Yantrik Jagaran

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Department of Mechanical Engineering

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Chairman's Message

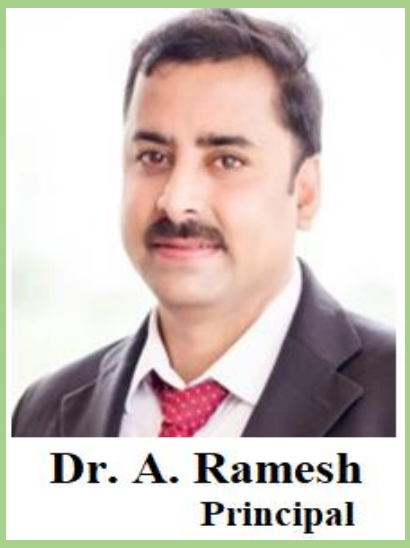
I believe in the philosophy of thought, word and deed as eternal which made Aditya what it is today. My thought to set a high bar to the institutions I setup by rising to the challenges of the educational field and get prepared for a life dedicated to the pursuit of knowledge, my word which always reflected my vision and gained the conviction of the heads of the institutes and parents, and my deed which makes my home and workplace as extensions of each other by considering the staff and students as the members of my extended family shaped Aditya

I know the value of a good education, more so because I did not have the benefit of the facilities that make the learning process smooth. I began my career as a lecturer, giving up my desire of qualifying in the Service Commission Examination. Out of my despair was born a strong determination which took the shape of Aditya Educational Institutions. The present-day job market poses fresh challenges that need to be managed innovatively. Global business Incubation centre, Microsoft Innovation Centre, Technical Skill Development Institute, T-hub, Training and Placement Cell, GATE coaching etc., act as perfect vehicles for this.

Vice- Chairman's Message

As a direct product of Aditya, I know how hard my father worked to put Aditya on the academic map of the country during its many stages of expansion, even in the most trying conditions. My master's degree from UTS Australia, the continent's premier university, has given me a better grasp of the educational system. Aditya technical campus in Surampalem was constructed in the aftermath to provide professional education in engineering, technology, management, and pharmacy, with the underlying principle of excellence and quality The campus has made rapid growth since its beginning in 2001 by upholding its unwavering dedication to advance knowledge and educate students in science and technology. The campus' main goal is to make teaching and research more relevant to the real world. The ultimate aim of Aditya is to make the campus the 'first stop' for companies in the recruitment process. Keeping in view the demands of the work environment which is beyond just knowledge and marks, a lot of emphasis is laid on the overall personality development of the students.

Principal's Message



Dr. A. Ramesh
Principal

The major issues we confront can't be handled at the same level of reasoning that we used to create them." Albert Einstein is credited with coining the phrase "theory of relativity." Man can only achieve immortality through knowledge. To stay relevant, knowledge must extend or grow. The road to excellence is the world's toughest, roughest, and steepest. Only quality is required and rewarded in our world. To develop new knowledge, available information must be directed by wisdom and intellect. Education's new duty is to promote creativity. The only way to address current and future problems and discover dynamic answers is to think creatively. Technology should be used to aid in the eradication of poverty around the world. In truth, India is home to 40% of the world's poor.

Miracles are the result of one's faith in oneself. At ACOE, education aims to develop character, strengthen the mind, broaden the intellect, and foster a culture of problem-solving. The student is placed through rigorous training so that when he leaves the Institute, he can stand on his own two feet.

HOD Message

Dr. Y K S Subba Rao
HOD, Dept. ME

Mechanical engineering is one of the oldest and broadest engineering discipline, and plays a significant role in enhancing safety, economic vitality, enjoyment and overall quality of life throughout the world.

Mechanical engineers develop state-of-the-art technologies and exhilarating solutions for the mankind. We attempt to provide our students with a cheerful, productive and satisfying experience at all levels of their program of studies to explore the amazing world of mechanical engineering.

Our department has a team of highly qualified and experienced faculty, good infra structure and lab facilities. We are striving hard continuously to improve upon the quality of education and to maintain its position of leadership in engineering and

Department of Mechanical Engineering

VISION

To be recognized as a Centre of Excellence in Mechanical Engineering towards imparting quality education.

MISSION

The department strives to provide the engineering foundation as well as professional, innovative and leadership, skills to the students through the following activities.

M1: Provide the state-of- art facilities.

M2: Disseminate knowledge by recruiting qualified and experienced Staff members.

M3: Enhance innovative activities by collaborating with industry and Research establishments.

