic Processing Research	2022	2672-152X	http://www.jcpr.or.kr/journal/journal/aboutthisjournal	http://www.jcpr.or.kr/journal/download/pdf/2682	SCI
Wind turbine power prediction via deep neural network using hybrid approach	Yarrapragada K. S. S. Rao	ME	Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy	2022	0957-6509	Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy: SAGE Journals (sagepub.com)	https://doi.org/10.1177/09576509221125863	SCIE
Infrared Thermal Images of Solar PV Panels for Fault Identification Using Image Processing Technique	Yarrapragada K. S. S. Rao	ME	International Journal of Photoenergy	2022	1687-529X	https://www.hindawi.com/journals/ijp/	https://www.hindawi.com/journals/ijp/2022/6427076/	SCIE

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						Link to website of the Journal	Link to article / paper / abstract of the article	
Effect of Dwell Time on Fracture Load of Friction Stir Spot Welded Dissimilar Metal Joints	D. V. S. S. S. V. Prasad	ME	Advances in Materials Science and Engineering	2022	1687-8442	https://www.hindawi.com/journals/amse/	https://www.hindawi.com/journals/amse/2022/2163507/	SCIE
Investigation on Physical and Mechanical Properties of Abaca Fiber Composites Using Filament Winding	D. V. S. S. S. V. Prasad	ME	Advances in Polymer Technology	2022	1098-2329	https://www.hindawi.com/journals/apt/about/	https://www.hindawi.com/journals/apt/2022/5000547/	SCIE
Machine Learning-Based Modelling and Predictive Maintenance of Turning Operation under Cooling/Lubrication for Manufacturing Systems	D. V. S. S. S. V. Prasad	ME	Advances in Materials Science and Engineering	2022	1687-8442	https://www.hindawi.com/journals/amse/	https://www.hindawi.com/journals/amse/2022/9289320/	SCIE

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						Link to website of the Journal	Link to article / paper / abstract of the article	
Experimental Studies on Fabrication and Thermal Characterization of Shape Memory Polymer Composites with Nanofillers	D. V. S. S. S. V. Prasad	ME	Journal of Nanomaterials	2022	1687-4129	https://www.hindawi.com/journals/jnm/	https://www.hindawi.com/journals/jnm/2022/3286792/	SCIE
Experimental Investigation on the Average Surface Roughness (Ra) of AlSi10Mg Alloy Manufactured by Laser Powder Bed Fusion Method	D. V. S. S. S. V. Prasad	ME	Advances in Materials Science and Engineering	2022	1687-8442	https://www.hindawi.com/journals/amse/	https://www.hindawi.com/journals/amse/2022/5874875/	SCIE
Assessment of Rotational Speed and Plunge Rate on Lap Shear Strength of FSSW Joints of AA7075/Mild Steel	D. V. S. S. S. V. Prasad	ME	Advances in Materials Science and Engineering	2022	1687-8442	https://www.hindawi.com/journals/amse/	https://www.hindawi.com/journals/amse/2022/6215249/	SCIE
Optimization of WEDM Process Parameters in Al2024-Li-Si3N4	D. V. S. S. S. V. Prasad	ME	Journal of Nanomaterials	2022	1687-4129	https://www.hindawi.com/journals/jnm/	https://www.hindawi.com/journals/jnm/2022/2903385/	SCIE

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MMC								
Mechanical Properties of Ramie/Hemp Hybrid Composites Influenced by Stacking Arrangement and NaOH Treatment	D. V. S. S. S. V. Prasad	ME	Advances in Polymer Technology	2022	1098-2329	https://www.hindawi.com/journals/apt/	https://www.hindawi.com/journals/apt/2022/8737669/	SCIE
Investigations of combustion, Performance, and emission Characteristics in a diesel engine fueled with Prunus domestica methyl ester and n-butanol blends	Bhanu Teja Nalla	ME	Environmental Progress & Sustainable Energy	2022	1944-7450	https://aiche.onlinelibrary.wiley.com/journal/19447450	https://doi.org/10.1002/ep.13811	SCIE
Performance and emission analysis of watermelon seed oil methyl ester and n-butanol blends fueled diesel engine	Bhanu Teja Nalla	ME	Mathematical Problems in Engineering	2022	1563-5147	https://www.hindawi.com/journals/mpe/	https://www.hindawi.com/journals/mpe/2022/2456338/	SCIE

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Production of biodiesel from phoenix sylvestris oil: Process optimization technique	Bhanu Teja Nalla	ME	Sustainable Chemistry and Pharmacy	2022	2352-5541	https://www.sciencedirect.com/journal/sustainable-chemistry-and-pharmacy	https://doi.org/10.1016/j.scp.2022.100636	SCIE
Experimental analysis of Sterculia foetida biodiesel and butanol blends as a renewable and eco-friendly fuel	Bhanu Teja Nalla	ME	Industrial Crops and Products	2022	9266-690	https://www.sciencedirect.com/journal/industrial-crops-and-products	https://doi.org/10.1016/j.indcrop.2022.114612	SCOPUS
Analysis on improving the conversion rate and waste reduction on bioconversion of Citrullus lanatus seed oil and its characterization	Bhanu Teja Nalla	ME	Sustainable Chemistry and Pharmacy	2021	2352-5541	https://www.sciencedirect.com/journal/sustainable-chemistry-and-pharmacy	https://doi.org/10.1016/j.scp.2021.100497	SCIE
An experimental study on transesterification process and emission analysis of diesel engine propelled with Capparis spinosa biodiesel	Bhanu Teja Nalla	ME	Biomass Conversion and Biorefinery	2021	2190-6815	https://www.springer.com/journal/13399	https://doi.org/10.1007/s13399-021-01744-y	SCIE

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						Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
Biofuel production from novel Prunus domestica kernel oil: process optimization technique	Bhanu Teja Nalla	ME	Biomass Conversion and Biorefinery	2021	2190-6815	https://www.springer.com/journal/13399	https://doi.org/10.1007/s13399-021-01551-5	SCIE
Production Process Optimization study on the synthesis of Manilkara zapota seed bio-oil and its characterization	Bhanu Teja Nalla	ME	Biomass Conversion and Biorefinery	2021	2190-6815	https://www.springer.com/journal/13399	https://doi.org/10.1007/s13399-021-01453-6	SCIE
Processing and characterization of carbon nanofiber composites for automotive applications	Anjibabu Merneedi,	ME	Journal of Nanomaterials	2021	1687-4110	https://www.hindawi.com/journals/jnm/	https://doi.org/10.1155/2021/7323885	SCIE
Teacher's perspective about Online Teaching-Learning	B. MarximRahula Bharathi	ME	Research Journal in Science, Engineering and Technology (IARJSET)	2021	2393-8021	https://iarjset.com/	https://doi.org/10.17148/IARJSET.2021.8821	PEER REVIEWED

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Exploration of Cu/g-C3N4 Nanocomposites as a Cost-Effective High-Performance Asymmetric Supercapacitor Electrode Material	Dr. Inamul Hussain	ECE	IEEE Transactions on Nanotechnology	2022	1536-125X	https://ieeexplore.ieee.org	https://ieeexplore.ieee.org/document/984 2315/	SCI
Artificial Intelligence-Based Smart Comrade Robot for Elders Healthcare with Strait Rescue System	Dr. G.Ramakrishna	ECE	Journal of Healthcare Engineering	2022	9904870	https://www.hindawi.com	https://www.hindawi.com/journals/jhe/2 022/9904870/	SCI
Analysis of performance, combustion, and emission parameters in a reactivity-controlled combustion ignition (RCCI) engine - an intensive review	Dr. G.Meenakshi Sundaram	ECE	International Journal of Ambient Energy	2022	2162-8246	https://www.tandfonline.com/	https://www.tandfonline.com/doi/epdf/10 .1080/01430750.2022.2056914?needAcc ess=true&role=button	SCI

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						Link to website of the Journal	Link to article / paper / abstract of the article	
Contor& Texture based analysis for Victim Identification in Forensic Deontology	Dr.G.Jaffino	ECE	Data Technologies and Applications	2021	2514-9288	https://www.emerald.com/insight/publication/issn/2514-9288	https://www.emerald.com/insight/content/doi/10.1108/DTA-03-2021-0075/full/html	SCOPUS
Wideband antenna array for C Band applications	M.Kishore Kumar	ECE	Design Engineering	2021	0011-9342	http://www.thedesignengineering.com/index.php/DE	http://www.thedesignengineering.com/index.php/DE/article/view/2729	SCOPUS
Facial Emotions recognition system for tested images by using navie bayes classification	M.Kishore Kumar	ECE	Advances and Applications in Mathematical Sciences	2021	ISSN:0974-6803	https://www.mililink.com/journals_desc.php?id=59	https://www.mililink.com/upload/article/931940420aams_vol_2011_september_2021_a5_p2519-2527_d._anjani_suputri_devi_ch._satyan arayan_and_m._kishore_kumar.pdf	UGC
Low Power Health Monitoring with Active Personal Assistance Based Upon IOT	G.Veerapandu	ECE	International Journal of Research in Engineering and Science	2021	2320-9356	https://www.ijres.org	https://www.ijres.org/papers/Volume-9/Issue-9/Ser-4/D09091419.pdf	UGC

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						Link to website of the Journal	Link to article / paper / abstract of the article	
MTCMOS Technique Based Low-Power Shift Registers	Y.Sugandhi Naidu	ECE	International Journal of Analytical and Experimental modal analysis	2021	0866-9367	https://ijaema.com/	https://ijaema.com/	UGC
Air Pollution: Effect on Human Health and Live Reporting Using IOT Technology	Dr.B. Annapurna	CSE	Turkish Journal of Physiotherapy and Rehabilitation	2022	2651- 445	https://dergipar k.org.	https://dergip ark.org.tr/en/p ub/tjpr	WOS
PeltierRadiator: TheSmart Heating/Cooling System for Vehicles with IOT Reporting	Dr.B. Annapurna	CSE	Turkish Journal of Physiotherapy and Rehabilitation	2022	2651- 445	https://dergipar k.org.	https://dergip ark.org.tr/en/p ub/tjpr	WOS
Deep Learning-Based Anticipation of Driver Movement in Semi-autonomous Vehicles	Dr. Pullela SVVSR Kumar	CSE	NeuroQuant ology	2022	1303- 515	https://neuroquantolog y.com	https://doi.org/10.14704/nq.2022.20.10. NQ55432.	SCOPUS
IoT-Based Healthcare Application and Security Framework	Dr. Pullela SVVSR Kumar	CSE	NeuroQuant ology	2022	1303 -515	https://neuroquantolog y.com	https://doi.org/10.14704/nq.2022.20.10. NQ55428.	SCOPUS

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						Link to website of the Journal	Link to article / paper / abstract of the article	
Facial Emotion Recognition and Detection Using CNN	Dr. B Kiran Kumar	CSE	Journal of Computer Sciences and Eng.	2022	2347-2693	https://turcomat.org	https://turcomat.org/index.php/turkbilmat/article/view	SCOPUS
The Element of Emotional Intelligence and their Impact on Social Relation	Dr. B.Annapurna	CSE	International Journal of Early Childhood Special Education	2022	1308-5581	https://www.int-jecse.net	https://www.int-jecse.net/data-cms/articles/20220507124317pm555.pdf	SCOPUS
Proposing a reliable method of securing and verifying the credentials of graduates through blockchain	Dr. B.Annapurna	CSE	EURASIP Journal on Information Security	2022	2510-523X	https://jis-eurasipjournals.springeropen.com	https://jis-eurasipjournals.springeropen.com/articles/10.1186/s13635-021-00122-5	SCOPUS
Ionic Liquid-Multi Walled Carbon Nanotubes-l-lysine Modified Glassy Carbon Electrode for Detection of Prednisolone	Ch Rajasekhar	H&BS	Journal of Molecular Liquids	2022	0167-7322	https://www.sciencedirect.com/journal/journal-of-molecular-liquids	https://doi.org/10.1016/j.molliq.2022.119729	SCOPUS
Ionic liquid based electrochemical sensor for the detection of efavirenz	Ch Rajasekhar	H&BS	Journal of Molecular Liquids	2022	0167-7322	https://www.sciencedirect.com/journal/journal-of-molecular-liquids	https://doi.org/10.1016/j.molliq.2022.119729	SCOPUS

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Machining Performance on SS304 using nontoxic, biodegradable Vegetable-Based Cutting Fluids	Ch. Prasad	H&BS	Chemical Data Collections	2022	2405-8300.	https://www.sciencedirect.com/journal/chemical-data-collections	https://www.sciencedirect.com/science/article/abs/pii/S2405830022001331	SCOPUS
Energy-efficient routing transmission for IoT based wireless body sensor network for health care monitoring system	G. Balaji prakash	H&BS	International journal of Health sciences	2022	2550-6978	https://sciencescholar.us/journal/index.php/ijhs	https://sciencescholar.us/journal/index.php/ijhs	SCOPUS
Low Power Multi-Chip Packaging and Scaling of IC design	B.Jyothi	H&BS	Gis Science journal	2022	1869-9391	https://gisscience.net	DOI:20.18001.GSJ.2022.V9I8.22.39913	SCOPUS
Non-Uniform Amplitude Distribution of Circular array with Beam Steering	B.Jyothi	H&BS	Journal of Huazhong University of Science and Technology	2021	1671-4512	https://portal.issn.org/resource/ISSN/1671-4512	https://drive.google.com/file/d/1sNU9RYSB1Jak1j9yJBiS4bDhd5TtqvlQ/view	SCOPUS
Optimized Non-Uniform circular Array Design Using SGOA	B.Jyothi	H&BS	Turkish Online Journal of Qualitative Inquiry	2021	1309-6591	https://www.tojqi.net/index.php/journal	https://www.tojqi.net/index.php/journal/article/view/2528	SCOPUS

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						Link to website of the Journal	Link to article / paper / abstract of the article	
Weighted 1D-local binary pattern features and Taylor-Henry gas solubility optimization based Deep Max out network for discovering epileptic seizure using EEG	Dr.G. Jaffino	ECE	DIGITAL SIGNAL PROCESSING	2022	2021.103349	https://www.sciencedirect.com/	https://www.sciencedirect.com/science/article/abs/pii/S1051200421003882	SCI
Hybrid Feature-Based Disease Detection in Plant Leaf Using Convolutional Neural Network, Bayesian Optimized SVM, and Random Forest Classifier	Dr.U.S.B.K.Mahalakshmi	ECE	Journal of food quality	2022	0146-9428	https://www.hindawi.com/journals/	https://downloads.hindawi.com/journals/jfq/2022/2845320.pdf	SCI
Using Electro encephalogram Classification in a convolution network, infer privacy on health care internet of things 5.0	Dr.U.S.B.K.Mahalakshmi	ECE	Expert Systems	2022	1468-0394	https://onlinelibrary.wiley.com/	https://onlinelibrary.wiley.com/doi/abs/10.1111/exsy.12942	SCI

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Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		Is it listed in UGC Care list / Scopus / Web of Science / other, mention
						Link to website of the Journal	Link to article / paper / abstract of the article	
Evaluate and Design the Mini-Hexagon-Shaped Monopole Antenna Controller to Minimize Losses in the Unit	Dr. R.Raman	ECE	Journal of Nuclear Energy Science & Power Generation Technology	2022	2325-9809	https://www.scitechnol.com/	https://www.scitechnol.com/peer-review/evaluate-and-design-the-minihexagonshaped-monopole-antenna-controller-to-minimize-losses-in-the-unit-GRxP.pdf	SCOPUS
Design and Optimization of Micro strip patch Antenna via Improved Met heuristic Algorithm	Dr. G.Ramakrishna	ECE	WirelessPers Communication	2021	1721–1739	https://dl.acm.org/journals	https://dl.acm.org/doi/abs/10.1007/s11277-021-08531-y	SCI
In-situ grafting of Au and Cu nano particles over graphitic carbon nitride sheets and unveiling its superior super capacitive performance as a hybrid composite electrode material	Dr. Inamul Hussain	ECE	Journal of Energy Storage (IF: 6.583)	2021	2352-152X	https://www.sciencedirect.com/browse/journals-and-books	https://www.sciencedirect.com/science/article/abs/pii/S2352152X21010008#:~:text=rights%20and%20content-.Abstract.g%2DC3N4%20sheets.	SCI

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Role of Nano Optics in High Performance Integrated Circuits & Consumer Electronics	B.Jyothi	H&BS	Gis Science journal	2021	1869-9391	https://gisscience.net/	https://drive.google.com/file/d/1sNU9RYSB1Jak1j9yJBiS4bDhd5TtqvlQ/view	SCOPUS
A Bibliometric Review Of Optical Physics With Lase Beam	B.Jyothi	H&BS	Journal of Pharmaceutical Negative Results	2022	9769-2341	https://www.pnrjournal.com	DOI: 10.47750/pnr.2022.13.S08.593	WOS

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Research Article

Nanosilica-Based Teff Straw as an Eco-Friendly Substitute for Special Concrete

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No construction activity can be conceived in the current context without concrete. A popular method is to manufacture concrete from a mixture of three ingredients: aggregates, cement, and water. Because of poor construction materials, many structures deflect prematurely and excessively. Another major worry in the building business is the cost of materials required to make concrete. As a result, adding other suitable components (known as additives) in a specific proportion to boost concrete strength is a regular requirement. Teff agriculture is more prevalent in the study region (Ambo Town), as Enjera is a common Ethiopian delicacy made from Teff. Nanofiber-based Teff Straw production from Teff agricultural fields is in excess, and it was not being used for anything other than feeding cattle, donkeys, and other animals. As a result, farmers use the unfavorable habit of burning surplus Nanofiber-based Teff Straw, resulting in environmental pollution issues such as carbon footprint. Furthermore, the natural Nanofiber-based Teff Straw is extremely strong, used to blend nanoparticles, and it may be useful in overcoming general structural problems while also being cost-effective for local building businesses. In light of this, the current research focuses on an experimental assessment of the applicability of Nanofiber-based Teff Straw as an extra concrete material in concrete mixes. The typical mix for C25 concrete has been designed to achieve a target average strength of 28 MPa with a liquid (water)-cement ratio (l-c ratio) of 0.50 and a slump range of 20-50 mm. All Nanofiber-based Teff Straw reinforced concrete beam samples failed due to pure flexural failure, whereas plane concrete beams failed due to beam crushing. With the addition of Nanofiber-based Teff Straw to concrete, the mean flexural strength increased by 19.38 percent, 4.19 percent, and 0.66 percent, respectively, with M1, M2, and M3 adding up this particular ingredient by the weight of concrete. As a result, adding Nanofiber-based Teff Straw to concrete increased its bending strength when compared to ordinary concrete. Slump reduction effects of 20.00 percent, 40.00 percent, and 50.00 percent were seen for mix designs M_1, M_2, and M_3 when Nanofiber-based Teff Straw was added to the concrete weight. Finally, due to volume addition of fresh concrete with Nanofiber-based Teff Straw, fresh concrete densities were reduced by 2.00 percent, 2.32 percent, and 2.84 percent, respectively.

1. Introduction

The need of concrete for civil infrastructure is in excessive demand in both structural and nonstructural elements. The most commonly used materials include reinforcing fibers like rubber tires, crushed glass pieces, broken plastics, and industrial wastes; the organic wastes such as bagasse, wheat husk, groundnut shell, sisal, Nanofiber-based Teff Straw; and inorganic elements like concrete aggregates and reinforcement elements [1]. The nanosilica-like organics are agro-waste used as a surrogate for fine aggregate and provides a supplementary pozzolanic property in the production of concrete [2, 3]. The organic and inorganic materials can be used in a various form in concrete as fractional

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Research Article

Effect of Nano Ground Granulated Blast Furnace Slag (GGBS) Volume % on Mechanical Behaviour of High-Performance Sustainable Concrete

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Utilization of various mineral admixtures in producing mortar decreases the porosity and capillarity, hence improves the durability in opposition to water and competitive solutions. In this research work, Ground Granulated Blast Furnace Slag is used to replace 30 percent, 60 percent, and 70% of ordinary Portland cement (OPC) (GGBFS). Mechanical property (compressive strength) and durability properties (permeability, porosity, and sorptivity) of high-performance concrete (HPC) are tested. Water permeability of M85 is measured using three cell permeability apparatus. Compressive strength, porosity, and sorptivity of the same mixes are also found. According to the test results of HPC, 30% replacement level of GGBFS gives higher compressive strength than 60% and 70% replacement levels of GGBFS. An equation is developed for permeability of HPC based on mechanical strength and porosity. It is found that coefficient of permeability of water for HPC mixes ranges from 5.1×10^{-11} cm/sec to 7.8×10^{-11} cm/sec. It is concluded that 30% GGBFS used in HPC produces less porosity, less permeability, and less sorptivity than compared to other replacement levels.

