Ist Virtual International Conference on Fuel, Energy and Environment

(ICFEE 2022)

June 09 & 10, 2022

Conveners:

Dr. P. Somasundaram

Dr. P. C. Murugan

Organized by

Department of Automobile Engineering

Kongu Engineering College

Perundurai, Erode – 638 060

Royal Book Publishing

Book Title	Ist Virtual International Conference on Fuel, Energy and Environment (ICFEE 2022)
Book Size	A4
Paper	Natural Shade
Publisher	**Royal Book Publishing** **K M Nagar, Ayodhiyapatinam,** **Salem.** **Tamil Nadu-636103** **Cell:+91 7598141199** **Email:** contact@royalbookpublishing.com

About the Conference

The Fuel, Energy and Environment terms are the essential domain of Engineering and Technology and these areas are predominantly focused by all R&D establishments. Thereby, the conference title is closely coined with those thrust areas towards bringing out the current research works related to Fuel, Energy and Environment. Rapid change in technology resulted in challenges like the Climate Change, Depletion of natural resources, etc., On the other side, researchers are focusing on addressing those challenges through breakthrough innovative technologies.Recent reports on Climate Change have revealed that global human activities have contributed to around 1°C of global warming above the pre-industrial levels (expected to reach 1.5 between 2030 and 2052) with the burning of fossil fuels. Increasing demand for energy is expected to add another 39 billion tonnes of carbon-dioxide emission, threatening the climate action plan of achieving net-zero by 2050. This worsening of emissions from fossil fuels burning, this conference is aimed to overcome the challenge through innovative ideas to reduce the impact on environment by reducing the total emission.Keeping this in mind, this conference is being organized towards setting up a platform for Researchers / Scientists / Industry Personnel's / Academicians / Students across the world to exchange their novel ideas and share their current research and findings for the benefit of the scientific community and environment. Therefore, as organizers, we encourage the entire research community to participate in this conference by sharing our innovative ideas / research works through your participation.

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CORRESPONDENT MESSAGE

Thiru. P. Sachithanandan

Correspondent

Kongu Engineering College, Perundurai.

I extend warm greetings and delighted to welcome you all for the 1ˢᵗ Virtual International Conference on Fuel, Energy and Environment (ICFEE 2022).

The desire for sustainable growth drives the steady rise of renewables. We may reduce the environmental impact of energy production and usage by employing renewable and often endless energy sources, and we can be less reliant on fossil fuels, whose supply is finite by nature.

Climate change is a problem in which renewable energies play a major role in sustainable development. I don't have to emphasize the readiness of tackling climate change in front of this crowd. I'm sure you're fully aware of the expected effects of climate change. To address all these issues, I hope that this conference would be able to meet its goal of offering a productive venue for academicians, researchers, and budding engineers to advance knowledge, research, and technology for the benefit of humanity and sustainable environment. There has always been a divide between those who can effectively utilize technology and those who cannot. In fact, all academicians, researchers, and budding engineers should think about humanity in order to create a peaceful society. We change to a better environment and a better life as a result of humanity. I thank you all for attending the conference and contributing your technical articles in this common forum.

PRINCIPAL MESSAGE

Dr. V. Balusamy., BE (Hons)., M.Tech., PhD.,
Principal
Kongu Engineering College, Perundurai

I am happy to note that the Department of Automobile Engineering is organizing 1st Virtual International Conference on Fuel, Energy and Environment (ICFEE 2022) during 9th & 10th June 2022.

The importance of energy in improving one's quality of life cannot be overstated. As a result, energy demand has risen dramatically in recent decades. Natural resources, on the other hand, are scarce. It is not possible to rely solely on fossil-based energy supplies; other resources, such as new and renewable energy, including nuclear energy, must also be considered. The usage of a variety of energy resources would be difficult to accomplish and would necessitate innovation in its development. Such energy innovation must examine not only one component of technology, but also other factors such as the environment, regulations, and economic considerations. This is the core premise underlying our conference's theme Fuel, Energy and Environment.

The objective of the 1st Virtual International Conference on Fuel, Energy and Environment (ICFEE 2022) is to provide a unique platform for researchers, scientists, engineers, and professionals across the world to present their most recent research findings and innovative ideas in the fields of Fuel, Energy and Environment towards making sustainable development of the global community.

I am confident that, with high-standard and high-quality submissions and talks, the (ICFEE 2022) will become one of the prominent conferences in the academic field of Fuel, Energy and Environment.