M4: Encourage citizenship activities with knowledge and skills.

PEO's

PEO1: The graduates will apply technical knowledge and skills as mechanical engineers to provide optimal solutions in industrial and real-life problems.

PEO2: The graduates of mechanical engineering will pursue advanced education, research and development and other innovative efforts in science, engineering and technology, as well as other professional careers.

PEO3: The graduates of the program will practice professional and ethical responsibilities including the societal impact of engineering solutions.

PEO4: The graduates of the program will practice as leaders in their fields of expertise and in activities that support service and economic development nationally and throughout the world.

PSO's

PSO1: Apply the analytical skills of Mathematics, Basic Science and Mechanical Engineering Streams to formulate, analyze and proved solution to complex engineering problems.

PSO2: Design system components or process of Manufacturing, Thermal Engineering Machine Elements and inter-disciplinary fields by applying appropriate techniques to meet the needs of industry and society.

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1. User cum eco-friendly smart parking lot

User cum eco-friendly smart parking lot is a project that helps to enhance the functionality of smart cities. Smart parking lots are mainly used for private parking spaces, hospitals, shopping complexes, public parking lots, offices, etc., to make the parking confusion free and less time taking. The smart parking systemgives the privilege for the drivers to book the parking slots in advance and also in a conventional way, where we directly go to the lot without booking a slot. The aim is to automate and reduce time spent in search for proper and empty parking slot, spot and even lot. We can make smart parking lot even smarter by using energy in an efficient way. This model keeps check on the lights that glow in the underground parking only in the necessary paths and critical spots. Smart parking makes use of sensing devices which are the basic requirement for making the lot automatic. Strong sensing systems are deployed to examine analyze the data in real time. The system increases the efficiency of the parking lots with the use of sensors. The sensors placed in the slot sense if parking slot is occupied or vacant. This way we automate the parkinglot.

The main challenges that the urban cities are facing are the traffic and parking problems. If we put a checkto these problems that's it, half battle won. And this traffic and parking problems are inter-related like people not able to find a slot to park their vehicles is also the reason for traffic in the cities. Due to increasein vehicles day by day the demand for parking lots has also raised. This issue of finding the parking slot forour vehicle is at each and every p-lace whether it is the shopping mall or companies or at the airport or in hospitals.It is said that on an average people spend about 20 minutes to find a parking for their vehicles, which leads to people parking their vehicles in the places where they are not supposed to and places whichare not for parking. These results in some adverse situations disabling other vehicles to move freely and sometimes can cause large traffic jams further which would lead to many other vulnerable situations. There are valid reasons for people parking in places which are not designated for parking like no availability of slots, no proper utilization of spaces, poor planning and most importantly poor infrastructure and functionality of existing parking lots. According to a survey, drives looking out for empty parking space are the prime cause of traffic congestion and it accounts for about 30% of traffic in the city.

User cum eco-friendly smart parking lot is a project that helps to enhance the functionality of smart cities. Smart parking lots are mainly utilized in private parking lots, hospitals, shopping malls, public parking garages, offices, etc., to make the parking lots hassle free and less time consuming.

The smart parking system enables drivers to book the parking slots online (in advance) and also in a conventional way, where we directly go to the lot without booking a slot. Smart parking includes the use of real time data, low-cost sensorsand applications that enables the users to find the parking slots easily. The aim is to automate the lot and reduce time spent in manually searching for the parking slot and even lot. We can make smart parking lot even smarter by using energy in an efficient way. This proposed model keep check on the lights that glow in the underground parking only in the necessary paths and critical point. Smart parking makes use of sensing devices which are thebasic requirement for making the lot automatic. The use of sensors makes the lot function in an efficient manner. The sensors placed in the slots recognize if parking slot is occupied or vacant. Another efficient module is added to this project which works great for shopping malls, where we can collect the emails of the users and when the parking lot is about to fill we send a message bearing "The lot is filling fast", by this it will be even more easy for the users to know the status of the lot. This way we automate the parking lot.