1. Introduction

Excessive performance concrete (HPC) is a brand new magnificence of concrete that has evolved in latest decades. HPC has a low water content and can attain sufficient rheological properties by combining optimal granular packing with the addition of excessive-range water lowering admixtures. One primary high-quality best within the making of HPC is the virtual elimination of voids within the concrete matrix that generate deterioration. Therefore, HPC has a tendency to exhibit superior residences such as superior energy, dura-

bility, and lengthy-time period balance. In competitive contexts, the long-term durability of concrete systems is always a concern to consider. When it comes to structures that are continually in contact with water, such as offshore systems, parking decks, and dams, water penetration is the most important aspect that determines the structure's durability. As a result, the permeability of the concrete and its pore architecture are crucial to its long-term endurance. Supplementary cementitious materials in high-performance concrete showed excellent performance in durability [1]. Chakraborty et al. [2] reported concrete developed with

RESEARCH ARTICLE

Hybrid optimization algorithm for optimal designing of microstrip patch antenna

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Abstract

Microstrip Patch Antennas (MPAs) are generally renowned for their adaptability regarding feasible geometries, which makes them appropriate for numerous diverse conditions. The suitability to integrate and the trivial structure with microwave incorporated circuits was said to be the major advantage among several advantages. MPA poses constricted bandwidth; thus it has a complication while tuning. In addition, MPAs are renowned for their reduced gain. As a result, there is a necessity to raise the gain and bandwidth of MPA. This work intends to put forward a novel approach that gets a non-linear objective for assisting the modeling of solution spaces for antenna constraints. Thus, "Salp Swarm based Shark Smell Optimization (SS-SSO) that hybrids the concepts of Salp Swarm Algorithm (SSA) and Shark Smell Optimization (SSO)" is developed that tuned the constraints of MPA. The implication of the developed approach is to boost the antenna gain by optimal electing of dielectric value, patch length, substrate width, and thickness of MPA.

KEYWORDS

antenna gain, dielectric value, MPA, SS-SSO algorithm, thickness

1 | INTRODUCTION

Because of their small size, low cost, and lightweight, micro-strip patch antennas are more popular in the mobile phone market. With technological advancements, antennas are taking on a larger role. The advancement of "wireless communication systems" has increased the demand for small, low profile antennas with a high gain and wider frequency range.[1-3] Because of these benefits, they were utilized in a wide range of appliances, including communications, satellite, biomedical, and radar. Because the demand for antennas that can emit over a wider variety of frequencies is rising in modern communication, bandwidth augmentation is a major concern. The design of antennas that combine several capabilities such as high gain over a wide impedance bandwidth, directional beam formation, and functionality has piqued researchers' interest in response to the growing needs for wireless communication.[4-6] An MPA includes a conducting ground and radiating patch, separated by a dielectric substrate, and a feed connected to the radiating patch. When an electric field is applied to a dielectric substance, bound charges can only travel within the molecules of the latter.[7,8] In contemporary era of wireless communiqué applications and service, low and compacted antennas are regarded as the most important alternative in wireless devices.[9] MPA is quite widespread among antenna design researchers and engineers owing to several benefits presented by them. Patch antenna was easier for designing, light weighted and every the areas/fields are distributed over the substrate, which is not costly.[10,11] With compacted dimensions and size, wide or broad bandwidth has to turn out to be a basic necessity in communiqués due to the rising count of users.[12,13]

Owing to the rising utilization of MPA in wireless communiqué, it includes a wider configuration range.[14,15] Multiple input multiple output systems provide the same capabilities and performance improvements while significantly reducing this complexity.[16] Moreover, radar devices are

An improved Grey Wolf algorithm for optimal placement of unified power flow controller

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ARTICLE INFO

ABSTRACT

Most crucial techniques for power system operation as well as control is Optimal Power Flow (OPF) that establishes the lowest operating costs and keeps the control variables within safe ranges. Furthermore, bus voltage and power flow across a power system are controlled by a device called a Unified Power Flow Controller (UPFC) and it is one of the most promising Flexible AC Transmission Systems (FACTS) devices for load flow control. Due to the necessary adjustments to take into account the UPFC characteristics, solving optimal power flow (OPF) problems with UPFC is a crucial and challenging task. Hence, this work intends to introduce a new Grey Wolf with Populace-based Update Evaluation (GW-PUE) algorithm for optimal placement of UPFC to achieve OPF. Different objective functions like minimization of power loss, voltage profile deviation and UPFC cost are considered for solving the placement problem. Moreover, the adoptedapproach is an improved form of the traditional Grey Wolf Optimization (GWO).At last, the adopted model is tested on the standard IEEE 5, IEEE 14 as well as IEEE 30 bus system. The performance of the suggested work is contrasted with extant methods in terms ofvarious measures. Especially, thecomputation time of the adopted GW-PUE method in IEEE 5 bus system is 59.61%, 14.85%, 1.33%, and 16.29% higher than the existing FF-CS, BBO, FF, and MSSA methods, respectively.

1. Introduction

In general, the power system [1] consists of a generating, distribution, and transmission system, with the distribution system playing the most essential role among them. The distribution system shares power and electrical utilities with consumers [2]. An optimal power system's goal is to deliver electricity to its customers in a reliable and efficient manner [3]. Furthermore, the power industry has made significant progress in de-regulating conditions in order to improve customer's economic efficiency [4]. The quality of electric power distributed to customers is referred to as PQ [5]. The effectiveness of the intelligent PQ systems is measured by computational indices like as power factor, voltage distortion, harmonics reliability, and service continuity [6]. Nowadays, achieving a suitable level of PQ in a power distribution system for nonlinear loads such as commercial, industrial, and residential is a major difficulty [7]. Still, the issues such as system impedance and fixed resonance with compensation make the perfoemance of the system more mulifaceted and defective [8]. Therefore, for prevailing these issues, the FACTS devices such as TCR, UPFC [9] are exploited to achieve better electrical power quality, which could present varied harmonic orders, recompense for reactive power [10]. Moreover, the source currents could be assessed when the loads are unstable and stable [11].

Numerous FACTS controllers have been implemented for controlling

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ORIGINAL ARTICLE

RA 123 s: Three metaphor-less Algorithms for Economic Load Dispatch Solution

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Abstract

This paper presents Rao-1, Rao-2 and Rao-3 algorithms (RA-123) approach to elucidate Economic Load Dispatch (ELD) problem which has Ramp Rate (RRL), Valve Point Effect (VPE), Prohibited Zones of Operation (POZ), and losses of lines. Besides most of the algorithms which depend on algorithmic-specific parameters, the proposed algorithm is independent of algorithmic-specific parameters. The principle contribution of this paper is to minimize the total generation cost by satisfying several constraints such as generation limits, load demand, valve point loading effect, and transmission losses considering metaphor-less algorithms (RA-123). The objective with VPE is considered to improve the performance of ELD. This paper determines the performance of proposed RA-123 algorithms considering different constraints on each test case system and compares them. To explore, ability of proposed optimization algorithms, these are implemented on test networks having 6, 40 and 110 unit systems and outcomes are compared with results attained by prior optimization algorithms. The evaluation of results shows ability and efficacy of (RA-123) for solving ELD problem.

Keywords Economic Load Dispatch · Valve Point Effect · Ramp Rate Limit · Prohibited Zones of Operation

List of symbols

FC	Fuel cost
CCC	Cost convergence curve
FCC	Fuel Cost Curve
F_c	Total Generation ($/hr)
a_j, Bj, cj	FC coefficients
P_j	Total power of generator j.
N	Number of generators
$d_j e_j$	Valve point coefficients
p_j^{min}	p_j^{max} Max and min capacity of jth unit
P_d	System demand
P_{loss}	Transmission losses
B_{jk}, B_{jo}, B_{oo}	Loss coefficients
p_j^{min}	p_j^{max} Upper and lower boundaries of POZs for every unit
n_{pz}	Number of POZs
P_{io}	Power output of previous hour
DR_j, UR	Down and upper ramp limits of jth unit (MW/h)

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1 Introduction

Economic load dispatch plays a key role in power system control and operation. ELD presents a vital role in forecasting the optimal power generation from generating units in order to meet load demand at minimum Fuel cost (FC), considering various operational constraints. ELD problem is non-linear and irregular. However, Fuel Cost Curve (FCC) of generation units is considered as smooth curve but VPE, POZs and RRL makes curve non-linear.

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Optimal siting and sizing of unified power flow controller using sensitivity constrained differential evolution algorithm

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Article Info	ABSTRACT
	This paper presents Sensitivity constrained placement of unified power flow controller (UPFC) considering active-power flow sensitive index (APFSI) and static voltage stability index (STATIC-VSI) to minimize active-power losses and to improve power transmission capacity. The sensitive factors are derived with respect to voltage, phase angle and current to formulate APFSI. Transmission line impedance parameters along with active and reactive-power flow measurements are considered to formulate static-VSI. Sensitivity constrained differential evolutionary (SCDE) algorithm is proposed for parameter setting through which power control and minimization of losses in system can be achieved. Testing is performed on IEEE-5, 14 and 30-bus networks in MATLAB and results indicate that SCDE is robust optimization technique compared to conventional method and genetic algorithm (GA).

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1. INTRODUCTION

The demand of power on load side is increasing day by day. The capacity limits of transmission line changes with increase in load. This leads to power congestion problems that result in sag and swell of voltages which can lead to voltage collapse or blackouts in power system [1]. The introduction of flexible alternating current transmission system (FACTS) devices like unified power flow controller (UPFC) offers a unified power flow (PF) distribution, relieving congestion problems by minimizing power losses [2]. The problem here is to site the UPFC at suitable location and size parameters of the device to reduce power losses and achieve unified PF.

From the recent work carried out by researchers it is observed that, Acharjee [3] proposed self-evolution algorithm for controlling and maintaining the power flow using UPFC. Chen *et al.* [4] presented hybrid intelligent algorithm for locating and sizing of UPFC. Esmaili *et al.* [5] presented a novel coordinated design of UPFC for power system stability considering culture-PSO-co evolutionary (CPCE) algorithm. Reddy *et al.* [6] proposed optimal allocation of UPFC critical based to enhance the voltage stability of system considering genetic algorithm based upgraded differential evolution algorithm In recent days, evolutionary algorithms [7] such as artificial algae algorithm (AAA) [8], modified particle swarm optimization (M-PSO) [9], imperialist competitive algorithm [10], dolphin echolocation optimization [11], Cuckoo search algorithm and chemical reaction optimization [12], genetic algorithm [13], sine-cosine algorithms [14] are proposed for optimal placement of UPFC for unified PF control. The studies [15], [16] proposed power congestion control strategy to increase the stability of the network. Suliman and Al-Khayyat [17] proposed power flow in

REVIEW

Electric vehicles charging in India: Infrastructure planning and policy aspects

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Abstract

Following years, electric vehicles (EVs) are promising technology for shifting
scattered exhaust emissions in mega-cities to integrated power plants in rural
areas, especially in urban areas. Transport sector electrification and increased
popularity of EVs make scientists and researchers, search for charging stations.
The ideal position, charge scheduling, and developed charging infrastructure
are the primary concern for the large-scale deployment of EVs. This paper
describes the possible demand for EVs charging station infrastructure and
challenges in the Indian situation. Along these lines, this study also provides
the research community with the latest developments and research findings of
charging infrastructure for EVs in India.

KEYWORDS

charging infrastructure, electric vehicle, hybrid electric vehicle, policy aspects

1 | INTRODUCTION

These days, energy efficiency is an essential criterion,
boosted by major concerns about climate change and ris-
ing oil prices in nations that depend vigorously on impo-
rted crude oils. The transport sector currently receives a
major part of oil consumption and much of it is used by
road vehicles.[1] With all these, the oil prices are going high
day by day, burdening the common man's life. With
energy conservation and the environment, the global focus
in the future will be on alternate fuels like electric vehicles
(EVs) and hybrid EVs to switch off internal combustion
engines (ICEs).[2] Inventing rechargeable batteries found
the application in EVs with wide application and electric-
ity distribution in the 19th century with electric motors. By
charging their batteries when needed, people were more
comfortable riding these EVs in the city. But the same peo-
ple preferred ICE vehicles to EVs when it came to long-
distance transport.[3] The use of charging time is more likely
to make them uncomfortable for use, according to the gen-
eral opinion on EVs. They have to charge the batteries

overnight, during office time, whenever they want to roam
within city boundaries. If the battery gets depleted quickly,
the vehicle becomes useless. Therefore, consumers of EVs
must be expected when charging the batteries for the use
of the EV when necessary.[4-6]

Lack of deployment in electrical equipment and slow
emerging technologies make India fragmented to the rest
of the world in EV adoption.[7] The present-day scenario
of EV in the world is compared with India in the aspects
of short-term (two and three wheeled) and long-term
(four-wheeled) vehicle adoption has been included and
analyzed in graphical chart (Figures 1 and 2).[7,8]

1.1 | Vehicle stock projections in India

There is increasing interest in the aggressive electrifica-
tion of passenger vehicles among policymakers, planners,
and regulators in India.[9] It pretends to be a log-linear
development in battery electric vehicles (BEV) sales with
the growth pace changing every 5 years between 2015

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Optimal Capacitor Placement - A Bibliometric Survey

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Load Flow Solution of Distribution Systems - A Bibliometric Survey

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NEW CONTROL STRATEGY BASED PHOTOVOLTAIC WATER PUMPING SYSTEM USING BLDC MOTOR DRIVE

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Abstract— A simple and efficient solar photovoltaic (PV) water pumping system utilizing an BLDC motor drive is presented in this paper. This solar PV water pumping system comprises of two stages of power conversion. The first stage extracts the maximum power from a solar PV array by controlling the duty ratio of a DC-DC boost converter. The DC bus voltage is maintained by the controlling the motor speed. This regulation helps in reduction of motor losses because of reduction in motor currents at higher voltage for same power injection. To control the duty ratio, an incremental conductance (INC) based maximum power point tracking (MPPT) control technique is utilized. The proposed system is modeled and its performance is simulated in detail. The scalar control eliminates the requirement speed sensor/encoder. Precisely the need of motor current sensor is also eliminated. Moreover, the dynamics are improved by an additional speed feed forward term in the control scheme. The proposed control scheme makes the system inherently immune to the pump's constant variation. In our proposed system, BLDC motor which has higher efficiency and noise less operation is considered. Maximum power loss of PV generator is well matched with the load characteristic of BLDC motor. MATLAB/SIMULINK results carried out for the different topology of the DC-DC converters are analyzed.

INDEX TERMS- *PHOTOVOLTAIC CELLS, MPPT, WATER PUMPING, SCALAR CONTROL, BLDC MOTOR DRIVES*

I.INTRODUCTION

In the modern era of development, renewable resources of energy, are being advocated by many countries to meet the increasing demand of electrical energy due to rapid depletion of non-renewable resources [1]-[2].The rising energy crises throughout the world and pollution of natural habitats, have been seeking attention from engineering and science fraternity since couple of decades. The knowledge for manifestation of renewable energy sources into useful form, has been maturing rapidly. The advent of fast switching power electronic devices and development in semiconductor technology, have majorly contributed to energy conversion methods. The renewable energy utilization, which started from converting the energy of running water, has travelled across to convert solar energy to electrical energy directly today. Solar photovoltaic (PV) energy converters earlier have been inefficient with the efficiency as low 5-6 % and highly costly [1]. However, with increased technological research and advancements, the efficiency PV array, at

ENERGY MANAGEMENT SYSTEM FOR HYBRID ELECTRICAL VEHICLE USING A BIDIRECTIONAL DC/DC CONVERTER USING FUZZY LOGIC CONTROLLER

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ABSTRACT

This project organizes a application of hybrid electric vehicle systems operated with novel designed bidirectional dc-dc converter (BDC) which interfaces a main energy storage (ES1),an auxiliary energy storage (ES2) and dc bus of different voltage levels. Proposed BDC converter can operate both step up and step down mode. In which step up mode represents low voltage dual source -powering mode and step down mode represents high voltage dc link energy – regenerating mode, both the modes are operated under the control of bidirectional power flow. This model can independently control power flow between low voltage dual source buck/boost modes. Here in, the circuit configuration, operation, steady-state analysis, and closed-loop control of the proposed BDC are discussed according to its three modes of power transfer. In this project fuzzy logic controller is used and also system results are validates through **MATLAB/SIMULINK** software.

Index Terms—Bidirectional dc/dc converter (BDC), dual battery storage, hybrid electric vehicle, Fuzzy logic controller.

I. INTRODUCTION

Worldwide environmental change and energy supply is declining have stimulated changes in vehicular innovation. For the applications in future vehicles the advanced technologies are current being investigated. Among such applications, fuel-cell hybrid electric vehicles (FCV/HEV) are efficient and promising candidates. Before, Ehsani et al. studied the vehicles' dynamics to look for an optimal torque-speed profile of the electric propulsion

system [1]. Emadi et al. talked about the working properties of the geographies for various vehicles including HEV, FCV, and more electric vehicles [2]. To satisfy huge vehicular load, for advanced vehicular power system Emadi et al. also integrated power electronics intensive solutions [3]. Schaltz et al. sufficiently divide the load power among the fuel cell stack, the battery, and the ultra capacitors based on two proposed energy-management strategies [4]. Thounthong et al.studied the impact of fuel-cell (FC) execution and the benefits of hybridization for control systems [5]. Chan et al. reviewed electric, hybrid, and fuel-cell vehicles and concentrated on structures and modeling for energy management [6]. Khaligh and Li introduced energy-storage technologies for HEVs and plug-in HEVs (PHEVs).

IMPROVEMENT OF POWER QUALITY IN RESIDENTIAL HOME USING FLC BASED MULTILEVEL INVERTER

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ABSTRACT:

To improve the power quality of a single-phase residential home, a multilayer transformer less hybrid series active filter is presented in this project. The suggested topology replicates current consumer tendencies toward electronic polluting loads and renewable energy integration, which might lead to a more dependable and sustainable supply. this project contributes to the enhancement of energy quality in the current singlephase system, with a focus on compensating compensation and energy conservation to ensure long-term supply. The controller uses a proportionate resonant (P+R) regulator to avoid current harmonic distortions from diverse non-linear loads from flowing into the utility. the important advantages of the proposed network topology includes its ability to concurrently fix the power factor and clean the grid while protective customers from power conflicts, sags and swells during a grid perturbation, it looks at the subject of harmonic compensation. it looks at harmonic compensation and evaluates the effect of control selection and time delays on real-time usage. The following results will be verified in MATLAB/SIMULINK environment.

Index Terms—*Hybrid active filters, power quality, renewable energy sources, multilevel converters, smart grids, real-time control, resonant controller*

nonlinear loads.

I.INTRODUCTION

Future trends toward the usage of smart grids, as well as the ever-increasing number of indirect industrial, commercial, and residential buildings polluting the environment, which has resulted in 100 percent of the total current harmonic pollution in grids, have raised serious concerns about future energy metrics energy efficiency. The growth of electrical equipment, as shown in Fig.1, which is linked to rapid charging with devices with external power sources requires prior research on the correction of compatible and inefficient power. The prevalent harmonic pollution device not only affects system efficiency but also increases grid disruption levels. Similarly, a warped current waveform causes extra heat losses and causes sensitive electrical components to fail. There are a few indications in the literature that address particular or frequent scenarios relating to energy quality problems caused by electrical distortions or current harmonics. This research includes new research difficulties confronting power converters in order to actively engage in lowering pollutant

Power Factor Improvement in Rectifier Based Electric Vehicle Charger and Harmonic Reduction

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ABSTRACT

The stream Indian circumstance has stepped gathering of Electric Vehicle (EV) to crush the atmosphere's carbon impression. In any case, the fuse of nonlinear EV charger offers unfortunate effects on battery's and EV's equipment. The AC–DC change of imperativeness through customary rectifier prompts the time of colossal inrush present and unpalatable spikes in the data current. Furthermore, the repercussions of block of imbued sounds may be found in the poor capability and debasement of the EV charger's segments. From this time forward, the resultant low power factor and distorted total consonant winding (THD) makes it understood to consolidate a Power Factor Correction (PFC) circuit at the hidden stage. As such, an Orcad Pspice reproduced PFC rectifier model has been proposed that gets rid of the annoying sounds, from this time forward, empowering the power factor. This is cultivated by working up a sinusoidal data inductor current in stage with the data voltage waveform. The model gets a straightforward control by using Critical Conduction Mode (CrCM) methodology under which the trading action occurs at zero similarly as apex of the current waveform. What's more, the circuit shows a shut circle framework where the delivered botch at voltage recognizing, current identifying, tweaked and reference current waveform relationship is evaluated. Therefore, the evaluation of achieved results explains the specific working of model and affirmation of solidarity power factor.

INTRODUCTION

Late years have seen a gigantic decrease in the petroleum products. In this way, a tendency towards battery worked EVs can be watched. This progress from the conventional non-renewable energy source-based vehicles to the EVs can be Partnered to the different benefits of EVs over its partners. Power, being an all-inclusive wellspring of vitality can be used for driving vehicles. Since, it is a cleaner and greener wellspring of vitality with the upsides of wide accessibility, zero discharge and nearly lesser on - street running cost, it ends up being gainful for vehicle application. Also, the ominous climatic conditions and the exhaustion of non-sustainable sources underscores on changing to electrically determined vehicles.