I congratulate the organizers and wish the conference a grand success.

x

HOD MESSAGE

Dr. C. Jegadheesan

Professor & Head,

Kongu Engineering College

On behalf of Department of Automobile Engineering, Kongu Engineering College, I would like to express my sincere gratitude and welcome you all for the 1st Virtual International Conference on Fuel, Energy and Environment (ICFEE 2022). In this realm of knowledge, no matter how much we can accomplish on our own, whether it's research or development, it's never enough. As a result, the conference's main goal is to share ideas, and it is believed that by engaging in this sharing, all parties who may benefit from the conference will be able to apply what they learn to their own activities.

With this note, I would like to welcome authors, participants, reviewers, and technical committee members for a productive conference with exciting and encouraging discussions and exchange of knowledge so that together we can anticipate a future of ground breaking knowledge, research, and technology. My heartfelt thanks to the Advisory Board, Organizing Committee, and Faculty Members who have helped to make this conference an exciting knowledge exchange platform with well-known and well-respected speakers to lead it.

CONVENERS MESSAGE

This First International Conference on Fuels, Energy and Environment (ICFEE 2022) was conducted by the Department of Automobile Engineering, Kongu Engineering College, Perundurai – 638060 during 9th and 10th of June 2022. This conference was intended to collect and share the recent developments in the field of engineering. Specialized experts from USA, UK, Spain and India shared their predictions on the future of Automotive Engineering, namely Alternate Fuels, Electric Vehicles, Battery Technology, Hydrogen Fuel Cells etc., using the research findings of their current technology used by industries. More numbers of experts in the field of Automotive Engineering reviewed the conference papers and commented the technical content where ever possible. Sixty-Nine research scholar team had presented their papers in the field of Core Automotive Technology, Material Science, Alternate Fuel, Energy and Environment. Those presentations were managed by twenty session chairs and session in-charges. Further, the papers are reviewed with the advice of advisory committee, towards refining the content of the papers to meet the journal requirements.

At this juncture, as conveners of the conference, we express sincere thanks to research community who submitted the technical papers, delivered key note addresses, acted as session chairs, acted as session in-charges and all the volunteers who directly and indirectly contributed to this conference.

Dr. P. Somasundaram

Professor

Department of Automobile Engineering

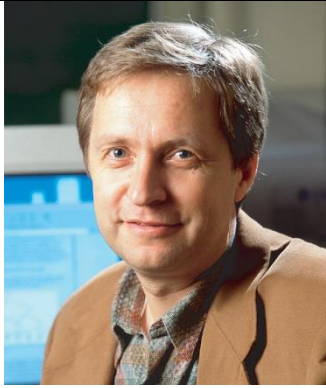Kongu Engineering College

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INDEX

Automatic Entrance Monitoring System with COVID Safety Precautions

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ABSTRACT:

Since 2019, COVID-19 has had substantial social impact. In offices, stores, and other public spaces, new restrictions on the gathering of participants allowed in a specific room. Social distance must be maintained. New progress in technology and nano technology have enabled the creation of a new low-cost monitoring system that customers can use to prevent health problems. The rapid advancement of computer vision has drawn increased attention to the global epidemic COVID-19, allowing for improved human-computer interaction and public health services. Various countries are experiencing a serious health catastrophe as a result of COVID-19's rapid spread. Wearing medical masks like cloth masks, surgical masks, and N95 respiratory masks in all the places where more people meet is an effective strategy to protect individuals from COVID-19, as stated by the World Health Organization (WHO). Manually monitoring people in public settings and detecting their face coverings is quite tough. As a result, an automatic real-time mask detection system is urgently needed to aid in the prevention of the public epidemic. Mask detection is carried out in this suggested study employing computer- based mask identification framework based on machine learning. The goal is to achieve high precision detection and classification in real time. A sanitizer is poured only after solenoid contact is powered.For those whose temperature is below or equal to the predetermined temperature, a solenoid lock is utilized to manage the door mechanism.

Keywords : *Human body temperature, face mask, sanitizer, contactless temperature sensor, COVID safety.*

Productivity Enhancement and Sustainability of A Rig Manufacturing With Moving Assembly Line Balancing

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ABSTRACT:

Line balancing is one of the major tools to improve the output of assembly line through reduction of unwanted activities and process duration. It is the issue of planning tasks to workstation along an assembly line, to get an optimal assignment. This study focuses on increasing the overall productivity of a single model assembly line. Calculating process cycle time, non-value-added activities, total work load on station, and work load distribution on each workstation are all part of the methodology. One of the main finding of the study is that there were no standard methodologies adopted which will in turn lead to improve the product delivery time. Following proper assembly line methodologies leads to improve the product delivery time.