- Precisely, the features that we have proposed in this methodology are: The parking lot is accessible to both the online users and normal conventional users as well.
- The lot is automated in such a way that it allots the slots to the users (offline and online) instinctively by getting the data from the sensors which are deployed at each slot to record the status of the slots.
- The functioning of the slot allotment is, for example: there are 4 slots in a lot and slot1 is already filled and one of the users have booked slot-2 then if another user has entered the lot for a slot, then he will be allotted with slot-3 automatically.
- To authenticate whether the online booked user is the one who have booked or not, this model has used the field called passkey where the online user will be asked to give any random passkey while booking and while entering the lot he will as be asked to enter the passkey that he have given while booking, if entered correct access will be given otherwise the user will not be able to enter the lot.
- This parking lot have also been designed in such a way that if the vehicle has been parked in any other slot which has not been assigned to him then there will be error message thrown that the vehicle is parked in wrong slot.
- This parking lot has also been designed in an energy efficient way. Coming to underground parking there is the necessity to glow the lights 24×7, but there is no necessity to glow all the lights all the time. The lights can glow in the main passage and in the critical points only and in the other sub-passages the lights glow only whenthe vehicle enters that passage, this feature has been implemented using ultrasonic senor.

- To make the users even more comfortable in knowing the status of the parking lot,we have implemented a feature like when the slots are almost filled like only one isleft then we send a messageto the user's mails that Parking lot is almost full.
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by,

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2. Advanced tracking system for alive human detection

Disasters cause social imbalance like unexpected deaths and injuries to humans and other living beings and also cause economic imbalance like property loss and food scarcity and can also cancel the progress of poverty reduction. This has a devastating impact on development and on our society. The disasters may be natural like floods, earthquakes or manmade like transportation and industrial accidents. However, we cannot stop any of the disasters from happening, but we can make them less damaging by saving more lives as much as possible.

People may get trapped in some places during disasters where they cannot jump out of that situation by themselves and need others to help them. Proper rescue and medication on time can save their lives. But manual detection of trapped people in those areas is a rigorous and time-consuming process. However, it is possible to detect those cornered people by using latest technologies. This approach may save plenty of lives by detecting the trapped people as soon as possible. At the same time, the rescue team can treat the detected people. This can save a lot of time since the detection and treatment of the injured persons takes place at the same time. We came up with an implementation called "Advanced tracking system for alive human detection" which is an automatic robotic vehicle that acts a transmitter. we implemented this robot using an Arduino uno micro-controller, a contactless IR temperature sensor, dc motors and quadruple half H-drivers and an LCD display.

Need for the tracking system:

In certain circumstances, it's anything but workable for the salvage group to face the challenge for looking of alive individuals to be available or not at the hour of fiascos. Thus, we chose this venture to make valuable for the poor people. A few times it is unsafe for entering the spots without knowing the presence of poor people. The gadget will permit one to recognize the alive human and the relating area will be shared to the salvage group through IOT.

- This task will notice the alive people during fiascos by utilizing Arduino.
- Contactless temperature sensor will recognize the alive human by the distinction between encompassing temperature and item temperature.
- With the assistance of contactless temperature sensor if temperature is close encompassing it is considered as an item if temperature is close to human temperature, it is considered as alive human.

- Once the alive human is recognized, the area is sent through IOT.
- Here GPS module is utilized to send location of the detected person.

It's anything but an incredible assistance to rescuers in location of living souls focused in unfortunate regions. Every one of the parts that are utilized in the equipment configuration are effectively accessible and the entire framework is cost productive. Here we are sending the temperature and area yet we can likewise send some other medical issue like heartbeat, beat pace ofthe recognized human to the beneficiary, so it will be not difficult to the rescuers to treat the patients on schedule. IoT frameworks permit clients to accomplish further computerization, examination, and joining inside a framework. They work on the range of these spaces and their precision. IoT uses existing and arising innovation for detecting, systems administration, and advanced mechanics.

KEY FEATURES OF IOT:

The main highlights of IoT incorporate man-made reasoning, network, sensors, dynamic commitment, and little gadget use. A concise audit of these highlights is given beneath:

Artificial intelligence - IoT makes essentially anything "keen", which is improving each part of existence with the force of information assortment, man-made calculations, and organizations. This means something as important as improving your cooler and cupboards to distinguish when drain and your number one cereal come up short, and then submit a request with your favored merchant.

Availability - New empowering advancements for systems administration, and explicitly IoT organizing, mean organizations are not, at this point only attached to significant suppliers. Organizations can exist on a lot more modest and less expensive scale while as yet being useful. IoT makes these little organizations between its framework gadgets.

Sensors IoT loses its differentiation without sensors. They go about as characterizing instruments - which change 1oT from a standard latent organization of gadgets into a functioning framework ableto do true combination.

Dynamic Engagement - Much of the present cooperation with associated innovation occurs through uninvolved commitment. IoT presents another worldview for dynamic substance, item, or administration commitment.

Little Devices - Devices, as anticipated, have decreased, less expensive, and all the more remarkable over the long run. IoT misuses reason assembled little gadgets to convey its exactness, adaptability, and flexibility.