Be that as it may, it is common for an EV battery to get released after some time. In this manner, so as to have a drawn-out continued charge, an EV charger's incorporation is essential. Thinking about that EV's battery requires a tangled charging framework, its suitable choice is significant. Be that as it may, charging of the battery from the lattice follows an AC–DC approach. The battery perfect DC esteem is accomplished by at first changing over the AC supply from the matrix to a proportional DC esteem utilizing a rectifier. Further, the acquired DC esteem at the DC transport capacitor is changed over to alluring battery level voltage through DC–DC converter. It very well may be seen that the EV charger is an amalgamation of AC–DC and DC–DC converter. Since, the infused sounds are because of nonlinear AC–DC and DC–DC converters, it prompts poor power

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DESIGN AND PERFORMANCE ANALYSIS OF 3PHASE SOLAR PV INTEGRATED UPQC

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ABSTRACT- Today power system demand is increasing. In recent year's power degraded at distribution side and Power loss is increasing at consumer side due to more uses of non-linear load. Power Quality issues created by sensitive load. In this paper MAF based UPQC device used to reduce voltage and current distortions. In this paper we use UPQC which consists of a series compensator and a shunt compensator and the PV cell is connected in between shunt and series connected voltage compensators. The compensator in series to a source is used to mitigate the voltage harmonics between the sources and loads. Whereas the shunt active filter is connected in parallel with the load is used to reduce and the harmonic currents produced by the load, reduce the total harmonic distortion (THD), extracting power from PV circuit, and increase the power factor of the system. The Synchronous reference frame based control is used in shunt and series compensators in UPQC. In this paper the power Quality can be improved by reduction of distortions leads to increase in efficiency of power system. The performance of MAF based UPQC is demonstrated by simulating the developed system design in MATLAB/Simulink under a Non-linear load.

Index Terms—Power Quality, shunt compensator, series compensator, UPQC, Solar PV,MPPT.

I.INTRODUCTION

With the advancement in semiconductor technology, there is an increased penetration of power electronic loads. These loads such as computer power supplies, adjustable speed drives, swtiched mode power supplies etc. have very good efficiency, however, they draw nonlinear currents. These nonlinear currents cause voltage distortion at point of common coupling particularly in distribution systems. There is also increasing emphasis on clean energy generation through installation of rooftop PV systems in small apartments as well as in commercial buildings [1], [2]. However, due to the intermittent nature of the PV energy sources, an increased penetration of such systems, particularly in weak distribution systems leads to voltage quality problems like voltage sags and swells, which eventually instability in the grid [3]–[7].

These voltage quality problems also lead to frequent false tripping of power electronic systems, malfunctioning and false triggering of electronic systems and increased heating of capacitor banks etc [8]–[10]. Power quality issues at both load side and grid side are major problems faced by modern distribution systems. Due to the demand for clean energy as well as stringent power quality requirement of sophisticated electronic loads, there is need for multifunctional systems which can integrate clean energy

Power Management and Control of Fuel Cell based Hybrid Microgrid with Interlinking Converter

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Abstract This work presents an interlinking converter architecture for integrating renewable energy into hybrid networks in a flexible manner with fuel cell (FC). With one AC port and two DC ports, the proposed converter provides a flexible alternative for integrating multiple DC sources and AC sources, which can be configured in a variety of ways A DC-DC converter, a DC-AC inverter, or a DC-DC/AC multiport are all examples of DC-DC converters. The architecture's overall concept, common mode voltage analysis, and adjustable operation modes are all described in depth. in this correspondence. The proposed system has been designed in Matlab/Simulink software. The results of the tests with FC is confirmed thattheconcept in terms of flexible conversion, high power density, low leakage currents as well as controllable power flow.

KeywordsRenewable Energy Sources, AC/DC Converter, FLC, Power Density, Flexible Conversion.

Introduction

Wind, photovoltaics (PV), and fuel cells are examples of renewable energy sources (RESs). The increasing penetration of renewable energy sources may pose a threat to the entire power system. At this time, the basic approach for achieving a flexible, secure, and stable power supply and accommodating more RES systems is still a mix of AC and DC grids [1]. Many DC generating RESs can be consumed flexibly by local loads in this manner, improving energy conversion efficiency and self-consumption [2], [3]. A hybrid grid architecture like this is also in line with programs like intelligent power conversion and near-zero-energy buildings [4], [5].

The power management and control of hybrid AC/DC grids have been the topic of prior-art study. An overview of hybrid microgrids was presented in [6], for example, in terms of system topologies, operation modes, power management, and control. The hybrid microgrid is becoming increasingly appealing as the number of modern DC loads and RESs increases, as well as the integration of energy storage into the system. The interlinking converter is crucial in such applications (e.g., reliability, manageability, and stability), as it allows multiple energy sources to be integrated into the grid. Power-sharing techniques for interlinking converters under various circumstances were also developed to ensure operation [6]. However, there hasn't been much effort in the literature to build interlinking converters, which could be a promising method.

The two methods are to use separate standard DC-DC and DC-AC converters to construct a multistage conversion system [6] and to use separate standard DC-DC and DC-AC converters to form a multistage conversion system [7]–[13], as well as designing stand-alone multiport

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Optimization of transesterification production of biodiesel from *Pithecellobium dulce* seed oil

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Abstract

This study is aimed to produce biodiesel from *Pithecellobium dulce* seed oil with methanol (CH_3OH) and sodium hydroxide (NaOH) using transesterification process. The impact of operating variables including time of reaction, oil to methanol molar ratio, and concentration of catalyst on yield of biodiesel is also studied. The experiments were designed based on Box–Behnken approach considering three factors with three levels. Regression analysis was employed to model the experimental results and a quadratic model was established to study the effects of selected variables on the biodiesel yield. Response surface technique was used to determine the optimal parameters for the transesterification process (RSM). An optimum yield of 96.6% at 6:1 methanol to oil molar ratio, 0.5 weight percentage of catalyst concentration and 3 h of time for reaction was obtained from the developed RSM model and the optimized conditions were validated with experimental results. Finally, the quality of the produced biodiesel was assessed by determining its properties and met with ASTM D6751 standards.

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J O U R N A L O F

Ceramic
Processing Research

Parametric optimization in machining of GFRP composite by taguchi grey relational analysis

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The glass fibre reinforce polymer composites are fabricated using compression molding technique. The epoxy resin is used as the matrix material and the glass fibres are used as the reinforcing element. The glass fibre with 30 percentage in weight proportion are used as the reinforcing element and the remaining is the epoxy based matrix material. The composite laminates are tested for its machining characteristics in CNC milling machine using solid carbide end mills. The cutting speed, feed rate and depth of cut are used as the milling process parameters and the responses are delamination factor and surface roughness. Optimal machining parameters are determined by the grey relational analysis (GRA) and discussed.

Introduction

The composites are found applications in several engineering fields due to its excellent properties such as light in weight and high modulus of elasticity. The glass fibre reinforced composite finds applications in space, aerospace, electronic components, energy, marine and defense sectors. The mechanical and the corrosion behavior of the composites are found to be higher because of its combination of properties of both the matrix and the reinforcing element. Initially the mold is prepared and the resin glue is poured into the mold and it is cured. The fabrication techniques used for the preparation of the composite laminate is compression moulding technique. The thickness of the composite laminate is 3mm approximately. The laminates are machined using CNC milling using carbide end mill cutter of diameter of 10mm. A vertical machine centre CNC milling machine is used in this work. The Table size is 800×400 mm with a spindle motor power of 7.5 KW. The spindle speed ranges from 100-7,000 rpm and the machine is capable of moving along X, Y and Z axis. The cutting parameters optimization of metal matrix composites are investigated using ANOVA and GRA [1]. Drilling of GFRP composite using GRA is carried out and optimal machining parameters are obtained using GRG from GRA [2]. Investigation on drilling performance characteristics on hybrid polymer composites using GRA, regression, fuzzy and ANN models are carried out. It is observed that the ANN is the suitable process that determines the optimum machining parameters [3]. The Taguchi method and Pareto analysis is carried out for the investigating the

optimum cutting parameters in turning glass fibre reinforce polymer composite. Minimum number of experiments is sufficient to perform machining characterization to achieve best optimal solutions using Taguchi analysis [4].

Filament winding is used to fabricate hollow pipes made of glass fibre reinforce polymer composite. Machining characteristics studies are investigated using multi performance optimization techniques such as GRA and it is reported that the machining performance can be improved effectively using this techniques [5]. The optimal parameters to obtain better responses, the grey relational analysis (GRA) was followed [6]. GRA and Taguchi optimization methods are followed to evaluate the hard turning process [7], multi response characteristics can be solved in GRA as single solution. The degree of higher order of gray relational grade defines the process parameters significance on the responses are noticed [8]. The Taguchi method and GRA to optimize the turning operation to improve hardness and toughness are followed. The multi-objective of the turning process is converted as a single objective function to obtain optimal process parameters [9]. The machinability of the end milling operation through multi-objective function analyzing methodology is studied [10]. The optimization of drilling parameters on natural fibre reinforced composites using central composite design is carried out [11]. The epoxy based composite are tested for the mechanical properties and analysed using ANOVA and Taguchi analysis [12].

Experimental Methodology

The process parameters selected for this research work are cutting speed, feed rate and depth of cut. The levels of parameters are chosen and experimental design is carried out using design of experiments and L27 orthogonal array

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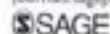Tel.: +91 9442224322
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Wind turbine power prediction via deep neural network using hybrid approach

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Abstract

Due to the chaotic nature of wind speed, short-term wind power prediction is a challengeable one. A reliable and accurate wind power prediction model is necessary for the wind turbine industry. Based on their improved ability to cope with complicated nonlinear issues, an increasing number of deep learning-based models are being explored for wind power prediction as artificial intelligence technologies, especially in deep neural networks. In this research, the wind power prediction model is divided into three stages. The first stage is to collect data from wind turbines. The second stage is to apply the optimal tuning of the Deep Neural Network (DNN) to predict the wind power. Here, the hybrid algorithm termedBird Swarm Merged Seagull Optimizer(BSMSO) stipulates DNN's weight optimization points for wind power prediction; in addition, it reduces the time required for the same. Finally, the efficacy of the proposed BSMSO-DNN prediction model is proved by matching the statistical performance measures as regards toerror metrics with other existing techniques. The simulation results reveal thatthe proposed hybrid modelreduces the prediction errors significantly.

Introduction

Wind power generation is currently a hot topic in the new energy power industry, as it is one of the prime renewable energy resources in all countries throughout the globe to occupy an increasingly important position. Traditional fossil-related energy sources, however, emit pollution that harms the environment and contributes to global warming.[1] Wind power technologies, specifically the most prevalent renewable energy sources have gained significant importance around the globe in light of the expanded demand for global energy and limited classic energy resources.[2]

The wind's uncertain nature and the changing characteristics of geography and climate make the task of predicting its wind power a critical one. Short-term and long-term based WPPs are the two basic kinds of which short-term wind power forecasts are made for periods extending from a few minutes to a day, whilst long-term forecasts are made for periods ranging from days, months, or even years in advance. Short-term wind power forecasting systems are preferred for ensuring an authentic forecasting model.

As wind power generation is inextricably linked to weather conditions, the first step in wind power forecasting is to forecast future values of the necessary weather variables at the wind farm level. This is done by using numerical weather prediction models.[3] The statistical method for WPP imitates the relationship between the measurements of meteorologicaland historical data, which generates outputs via statistical methods whose parameters are determined using data without examining any physical phenomena.[4] The physical method of WPP focuses on describing the

wind flow around and inside the wind farm, as well as utilizing the power curve of the manufacturer to propose a wind power output estimate.[5] WPP Systems' hybrid technique blends the two methods in order to maximize the benefits of both and improve predictions.

The very-short-term speculation method includes statistical models that depend on time series techniques and comprise Kalman Filters, ARMA, ARX, and Box-Jenkins as the prediction systems. In all these models, past values of the forecasted variable are considered as inputs only. Meanwhile, other explanatory variables can be used, which can improve the forecast error. Statistical techniques require only one step for converting input variables to power output. As a result, the schemes utilized are termed as "black box" techniques.

Wind forecasts normally encounter errors of 15%–20% MAE for a single wind plant.[6]Torres et al.[7] discovered that using an ARMA model and 9 years of historical data, they could get a 20% error reduction as opposed to persistence when forecasting average hourly wind speed for a 10-h

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Research Article

Infrared Thermal Images of Solar PV Panels for Fault Identification Using Image Processing Technique

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Among the renewable forms of energy, solar energy is a convincing, clean energy and acceptable worldwide. Solar PV plants, both ground mounting and the rooftop, are mushrooming thought the world. One of the significant challenges is the fault identification of the solar PV module, since a vast power plant condition monitoring of individual panels is cumbersome. This paper attempts to identify the panel using a thermal imaging system and processes the thermal images using the image processing technique. An ordinary and thermal image has been processed in the image processing tool and proved that thermal images record the hot spots. Similarly, the new and aged solar photovoltaic panels were compared in the image processing technique since any fault in the panel has been recorded as hot spots. The image recorded in the aged panels records hot spots, and performance has been analyzed using conventional metrics. The experimental results have also been verified.

1. Introduction

The usage of renewable energy is increasing daily to give a sustainable and clean form of energy. The recent day's use of solar energy has grown tremendously. Both rooftop and ground-mounted technologies penetrated the market at a rapid phase. In the same way, the operation and maintenance of solar panels also need to be taken care of. Solar PV systems are maintenance-free; however, the system's monitoring is essential to achieve the maximum yield from the plants. Several parameters affect the panel output like dust, humidity, shadow temperature, and moisture. In an extensive power plant, monitoring of individual panels is a cumbersome process. However, any parameters affecting the yield of solar panels will induce internal resistance. Thus, a thermal image of the panels will be able to identify the fault of the panel quickly. Several thermal imagers are readily available in the market; analyzing individual images is a difficult task. Hence, the picture taken in a thermal imager is processed by MATLAB Simulink software for the different steps in the images' layering. The temperature difference is associated with bordering the modules, and hot spots are easily identified.

2. Literature Review

Different types of solution for the fault detection and the analysis by the various steps such as monitoring systems, I and C analysis based on artificial intelligence, and voltage and current measurements and also by power loss measurements analysis process of the different methods have no

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Research Article

Investigation on Forestry Wood Wastes: Pyrolysis and Thermal Characteristics of Ficus religiosa for Energy Recovery System

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Pyrolysis is the most important thermochemical process that can be used for the production of biofuel, from wood and wood-based lignocellulosic materials. In this study, bio-oil is produced from the bio-weed named *Ficus religiosa* by the thermal pyrolysis process by utilizing laboratory-scale fluidized bed reactor. This study deals with the production of maximum bio-oil by optimizing process parameters such as process temperature, particle size, and sweep gas flow rate. Further different analytical techniques were used to describe the properties of bio-oil for different applications. Wood and wood barks of *Ficus religiosa* were chosen as the raw material due to their higher volatile content (72.4%). The maximum yield of 47.5 wt% bio-oil was collected at the optimized operating conditions of 450°C temperature, 1.0 mm particle size, and 2.0 m³/h sweep gas flow rate. Compared with other operating parameters, temperature is observed as the most significant one to determine the product yield. Through chromatographic analysis, it was identified that the bio-oil is found with the variety of chemical compounds including alcohols, alkenes, phenols, saturated fatty acids, and esters.

1. Introduction

The promotion of sustainable energy development has been aided by increased global energy demand with increased greenhouse gas emissions [1]. Wood and biomass materials are taken as promising alternative material for producing fuels and chemicals [2]. These sources are renewable, available abundant, carbon-neutral, and does not compete with food [3]. Since the mid-1970s, when the oil crisis began, numerous efforts were made to convert wastes into fuels and chemicals. To meet country's energy needs, United States, China, India, and other countries are significantly dependent on foreign countries, creating tremendous incentives for the development of renewable energy sources. In 2020, India contributed 4.6% to the global fossil fuel use, placing it third in the world after United States and China. In accordance with the findings of Huber, biomass-derived biofuels are the viable resource for liquid hydrocarbon production for

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Research Article
Mechanical Properties of Arecanut and GFR Hybrid Polypropylene Composites

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The mechanical characteristics of hybrid polypropylene composites may be enhanced by adjusting the fibre loading and ratio, according to this study. The hot press technique was utilised to generate a variety of composites with four different amounts of fibre loading. In addition, the fibre ratio in composites with a 20-weight-percent fibre loading was changed. The composites were characterised using Fourier transform infrared analysis as well as tensile, flexural, and hardness tests. In the composites that have been created, Fourier transform infrared examination showed that hemicelluloses, lignins, and moisture were present, all of which have the potential to reduce tensile strength. Fibre loading resulted in a decrease in tensile strength but an increase in Young's modulus. With increasing fibre loading, flexural modulus and hardness rose, whereas flexural strength declined. The best mechanical qualities were found in a composite made primarily of arecanut and glass fibres, with a weight ratio of 1 : 3.

1. Introduction

Design freedom is provided by hybrid fibre–polymer systems, which allow for the tailoring of composites and the attainment of qualities not possible in binary systems comprising the same fibre/filler in matrix [1]. In few cases, benefits of one fibre can outweigh the drawbacks of another. As a result, proper material design could bring about a performance-to-cost equilibrium [2, 3]. Automotive industry is the primary consumer of natural fibres because of their functional characteristics. Mirror frames, doors, windows, and other interior sections can all be made from composites such as can truck cabs, panels, shelves, and other trim components [4–6]. Composites are also popular in the production of brake shoes. Palm tree species (*Areca catechu*) bear the arecanut fruit (also known as the arecanut) and are found throughout Asia [7]. Fibres made from arecanuts are inexpensive. The fundamental issue with natural fibre composites is their incompatibility with polymer matrixes due to the hydrophobic nature of natural fibres [8–10].

Polymeric matrix composites commonly use glass fibres as reinforcement. Many applications benefit from its low cost, strong tensile strength, resistance to chemicals, and insulating properties [11, 12]. Among the most commonly

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COMPUTATIONAL INTELLIGENCE ON ENERGY CONSERVATION, ALTERNATE FUELS AND ENVIRONMENTAL CONCERNS

Biodiesel blends: a comprehensive systematic review on various constraints

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Abstract

Biodiesel is a renewable, clean-burning diesel replacement that can be used in existing diesel engines without modification. Biodiesel is among the nation's first domestically developed and economically usable advanced biofuels. Throughout the field of biodiesel including FAME/FAGE diesel variants, the concentrations of close to around 20% conform to every requirement out from the existing fuel content guidelines. Larger blending ratios are essential for hydrotreated vegetable oil blends to lubricity enhancers. Of organic biobutanol blends, the suggested blending ratio is restricted to 10% or less to prevent high water content and low cetane content. Here, the presented survey intends to make a review of 65 papers that concerns with biodiesel blends. Accordingly, systematic analyses of the adopted techniques are carried out and presented briefly. In addition, the performances and related maximum achievements of each contribution are also portrayed in this survey. Moreover, the chronological assessment and various blends of biodiesel in the considered papers are reviewed in this work. Finally, the survey portrays numerous research problems and weaknesses that may be helpful for researchers to introduce prospective studies on biodiesel blends.

Keywords Biodiesel blends · Glycerol · Blending ratio · Lubricity enhancers · Cetane content

Introduction

Biodiesel is defined as the mixture of mono-alkyl esters of animal fats or vegetable oils (Maawa et al. 2020). Both oils and fats were added chemically to the biodiesel with a biodiesel catalyst, a glycerin co-product, and a short chain of alcohol (such as methanol) (Veinblat et al. 2018). Biodiesel would therefore be technically mixed through petroleum diesel at some cost. Biodiesel could be used on its very own as B100 or mixed for petroleum diesel in certain ratios (Devarajan et al. 2020). According to potential depletion and growing price of oil along with environmental issues generated using fossil fuel consumption, desire based on renewable fuels has drawn a great deal of interest (Bencheikh et al. 2019; Oliveira and Caires 2019). Moreover, the waste cooking oils and non-edible oils were used within appealing as starting materials in biodiesel in an easy manner (Beatrice et al. 2014; Jamrozik 2017). One of the important advantages in fuel is that its performance and properties were identical to traditional diesel fuels (Das et al. 2018).