Keywords : *Assembly line balancing, Productivity, Optimize, Methodology.*

Design of Superlift Luo Converter For Electric Vehicle

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ABSTRACT:

In recent trends, electric vehicles (EVs) are replacing conventional vehicles in the automobile industry because of the serious problems they pose to the environment and human life. An energy storage device (battery) plays a major role in providing a power supply to the vehicle. Due to automotive constraints, the power supply should be highly efficient and have low current and voltage ripple. DC-DC converters indeed provide the same. The design of 12V–60V DC-DC SLLC (Super-lift LUO converter) is proposed in this paper, with an emphasis on electric vehicle (EV) applications. The low output voltage ripple is a benefit of the SLLC topology. The basic boost converter (12V–60V) is modelled and analysed in MATLAB SIMULINK, and the output voltage ripple is calculated. A three-stage super-lift LUO-converter is then designed and modelled in MATLAB SIMULINK. The voltage output is analysed for each stage and the ripple voltage is calculated. The comparison of voltage ripple between the CBC and SLL converter shows that, the output ripple gets reduced in the proposed SLLC.

Keywords: Electric Vehicle System, DC to DC Converters, Super-lift LUO Converter, Ripple Voltage.

Design of A Window Control System using Temperature Sensing Unit

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ABSTRACT:

This project deals with the prevention of AC-power wastage in the cars. The wastage of AC- power occurs when the window of the car is in open without our knowledge. Our objective of using air conditioning is to maintain the certain temperature inside the car. When the window is in open condition, there is no efficiency, the temperature inside the car is not maintained at definite temperature, there occurs a loss in AC- efficiency. To rectify this problem, we have a solution. This problem is rectified with the help of temperature sensor, Arduino UNO chip and power window. Temperature sensor senses the inner temperature of the vehicle. This temperature is given to the Arduino UNO as the input. Before this Arduino UNO is coded using Arduino IDE application. If the inner temperature sense by the temperature sensor is greater than the optimum temperature coded in Arduino UNO, Arduino sends the output signal to two sectors. First sector activates alarm instantly and next sector is to operate the power window to close. The second sector operation is coded with the delay function of 10seconds, so the window is closed after 10seconds from the Alarm sound, by this we can save the wastage and efficiency of Air Conditioning system.

Keywords: Air conditioning, Maintain temperature, Power window control.

Impact of Heat Treatment on Mechanical and Tribological Properties of Metal Matrix Composites of Aa6082 T6 with Tin, Zinc and Graphite

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ABSTRACT:

In this research article, the metal matrix composite with AA6082 was formed with mono Tin(5 wt%), Zinc(5wt%), graphite(5wt%) and hybrid. The solution heat treatment process and quenching with water and solidification were carried out and results were compared with AA6082 T6. The different analysis includes mechanical properties (Tensile strength, micro hardness), metallurgical properties (SEM and EDX) and tribological property (friction and wear). Micro structure of heat treated AA6082 MMC found with lower defects and fine grain size. Hardness values of heat treated AA6082+Zinc(A6) and hybrid AA6082(A8) found higher than AA6082 T6. The ultimate tensile strength of heat treated AA6082+Zinc(A6) and hybrid AA6082(A8) observed higher than AA6082 T6. The wear and friction rate also reduced with heat treated AA6082 +Zinc and AA6082 hybrid metal matrix composites.

Keywords: Heat treatment, Stir casting, Hardness, SEM, Wear.

Automatic Fertilizer Spreader Using Solar Power

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ABSTRACT:

The nation with agriculture as back bone-facing many struggles in it. One of the main struggles in agriculture is pests and it can be prevented by spraying fertilizers. Though the fertilizer sprayed by existing methods preferred nowadays, they cannot be effective and efficient. So, we proposed the project Automatic fertilizer sprayer for automatic spraying of fertilizers which runs on the rechargeable battery. We used the Bluetooth module to get input to the rover and wiper motor for motion in addition this pesticide sprayer reduces efforts to farmers and saves time.

Keywords: *Wiper motor, Bluetooth, PIC16F877.*

Heat Transfer Enhancement in Shell and Tube Heat Exchanger by Using Rectangular Serrations on Tubes

P. Vigneshwar[1], S. Surendran[2], K. R. Vignesh[2], M. Venkatesh[2], R.Yuvaraj[2]

[1]*Assistant professor, Department of Mechanical Engineering, Saranathan College of Engineering.*

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ABSTRACT:

In this study, 1-D steady state heat transfer was accomplished for shell and tube type heat exchanger with counter flow configuration. Shell part of the heat exchanger carries cold water with a temperature of 30°C whereas the tube part carries hot water with a temperature of 60°C. The analysis is done for 0.1 kg/s mass flow rate of the primary flow and secondary flow. Various models were designed by providing rectangular serrations on tube side for different thickness ranging from 1.5 mm to 3 mm. The heat exchanger's temperature profiles for hot and cold fluid flows are presented in this article. It is resulted that for the various models designed, efficiency increases with increase in serration thickness. Maximum of 36.6% of mean efficiency has been achieved with 3 mm serration thickness whereas only 7.2% mean efficiency for the same conditions on a flat tube side surface without serration.