LIMITATIONS

- The exact body temperature of humans can't be detected.
- The system can only take a straight path.
- Detecting humans is difficult in case of fire accidents.
- Can trace humans only for limited distance from sensor.

ADVANTAGES

- Finds most accurate location.
- Cost effective.
- Easy to build.
- Location is shared to mobile directly.
- Alerts rescue team about alive humans present.

APPLICATIONS

- It is used to detect whether any people are there in prohibited areas.
- Used to find locations of any person.
- Used to find if the body is alive or not.

by,
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GORU YADAGIREESH (19MH5A0315)

"Success lies in being true to yourself—and living life on your own terms."

3. ARTIFICIAL INTELLIGENCE ANDMACHINE LEARNING

Abstract:

Automation, Artificial Intelligence (AI) and Machine Learning (ML) are pushing boundaries in the software and hardware industry to what machines are capable of doing. From just being a figment of someone's imagination in sci-fi movies and novels, they have come a long way to augmenting human potential (reducing risk of human errors) in doing tasks faster, more accurate and with greater precision each time – drivenby technology, automation and innovation.

This is indeed creating new business opportunities and is acting as a clear competitive differentiator that helps analyze hidden patternsof data to derive possible insights. AI and ML can certainly enrich our future thereby making the need for intelligent and sophisticatedsystems more important than ever.

Automation comes to the core of this modernization where mundanetasks are being automated using AI and ML. B2B and B2C companies are adopting this technology and everyone is becoming a digital technology enabler. This is predominantly a cultural shift that every organization is going through and thereby elevating user experience.

Business/Technology Trends:

Most C-level executives either have already adopted or have plans to adopt AI into their organizations. The future of Artificial Intelligence in IT is going to be a landmark and will see an astronomical rise in the growth of the following key emerging technologies:

- Bots
- Artificial Intelligence
- Internet of Things (IoT)
- Blockchain
- Automation
- Cloud Computing

Bots are going to be the next buzzword in the years to come. They are no longer a hype and many organizations have started to bring alive the idea of getting closer to human-less and automated interactions which are more rule-based AI enabled Auditory chat-bots that are more speech based are going to be following this. The key to a successful Chatbot is bringing in clarity to what is needed - plan to have a plan before building a Chatbot.

Artificial intelligence(AI) is getting into virtually every technology that is helping make systems take smarter decisions.

Building intelligent Apps becomes a key here. For example, building a smart ERP assistant or a smart camera.

Internet of Things (IoT) is enabled by Artificial Intelligence / Machine Learning.

that is helping manage mind-boggling volumes of data. The sensors and chips that exist in physical things around us present

a huge opportunity in tapping valuable data, running analytics and using those we can make informed and better decisions with. For example, Fitbit health, a fitness mobile device leading to better customer experience. In the times we live in, the power in our mobile device is much more than the power in our homes, enabled by AI performing human-like tasks with access to endless data.

The use of AI, on the other hand, can be completely **biased** on the data used to train the AI enabled systems.

Blockchain is another key technology that will define the way transactions are done, making it more simple, secure and cost effective, while ensuring a seamlessly distributed (not copied) networked financial system. It is often referred to digital gold as well and has built-in robustness. Blockchain can't be controlled by a single entity; hence is secure, has no single point of failure, is transparent, public and decentralized.

AML (Anti Money Laundering) and KYC

(Know Your Customer) practices adopted in blockchain are key contributors to its widespread acceptance.

Automation is leading the way things are being done today – simple tasks which are repeatable and with a defined behavior