Generally, diesel fuel will be really significant based on the wealthy financial system in countries because it has a broad variety of applications like mobile drives, power generators, as well as in mechanical engines (Najafi 2018). The usage of animal fats or vegetable oils as fuel will produce several issues in the engine, such as inadequate combustion, engine fouling, low fuel atomization, and oil toxicity based on increased viscosity (Shen et al. 2018; Jagtap et al. 2020). However, the

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An Improved Metaheuristic Method-Based Neural Network for Predicting Wind Turbine Power

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ABSTRACT

Wind power production has advanced rapidly in recent years as a supreme renewable energy source that is safe, reliable, pollution-free, and simple to integrate into the power grid. Furthermore, employing data acquisition and supervisory control to predict wind turbine power may not result in the best governing approach, as non-calibrated data may be generated due to sensor degradation. Hence, to solve the adverse impact, it's planned to incorporate the wind turbine Supervisory Control and Data Acquisition (SCADA) data into the improved optimization based NN, resulting in the development of a highly accurate prediction model. Thus, SCADA data of the wind turbine such as active power, bearing shaft, gear box shearing, gear box oil temperature, generator rpm, generator windings 1 and 2, hub temperature, reactive power, rotor rpm and wind speed are fed as input features to the predictive model. In order to achieve better prediction, the NN will be trained by using a new Coefficient Factor Updated Coyote Optimization Algorithm (CFU-COA), which is the conceptual advancement of traditional Coyote Optimization Algorithm (COA). Finally, the supremacy of the presented approach is proved with respect to varied error measures.

Introduction

With the reduction of conventional fossil fuels and the environmental pollutions, extracting energy from renewable sources like solar energy, wind energy, and other forms of renewable energy is becoming increasingly popular as a means of addressing the global energy crisis and pollution (Neshat et al. 2021). Furthermore, with full-fledged technology and least cost for development, wind power has emanated as the most promising energy source (Li et al. 2018). In grid-connected wind power generation, the unpredictability, instability, and inconsistency of wind energy plays a major role (Karakuş, Kuruoğlu, and Altınkaya 2017). As a result,

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Research Article

Effect of Dwell Time on Fracture Load of Friction Stir Spot Welded Dissimilar Metal Joints

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The dissimilar materials joining in heavy structural fabrication industries is tedious work for welding and design engineers, since the weld region's criticality is encountered by hot cracking and its associated problems. Moreover, dissimilar materials are joined by mechanical locking such as rivets, bolt and nuts, and screws. Nowadays, the fasteners are eliminated by friction stir welding (FSW). The friction stir spot welding (FSSW) is a variant of FSW; it can be avoided by seam welding. Hence, in this investigation, FSSW is used for joining AA6061 aluminum alloy with mild steel using tool rotation speed, plunge depth and rate, and shoulder to pin diameter ratio. The experimental method observed that the joint fabricated with a rotational speed of 1000 rpm, plunge rate of 3 mm/min, plunge depth of 6 mm/min, and shoulder diameter to pin diameter ration of 3.0 yielded highest fracture load The optimum heat input could obtain the improvement in FSSW joint strength. Recrystallized grains and favorable intermetallic compound formation are the primary factors for sound welding.

1. Introduction

Friction stir spot welding (FSSW) technology has been successfully utilized to weld aluminium and magnesium alloy used in automotive and aerospace industries. Aluminum alloys have widespread applications in manufacturing aerospace and structural components due to their high strength [1]. The FSSW procedure was used by Chowdhury et al. [2]which used FSSW on AA5754 and AZ31 Balloy. Choi et al. [3] conducted an experiment using a tool constructed of high-strength steel and consisting of shoulder, shank, and probe. The tool had a shoulder, pin, and height which were 13 mm, 9 mm, and 0.5, respectively. Intermetallic compounds were found to develop at the interface of Al/Mg alloy joints. By accelerating the rotational speed of tool and holding time, the formation of the IMC

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Research Article

Investigation on Physical and Mechanical Properties of Abaca Fiber Composites Using Filament Winding

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Composites that were made stronger with jute fiber and glass fiber were used to test the performance of filament wound abaca fiber composites. Tensile, bending, and dynamic mechanical analyses were used to figure out the mechanical properties of the composites. Fiber composites and glass-fiber composites were found to have higher density and mechanical properties than abaca fiber-based composites. This is because resin did not get into the cell cavity of the fiber's inner tissue structure. The abaca fiber composites that worked the worst were those in which the fibers were pulled out while the fibers on the surface were torn. The fiber-reinforced epoxy circumferential composite interface junction in the twisting abaca fiber circumferential composite was found to be more flexible and have a higher glass transition temperature than any of the other composites (6000 MPa). We found that twisting abaca fiber-naval ordnance laboratory and twisting abaca fiber-prepared circumferential composite had the lowest frequency dependence and performance variability. To improve composite properties, both the outside and inside structures of twisting abaca fiber need to be fixed. There is also a rise in fiber-to-resin contact and a rise in fiber surface area. The diameter of the fibers also gets smaller.

1. Introduction

Low density, great mechanical qualities, low cost, sustainability, and biodegradability are all reasons why natural fibers are becoming increasingly popular. Glass fiber [2] in composites can be replaced by natural fibers, which has the potential to save energy and make it easy to process and recycle composites in an environmentally friendly way, which in turn is spurring growth in the number of products that incorporate natural fibers [3, 4]. The mechanical qualities of abaca fibers separated and manufactured from abaca are excellent [5]. At the point of break, the single-abaca fiber was capable of elongation at break of 4.3–9.7 percent. Abaca fibers are considered to be natural glass fibers because of

Hindawi

Research Article
Machine Learning-Based Modelling and Predictive Maintenance of Turning Operation under Cooling/Lubrication for Manufacturing Systems

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Cutting force is one of the significant parameters in the metal cutting process. The metal cutting process is the primary in the production and manufacturing industry to produce high-quality products. Every production and manufacturing needs to develop a technology, i.e., a cooling or lubrication system at the cutting zone while doing the metal cutting process. This current work focuses on developing the machine learning algorithm by using three different types of regression processes, namely, polynomial regression process (PR), support vector regression (SVR), and gaussian process regression (GPR). These three processes are developed to predict the machine learning force, cutting power, and cutting pressure by controlling primary factors (cutting speed, depth of cut, and feed rate). The cooling or lubrication process also affects the machining process. We need to maintain the minimum qualifications to perform under minimum quality lubrication (MQL) and high-pressure coolant (HPC). The ANN algorithm was used to run different parameters, and these parameters are optimized for cutting force.

1. Introduction

In industry 4.O, some techniques are used, i.e., IoT, machine learning, artificial intelligence, blockchain technology, etc. These technologies are tested to enhance the quality and productivity of the industries [1]. Now, several manufacturing industries are working on intelligent manufacturing techniques integrated with several sensors with the machines. These manufacturing sensors were synchronized with the various systems through the IoT and used for different prediction management [2, 3].

Metal cutting predictive models have some excellent characteristics because of prediction by using one or more input parameters to get the output parameters. Modelling and forecasting the cutting force in the turning process is related to the number of parameters [4]. Also, it is the getting of power needed for the machine tool, in any way number of parameters challenging to develop the model. Several

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Research Article

Experimental Studies on Fabrication and Thermal Characterization of Shape Memory Polymer Composites with Nanofillers

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Shape memory polymers (SMP) have piqued the interest of the research and development sector due to their new features and immense potential. The polymer matrix epoxy was changed using varied weight percentages of aliphatic monomer-neopentyl glycol diglycidyl ether (NGDE), and the optimal weight percentage of NGDE was identified. The weight percentages of NGDE-CNT are 0, 0.3, 0.6, 0.9, 1.2, and 1.5. The use of nanofillers such as carbon nanotubes (CNT) has been promoted to improve the heat conductivity of composites. The thermal conductivity of shape memory polymers has been enhanced through the addition of varying quantities of CNT filler. Mechanical characterizations such as tensile testing, Young's modulus, impact strength, and heat related tests such as form recovery testing, shape fixity, and recovery time were also investigated. From the investigational outcomes, optimal weight percentage of NGDE loading into epoxy is 15%, and maximum tensile strength attains at 1.2 wt. percent of CNT.

1. Introduction

Shape memory polymers are a form of shape memory material (SMM) that can return to their original shape after being altered by an external stimulation. SMP are now part of a new family of materials called as "smart polymers," and they have the unique ability to be moulded into a temporary shape, store that compo-

rary shape, and then return to its original shape when prompted by an external signal. However, the SMP actuation speeds are restricted by the poor heat conductivity of polymers, which is typically less than 0.3 W/m·K. [1–4] Polymer shape memory effect is caused by their exceptional molecular structures. A distinctive polymer is a complex combination of several long, intertwined molecular chains linked by distinctive net sites

Hindawi

Research Article

Experimental Investigation on the Average Surface Roughness (Ra) of AlSi10Mg Alloy Manufactured by Laser Powder Bed Fusion Method

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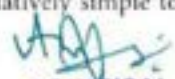Correspondence should be addressed to Mohamad Reda A. Refaai; refaai.mraworks@yahoo.com

AlSi10Mg alloy is an extensively utilised material having good mechanical qualities. The laser powder bed fusion procedure has been applied for fabricating the aluminium alloy (AlSi10Mg) plates in this research. Different exposure periods and scan techniques were applied in this work to measure the average roughness. Results demonstrate that the energy density grew and roughness reduced at first and then improved. Furthermore, there were considerable differences in roughness throughout the created faces. At 125 J/mm³ and 180 J/mm³, excellent surface quality was attained. By this experiment, it was noticed that the direction of scan, wiper movement, and gas flow are the key parameters.

1. Introduction

Since 1985, additive manufacturing of metals and alloys has attracted researchers and industrial experts. Huge efforts have been made to prove several aspects of this metal production procedure, including the technological aspect [1], the metallurgical aspect [2], and the design aspect [3]. Laser powder bed fusion, sometimes known as laser fusion, is a technique that uses lasers to fuse powders in a bed. SLM has become one of the most used methods of laser melting [4]. In real-time practice, the laser bed fusion method has been used in the production of a number of products such as steel [5], titanium [6], nickel [7], and aluminium alloys which are some of the real-time examples. The capacity of

manufacture unique components without the use of part-specific equipment is one of the advantages of LPBF technology. Laser powder bed fusion is a well-known innovative technology for developing and manufacturing high-performance components for aerospace and automotive applications [8]. Aluminium alloys are attracting attention as construction material for parts with a high strength-to-weight ratio, low cost, and damage tolerance [9]. In comparison to alloys such as stainless steel SS 316L, Inconel 718, and titanium alloy (Ti6Al4V) [5], the printability of aluminium alloy is inferior [10]. Due to a slight change in phase 2 and solidus temperature near the two series, six series, and seven series of superalloys, only near-eutectic casting alloys AlSi12 and AlSi10Mg are relatively simple to produce.

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Research Article

Assessment of Rotational Speed and Plunge Rate on Lap Shear Strength of FSSW Joints of AA7075/Mild Steel

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Friction stir spot welding (FSSW) is an upgraded version of the friction stir welding process. This welding process can be used to replace permanent and temporary fastens such as bolts and nuts, screws, rivets, and welds. FSSW can be utilized to replace steel rivets in aircraft structure fabrication due to the elimination of time required to complete the joints and special tools. Moreover, the joining of dissimilar joints is very difficult due to the formation of different proportions of intermetallic compounds in the weld region. A lot of process parameters may influence the quality of the joints. This investigation analyzes the effect of speed of tool rotation and plunge rate of tensile shear fracture load of AA7075 mild steel dissimilar metal joints. From the observation, the joint fabricated with a speed of tool rotation of 1000 rpm and a plunge rate of 6 mm/min yielded a maximum shear fracture load of 9.86 kN. This weld strength enhancement may be linked to the formation of dynamic recrystallization and density distribution of strengthening precipitates.

1. Introduction

Dissimilar materials (such as aluminum and steel) fill the specific requirements in engineering applications, such as corrosion resistance and weight reduction. However, due to their manufacturing complexity, it is challenging to join them. These two alloys are difficult to be welded using fusion welding process [1]. The intermetallic compound is the major problem in the welding region. The intermetallic compound will reduce the joint strength due to its brittle nature. Solid-state technology is an ideal process to join such type of dissimilar materials. Friction stir welding (FSW) is one of the processes to join similar and dissimilar materials [2]. FSW eliminates all the fusion welding problems. Rivets, bolts and nuts, and screws were used as mechanical elements to join dissimilar materials. Due to the large tool requirement, the riveting process consumes more time than other joining processes [3]. The friction stir spot welding (FSSW)

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Research Article

Optimization of WEDM Process Parameters in Al2024-Li-Si₃N₄ MMC

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The present study focuses on optimization of operating parameters in wire electric discharge machining of AA2024 aluminium alloy reinforced with lithium and silicon nitride particles. Aluminium composite was produced through the two-step stir casting route with the combination of 2% lithium and 10% silicon nitride reinforcements. Experiments were performed using the Taguchi design of experiments to optimize the selected input parameters such as pulse on time, pulse off time, current and wire feed for the response parameter, material removal rate, and surface roughness. An ANOVA-based regression equation with genetic algorithm was used to optimize the input variables. The gray relational grade was also performed to optimize multiple performance characteristics. Taguchi-based optimization analysis results in wire feed as the domination factor for material removal rate and surface roughness. Increased wire feed increases the material removal rate with good surface finish as confirmed from gray relational grade analysis. Regression equation generated results with minimum error (<2%) proving the accuracy of the investigation. A genetic algorithm-based study also confirms the analysis of Taguchi and gray relational grade. The wire feed rate at 3 m/min and pulse on time of 120 microseconds were found to be similar for material removal rate and surface finish. Current at 50 A increases the material removal rate and current at 30 A results in good surface finish.

1. Introduction

Advanced composite materials with high strength, high hardness, and light weight finds applications in defense, space craft, and engineering industries [1]. Aluminium composites with SiO2, SiC, B4C, and TiB2 reinforcements has shown remarkable improvements in terms of microstructural, mechanical, and thermal properties. Silica added composite reveals good fluidity with lower stiffness values. Increased heat transfer and wear resistance with better mechanical properties were noticed for the addition of silicon with the aluminium matrix [2, 3]. Machining of such composite materials is difficult in conventional machines and need focus on nonconventional techniques for good surface finish with accuracy. Wire

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Research Article

Mechanical Properties of Ramie/Hemp Hybrid Composites Influenced by Stacking Arrangement and NaOH Treatment

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This research is aimed at seeing how different stacking sequences and chemical treatments impact the mechanical characteristics of ramie–hemp composites. Hand-lay-up procedures were used to create a blend of woven ramie and hemp fibers. The woven ramie was treated with a diluted 6% sodium hydroxide (NaOH) solution to compare the mechanical properties of preserved and unpreserved ramie hybrid composites. According to the findings, the tensile properties of hybrid composites are better in three-layer composites than in four-layer composites. Hemp-based hybrid composites outperform other hybrid composites in terms of mechanical properties. Hybrid composites that have been treated have better tensile and flexural properties than hybrid composites that have not been treated. The sample H/R/H/R was found to have the best impact characteristics. This research is part of a more extensive investigation of hybrid composite's application in high-velocity impact applications.

1. Introduction

Natural fibers of diverse dimensions and properties, produced from plants, animals, and minerals, have been widely employed to suit textile demands for a long time. [1]. Like cotton, plant fibers have been beneficial for thousands of years, gaining the nickname "white gold." Two plant-based materials are now being utilized in combination with natural fibers [2, 3]. Polymer composites outperform traditional materials in terms of engineering. Chemical resistance is higher in polymers than it is in metals. Biodegradable and replenishable, natural fibers are a precious resource. Natural fibers provide a number of advantages over synthetic fibers, including the fact that they are nonabrasive, have a low den-sity, have good acoustic properties, are less expensive, are more readily available, and can be recycled more easily [4]. Composites can benefit from the use of ramie (Hibiscus cannabinus L.), which can replace synthetic fibers and other traditional materials. Among the many benefits of using ramie over synthetic materials are the fact that it is cheaper, less dense, more flexible, nonabrasive, toxic-free, reusable, and biodegradable [5–7]. Natural fibers, while their advantages, have some limitations in the industry. The low heat stability, high moisture absorption rate, and poor adhesion to synthetic alternatives limit the utilization of natural fibers in industrial applications. Natural fibers have been chemically modified and hybridized with synthetic fibers in the majority of situations [8]. Natural and synthetic fibers can be

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ORIGINAL RESEARCH

Sustainable Energy

Investigations of combustion, performance, and emission characteristics in a diesel engine fueled with *Prunus domestica* methyl ester and n-butanol blends

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Abstract

The chief objective of this study is to utilize non-edible, carbon-rich oil derived from *Prunus domestica* seeds as blended fuel. The combustion efficiency of derived blends shall further be enhanced by blending higher alcohol into bio-diesel/diesel blends. This work details the impact of effectively utilizing waste and non-edible oil to replace fossil fuels partially. In this study, the *P. domestica* is trans-esterified to methyl ester and blended with diesel at 20%. Further to enhance the ignition nature, butanol, higher alcohol, is blended to *P. domestica* biodiesel/diesel blends at 5% and 10%. The ignition pattern of the modified fuels is extensively studied and compared with diesel in a stationary research diesel engine. This study involves four fuel samples, namely, neat *P. domestica* methyl ester and is termed PDME. 20% of PDME is blended with 80% diesel is referred to as PDME20. 20% of PDME with 5% n-butanol and 75% diesel is termed PDME20Bu5D75, 20% of PDME with 10% n-butanol and 70% diesel is termed as PDME20Bu10D70 and diesel. Addition of PDME and butanol at different blends found miscible with diesel. PDME and butanol provided a suitable time for reaction and mixing, complete combustion, higher O_2 content, and rich fuel-air mixture, resulting in lower emissions than diesel. Further, butanol aided better atomization, effective combustion and resulted in higher efficiency with lower fuel consumption. Adding butanol also lowered the viscosity and improved the mixing process, and produced better in-cylinder pressure and heat release rate.

KEYWORDS

n-butanol, oxygenated fuel, *Prunus domestica* methyl ester, standard diesel

1 | INTRODUCTION

The global scenario regarding the depletion of fossil fuels is an alarming issue for the developed and rapidly developing countries to switch over to alternative energy sources.[1] The best source for replacing fossil fuels is bio-fuels, which have multiple advantages such as low cost of production, no changes required in the assembling unit of the automobile, and low percentage of exhaust emissions.[2] The sudden and unpredictable rise in prices for fossil fuels warns many researchers to focus intensively on developing and improving biofuels

Hindawi

Research Article

Performance and Emission Analysis of Watermelon Seed Oil Methyl Ester and n-Butanol Blends Fueled Diesel Engine

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The impact of n-butanol, a next-generation biofuel, with watermelon methyl ester in a constant-speed diesel engine was analyzed. Methyl ester from watermelon seed oil is considered to be a promising alternative source to the standard diesel due to similar characterization. The n-butanol additive was added in small proportions as an oxygenated fuel for reducing emissions, improving thermal efficiency, and accelerating the combustion process. N-Butanol is blended with watermelon methyl ester in the form of emulsions in two different proportions (5% and 10% volume basis). Experiments were conducted with three different emulsions fuels, WME20, W20Bu5D75, and W20Bu10D70, and compared vis-à-vis standard diesel. Investigations revealed that the addition of n-butanol as an enhancer with WME20 improved characteristics owing to its inherent nature of oxygen content. The blending of WME with n-butanol improves brake thermal efficiency when compared to WME20 and slightly matches with standard diesel. The max BTE was recorded 32.79% for WME20Bu10D70 at the crest load. The peak BSFC was 0.26 kg/kWh for W20Bu10D70 at the crest load. The emissions such as CO, smoke opacity, and HC were significantly reduced, vis-à-vis diesel, and the oxides of nitrogen (NO_X) and carbon dioxide (CO_2) were decreased, relative to WME20. The maximum EGT was 354.98°C for W20Bu10D70 at the crest load. The peak CO emissions were 0.078% for W20Bu5D75 at the crest load. The blending of n-butanol with WME20 reduces the ignition delay while the combustion duration increases with an increase at full load conditions. The emulsion fuels tested in an unmodified engine did no negative impact on the engine stability.

1. Introduction

Relative to any temporal phase in human history, the twenty-first century is forecasted to register the highest energy intensity and resource consumption, by virtue of increased demand driven by hitherto unprecedented prosperity. Over the course of the succeeding decades, a transition of substantial segments of the population, especially in Asia and Africa, from poverty to the middle with the concomitant change in consumption

Production of biodiesel from phoenix sylvestris oil: Process optimisation technique

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ARTICLE INFO

ABSTRACT

This research aims to extract biodiesel from Phoenix sylvestris seed oil (PSSO). The free fatty acids of biodiesel are evaluated and found to be 9.37 mg KOH/g. The high FFA value suggested implementing a two-step transesterification process. An optimisation technique was employed to achieve high yield with enhanced quality and minimum wastage. The Taguchi method optimised experimental entities such as methanol to oil proportion, agitation speed, catalyst quantity, and reaction temperature. The investigations revealed that agitation speed of 450 rpm with reaction temperature of 55 °C, the molar proportion of 4.5:1 and 1.5 wt% of NaOH produced 93.2% efficient conversion. The methanol to oil proportion is measured as the significant entity with 54.95% contribution in the reaction process using ANOVA. The biofuel obtained from Phoenix sylvestris seed oil matches with necessary international standards.

1. Introduction

The consumption of fossil fuels is the chief contributor to climate change and air pollution. The latest scientific evidence emphasises the need to lower greenhouse gases as the energy consumption rate is elevated by 2.9% (Ramasamy et al., 2021). Biofuels are innovative and efficient solutions to achieve pollution-free and eco-friendly industrialisation (Devarajan et al., 2021a). However, the major challenges linked with biodiesel are high fuel prices and food fuel conflict (Rangabashiam et al., 2021). In a developing nation like India, the luxury of diverting food crops for biodiesel production is dubious as it leads to food security (Raja. et al., 2021). In addition, fuel derived from animal fats cannot emerge as a viable source of biodiesel production as the majority of the people involved in the agriculture sector practice mixed farming, where animals serve as a source of livelihood (Nagappan et al., 2020). Hence, the most promising strategies are developing and mechanising alternative fuels produced from non-edible renewable resources (Arulprakasajothi et al., 2019). Alternate fuels derived from non-edible renewable products and crops will nullify the negative impact of

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Experimental analysis of Sterculia foetida biodiesel and butanol blends as a renewable and eco-friendly fuel

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ABSTRACT

The current research intended to investigate the performance, emission and combustion characteristics of Sterculia foetida biodiesel blending with n-butanol at two different proportions (5% and 10%). The non-edible nature of the Sterculia foetida kernel oil favored choosing as feedstock. It comprises more than 70% of sterculic acid, a cyclopropane ring in its chemical structure. The base-catalyzed transesterification process converted Sterculia foetida kernel oil into biodiesel. The n-butanol additive was added in 5% & 10% volume as an oxygenated fuel to S. foetida / diesel blends for reducing emissions and improving thermal efficiency. Investigations revealed that brake thermal efficiency was improved by adding n-butanol in the blends compared with 20% S. foetida biodiesel + 80% Diesel. The emissions such as carbon monoxide, smoke opacity and hydrocarbons have significantly reduced vis-à-vis standard diesel. The oxides of nitrogen (NO_X) and carbon dioxide (CO_2) decreased relative to 20% S. foetida biodiesel + 80% Diesel. The analysis in combustion registered an improvement for butanol/diesel/biodiesel blends relative to S. foetida biodiesel owing to the innate content of oxygen in Heat Release Rate and In-Cylinder Pressure. Hence the addition of butanol with S. foetida biodiesel appears as a good substitute for straight diesel.

1. Introduction

Challenges concerning the availability of land resources and the increase in population, especially in countries like India render edible oil a wrong choice for biodiesel production. Thus, it establishes the need to look into the utilization of inexpensive non-edible oils, and their products, because of their cost-effectiveness (Anjibabu et al., 2021, Asha et al., 2022). The predominant use of non-edible feedstock for biodiesel synthesis is mainly due to the restriction of edible oils to fulfill local needs (Tamilselvan et al., 2017). The use of non-edible oils will solve the food-fuel conflict. Diesel, as a fuel, is significant in various sectors like

industries, transportation and agriculture (Vijayaragavan et al., 2021). Due to limited availability, rising population, and growing energy demand (Singh and Chauhan, 2017). As tabulated below, India imports around 75% of crude oil from other countries. Table 1 represents the countries with % of crude oil imported by India. Crude oil imports are primarily responsible for deprecating the rupee against the dollar and resulting in sizeable outflows from the state's foreign exchange reserves (Silitonga et al., 2013, Choubey et al., 2021, Devarajan et al., 2021). The increased demand for petrol, diesel and kerosene indicates that a search for an alternate source of fuel that has similar characteristic behavior to that of diesel is an immediate and urgent need. The need to look after

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Analysis on improving the conversion rate and waste reduction on bioconversion of *Citrullus lanatus* seed oil and its characterization

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ARTICLE INFO

ABSTRACT

The works focus on maximizing the efficiency and reducing the wastage of reactant to make the possibility of upscaling in the bio-fuel production process for maximum yield conditions. Bio-oil derived from the *Citrullus lanatus* (Watermelon) for synthesizing methyl ester was used as a feedstock. The value of 1.13 mg KOH/g FFA content is recorded in the oil by employing the titration technique. Henceforth, transesterification using base catalyst reaction was allowed to transform watermelon seed oil into methyl ester. The experimental variables like methanol to oil molar ratio, KOH, and time remained for optimization based on the Taguchi technique. The outcome of the work was a 6:1 M ratio, 1 wt% KOH, 150 min and 55 °C are optimal experimental conditions for maximum conversion efficiency of 93.2%. Amid the four entities, the molar ratio was identified as the substantial influencing variable. The EN14214 standards were compared with characteristics of watermelon methyl ester, and the values obtained have fulfilled the requirements.

Authors contribution statement

Yuvarajan Devarajan and Bhanu Teja Nalla conceived of the experiential idea. Yuvarajan Devarajan, Bhanu Teja Nalla and Dinesh Babu Munuswamy conducted the experiments. Ganesan Subbiah and Ruby Mishra contributed to manuscript writing such as abstract, literature review, experimental fuel and methodology and interpretation of the results. Suresh Vellaiyan helped in interpretation of the results. All authors (Yuvarajan Devarajan, Bhanu Teja Nalla, Dinesh Babu Munuswamy, Ganesan Subbiah, Ruby Mishra, Suresh Vellaiyan) discussed the results and contributed to the final manuscript.

1. Introduction

The earth's major share of energy is currently dependent upon fossil resources. The depletion of fossil fuels, energy crisis, environmental concerns, and population growth needs to search for another alternative source to fulfil the energy demand (Sathiyamoorthi et al., 2021). One among them is biofuel, which has great credibility to replace fossil fuels. Biofuels, a promising substitute for replacing fossil fuels, are generally processed from organic resources like vegetable oils and animal fats. The advantages of Biofuels are lower exhaust emission, non-toxicity, biodegradable, environmentally friendly, negligible sulfur content, higher flash point and cetane number (Devarajan et al., 2021).

The rise in the attention of biofuels made from biological sources is considered an alternative source of energy due to its advantageous impacts in the unstable costs of the fuels decrease of greenhouse effect, transportation problems, and improvement in energy security (Ali et al., 2013). The interest in biodiesel can be ascribed to its biodegradable nature, non-toxicity and low carbon dioxide, hydrocarbon, particulate matter and nitrogen emissions. While there are myriad sources for the synthesis of methyl esters, the dominant source continues to be

ORIGINAL ARTICLE

An experimental study on transesterification process and emission analysis of diesel engine propelled with *Capparis spinosa* biodiesel

Kai Liu[1] · Yuvarajan Devarajan[2] · Vinnaras Nithyanantham[3] · Bhanu Teja Nalla[4] · Vybhav Krishnamurthy[5]

Abstract

This work involves a detailed study on the transesterification process of waste and non-edible seed oil derived from *Capparis spinosa* (CSBD) to fuel research diesel engines. The positive claim of employing non-edible seeds shall reduce fossil fuel usage. This work examines the study on CSBD on transesterification and the emission patterns of a 4-stroke research diesel engine. Emission patterns were calculated in various circumstances by changing CSBD percentage (10 and 20% volume) and diesel. Ten and 20% vol of CSBD blended with 90, and 80% of petro-diesel is referred to as D90CSBD10 and D80CSBD20, respectively. Results revealed that the CO, HC, and smoke opacity were lower with a slight increase in NO emissions for all CSBD blends than diesel. Hence, this study concluded that the fuel obtained from *Capparis spinosa* oil is a viable alternate to diesel.

Keywords Biodiesel · Emissions · Non-edible oil · Diesel · Engine

Abbreviations

BD	Biodiesel
CSBD	*Capparis spinosa* Biodiesel
D90CSBD10	90% Volume of diesel blended with 10% volume of CSBD
D80CSBD20	80% Volume of diesel blended with 20% volume of CSBD
CO	Carbon monoxide
NO_x	Oxides of nitrogen emission
HC	Unburned hydrocarbon

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1 Introduction

Environmental degradation and drastic rise in fossil fuel practice emphasize biodiesel usage as a possible substitute for diesel. Biodiesel is mainly produced from edible, non-edible waste products [1]. Rice bran, sunflower, groundnut, soybean, and mustard are the major sources of edible oils. Jatropha, mahua, and Karanja are the sources of non-edible oils. Furthermore, the used oils from restaurants and homes are employed as waste cooking oils. The oils derived from the waste seeds, namely neem, custard, sapota, cashew nuts, and grape, are waste and non-edible oil. The oils are converted to biodiesel by many path ways: esterification, transesterification, pyrolysis, thermal cracking, and many more [2]. However, many studies have concluded that transesterification is economical and viable to convert the oil to methyl/ethyl ester than other methods. Sathiyamoorthi et al. [3] made biodiesel from Palmarosa oil engaging the conventional transesterification process and produced 77.2% biodiesel in 67 min. Rangabashiam et al. [4] employed a conventional transesterification process of Annona squamosa and yielded 87.5% of methyl ester in 66 min. In another study, Raja et al. [5] produced biodiesel from grape seed oil following conventional transesterification procedures and yielded 80.2% biodiesel in 65 min. Devaraj et al. [6] employed a conventional transesterification process of Pongamia and yielded 82.3% of methyl ester in 74 min.

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ORIGINAL ARTICLE

Biofuel production from novel *Prunus domestica* kernel oil: process optimization technique

P Babu Aurtherson[1] · Bhanu Teja Nalla[2] · Karthikeyan Srinivasan[3] · Kulmani Mehar[4] · Yuvarajan Devarajan[5]

Abstract
Biodiesel obtained from low-cost non-edible oils is the most promising alternative fuel for conventional diesel fuel. In this current work, *Prunus domestica* kernel oil was used as a feedstock for synthesizing methyl ester. The FFA value of the kernel oil was examined by employing the isopropyl alcohol technique and found to be 11.63 mg KOH/g. Hence, oil was processed with a two-step transesterification process using acid (H_2SO_4) and base (NaOH) catalyst reaction to convert into biodiesel. To obtain maximum yield and high-quality biodiesel, an optimization technique was employed. In this technique, the process parameters such as experimental duration, reaction temperature, NaOH concentration, and methanol to oil ratio were optimized based on Taguchi technique. The investigations revealed that 150 min, 60°C, 8:1 ratio, and 1 wt% NaOH were optimal process parameters obtained with a reaction efficiency of 97.86%. The experimental analysis considered that the methanol to oil ratio was happened to be the most substantial entity using ANOVA. The biodiesel *Prunus domestica* methyl ester produced matched and fulfilled the standards EN14214.

Keywords *Prunus domestica* kernel oil · Transesterification · Optimization · Taguchi · ANOVA · Biodiesel · *Prunus domestica* methyl ester

Abbreviations
PDFO	*Prunus domestica* kernel oil
RBF	Round bottom flask
PDME	*Prunus domestica* methyl ester
ANOVA	Analysis of variance
FFA	Free fatty acid
DOE	Design of experiment
A.V	Acid value
S/N ratio	Signal to noise ratio
OA	Orthogonal array

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1 Introduction

The fundamental concerns of public policymakers, researchers, and engineers centered exclusively around the formulation of innovative solutions and technologies to achieve rapid economic growth and industrialization, with little to no concern apropos the depletion of resources or inadvertent detrimental effects on the environment. With the emergence of the concept of sustainable development and the scientific consensus vis-a-vis the anthropogenic acceleration of climate change, environment-consciousness has become an integral part of engineering design [1].

Attributable to the paradigm mentioned earlier, a shift is, indubitably, the environmental damage wrecked by the utilization of fossil fuels. Particularly the release of CO_2, smoke opacity emission is a cause of grave concern [2, 3]. The International Panel on Climate Change portends that a 1.5 degrees centigrade rise in global average temperature will result in global weather extremities, more frequent floods, droughts, rise in sea level, among other things. The impacts of climate change will be devastating for an agricultural nation

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ORIGINAL ARTICLE

Production Process Optimization study on the synthesis of *Manilkara zapota* seed bio-oil and its characterization

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Abstract

In this study, *Manilkara zapota* seed oil was used for biodiesel production. The free fatty acid content of the oil was determined as 5.91 mg KOH/g and hence a two-step acid-base transesterification reaction was followed to convert *M. zapota* seed oil into biodiesel. The performance variables such as reaction temperature, alcohol to oil ratio, experimental duration, and catalyst weight were optimized using Taguchi orthogonal array. The study revealed a 40°C reaction temperature, 6:1 alcohol-to-oil ratio, 150 min experimental duration, and 1 wt.% NaOH catalyst that were optimal performance variables to obtain maximum conversion efficiency of 97.08%. Among the four performance variables, the alcohol-to-oil ratio was found to be the most effective variable with 84.36% of the contribution. The synthesized *Manilkara zapota* methyl ester (MZME) procured from seed oil with optimized performance variables matches with the standards of ASME D 6751.

Keywords *Manilkara zapota* seed oil · Transesterification · Optimization · Taguchi orthogonal array · Biodiesel

Abbreviations

MZSO	*Manilkara zapota* seed oil
MZME	*Manilkara zapota* methyl ester
OA	orthogonal array
RBF	round bottom flask
A.V	acid value
FFA	free fatty acid
DOE	design of experiment
ANOVA	analysis of variance
S/N ratio	signal to noise ratio

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1 Introduction

The contribution of fossil fuels such as crude oil, coal and natural gas to the total world's energy consumption is more and exhaustive over the years. On the other end, continuous usage of these fossil fuels poses serious environmental issues like global warming and climate change which endangers man's existence in the future [1]. Combinations of these factors are driving mankind to search for alternative and sustainable fuels for internal combustion engines [2]. Biodiesel has received greater attention because of non-toxicity, renewability and biodegradability. Owing to its comparable physio-chemical properties with diesel, it can be the best alternative fuel for the diesel engine [3]. Moreover, diesel engines using biodiesel as fuel produces lower emissions of carbon monoxide, particulate matter and oxides of sulfur [4]. USA, Europe, Indonesia and Malaysia are major producers of edible oils and biodiesel is being produced in these countries using edible oils

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Research Article
Processing and Characterization of Carbon Nanofibre Composites for Automotive Applications

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Currently, numerous studies have shown that carbon nanofibres have mechanical properties that are replaced by other widely used fibres. The high tensile strength of the carbon fibres makes them ideal to use in polymer matrix composites. The high-strength fibres can be used in short form in a composite and mass-produced to meet the high demands of automotive applications. These composites are capable of addressing the strength requirement of nonstructural and structural components of the automotive industry. Due to these composite lightweight and high-strength weight ratios, the applications can be widely varying. The research for these materials is a never-ending process, as researchers and design engineers are yet to tap its full potential. This study fabricated phenolic resin with different wt% of carbon nanofibre (CNF). The percentage of the CNF as a filler material is varied from 1 to 4 wt%. Mechanical properties such as hardness, tensile strength, and XRD were investigated. Phenolic resin with 4 wt% of carbon nanofibre (CNF) exhibits maximum tensile strength and hardness of 43.8 MPa and 37.8 HV.

1. Introduction

Nanocomposites provide a new class of material having combined properties of matrix and filler [1]. Nanocomposites using different fillers such as carbon nanotubes, nanofibres, silicates, clays, and metal nanoparticles can be prepared and applied in different fields like biomedical engineering, environmental applications, surface science, and the pharmaceutical field [2]. High-performance engineering materials with innovative properties were prepared through nanocomposite fabrication [3]. From the past few decades, the potential of carbon nanofibres (CNFs) and carbon nanotube (CNT) has been expanding [4]. Researchers around the globe are working to utilise the superior properties that these nanocomponents possess for various applications. The applications range from biosensors to new-age batteries

[5]. The high surface area with less volume of CNF is suitable to suppress the defects that can be raised [6]. For micromechanical interlocking, the CNTs should exhibit some surface defects. This may include bonds in the CNT structure due to nonhexagonal defects and variation in diameter [7]. This kind of adhesion is very poor in CNT reinforced polymer composites because CNTs possess an almost smooth surface [8]. Chemical bonding includes ionic or covalent bonding capable of making changes in the smooth surface structure of CNTs. This helps to improve the effective stress transfer between the filler and matrix [9].

Depending on the carbon atom layer orientation in the CNF, the properties have varied. Carbon sp^2 filaments are stacked, and the CNFs are formed [10]. Depending on the stacking of the graphite planes, the CNF has different shapes [11]. Magesh et al. developed MWCNT incorporated

Teachers' perception about Online Teaching-Learning

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Abstract: The outbreak of COVID-19 virus has brought the world to standstill and witnessed the slowdown in almost all the major fields such as finance, industry and education except IT sector. But education sector passed through a worst phase after having shut down of all the educational institutions and universities in the country. In view of this, online class work is implemented to avoid the loss of academic year for the students by scheduling them. A compressive survey is conducted in this work, to get aware of the facts and figures about online teaching and learning and the teachers' perception is analysed.

Keywords— Online teaching, Teaching software, Demographic Analysis

I. INTRODUCTION

Education sector is adopting internet-based teaching and learning as the normal life is disrupted heavily due to lockdowns and other restrictions imposed by the Governments. The situations forced the students, parents and teachers to move to online platform to avoid the academic loss to the students. Teachers and students chose the available platforms such as Microsoft Teams, Zoom etc. Apart from these, online organizations such as Coursera offering online courses with certification for the students and academicians globally. Even prestigious education institutes in India such as IIT Madras, Chennai have come forward by announcing the degree courses and certificate courses through online mode [Jan et al, 2017].

Developing countries like India, technological facilities are not extensively available to all the students and teachers to implement online teaching and learning effectively. Students from remote and rural areas have suffered from many issues. State Governments established the education channels using available networks, for example, Kalvi TV in Tamil Nadu, Mana TV in Andhra Pradesh [AP Government, 2021] are implementing the schedules to cover the syllabi and to avoid any waste of time for the students during the academic year [Santhi, 2020].

Conventional method, Chalk & Board helps the learners to grow with the efficient interaction with the teachers and peers [Ajideh, 2003]. Teacher can directly teach the concepts in the class room and it facilitates the teacher to understand the strengths and weaknesses of students and to clarify their doubts, if any. In some cases, students may feel shy to raise their doubts in class room with the teacher concerned.

At the same time, students are having lot of flexibility to interact with the teacher with respect to the concepts and teachers also feel comfortable to attend online schedules. Online classes eliminate physical travel which saves the time and other resources. Teachers can easily evaluate the students' assignments through online submissions. On the contrary, question arises here that the students/learners will be online but whether they are attentive to the online teaching or not. Moreover, there is a chance of malpractice on the part of students to copy the answers or files, while writing their assignments. It was observed that, teachers are paid either low salary or no salary by few organizations [Jena, 2020].

As a matter of fact that whether it is conventional class room or online class, it is mandatory for the students to attend their classes as per the schedules and the evaluation of examination answer scripts may be carried out online or offline and Anna University [TNM Staff, 2020] is conducting evaluation online and off-line evaluation is being carried out by the Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh [TNM Staff, 2020]. In this work, a survey is conducted by considering certain geographical area, to know the impact of online teaching and learning and the reasons identified on the part of teachers and their perception about online classes.

2. RESEARCH METHODOLOGY

The study investigated about the teachers' opinion about online class work in East Godavari district of Andhra Pradesh state by distributing the questionnaire to as many as 200 teachers of UG/PG programmes. Only 65 teachers are responded

Exploration of Cu/g-C₃N₄ Nanocomposites as a Cost-Effective High-Performance Asymmetric Supercapacitor Electrode Material

Sebina Yesmin, Inamul Hussain, Meghali Devi, Rajdeep Dasgupta, and Siddhartha S. Dhar

Abstract— This work reports the synthesis, characterization, and electrochemical analysis of composites comprised of copper nanoparticles grafted on graphitic carbon nitride (g-C₃N₄) for cost-effective, high-performance supercapacitor applications. A facile synthesis method was adopted to impregnate copper nanoparticles over g-C₃N₄ sheets, and structural and morphological characterizations evidenced successful in situ grafting of Cu/g-C₃N₄. Different electrochemical investigations were accomplished to estimate the supercapacitive behavior of the designed electrode material. These electrochemical analyses unveiled that the designed nanocomposites showed superior electrochemical performances than pristine g-C₃N₄. Equivalent series resistance of 1.61 Ω was obtained for Cu/g-C₃N₄, which is lesser than base material g-C₃N₄ sheets (2.19 Ω) from the Nyquist plot of EIS spectra. An asymmetric solid-state supercapacitor was designed, and a specific capacitance of 265.25 Fg^{-1} at 0.5 Ag^{-1} current density was found, along with an energy density of 36.87 Wh/kg at a power density of 2.50 kW/kg. Moreover, good cyclic consistency of 79.4 % capacitance retention was obtained at 5 Ag^{-1} at 5000 cycles. These electrochemical performances indicate that Cu/g-C₃N₄ nanocomposites have a vast potential to use in energy storage perspective.