Practical approach to AI and its implementation

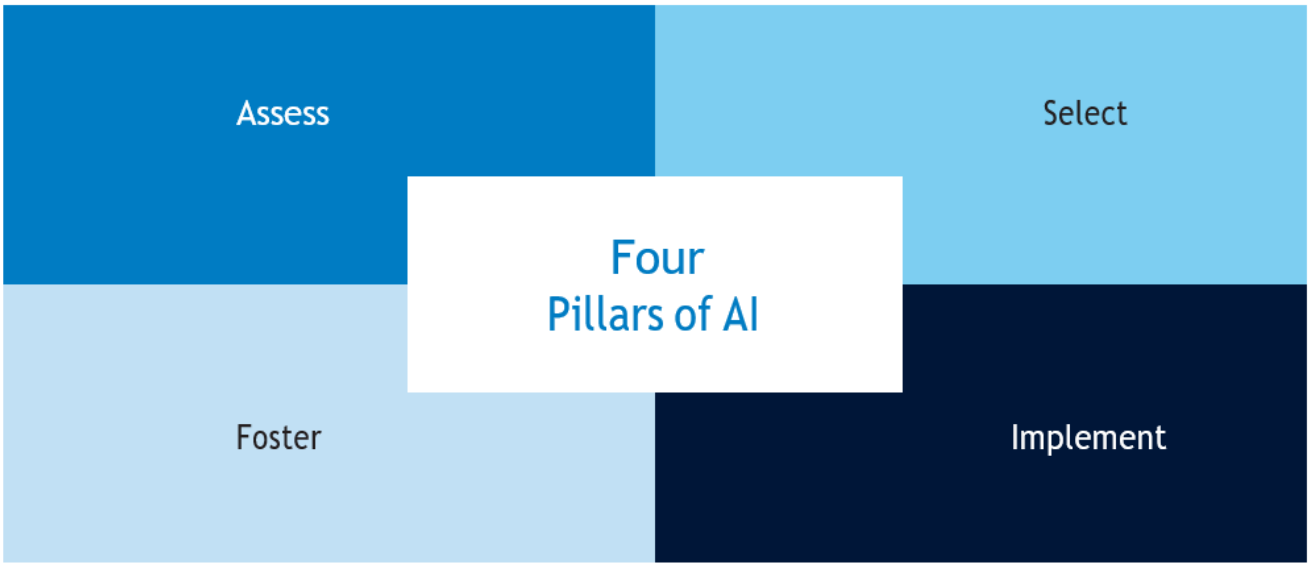
One of the pragmatic ways in which AI is ruling the world is creating doubts in people's s mind if it will eventually replace humans. The fact however is that it will not; it will augment and amplify what humans can do so that humans become more efficient. To give some perspective of this, can a teacher be made redundant when the student does their job well based on the instructions given by the teacher?

For example; if a human does 100 things as part of the job, AI tends to replace those 20-25 things that can be automated and are repeatable and the efforts saved here can be repurposed to other important tasks.

AI is all about instructing a machine to enable, repeatedly similar tasks, modify its operation based on a particular event, automating the processing of large amounts of data and helping humans make informed decisions by using insights presented by AI technologies.

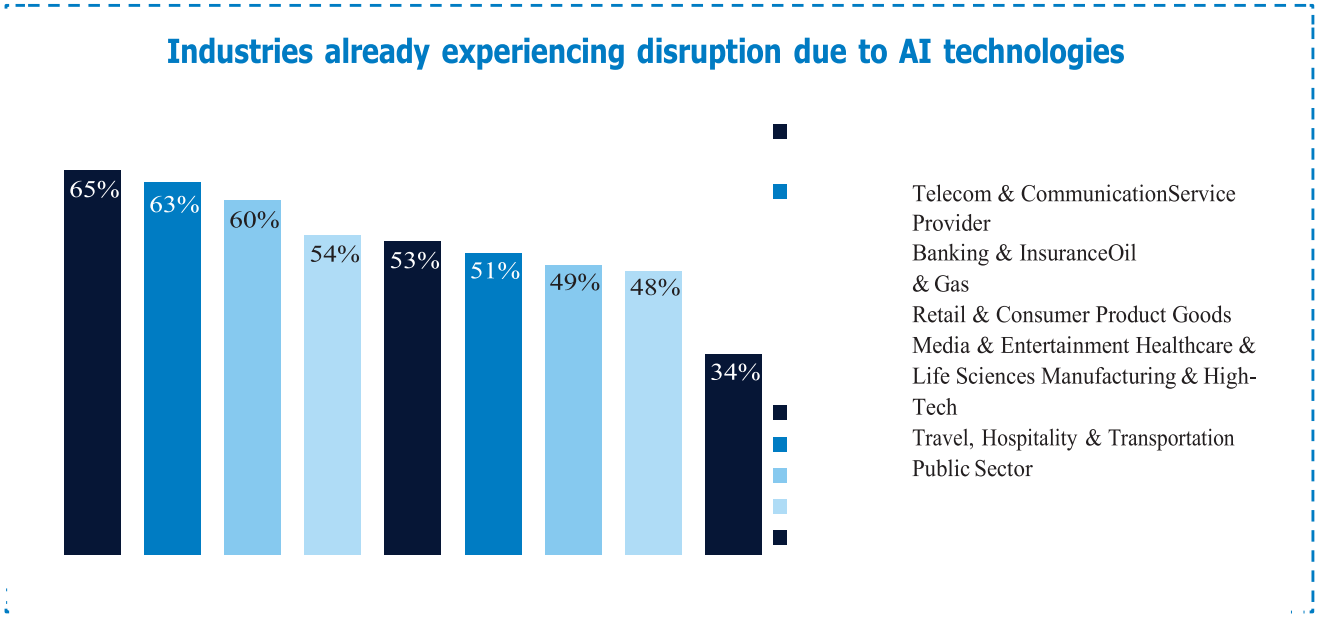
Automation is at the core of AI; it helps in saving precious human hours so that mundane tasks can be done by robots and humans can focus on business centric tasks and other priorities.