Index Terms— Copper nanoparticles, electrochemical analysis, specific energy, graphitic carbon nitride, specific power, supercapacitors.

I. INTRODUCTION

As the year passes, the importance of energy production, storage, and conversion has increased due to the expansion of human civilization. With the rapid growth of industrial innovation and technological up-gradation, the existing fossil fuel cannot fulfill the required energy demand of the increasing human population. Until 2016, fossil fuels contributed 62.88% of the world's energy demands, and 25% of the total global greenhouse gas emissions were responsible for this combustion of fossil fuels [1-4]. Hence, it becomes an utmost responsibility to balance the existing ecosystem by replacing green, reasonable, and high-capable renewable energy sources and storage devices for fossil fuels. Supercapacitors have been attracted to the recent energy storage applications among energy storage devices like capacitors, batteries, fuel cells, etc., owing to their capability to bridge the high-performance energy density of the battery with the high-performance power density of the capacitor by utilizing its quick storage and even discharge of energy properties [5]. The performance of an electrochemical device relies on the materials used in the designing processes, and the selection of electrode materials for supercapacitors is crucial due to the need for a high surface area, suitable electrical conductivity, chemical solidity compatible with different electrolytes, and permeability of electrolyte solutions [6] altogether. Supercapacitors are categorized as electrochemical double-layer capacitors (EDLC), pseudocapacitors, or hybrid capacitors grounded on the electrode materials and charge buildup processes [5]. Various carbonaceous materials [7] can store charges and deliver energy by developing double layers of charges on electrode/electrolyte interfaces, whereas redox materials like transitions metal oxides [8] and conducting polymers [9] are employed as pseudocapacitor electrodes where storing charges take place via faradaic mechanisms. Composite hybrid capacitors use carbonaceous material, metal oxide, and conductive polymers, which integrate the functionality of EDLCs and pseudocapacitors.

Graphitic carbon nitride (g-C₃N₄), with its peculiar graphite layout, can have numerous photocatalytic, pollution degradation, energy storage, etc., applications [10-12]. Due to the advantages associated with g-C₃N₄, like easy preparation, cost-effectiveness, and excellent thermal and chemical stability, different heterostructures based on g-C₃N₄ have proven to be attractive electrode materials for supercapacitors [14-21]. Noble metals can have the prospective to be employed as electrode material for supercapacitors for their excellent conducting properties and high electrochemical stability in different electrolytes [22]. Hence, many quality works were reported based on copper, silver, gold, platinum, etc., for metal-based electrode material for supercapacitors [23-33]. In this work, the enhancement of electrochemical performances was accomplished by impregnating copper nanoparticles over g-C₃N₄ sheets by improving the specific capacitances by augmenting the conductivity, surface area, and porosity g-C₃N₄ with a facile, low-cost synthesis process. The evaluation of electrochemical analysis was carried out by different methods

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Research Article

Artificial Intelligence-Based Smart Comrade Robot for Elders Healthcare with Strait Rescue System

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A rising proportion of older people has more demand on services including hospitals, retirement homes, and assisted living facilities. Regaining control of this population's expectations will pose new difficulties for lawmakers, medical professionals, and the society at large. Smart technology can help older people to have independent and fulfilling lives while still living safely and securely in the community. In the last several decades, the number of sectors using robots has risen. Comrade robots have made their appearance in old human life, with the most recent notable appearance being in their care. The number of elderly individuals is increasing dramatically throughout the globe. The source of the story is the use of robots to help elderly people with day-to-day activities. Speech data and facial recognition model are done with AI model. Here, with the Comrade robotic model, elder people's healthcare system is designed with better analysis state. The aim is to put in place a simple robotic buddy to determine the health of the old person via a headband that has been given to them. Comrade robot may do things like senior citizens home automation, home equipment control, safety, and wellbeing sensing, and, in emergency situation, routine duties like navigating in the outside world. The fear that robotics and artificial intelligence would eventually eliminate most of the jobs is increasing. It is anticipated that, in order to survive and stay relevant in the constantly shifting environment of work, workers of the future will need to be creative and versatile and prepared to identify new business possibilities and change industry to meet challenges of the world. According to the research, reflective practice, time management, communicating, and collaboration are important in fostering creativity.

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REVIEW

Analysis of performance, combustion, and emission parameters in a reactivity-controlled combustion ignition (RCCI) engine – an intensive review

P. V. Elumalai [a], A. R. Pradeepkumar[b], M. Murugan [c], A. Saravanan [a], M. Sreenivasa Reddy[a], S. Rama Sree[d] and G. Meenakshi Sundaram[e]

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ABSTRACT

The new diversion of research in the field of engine modification is reactivity-induced compression ignition (RCCI). Researchers recommend that RCCI is the solution for regulating pre-mixed combustion, thereby promoting lean air–fuel mixture combustion. It is also suitable for low-temperature operations. The combination of lean mixture and low-temperature operations leads to a reduction of the oxides of nitrogen and particles of soot production during combustion. This paper analyses the principle and methodology of RCCI and compares its performance with homogeneous controlled compression ignition (HCCI). An intensive literature review is done and a concluding report is compiled. This will be an essential content for researchers who pursue their experimental and analytical work in RCCI. The future scope of RCCI can be extended to alternate fuel sources such as biodiesel ethanol and natural gas by adopting HCCI concepts. However, there are a few limitations in this, such as higher HC and CO emissions, which may necessitate oxidation catalysts.

1. Introduction

In the automobile sector, conventional engines are the most preferred for the automotive and power production sector due to their consumption and cost economy in terms of fuel used (Benajes et al. 2016; Kakaee, Rahnama, and Paykani 2015). However, diesel engines are being ignored by many manufacturers because of their environmental pollution, especially caused by the oxides of nitrogen and soot emission (elumalai et al. 2021). A lot of research studies have been carried out to limit emissions from the diesel engine in past decades. Hence, researchers devoted their efforts towards reducing pollutants as these affect human health and the environment (senthur et al. 2022; Kakaee, Rahnama, and Paykani 2015). Work on in-cylinder treatment and exhaust treatment systems is going on at a fast pace to meet the stringent emission standards. There are a few devices for post-emission treatment, such as particulate filters, lean NO$_x$ trap, after-treatment devices, etc. However, the devices for post-emission treatment are not durable and cost-effective (Kakaee et al. 2016). Many researchers have already attempted in-cylinder treatment of NO$_x$ and soot particles. Low-temperature combustion has been found to reduce the emission of nitrogen oxides (NO$_x$) due to high triggering energy (Zhang et al. 2017).

In homogeneous controlled compression ignition (HCCI) technology, the combined decrease of nitrogen and soot can be accomplished by controlling the timing of ignition and the heat release rate (HRR), resulting in an almost constant combustion volume. However, it leads to a rapid rise of heat release and pressure, and, therefore, regulation of the combustion process is required (Dempsey et al. 2014).

RCCI technology adopts the principle followed in dual fuel consumption. It can be termed as a variant of HCCI that controls the combustion process while using less fuel quantity. In general, RCCI has the capacity of in-cylinder fuel blending and multiple injections. It controls the reaction of fuels to enhance the quality of combustion. The low-reactivity fuel produced in the combustion cylinder in the RCCI engine generates a completely mixed charge of low-reactivity fuel–air and recirculated exhaust gas. The slightly elevated gasoline is then infused until all of the charge in the combustion is consumed. The RCCI engine eliminates the post-treatment methods of reducing emissions. Low fuel reactivity also contributes to greater fuel efficiency. Low-reactive fuel and air are directly passed through the inlet in a few trials, while high-reactivity combustion takes place directly. Petrol has been used as low-reactivity fuel in most cases. Many researchers have demonstrated their engines with increased fuel efficiency. Nearly all researchers have shown that RCCI technology simultaneously reduces nitrogen oxides and particulate matter. RCCI is a concept developed by the Wisconsin–Madison University, which has achieved 60% thermal efficiency. This explains that 60% of fuel has been utilised for producing power (Elumalai et al. 2021).

Tables 1 and 2 display RCCI engine efficiency and combustion and emission characteristics for specific fuels used. They

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Weighted 1D-local binary pattern features and Taylor-Henry gas solubility optimization based Deep Maxout network for discovering epileptic seizure using EEG

G. Jaffino ᵃ ✉, M. Sundaram ᵇ ✉, J. Prabin Jose ᶜ ✉

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Abstract

Epilepsy represents chaos in nerves which can affect the world's population. Such type of abnormal activities of the brain can lead to seizures. Hence, precise and timely treatment of seizures is important to minimize financial and living costs. Electroencephalogram (EEG) is considered an imperative tool for analyzing epilepsy to diagnose epilepsy. This paper devises an optimization-aware deep model for detecting epilepsy using EEG signals. Here, the EEG signals undergo feature extraction wherein several features like relative amplitude, spectral entropy, logarithmic band power, power spectral density, Multiple kernel weighted Mel frequency cepstral coefficient (MKMFCC), tonal power ratio. The proposed weighted one-dimensional Local Binary Pattern (1D LBP) is obtained by combining weighted function in 1D-LBP are extracted. After extraction of features, data augmentation is carried out by flipping the EEG signal with the circular shift. The training of the Deep Maxout network is trained is done by the devised Taylor Henry gas solubility optimization (Taylor HGSO), by merging the Taylor Series and HGSO. The developed Taylor HGSO-based Deep Maxout network offered enhanced performance with high accuracy of 93.6%, sensitivity of 94.7%, and specificity of 93.4%.

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Keywords

Epileptic seizure detection; Deep Maxout network; Electroencephalogram signal; One-dimensional local binary pattern; Data augmentation

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Research Article

Hybrid Feature-Based Disease Detection in Plant Leaf Using Convolutional Neural Network, Bayesian Optimized SVM, and Random Forest Classifier

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Plant diseases are unfavourable factors that cause a significant decrease in the quality and quantity of crops. Experienced biologists or farmers often observe plants with the naked eye for disease, but this method is often imprecise and can take a long time. In this study, we use artificial intelligence and computer vision techniques to achieve the goal of designing and developing an intelligent classification mechanism for leaf diseases. This paper follows two methodologies and their simulation outcomes are compared for performance evaluation. In the first part, data augmentation is performed on the PlantVillage data set images (for apple, corn, potato, tomato, and rice plants), and their deep features are extracted using convolutional neural network (CNN). These features are classified by a Bayesian optimized support vector machine classifier and the results attained in terms of precision, sensitivity, f-score, and accuracy. The above-said methodologies will enable farmers all over the world to take early action to prevent their crops from becoming irreversibly damaged, thereby saving the world and themselves from a potential economic crisis. The second part of the methodology starts with the preprocessing of data set images, and their texture and color features are extracted by histogram of oriented gradient (HoG), GLCM, and color moments. Here, the three types of features, that is, color, texture, and deep features, are combined to form hybrid features. The binary particle swarm optimization is applied for the selection of these hybrid features followed by the classification with random forest classifier to get the simulation results. Binary particle swarm optimization plays a crucial role in hybrid feature selection; the purpose of this Algorithm is to obtain the suitable output with the least features. The comparative analysis of both techniques is presented with the use of the above-mentioned evaluation parameters.

1. Introduction

Diseases, pests, and other undesirable substances present in crops can cause a sharp decline in agricultural production [1]. The impact of these dangerous factors on crops has a direct impact on the decline of the quality and quantity of crops. To combat, control, and mitigate the effects of biological organisms and diseases, the term "pesticides" was coined [2]. Typically, the diagnosis of plant pests and diseases is usually analyzed by visual inspection based on the

Using electroencephalogram classification in a convolutional neural network, infer privacy on healthcare internet of things 5.0

U. S. B. K. Mahalaxmi ✉, Kishan Bhushan Sahay, R. Sabitha, Sulaima Lebbe Abdul Haleem, Prabjot Kaur, P. Vijayakumar

Abstract

When enabled by the internet of health things (IoHT), brain neuroscience may conduct online analysis of brain information through multi-variate electroencephalogram (EEG) classification, which would be a requirement for the recent surge in biofeedback technologies and medical supervision. With the ever-increasing privacy issues and vulnerabilities of conventional methods, a universal and reliable-based authentication framework for smart IoHT application with 5G technology (healthcare 5.0) is needed. Research teams have come to trust the EEG features because of their reliability, durability and universality. Fortunately, the testing paradigm's restricted functionality and poor classification accuracy have kept an EEG-based identity authentication scheme from being widely seen in IoHT scenarios. However, due to unsatisfactory categories and the failure of a reliable identity authentication scheme, it remains important in research challenges. This research presents the design of an EEG identity authentication system supported via convolutional neural network classification includes cloud support storage methodology in the healthcare 5.0 environment, resulting in extremely high reliability, consistency and protection for the next generation of smart systems. The experimental results indicate that the accuracy and efficacy of the user authentication expect a higher legal probability of success and a lower unauthorized likelihood of success from a safety perspective. As compared to other frameworks, traditional EEG-based authorization approaches test results to reveal that the proposed methodology yields the desired classification accuracy of 97.6%. The experiment performance on an authentication scenario is structured to prove that the proposed method is efficient, reliable and accurate.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

Journal of Nuclear Energy Science & Power Generation Technology

Research Article

Evaluate and Design the Mini-Hexagon-Shaped Monopole Antenna Controller to Minimize Losses in the Unit

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Abstract

Main Aim: Hexagon-shaped mono-pole transmitters are developed, computed, and evaluated in a range of applications. Their whole performance is being compared.

Methods: Various hexagon-shaped mono-pole transmitters are built and modeled using the HFSS. These transmitters are built with Defective Ground Structure (DGS) but include openings in the patch antenna for High-Frequency Spread Spectrum (HFSS), also on the surface, but also. That influence including its position including its slot upon this radiation pattern is examined. Evaluate the modeling, the controller was designed for the broadcast subsystems and respective reflectivity and VSWR have been found.

Findings: The specifications of the antenna is return losses, VSWR, amplification and switching frequency, among other things are assessed as are usually uncertain and VSWR for the manufactured device. The transmissions are continuously monitored. Another most unclear wavelength is around 10 dB among a large bandwidth and that they are less than 10 dB over a specific frequency range. The value of VSWR is less than 2.

Applications: These transmitters may be utilized for wirelessly and interior activities via UWB technology.

Keywords: Gains; Hexagon shaped patchwork; Returning loss; Slot module; and UWB

Introduction

To facilitate industrial applications, the Federal Trade Commission allocated a frequency range between 3.1 GHz and 10.6 GHz. When it comes to these operations, monopole antennas are often employed because of their high bandwidth [1]. However, the disadvantage of traditional monopoles is that they are not simple and need a wide input impedance orthogonal to the radiating patch. The results of research into shrinking the size of antennas resulted in the creation of UWB printed electronics that used a partial ground plane many scientists [2] are presently focusing on conventional single ultra-wide bands with perforations mostly in major updates and occasionally potentially perforations mostly in the earth. Due to its excellent connection speed, energy efficiency, easy setup, cost-effectiveness, compact size, low density, and broadband breadth such broadcasters have become extremely prevalent [3–24]. They're getting cheaper.

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This influences the generation of energy if a spot is eliminated from the patchwork. The present proportion on the patch antenna changes as a result of changing the slot placement. The lowest operational frequency at which currents produced on the surface of the antenna may travel is dependent on the length of the greatest electrical route that can be traveled. When it comes to attaining UWB properties, the design of the groove and the size of the slot are critical. Generally, the current is generated at the base of the monopole, and even on opposite sides of the monopole's edges. As a result, slots are cut into the bottom margins of the patch, next to the feed line, to enhance UWB parameters. It is also important to note that the bottom layer of the transmitter is a component of the radiating configuration as well as the beam width on the radiating patch. When it comes to obtaining broadband capabilities, the distance between the patch antenna and the patch is essential. It is necessary to utilize a faulty ground construction for UWB characteristics while using a monopole antenna. Bevel slots are cut onto the grounding plane to provide optimal matching and susceptibility bandwidth.

Developers analyze the accuracy of several smallish classifications on UWB hexagonal antenna configurations with microstrip feeds, which are expected to operate in the spectral region 3 GHz-12 GHz.

Variations in patch antenna width and slot measurements are to examine the effects of varying radiation patchwork functionality lengths and slot measurements. A faulty ground construction is used in every instance. Total return loss, VSWR, gain, and switching frequency of various configurations are all measured to compare their performance. The transmitters are developed and tested with the help of the HFSS program.

In addition to modeling as well as assigning tasks, hexagonal transmitters including an L-gap are created and transmission losses are assessed in the lower bug fix and slotted (antenna-1) another with a rectangular form slot in the grounding bug fix and spaces mostly in-plane (antenna-2).

Design of a Hexagon Shaped Monopole Transmitter Antenna

A rectangles patchwork should then be produced, keeping considering careful mind the input impedance, to generate a hexagonally configured magnetic dipole. Afterward, this is converted into something like a broadband transmitter by adding perforations therein. Finally, that use analogous expressions most of which are presented in the next sections, it is converted into yet another hexagonal configuration. Concourse within that paper would be an "L" channel hexagon-shaped aerial, patching openings, and microstrip patch openings. That L-slot, bevel-slots inside this patch and charged particle apertures are required. That the very first commencement node is considered to have been the reflection coefficient of 2.98 GHz.

For Transmitter 2 we have cut a hexagonal antennae patch with a rectangular patch, beveled slots in the patches, and a round slot on the bandpass filter, as well as rectangular slots in the bottom layer or ground plane of the patch. The frequency range of 7.5 GHz has been assessed and transmission signal 2 findings were first examined. The substratum is FR4 thick of 1 mm as well as the dielectric of 4.4, used

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RESEARCH-ARTICLE   𝕐 in ☽ f ✉

Design and Optimization of Microstrip patch Antenna via Improved Metaheuristic Algorithm

Authors: 👤 Ramakrishna Guttula, 👤 Venkateswara Rao Nandanavanam, 👤 Vella Satyanarayana
Authors Info & Claims

Published: 01 September 2021 Publication History

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Abstract

ABSTRACT

Nowadays, Microstrip patch antennas (MPA) are commonly deployed in various applications as it has number of benefits like compatibility, lower volume, low weight, low cost and easiness to install on

approach, which derives a non-linear objective model to assist in designing the solution spaces of antenna constraints. For this, a new improved optimization concept termed as Elephant Herding

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In-situ grafting of Au and Cu nanoparticles over graphitic carbon nitride sheets and unveiling its superior supercapacitive performance as a hybrid composite electrode material

Sebina Yesmin [a]   ✉, Meghali Devi [b], Inamul Hussain [c], Rajdeep Dasgupta [a], Siddhartha S. Dhar [b]

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Abstract

In this article, a bimetallic hybrid composite of Au and Cu nanoparticles over graphitic carbon nitride has been reported as supercapacitor electrode material. The bimetallic Au-Cu/g-C_3N_4 hybrid was synthesized using facile one-phase impregnation of Au and Cu nanoparticles in holey g-C_3N_4 sheets. The as-synthesized materials were systematically characterized to assess structural, morphological, electronic, and thermal properties. The electrochemical tests revealed that the Au-Cu/g-C_3N_4 hybrid uncovers a superior specific capacitance of 506.25 F/g at 1.25 A/g current density amiable cycle stability with 76.1% capacitance retention at 5 A/g current density after 5000 cycles and excellent rate capability. Our designed asymmetric supercapacitor device based on Au-Cu/g-C_3N_4 hybrid unveils specific energy of 59.3 Wh/kg at a specific power of 2.49 kW/kg. The substantial enhancement in supercapacitor performance of Au-Cu/g-C_3N_4 compared to pristine g-C_3N_4, Au/g-C_3N_4, and Cu/g-C_3N_4 is attributed to synergy between Au, Cu nanoparticles, and semiconductor g-C_3N_4 surface. In hybrid electrode material, the mass ratio of components plays a vital role synergistic supercapacitive effect.

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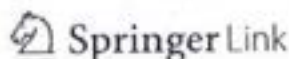
Contour and Texture-Based Approaches for Dental Radiographic and Photographic Images in Forensic Identification

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Abstract

In forensic odontology, the challenging task is to identity the decomposed and severely burnt corpse of individual person. In such a situation, dental records have been used as a prime tool for forensic identification. The main goal of this work, by comparing the analysis of contour shape extraction and texture feature extraction for both radiographic and photographic images, is used to identify a person. In this work, contourlet transform is used as a contour shape extraction; Local Binary Pattern (LBP), Center-Symmetric Local Binary Pattern (CS-LBP) are used as texture features. Both AM and PM images are used to identify the person more accurately by comparing different matching algorithms. In order to salvage better matching performance, Cumulative Matching Curve (CMC) is used for both radiographic and photographic images. Better matching is observed for radiographic images than photographic images by Hit rate performance metrics.