We should embed intelligence into what we do as routine work and where it requires humungous efforts to process large volumes of data that require correlation to be built into multiple systems. Artificial Intelligence is there to augment and not replace human potential. AI is all about strategy, technology is just an enabler of that to drive insights and help with decision making.



AI and its use cases

As part of the recent study conducted by Infosys, the diagram below depicts the percentage of respondents in each industry who havealready been experiencing disruptions due to AI technologies:



AI can help us across industries and someof its abilities are as listed below:

- **The Finance industry** can greatly benefitfrom fraud detection and identity theft issues, do sales forecasting, use chat-bots, enable personalized offers, hedge fund management, customer centricity by recommending unique/customer specific offerings and lead generation. AI can also help banks detect margin improvement areas using Robotic Process Automation (RPA) that can enable bottom line growth. With the recent trends/incidents on financial frauds, detecting such incidents becomes all the more important for compliance and best governance.
- **The Healthcare industry** can be benefitted by analyzing tests and providing personal treatment, advice to patients using assistants/chatbots, monitor and recommend based on individual health data. AI can also be used to medically train people and augment capabilities of human reach.
- In the **Retail industry**, chat-bots can help consumers interact with your brand more efficiently. . For example, detect usage patterns and suggest options, perform social media monitoring and marketing

analytics. AI can help tremendously here as consumer spending power anddecisions have direct impact on retail industry including logistics, transportation, manufacturing, suppliers, marketing etc. Any sort of insights that can influence consumer spending will be a great boon and can help retailers to take corrective actions using AI e.g. focus on geographies,seasons, under-performing stores, errors due to paperwork etc.

- **The Education industry** can use AI to revolutionize education delivery, personalizing and customizing based on student needs including global classrooms, checking and grading students, reviewing homework, recommending higher education

institutes based on area of interest andpast educational exposure/experience and recommending learning paths.

- **The Insurance industry** can use AI to detect frauds, process claims, suggest better policies and competitive policy pricing, risk management, enable personalized offers based on health status. This can be augmented by processing data from multiple systems including Internet of Things (IoT) devices

to offer personalized policies and data analytics and visualization and can help improve customer experience dramatically. .

Some of the **practical use cases** of Artificial Intelligence, in a nutshell, are:

- Detect usage patterns and suggestoptions
- Monitor infrastructure and recommendbased on health data
- Predict analytics for data security anddata theft
- Manage entire systems independently
- Manage knowledge base
- Do sales forecasting and leadgeneration
- Perform customer service using bots
- Assist HR analytics
- Perform data management, processingand monitoring
- Perform social media monitoring andmarketing analytics
- Detect system anomalies - Anti-MoneyLaundering
- Predict technology failures - disk, file-system, reactive analysis

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4. Real-time face mask detection and thermal screening

COVID-19 is an illness caused by the SARS-CoV-2 corona virus, which is a novel corona virus. Following a report of a cluster of cases of „viral pneumonia' in Wuhan, People's Republicof China, WHO first heard of this new virus on December 31, 2019. The majority of persons who have symptoms (about80%) recover without the need for hospital care. About 15% becomevery unwell, requiring oxygen, and 5% become critically ill, requiring intensive care. Respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism, and/or multi organ failure are some of the complications that can lead to mortality. People over the age of 60, as well as those with underlying medical conditions such as high blood pressure, heart and lung disease, diabetes, obesity, or cancer, are more likely to develop serious illnesses. COVID-19, on the other hand, can affect anyone at any age, causing significant illness or death. Whether or not they need hospitalization, some persons who have had COVID-19 continue to have symptoms such as tiredness, respiratory, and neurological issues. WHO is collaborating with our Global Technical Network for COVID-19 ClinicalManagement, researchers, and patient groups throughout the world to plan and conduct studies of patients who have progressed beyond the acute phase of their illness. Simple precautions such as physical separation, wearing a mask when separation is impossible, keeping rooms well aired, avoiding crowds and close contact, frequently wiping your hands, and coughing into a bent elbow or tissue will help you stay safe. Inquire about local guidance in the area where you live and work. Complete all of the tasks. The most prevalent COVID-19 symptoms are:

- Fever
- Coughing that is dry
- Fatigue

Other less prevalent symptoms that may affect some patients include:

- Taste or olfactory loss
- Congestion in the nose
- Conjunctivitis is a condition that affects the eyes (also known as red eyes)
- A scratchy throat
- Headache
- Pain in the muscles or joints
- Various types of skin rashes

- Vomiting or nausea are both symptoms of nausea
- Diarrhea
- Dizziness or chills

Whenever feasible, anyone with symptoms should be checked. People who have hadclose contact with someone who is, or may be, sick but do not have symptoms should also consider testing – call your local health guidelines and follow their advice. While waiting for test results, a person should isolate themselves from others. When testing capacity is limited, tests should be performed first on those who are at higher risk of infection, such as health care workers, and those who are at higher risk of serious sickness, such as the elderly, particularly those who live in senior residences or long-term care facilities. In the majority of cases, a molecular test is performed to detect and confirm SARS-CoV-2 infection. The most common molecular test is polymerase chain reaction (PCR). A swab is used to collect samples from the nose and/or throat. By multiplying viral genetic material to detectable quantities, molecular assays detect virus in a sample. As a result, a molecular test is utilised to establish the presence of an active infection, usually within a few days of exposure and around the time symptoms appear.

Rapid antigen tests (also known as rapid diagnostic tests or RDTs) are used to identify viral proteins (known as antigens). A swab is used to collect samples from the nose and/or throat. These tests are less expensive than PCR and provide findings faster, but they are often less reliable. When there is more virus circulating in the population and when a sample istaken from an individual when they are most infectious, these tests function best. If you think you might have COVID-19, call your doctor or the COVID-19 hotline for information on whenand where to receive a test, how to stay at home for 14 days away from people, and how to keep track of your health. If you experience shortness of breath, chest pain, or pressure, seek medical attention at a health facility right away. For directions to the appropriate health facility, call your health care provider or a hotline ahead of time.

PREVENTIONS TO PROTECT FROM COVID-19

A. Face mask
B. Temperature check
C. Sanitization

Face mask:

In the case of a virus transmitted by sputtering (spraying), it appears that wearing a face mask is necessary to protect people and restrict illness spread. The corona virus pandemic of 2019-20 is presently underway. COVID-19 (corona virus disease 2019) is an infectious disease with flu-like symptoms at first.

COVID-19 originally appeared in China, then soon spread over the rest of the world. When compared to the flu, COVID-19 is considered to be very contagious.We offer a face mask recognition model in this research that detects whether or not a person is wearing a face mask in real time.

Temperature check:

The infrared radiation generated by all materials at temperatures above absolute zero, (0°Kelvin), is detected by an infrared in temperature probe, which measures temperature. A lensfocuses infrared (IR) radiation on to a detector, which transforms the energy to an electrical signal that can be shown in temperature units after being corrected for ambient temperature change. This setup allows for temperature measurement from a distance without having to touchthe thing being monitored. As a result, the infrared temperature sensor can be used to measure temperature in situations where thermocouples or other probe-type sensors are unavailable or,for a variety of reasons, do not produce accurate data. The object to be monitored is moving; theobject is surrounded by an EM field, as in induction heating; the object is enclosed in a vacuum or other controlled atmosphere; or the object is used in applications that need a quick reaction.

Designs for an infrared thermometer (IRT) have been around since at least the late 1800s, and Charles A. Darling (1) incorporated some of Fry's notions in his 1911 book "Pyrometry." However, the technology to transform these notions into practical measurement equipment did not exist until the 1930s. Since then, the design has evolved significantly, and a significant amount of measurement and application expertise has been accumulated. The approach is currently well- accepted and widely employed in both industry and research. The Fahrenheit (°F) scale, the Celsius (°C) scale, and the Kelvin (K) scale is the three most widely used temperature scales in the world today. The thermocouples, resistive temperature devices (RTDs, thermistors), infrared radiators, bimetallic devices, liquid expansion devices, molecular change- of-state, and silicon diodes are the seven primary types of temperature measurement sensors, Thermocouples, Resistive temperature measuring devices ,Infrared Sensors, Bi metallic Devices, Thermometers , Silicon Diode, and Change-of-state Sensors.