Keywords

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Wideband Antenna Array For C Band Applications

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Abstract— A Wideband antenna array is proposed for the C-band applications. Proposed antenna is a eight element corporate feed antenna with a coax feed. The radiating element is a diagonally truncated rectangular patch with two symmetric slots on either side of the patch. The symmetric slots are used to get the necessary bandwidth and the diagonal truncations are used to get right hand circular polarization. The simulation results show that the proposed antenna is radiating at 5.72 GHz with a return loss of –20.62 dB and a band width of 132 MHz ranging from 5.630 GHz to 5.762 GHz. The gain of the antenna is 14.81 dB with a beam width of 40^0 and a side lobe level of 13 dB. From the obtained simulation results it is evident that the proposed antenna is best suited for the C-band applications.

Keywords— Circular Polarisatio; C-band; symmetric slots

1. Introduction

C-Band which covers the frequency range from 4GHz to 8 GHz have two major applications, One is the satellite communication and the other is the Weather radar. Antenna is an important component for any communication system, though microstrip antennas have low gain and bandwidth they are highly desired with some of their unique characteristics of low profile and ease of fabrication. To over come the above said disadvantages researchers have proposed many techniques. To enhance gain one of the best followed technique is forming antenna array and to enhance the band width one of the techniques is to place symmetric slots in the patch [1]-[3]. For both the C-band applications, needs an antenna with high gain and wide band width. The c band frequency allow radar to create small beamwidth with a small antenna. The c-band signal attenuates easily and so been used for the weather observation in short range. The antenna size is smaller because of the frequency and wavelength and this is useful for the radars for TV stations. Circular polarisation when compared to linear polarization reduces the effect of adverse climatic conditions on signal and the signal attenuation is reduced by using circular polarization [4].

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FACIAL EMOTIONS RECOGNITION SYSTEM FOR TESTED IMAGES BY USING NAIVE BAYES CLASSIFICATION

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Abstract

Facial Expression Recognition (FER) has challenging task in computer vision. These expressions are very important carriers for human to convey emotions in communication. Here we present basic expressions like angry, fear, neutral, sadness, surprise and disgust. One of the non-verbal communication method by which one understands the mood of a person is the expression of face. Colored image or an image in a video sequence is the input of the processing system. Different classifications and algorithms are available for FER, of which different classifications gives different accuracies. The existing SVM and Naive Bayes classification is proposed to classify the facial expressions and the accuracy of detecting the emotion is calculated.

I. Introduction

Faces play a crucial role in FER. Interaction with others humans possess and express various emotions. Emotions are mainly reflected through facial

Low Power Health Monitoring With Active Personal Assistance Based Upon IOT

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Abstract—Among sensible goals of active and assisted living paradigm is the unobtrusive monitoring of daily living activities. A lot of research has been going on continuous home and personal monitoring applications. There are many solutions were adapted by these technologies to make better remote monitoring applications. The traditional continuous home and personal monitoring systems which are implemented with traditional client-server architecture which may fail in factors like low power consumption, un-deterministic data delivery time. More sensitive to external connectivity issues (temporary failures of servers), adhoc networks (using ZigBee and Z-wave etc.) and also increase the cost of implementation. However, when dealing with the home environment, and especially with older adults, obtrusiveness, usability, and cost concerns are of the utmost relevance for active and assisted Living (AAL) joint program. With advent of cloud services, the continuous remote monitoring based applications became truly "plug-and-play" approach implementation and also reduce the problems of temporary failures. One of the biggest challenges in this area is to make such application devices work with low power (battery based applications). The main drawback comes from the higher power consumption, inherently needed to sustain much higher data rates. In this project, a solution is proposed to improve the low power consumption in Wi-Fi sensors by making use of advanced RF based Microprocessor from Texas instruments (CC3200). Bed Occupancy sensor automation has been designed and implemented to test the feasibility of the approach. The TI CC3200 comes with ARM-Cortex-M4 as a core and inbuilt Wi-Fi subsystem. The CC3200 provides different power modes to make the device enter into sleep or hibernate mode. This device will only enter only in work phase when the sensor is active state. During this phase, the processor sample and processes the sensor data and uploads to the cloud using REST API. Thing speak is an IoT cloud service used to present the sensory data as graphs, bar charts, and dashboards on the cloud remaining time it will enter into sleep phase to save the power of the device, so that it will extend the battery life time of the device.

KEYWORDS: SoC, WBAN, IoT, Rest, AAL, ZigBee

I. INTRODUCTION

The average population age [1] has been increment in a progressive manner, which has a deep social and economic impact, most importantly. The effects of social and healthcare policies between younger and older class-ages creating a progressive imbalance, questioning the sustainability of long-established welfare models.Reducing the need of social and health-care services currently associated with aging is a primary goal, in order to preserve quality of life of aging population in an affordable way. The current popular Communication and Information technologies may contribute to the development of active aging scenarios [2], and are at the core of many worldwide research initiatives and programs. Among them, the "active and assisted Living joint program" (AAL-JP) [3] is exploring opportunities fostered by Communication and Information Technologies to improve the conditions of life for older adults.

The implementation age-friendly home environments is a relevant goal: concepts such as smart homes [4]–[6], ambient intelligence [7],telemedicine [8], [9], and telemonitoring [10]–[12] converge in such a perspective. Key enabling technologies include sensing, reasoning, communicating, and interacting components. In order to be effective, deployment of ICT solutions within the home environment should not be perceived as intrusive, should not require bothersome changes in lifestyles and habits and needs to be accessible and trustworthy to (possibly unskilled) older adults. This scenario introduces stringent and peculiar design constraints. According to people-centric paradigms we describe how the above concepts have driven the evolution of "smart home" systems.

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MTCMOS Technique Based Low-Power Shift Registers

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Abstract:

For low power, high speed design of flip-flop having less number of transistors and only one transistor being clocked by short pulse train which is true single phase clocking (TSPC) flip-flop. Compared to Conventional flip-flop, it has 5 Transistors and one transistor clocked, thus has lesser size and lesser power consumption. It can be used in various applications like Shift Registers, Counters, Digital VLSI clocking system, Buffers, Microprocessors etc.The analysis for various flip flops for power dissipation and propagation delays at 0.18μm, 0.12μm and 90nm technologies is carried out. The leakage power increases as technology is scaled down. The leakage power is reduced by using best technique among all run time techniques viz. MTCMOS. Thereby comparison of different conventional flip-flops and TSPC flip-flop in terms of Power consumption, Propagation delays, Product of Delay-Power (PDP), Area and Leakage power with Microwind simulation results is presented. Applications like Shift Registers, Counters are implemented in terms of Power consumption, Propagation delay and Leakage power.

Keywords: Flip-Flop, True Single Phase Clocking (TSPC), MTCMOS, Product of Delay-Power (PDP).

I. INTRODUCTION

Shift registers are a kind of logical logic circuit, primarily for storing digital information. They're a gaggle of chain slipper in order that the flip-flop output becomes subsequent flip-flop entry. All scales are controlled by a standard watch, and are adjusted or reset at identical time. The log storage capability is that the total range of bits one or zero. Every section (flip-flop) within the shift record represents one a part of the storage capability. Therefore, the quantity of steps within the log determines its storage capability. Transfer history may be parallel to serial input and output. There's usually a provision reminiscent of serial input, parallel output, or parallel input for serial output. The two kinds a parallel and serial input yet as a series with parallel and parallel outputs, and it's bidirectional from left to right or right to left. Shift register is implemented in four forms of logs operate in one in every of the subsequent modes with the applied clock pulse: serial input on parallel output (SIPO), serial input on serial output (SISO), parallel input on serial output (PISO), parallel input on parallel output (PIPO) [5]. The shift register also implemented by using CMOS and Bipolar transistor in a combination form for combine advantage of both the logic, the circuit known as BICMOS [6]. It provides reduce power and high speed circuit. The output of every gauge is connected to the gauge D input to the proper. Shift records contain information in their memory that's either stirred or "converted" to their desired positions with every hourly pulse.

The flip-flop D is acquired basically by the SR circuit dependent on NOR. It has just a single D input, and it is legitimately associated with the S input of the lock without the feedback circuit. The R input of the latch is connected with the inverted value of D. When CK = "1" the output Q contain the value of the D when the clock in the active mode. All measurements are constrained by a typical watch, and are set or reset on the double. The submitted plan improves the number and thickness of cells Vitality utilization hour Satisfactory in the lock d. The flip-flop in D utilized numerous sorts of utilizations, for

AIR POLLUTION: EFFECT ON HUMAN HEALTH AND LIVE REPORTING USING IOT TECHNOLOGY

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ABSTRACT

Air pollution is one of the significant reasons for disease, demise, and ailment across the world however the circumstance of air pollution in India is at its pinnacle. According to the recent survey, out of the list of 30 most polluted cities around the world, 21 are from India itself. It mirrors the plight of individuals living in the country who are compelled to breathe in the toxic gases regarding breathing air. It is stunning to realize that 140 million individuals of India inhale the air which is 10 times dirtier than the protected air limit endorsed by World Health Organization (WHO). Over half of pollution is delivered alone by the industries. [1] Our paper arrangements to distinguish the greatest contributors of air pollution and report it straightforwardly to the Central Pollution Control Board (CPCB). Till now the government has crude information about 51% of air pollution delivered by industries however, which industry is creating how much pollution is obscure. Our proposed work distinguishes the pollution created and the degree of pollution. If any industry is found producing above the threshold limit, those ventures are accounted for straightforwardly to the CPCB through IoT technology-based reporting system. We use the MQ7 sensor to identify the presence of carbon particles as the pollutants as they are the most abundant pollution-causing materials in the air. The framework is liberated from defilement and dependable for live revealing. We use Atmega 328P PU Microcontroller as the programmable smart device, MQ-7 as the pollution locator, ESP8266 based Internet of Things (IoT) as reporting framework, we even utilize Liquid Crystal Display (LCD) gadget to locally show the sensor readings.

Keywords: World Health Organisation (WHO), Central Pollution Control Board (CPCB), Atmega 328P PU Microcontroller ESP8266, Internet of Things (IoT), Liquid Crystal Display (LCD).

I. INTRODUCTION

Air pollution recently caused 16 lakh deaths in India as per the survey by news18. The infants are at the maximum risk due to air pollution. As per the State of Global Air (SOGA), if a person remains regular in contact with air pollution, it can be lethal and readily cause heart attack, lung disease, diabetes strokes, infections, and even cancer. The same report reveals the air pollution is the cause of largest risk factor of causalities and deaths across the country. Air pollution is identified as the biggest cause of infant deaths in India. [1]

PELTIER RADIATOR: THE SMART HEATING/COOLING SYSTEM FOR VEHICLES WITH IOT REPORTING

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ABSTRACT

Radiators are one of the major integral parts used in vehicles, construction, and electronics to regulate heating/cooling effects. Starting from a simple car, to aircraft, radiators are the compulsory arrangements for all mechanical engines. In current time every vehicle including, car, bus, trucks, tractors, etc. Use radiators to cool down their engines. Being one of the most important, Radiators are one of the most vulnerable mechanical components of vehicles too. Radiators are used in the vehicle to stabilize the excessive heat of the engine.[1] In extreme weather countries like Canada, the USA, Russia, etc. temperature is very cold which mostly freezes the distilled water in vehicles.[2] The countries like Dubai, Brazil, Egypt are very hot were present in Radiators easily boils. One another issue with the Radiators is their heavyweight, bulky design and continuous wear and tear like leaks and damage. The heavyweight gives an extra burden to the engine and reduces vehicle fuel efficiency.[3] In very cold regions engines takes additional time to start with the help of engine heating coils and in hot regions, engine temperature rises very easily. To overcome all these issues we propose automatic sensor-enabled and Peltier-operated Radiators. It can automatically switch in between hot and cold modes based on engine temperature. If it finds the engine is hot it switches to cold mode and starts to cool the engine. If it finds the engine is too cold to start, it automatically heats the engine to reach an optimum temperature to start. It is the first of its kind of hot/cold automatic smart Radiators. It is lightweight, low cost, low maintenance, and very compact. Even to repair the Radiator all parts are detachable to repair. Peltier plates are small in size and multiple pieces work together to cool and heat the system. Any damage in the Peltier-based radiator needs only the replacement of few grams of Peltier, not the whole unit. It hardly takes few minutes. This can surely help the vehicle sector get reliable, cheaper, compact, lightweight, and smart radiators soon. The system is controlled by Atmega 328 P PU Microcontroller which uses the LM-35 based temperature sensor to sense the engine cooling and heating situation in real-time. The sensor data is processed by the microcontroller to analyse the temperature value and activate the heating and cooling effect of the Peltiers. The whole data is uploaded to the cloud server using ESP8266 based IoT system. It has worldwide coverage and so unlimited reporting range

Keywords: Radiator, Peltier, Atmega 328 P PU Microcontroller, LM-35 Temperature Sensor, ESP8266, etc.

Deep Learning-Based Anticipation of Driver Movement in Semi-autonomous Vehicles

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Abstract

Advanced Driver Assistance Systems (ADAS) are quickly becoming one of the most intriguing research topics pursued by automakers to improve traffic safety and transportation effectiveness. Over the last ten years, ADAS has increased driving safety. These are the systems that aid drivers in improving vehicle safety while they are on the road by taking the appropriate action in response to potential hazards to vehicle safety. Since road traffic accidents account for over 35.2% of all accidental deaths and are the sixth most common cause of death in India, there is a pressing need for study into this issue. The adaptive pre-processing methods needed to extract additional features from the photos in our dataset are presented in this study. Here, the algorithms for movement anticipation are discussed along with inside and outside feature extraction strategies. It then contrasts the results with conventional categorization methods.

Keywords: Anticipation, ADAS, Vehicle, Autonomous, NHTSA.

1. Introduction

One of the most serious causes of unnatural deaths nowadays is traffic accidents. The majority of traffic accidents happen as a result of the driver's negligence or incapacity to recognise potential risk in time. Therefore, the automotive research community and car manufacturers are concentrating on proactive driving aid system technologies that may significantly increase driving safety [1]. We further evaluate the data to determine the severity of the issue. Figure.1 shows that the primary cause of unintentional traffic fatalities is reckless and risky driving, which is a powerful incentive to solve the driver aid issue.

IoT-Based Healthcare Application and Security Framework

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Abstract

Most applications based on wireless sensor networks (WSNs) nowadays are moving toward the Internet of Things (IoT) paradigm. In order to manage the vast amount of digital resources produced by a large number of heterogeneous devices, the IoT idea is combined with the cloud. A common IoT framework that is interoperable with global infrastructure is much sought for. IoT solutions that need human interaction initially require user identification and permission of access requests made by authorised users. This study provides a plan for creating a general foundation for practical Internet of Things applications. Additionally, it comprises the design and analysis of the two most crucial security modules, access control and authentication, which vary from the security characteristics necessary in a completely automated system. The creation of a general multi-layer architecture serves as the foundation of this study endeavour. Here, the integration of the disparate areas is the key concern (intranet, web, cloud, and application). The layered framework's fine tuning capability makes it possible to add, remove, or modify functions at each horizontal tier, making it capable of meeting the majority of needs of IoT-based remote applications. Here, vertical layers serve as the glue holding together the horizontal layers. The four-layer framework's secured workflow is examined, and remote health scenarios are used to test the framework's viability.

Keywords: IoT, Healthcare, Security, Network, Cloud, Internet.

1. Introduction

Given that there are more Internet-connected gadgets than people on the planet, there is a huge need for automated or semi-automatic interactions. Real-time data capture, high-volume digital content transmission, and processing are all made possible by technological advancements. The idea was developed with the intention of minimising human interference and improving living. Kevin Ashton of the MIT Auto-ID Center initially used the term "Internet of Things" (IoT) to describe this idea. A network of linked computer nodes or networks is referred to as the "Internet" and operates using a set of common protocols. "Things" in this context refer to actual things or commonplace items with processing units that are linked to the Internet to enable access from anywhere at any time. To connect to the Internet, objects must have a distinct identification, such as an IP address [1]. Due to a lack of address space in the IPv4 protocol (232), IPv6 is used to identify a significant number of Internet--

Facial Emotion Recognition and Detection Using CNN

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Abstract: People's facial expressions reveal a common set of feelings that we all share. Face-recognition technology has been deployed in a wide range of applications that require additional security or personal information. Facial expressions such as sadness, happiness, surprise, rage, and fear may all be used to determine a person's emotional state using facial emotion detection. Face emotion recognition and detection is critical for marketing purposes. Customers' reactions to all of a company's products and offerings are the lifeblood of the majority of enterprises. It is possible to determine whether or not a consumer is satisfied with a product or service based on their emotional response to an image or video captured by an artificially intelligent system. Using transformed photos, several machine learning approaches, such as Random forest and SVM, were previously utilised to estimate sentiment. Computer vision, for example, has made significant strides in recent years thanks to advancements made possible by deep learning. Facial expressions may be detected using a convolutional neural network (CNN) model. This dataset is used for both training and testing purposes.

Keywords: CNN, facial expressions, intelligent, machine learning, SVM.

Introduction:

Any inter-personal relationship involves emotions. These may be expressed through facial expressions, conversation, gestures, and even attitude. Faces are the most apparent and information-rich options for Emotion Recognition. Faces are also easier to gather and process than other expressions. A facial expression is a complex movement of the face muscles that conveys the subject's feelings to others. Expressions convey a person's inner feelings. For these reasons, researchers in psychology, animation, HCI, linguistics, neurology, medicine, and security are becoming interested in a human-computer interaction system for autonomous face recognition.

Face and expression analysis using computers is a new area. Emotion analysis is matching a face to an emotion. So, the goal is to read a person's feelings from their face. Automated face expression analysis systems facilitate human-machine interaction. But this is not an easy process. Many characteristics of facial expressions can now be retrieved and evaluated for good sentiment analysis using deep learning and convolutional neural networks (CNN) [5]. Our goal is to create a deep learning-based model for face sentiment analysis. Using a convolutional network architecture, face characteristics can classify emotions into Disgust, Fear, Anger, Surprise, Happiness, Sadness, and Neutral.

In this study, a typical neural network with data augmentation is used to recognise face expressions. This method can categorise images into Anger, Disgust, Fear, Happy, Sad, Surprise, and Neutral. Due to their huge number of filters, CNNs are superior for image identification tasks.

2. LITERATURE SURVEY:

An individual's emotions have a significant impact on their ability to learn. Because of their inability to regulate their emotions, kids with high-functioning autism (HFA) often have difficulty focusing and paying attention in class. Once unpleasant emotions have emerged in HFA children, attempts to regulate them are

THE ELEMENT OF EMOTIONAL INTELLIGENCE AND THEIR IMPACT ON SOCIAL RELATION

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ABSTRACT: Particularly the most basic and significant aspect of human experience is our capacity to experience emotions. Humans can feel a myriad of emotions can be joy, pleasure anger, stress. Defining emotion is a complicating task but the concept somewhere lies between the field of psychology, philosophy, and neuroscience. In this paper, we are discussing emotions from the perspective of psychology. Emotions and intelligence have different meanings and roles from the viewpoint of psychology but after combining both words, EI can be referred to as an ability that provides an advantage in the world to deal with many negative emotions and in spread harmony. Emotional intelligence has drawn the attention of many researchers in every field. The Emotional intelligence first article was published by Salovey& Mayer in 1990 after that so much work has been done in the academic area of professional relations, instruments, or Scales for EI. So, the researcher decided to study factors of emotional intelligence and its role in social relationships. [1] [2]

KEYWORDS: Social relation, Emotional intelligence

1. INTRODUCTION

"Emotional intelligence is your ability to recognize and understand emotions in yourself and others, and your ability to use this awareness to manage your behavior and relationships".[3]

Emotional intelligence is a widely used concept of psychology. This term is used by many researchers to study the EI of human beings in various settings. The emotional intelligence term emerged from the theory of 'social intelligence' which is given by Robert Thorndike in the late 1930 Emotional intelligence (EI) deals with the competence of an individual to perceive, control, and evaluate emotions of themselves and others. Emotional intelligence is important for the person for coping with dynamic change in our social settings. It can be understood as an association among individual emotions and cognition that support a person coping with surrounding and understanding others around them. Researcher contradicts the adaptability of EI, few of them says EI can be improved through learning, and few claims that it is an inborn quality of an individual. EI is important for a human being not only for personal development but also for relationship management with others, social skills development. An emotional intelligence person has generally shown few traits like Emotional awareness, employing emotions to understand, and solving problems. Skilled in emotion management of oneself and others as well.[4]

"Emotional intelligence is an educational, permanent, and continuous process that intends to boost the development of emotional competencies as an essential element of human development to qualify individuals for life and to increase personal and social well-being."(Bisquerra, 2009) [5]

2. WORKING PRINCIPAL AND THEORIES OF EMOTIONAL INTELLIGENCE

Many psychologists and sociologists have talked about emotional intelligence but three major models have been acknowledged for the concept and component of emotional intelligence. They are:

1. Performance model: Goleman's
2. Competencies model: Bar-On's
3. Ability model: Mayer, Salovey, and Caruso's

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RESEARCH

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

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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
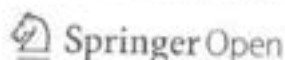
engineers and treatment given by fake doctors. Validating the certificates properly before taking someone into an organization is the key to solve this hitch. The primary cause of this problem is that credential verification is not as easy as it is seems. It takes a lot of resources, time, and money 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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Ionic liquid-multi walled carbon nanotubes-L-lysine modified glassy carbon electrode for detection of prednisolone

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ABSTRACT

Prednisolone (PDN) is a corticosteroid drug that is used for treatment of a number of inflammatory conditions such as bronchial asthma and allergic reactions around the world. An overdose of PDN can cause adverse effects in the human body. Moreover, athletes in sports reportedly abuse it. Therefore, the development of analytical tools for PDN monitoring is vital. In this work, multi-walled carbon nanotubes (MWCNTs)-Ionic liquid (IL)-L-lysine modified glassy carbon electrode (GCE) sensor was developed for the determination of PDN using voltammetry technique. The IL based nanocomposites were characterized via scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform infra-red (FT-IR) spectrometer, thermal gravimetric analysis (TGA) and electrochemical impedance spectroscopy (EIS) techniques. Under optimized experimental conditions, the newly fabricated electrode exhibited remarkable electrochemical performance with LOD (limit of detection) and LOQ (limit of quantification) of 0.0214 μM and 0.3016 μM, respectively, for PDN detection. In addition, the developed electrode also displayed a superior selectivity for PDN in the presence of the interfering substances. The fabricated MWCNTs-ILs-L-lysine-GCE exhibited a remarkable stability where the electrode retained 89 % of its first peak-current response with an estimated relative standard deviation (RSD) of 1.72 % after 4 weeks storage. Furthermore, the reproducibility the fabricated electrode was acceptable with RSD value of 3.0% for ten repeated measurements (n = 10). The proposed MWCNTs-ILs-L-lysine-GCE sensor was successfully employed for determination of PDN in aspelone syrup sample via differential pulse voltammetry (DPV).