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by,
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YEDLA GANESH BABU (19MH5A0353)

5. Project Idea

Fabrication of 3D Printing Components

Abstract:

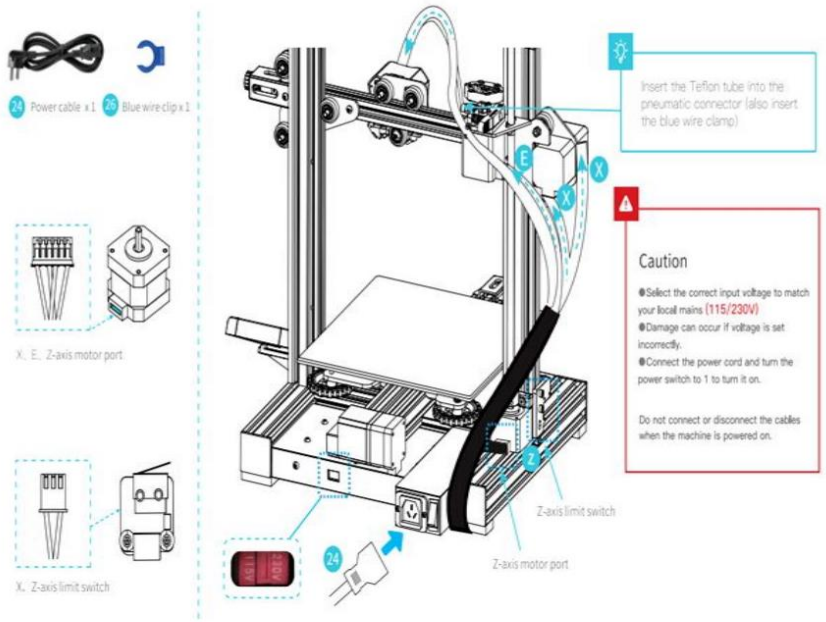
3D Printing technology, also known as Additive Manufacturing (AM), refers to processes used to generate a 3D object in which layers of material are successively formed under a computercontrolled program to create a physical object. The 3D file source is usually sliced into several layers, each layer generating a set of computercontrolled instructions. Both 3D printing and additive manufacturing reflect that the technologies share the theme of sequential-layer material addition or joining throughout a 3D work. In this work, the components of 3D printer are assembled and the machine is tested. FDM technology is used to print the objects. The objects manufactured through 3D printing process can be of almost any shape or geometry with high quality and finish.

INTRODUCTION:

General explanation of 3D Printing: A method of manufacturing known as _Additive manufacturing, due to the fact that instead of removing material to create a part, the process adds material in successive patterns to create the desired shape. Main areas of use: Prototyping Specialized parts – aerospace, military, biomedical engineering, dental Hobbies and home use Future applications– medical (body parts), buildings and cars 3D Printing uses software that slices the 3D model into layers (0.01mm thick or less in most cases). Each layer is then traced onto the build plate by the printer, once the pattern is completed, the build plate is lowered and the next layer is added on top of the previous one. Typical manufacturing techniques are known as _Subtractive Manufacturing because the process is one of removing material from a preformed block. Processes such as Milling and Cutting are subtractive manufacturing techniques. This type of process creates a lot of waste since; the material that is cut off generally cannot be used for anything else and is simply sent out as scrap.

Advantages and Limitations:

Layer by layer production allows for much greater flexibility and creativity in the design process. No longer do designers have to design for manufacture, but instead they can create a part that is lighter and stronger by means of better design. Parts can be completely re-designed so that they are stronger in the areas that they need to be and lighter overall. 3D Printing significantly speeds up the design and prototyping process. There is no problem with creating one part at a time, and changing the design each time it is produced. Parts can be created within hours. Bringing the design cycle down to a matter of days or weeks compared to months. Also, since the price of 3D printers has decreased over the years, some 3D printers are now within financial reach of the ordinary consumer or small company. The limitations of 3D printing in general include expensive hardware and expensive materials. This leads to expensive parts, thus making it hard if you were to compete with mass production. It also requires a CAD designer to create what the customer has in mind, and can be expensive if the part is very intricate. 3D Printing is not the answer to every type of production method; however its advancement is helping accelerate design and engineering more than ever before. Through the use of 3D printers designers are able to create one of a kind piece of art, intricate building and product designs and also make parts while in space! We are beginning to see the impact of 3D printing many industries. There have been articles saying that 3D printing will bring about the next industrial revolution, by returning a means of production back within reach of the designer or the consumer.



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