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1. Introduction

Prednisolone (PDN) (11b,17a,21-trihydroxy-pregna-1,4-diene-3,20-dione), is an artificial corticosteroid commonly prescribed for clinical treatment of a number of inflammatory conditions such as bronchial asthma and allergic reactions due to its anti-inflammatory and immunosuppressive properties [1]. The use of PDN can cause decreasing organ rejection before, during and after organ transplant [2]. An overdose intake of PDN may lead to hypertension, increase in weight, deterioration of diabetes as well as hindrance of growth in children [3]. In addition, athletes are misusing PDN in sports and World Anti-Doping Agency (WADA) forbids its usage [4,5]. The conventional analytical techniques widely used for detection of PDN in different sample matrices include chromatography-based techniques [6-11], UV spectrophotometry [11] and voltammetry [12,13]. The downsides of most of these conventional methods include the costly instrumentations and the time consuming sample preparation procedures [14]. An alternate and more practicable solution to these drawbacks is the application of electrochemical techniques. The popularity of these methods lies in the numerous advantages it offers, such as fast and simple to use equipment, increased selectivity as well as excellent sensitivity [15,16]. To date, electrochemical sensing nanomaterials with distinctive properties such as excellent electro-catalytic activity and conductivity are used as electrode modifiers. These nanomaterials include graphene oxide [17], reduced graphene oxide [18,19], carbon nanotubes (CNTs) [20,21], CNTs/metal/metal oxide nanoparticles [20,22] as well as metal oxides/molecularly imprinted polymers (MIPs) [23,24]. The modified electrodes are reported to exhibit excellent electrochemical performance due to increased electrode's surface area, which facilitates rapid transfer of electrons [19]. Although outstanding sensitivity and selectivity

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Ionic liquid based electrochemical sensor for the detection of efavirenz

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ABSTRACT

This study reports an electrochemical carbon sensor modified with graphene oxide (GO), silver nanoparticles (AgNPs) and 1-Allyl-3- methylimidazolium dicyanamide (AmmDCA) ionic liquid. The ionic liquid-based electrochemical sensor has been developed for the detection of efavirenz (EFV), a drug used in the fixed dose combination tablet for the treatment of HIV. The AgNPs/GO/AmmDCA nanocomposites were characterized via scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform infra-red (FT-IR) spectrometer, and Ultraviolet–visible (UV–Vis) spectroscopy. The GCE/GO/AgNps/AmmDCA sensor demonstrated good electrocatalytic activity towards the detection of efavirenz, using the supporting electrolyte, phosphate buffer at pH 10.0 and accumulation time of 30 s, within the linear dynamic range of 1.0 to 7.0 µM with a detection limit of 0.0474 nM and limit of quantification 0.158 nM. The surface area of the ionic liquid modified electrode was 0.421 cm^2 calculated using the Randles-Sevcik equation which was four times higher than the glassy carbon electrode. The developed sensor in this study displayed an increase in electrochemical signal of EFV, ≥800 µA, and the calculated recoveries were in the range of 98.5 – 103%, proving the high sensitivity, good selectivity and stability of the developed sensor thus proven to be valuable in pharmaceutical samples analysis.

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1. Introduction

Efavirenz (EFV) (Scheme 1), 6-chloro-4-(2-cyclopropoylenthynyl)-4-(trifluoromethyl)-2,4-dihydro-1H-3,1-benzoxazin-2-one is the non-nucleoside reverse transcriptase inhibitor (NNRTI) used as part of the antiretroviral therapy for the treatment of human immunodeficiency virus (HIV) [1]. EFV is used in the pharmaceutical formulations of the Fixed-Dose Combination tablets either with a nucleoside reverse-transcriptase inhibitor (NRTIs) or with a protease inhibitor (PI) thus preventing HIV from replicating [2]. Present strategies for the supervision of HIV in patients suggests the use of two nucleoside reverse transcriptase inhibitors (NRTI) in the FDC ARV therapy that is currently administered as a single tablet once a day [3]. These medicines stop the HIV from increasing by avoiding the reverse transcriptase enzyme from working. This enzyme transcribes HIV genetic material (single-stranded RNA) into double-stranded DNA [4]. This step occurs before the HIV genetic code gets inserted into the genetic code of a diseased cell. EFV is also used in grouping with other anti-retroviral agents as

part of an extended post-exposure prophylaxis regimen to decrease the hazard of HIV infection to human exposed to an important risk [5]. The investigation of medicines and biological complexes are vital in controlling drug quality to significant effects on public health [6–8]. According to previous literature several analytical techniques as such as high-performance liquid chromatography (HPLC) [9–11] spectrophotometry [4,12] have been published for the detection of EFV, these methods are sensitive and reliable may require long treatment procedures with high-cost implications.

Electroanalytical methods with mercury, carbon paste and metallic carbon paste electrodes as the working electrode [13–15] have been developed for the determination of EFV. Electrochemical procedures offer simplicity, low cost, rapid response, good selectivity, and high sensitivity in the detection of analyte in various sample matrices [16–18]. With the recent advancements in the use of electrochemical sensors and biosensors, new methodologies involving modification of carbon paste electrodes with nanoparticles and ionic liquids has been developed for the detection of various pharmaceuticals and biological samples [19–21]. Room temperature ionic liquids (RTILs) can be used as a binder or modifier to carbon paste electrodes (CPE) whereby it increases the hydrophilicity of the electrode surface due to its ionic nature [22–25] matrices. Good solubility and high viscosity allow the

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Data Article

Machining performance on SS304 using nontoxic, biodegradable vegetable-based cutting fluids

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ARTICLE INFO

ABSTRACT

A large amount of cutting fluids with mineral and petroleum bases combined with carcinogenic chemicals are used to enhance their effectiveness in the machining industry. Such fluids pose a high threat to the surroundings and people, who come into touch with these directly or indirectly. Without neutralization, the disposal of fluids comprises a heavy risk of polluting water sources and harming ocean life. Several vegetable-based cutting fluids provide a friendly environment and good working conditions to employees. In this research, food-grade emulsifiers and natural additives were combined with edible corn oil, which was employed as base oil to make cutting fluids completely biodegradable as a result. A new class of non-toxic cutting fluids was prepared and tested on SS 304 with coated TiAlN using a lathe machine. Since the base oil, additives, and emulsifiers all naturally possess antimicrobial qualities, microbial contamination is prevented for a considerable amount of time.

Specifications Table

Subject area	Cutting Fluids, Machine Tools, Mechanical engineering, Physical Chemistry, Chemical Engineering, machining, etc.
Compounds	SS 304, emulsifier, Polysorbate 85, Polysorbate 80, Triethanolamine, Cymbopogoncitratus, Centellaasiatica's stem and leaf, jaggery syrup, turmeric powder.
Data category	synthesized, machining time, Speed, fluids flow rate, etc.
Data acquisition format	Machining time, Temperature, Surface roughness, Cutting forces, Tool wear
Data type	Raw, analysed.
Procedure	Azadirachta indica, Cymbopogoncitratus, Centella asiatica's stem, and leaf, jaggery syrup, and turmeric powder in corn oil with 10%, 20%, 30%, 40%, and 50% emulsifier content mixed at room temperature for cutting fluids. Water and cutting fluids ratio of 1:20 was used

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Energy-efficient routing transmission for IoT based wireless body sensor network for health care monitoring system

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Abstract---Body Sensor Networks are very useful in medical services
for theidentification ofhealth concerns.In the human body,
heterogeneous sensor nodes are used to measure data such as blood
glucose, pulse,ECG, etc.Sensors are placed on patients to continually
monitor their health status.Patients' smart gadgets with web access
serve as gateways tothe internet of things-based WBANs.With the
increasing usage of IoT-based body sensor networks, a large volume of
health data traffic will develop, necessitating the need for a high
consumption efficiency system for radio resource management.One of
the most essential parameters in Energy Efficient Routing
Transmission (EERT) design for the Internet of Things is reducing
energy usage and longer network lifespan by sensor nodes using ad
hoc networks. Data from sensor nodes is sent to a sink node via
intermediary nodes. End-users can use the information accessible in
the sink node for additional analysis.The remaining energy balances
energy usage across nodes, and the distance parameter assures
effective delivery of packets to the base station.Depending on the
outcomes of data packet queuing up, a technique for arranging data
packet transfers for medical applications with delay limits is being

Low Power Multi-Chip Packaging and Scaling of IC design

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Abstract

This paper presents Challenges in chip configuration and how to accomplish quality and dependability in chip plan to met our innovation needs in future. The push toward both multi-chip bundling and kept scaling of computerized rationale is making disarray about how to group plans, what configuration apparatuses work best, and how to best improve efficiency and meet plan targets. This paper will incorporates clarification of 2D to 3D fan-outs, and full 3D-IC stacked kick the bucket to met required objectives in planning of chips. The troublesome intricacy and unwavering quality of immense chips should be still be possible by separating the issue into more modest pieces. "This permits unwavering quality to be tended to in a right by-development way for the constituent more modest kicks the bucket, and afterward uniting these LEGO blocks in the generally multi-pass on 3D framework significantly more . "The adaptability and control to deal with the extraordinary necessities for the various kicks the bucket at various interaction hubs or with various usefulness (memory, rationale, simple, and so forth) empowers creators to Shift Left and assurance the end framework quality and dependability." What the following five years hold for designing groups to accomplish new degrees of force, execution and dependability gains isn't yet clear, however the various methodologies should offer a very sizable amount of chances for separation.

Keywords : Scaling , Multi die , 2D ,3D fan-outs , stacked die, LEGO

1.   Introduction

The quantity of alternatives is expanding, yet tooling and systems haven't made up for lost time the push toward both multi-chip bundling and kept scaling of computerized rationale is making disarray about how to group plans, what configuration devices work best, and how to best improve efficiency and meet plan destinations.

While the objectives of configuration groups stays as before — better execution, lower power, lower cost — the decisions frequently include compromises between configuration spending plans and the amount of that expense can be amortized through volume, and how far existing instruments and procedures can be extended to deal with multi-chip designs. There additionally are more decisions than any time in recent memory — full and fractional hubs, and adaptations of those that are enhanced for force, execution or cost — just as different bundling alternatives that range everything from 2D to 3D fan-outs, and full 3D-IC stacked bite the dust. Each has its upsides and downsides, yet no single arrangement is ideal for everything, and not the entirety of the pieces are set up or cooperate for every one of them.

"There are a few kinds, as MCM, interposer, InFO, or a genuine 3D stack with through-silicon vias, gadgets sitting one on top of other each, each with its own difficulties," said Anton Rozen, head of VLSI backend at Mellanox Technologies, in a show at the new Ansys IDEAS Summit. "In like manner, we need to address the force conveyance for such gigantic gadgets — and obviously, the warmth dissemination.

Dividing of frameworks across numerous chips, and sometimes different measurements, opens up a totally different arrangement of difficulties and openings.

"A portion of the investigation instruments are possibly helpful there," said Rob Aitken, R&D Fellow at Arm. "However, would we say we will see singular squares and cells the way that we have done verifiably with huge ICs, or would we say we will separate things at the degree of centers, or at that bigger sub-gathering/chip let type approach level? These are questions that are unanswered right now on the grounds that the quantity of potential methods of doing these things is colossal, and the victors presently can't seem to be resolved. We will see throughout the following not many years where this innovation goes." The possible issues and vulnerabilities range the whole plan through-assembling chain, and configuration groups need to look both left and option to comprehend where they may run into issues.

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Non-Uniform Amplitude Distribution of Circular array with Beam Steering

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ABSTRACT

Side lobe level is major problem in circular antenna array synthesis. Beam forming involves in accepting desired signal and rejecting any undesired signal. Many numerical techniques and methods are proposed earlier which involved pattern synthesis with non uniform excitation amplitudes, phase adjustments and non uniform spacing parameters. In this Paper by using SGOA the NUCA is designed for elements ranging from 15 to 35 .With the corresponding main beam shifted to 15^0. The amplitude distribution and corresponding radiation patterns and convergence plots are determined under various beam positions. 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 constraint involves in control over the BW , Optimized SLL and BW are reported as SLL optimized to 12.015dB.

Keywords : SGOA, NUCA, Beam width, SLL, Beam steering

1.INTRODUCTION

The antenna arrays are significant elements in the wireless communication systems now a days. Out of all the different geometries of antenna arrays like linear, circular planar and non-planar 3D, the corresponding circular arrays have many advantages which are perfectly suitable for the applications in wireless communications [1-6]. This expressed a challenge to the antenna engineers to design the circular array antennas which can produce desired radiation patterns for several wireless applications like personal communication systems, RADAR, commercial wireless systems and several other defense applications. 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 minimized or maximized (Jyothi, Volume-8 Issue-4, February 2019).

2.Problem Statement

2.1 Problem Formulation

In this case, the NUCA is designed for elements ranging from 15 to 35 with an interval of 5. With the corresponding main beam shifted to 15^0. The amplitude distribution is determined. The corresponding radiation patterns and convergence plots are obtained.The constraint involves in control over the BW. The respective BW is kept constant or restricted to the respective BW of the uniform distribution with the same number of elements. The SGOA determined NU amplitude distribution for different sized NUCA. 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

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Jyothi Buddida , Kamala Srinivasan

Optimized Non Uniform Circular Array Design Using SGOA

Research Article

Jyothi Buddida[1], Kamala Srinivasan[2]

Abstract

Circular array antennas have become more popular after the advent of wireless communication. Side lobe level is major problem in circular antenna array synthesis. Beam forming involves in accepting desired signal and rejecting any undesired signal. Round exhibits enjoy the benefit of certain inborn highlights like example guiding capacities. Not with standing, union of round exhibits is an unpredictable issue. In this paper, the union of round about clusters with the goal of sidelobe level concealment is done utilizing novel gathering of people improvement procedures. The created designs are contrasted and those of the uniform circulation of round clusters. The round exhibit of 20, 25, 30 and 35 components is planned with the SLL of - 25dB as target. The investigation of the cluster is completed as far as the radiation designs.

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Role of Nano Optics in High Performance Integrated Circuits & Consumer Electronics

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Abstract

In optical circuits used in consumer electronics, communications, and security applications, nano-optic devices offer significant benefits by virtue of their novel behavior, small size, ease of integration, and lower overall costs. Nano-optics is a valuably novel class of technology that takes advantage of light's unique interaction with subwavelength, nano-scale patterned materials, and nanotechnology-enabled fabrication. Nano-optic devices also can be designed to operate over any wavelength range. The basic methodology is applicable to UV, visible, and IR wavelengths with appropriate variations in structural dimensions and materials.This paper presents various Nano-Lithography Methods ,manufacturing & integration and applications of Nano optics. Today, optical component and circuit designers find themselves simultaneously needing to meet requirements for delivering increased performance and functionality, while continually reducing costs and size. Bulk-optic-based optical circuits, while benefiting from years of accumulated efficiency gains, face significant technology barriers to achieving the cost and integration levels that are required for next-generation optical systems for consumer electronics (e.g., optical data storage, digital imaging and display), industrial optics (e.g., sensors and control systems), and optical communications (e.g., transceivers and optical routing) applications. Nanostructure-based optical components"nano-optics" address these cost issues by taking integrated optical component design to the next level of density, cost and reliability. Depending on the configuration of the nano structures polarizers , polarization beam splitters and combiners ,wave plates, filters , micro lenses ,antireflective and diffusive coatings. Subwavelength optical elements provide a new set of building blocks for integrating optical functions. A polarizer/wave plate nanostructure together with photo detectors can be combined to provide a high-speed feedback device for determination of polarization and phase of incident-light.

The master used to imprint the subwavelength structures, an essential ingredient in the process, can be created using various techniques, including holographic and electron-beam lithography. Because the mold can be replicated and reused, complex multistep and multi process methods can be used to create complex nanostructure patterns. Since these initial tooling steps do not need to be repeated for each production wafer, the investment is amortized over the complete production run of a particular nano-optic device. Using different masters with different nanostructure patterns allows the same manufacturing process to create the full range of optical components.

Keywords : Nano-optic devices, integrated circuits, sub-wavelength ,beam splitter, Lithography.

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A Bibliometric Review Of Optical Physics With Laser Beam

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Abstract

This Paper aims to analyze the work done in the filed of optical physics with free electron laser beam from 2000 to 2021, using bibliometric methods. This study presents a Scopus database review on "Optical physics using free electron Laser beam". In recent decades, optics research has blossomed with the invention of the laser, an increasing interaction between optics and electronics, the development of new materials with unique optical properties, and other extraordinary advances. In this paper, we constructed a citation network of papers to investigate the structure of research and to detect emerging research domains in optics. This bibliometric survey helps to know advantages of optic physics in various fields with emission of light. This paper presents bibliometric survey of optical physics from the year 2000 to 2021 May. The database analysis of the Lasers is done through Scopus and tool like VOSviewer Version 1.6.15. This database survey is represented for maximum number of publications are from conferences and journals, from books and articles, affiliated to science and engineering, from India and other countries.

Methods: We collected citation data of optics-related publications from the Scopus data base from 2000 to 2021. Scopus analyzer is used for representing analysis in terms of Document by author, source, year, and country. VOS viewer Version 1.6.15 is used for the analysis of different types such as co-authorship, co-occurrences, citation analysis etc.

Results: In this study, a database search outputs a total of 182 articles on Optical physics from 2000 to 2021. Statistical analysis and network analysis shows the maximum articles are published in the years 2019 and 2020 with United States contributed the largest number of documents. From Scopus analysis, it is clear that large number of articles were published by Erratum(Physics Review). Network analysis of different parameters shows a good potential of the topic in terms of research.

Conclusions: Scopus search outcome has 182 articles, in this 173 were in English, 7 were in Chinese and 2 were published in Italian. Authors, documents, country, Funding sources etc analyzed. Network analysis of different parameters indicates that, there is a lot of scope to contribute in the further research in terms of medicine and electronics.

Keywords: Optical Physics, Atomic physics, Laser beam, Coherence, Non-linear optics, atomic physics.

Optics; examines light, light events and the interaction of light with matter. Light-related topics such as shadow formation, enlightenment, reflection, refraction, color and vision phenomena, mirrors, lenses and prisms are among the topics of optics. Telescopes

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INTRODUCTION

Optical physics is the study of the generation of electromagnetic radiation, the properties of that radiation, and the interaction of that radiation with matter, especially its manipulation and control. It differs from general optics and optical engineering in that it is focused on the discovery and application of new phenomena. There is no strong distinction, however, between optical physics, applied optics, and optical engineering, since the devices of optical engineering and the applications of applied optics are necessary for basic research in optical physics, and that research leads to the development of new devices and applications. Researchers in optical physics use and develop light sources that span the electromagnetic spectrum from microwaves to X-rays. The field includes the generation and detection of light, linear and nonlinear optical processes, and spectroscopy. Lasers and laser spectroscopy have transformed optical science. Major