Performance Enhancement and Emission Reduced Reduction of an Ic-Engine Using Propanol and Hexanol Mixture

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ABSTRACT:

Non-renewable oil sources are increasingly depleting as a result of the rapid development of industrialization and the automotive sector in recent decades, resulting in increased energy demand. The research in this paper focused on designing new fuel mixtures to minimise fuel consumption, reduce the environmental effects of combustion emissions, and increase efficiency. It outlines the experimental effects of different diesohol (Diesel+ alcohol mixture) mixtures. To investigate the efficiency of an internal-combustion engine when propanol and hexanol are used in separate proportions with diesel. Various diesohol mixtures (2%, 4%, 6%, 8%, and 10% propanol and hexanol with diesel fuel) were tested and compared to pure diesel samples. Propanol and hexanol boost brake thermal performance while lowering specific gasoline consumption. Blends emit slightly less particular HC, NOx, and O2 than diesel, but significantly more CO2. A diesel engine energy and exergy study is conducted to determine the impact of using propanol and hexanol with biodiesel. The PH10 blend needs to perform similarly to pure diesel once tried to compare to the other blends in the test, with only 2.37 percent lower brake thermal efficiency, 3.6 percent higher brake specific fuel consumption, 17.55 percent lower specific nitrogen oxide emission, 18.18 percent higher specific hydrocarbon, and 33.33 percent higher specific carbon monoxide emission.

Keywords: Diesel engine diesohol, Alternative fuel, Efficiency, Combustion, Energy, Exergy, Emissions.

Multi Nut Wheel (Car) Tightener and Remover

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ABSTRACT:

One of the most important factors in extending the life of an automobile is proper maintenance. It mostly entails changing a punctured tyre, which has always been a challenging task. Although every automobile manufacturer supplies tools such as a L wrench and a jack, using these items still takes a trained individual. As the number of passenger cars on the road grows, so does the number of vehicles experience tyre failure. For spare tyre replacement, the car is frequently equipped with a tyre wheel nut remover and a jack. Many accessory manufacturers for passenger cars and heavy vehicles focus on creating wheel nut pullers that use a single tool to remove each nut one at a time. Main problem they have still faced is longer time consumption and tedious work to do skilled worker. Therefore, it is crucial to have a tool that should be designed ergonomically, easy to handle, lightweight, requires small space and can perform a similar task in one time. In our work, a tyre nut removal with required pitch circle diameter has been developed to replace T-nut wrench. This tool can open five nuts in one time and the force utilization has been reduced. It will help the car owner to overcome the difficulty of tyre replacement.

Keywords: multi nut remover, car tyre, l wrench, jack, pitch circle diameter.

Oil Separator

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ABSTRACT:

Oil separating method is known for environmental friendly features. An oil separation is a device that is designed to adsorb floating oil from a liquid medium. For past few years oil spill occurs in sea, food industry, waste water treatment, tool parts washing etc. Water pollution is uncontrollable. Due to water pollution, people, fishing and aquatic organisms are greatly affected. There are many ways to clean this oil spill. Generally workers use to clean oil through buckets and mop, these thinks affect humans health. To avoid this, an oil skimmer used but those devices are made for particular process. As we made changes in design, we can collect the separated oil through tanks and have found the speed of disc, oil recovery in a particular time for different depth of disc on the liquid-oil mixture surface and power consumption of device. Recovered 95% of oil after separation.

Keywords: *Journal, Disc, Motor, Oil collector, Blades.*

Customiszed Design of Inductive Sensor for an Early Detection of Cracks in Indian Rail Transport

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[3] *Graduate Students, Department of Electrical and Electronics Engineering, Kongu Engineering College, Perundurai, Tamil Nadu.*

ABSTRACT:

The objective of this paper is to provide a solution to a serious issue in today's world of transportation through railway. The practice to examine the flaws which lead to serious effects in rail track is rail inspection. Among the world countries, Indian railways are the fourth-longest, but when it comes to reliability and safety it lags to provide world standard. As a result, if the track is damaged, it severely loses valuable human lives and property. This derailment in tracks is caused by cracks in the rails. Therefore, an early crack detection and protection system is required to save the life. This paper proposes a customized design of an inductive transducer for and crack detection system on railroad tracks to avoid train accidents. Existing method uses the manpower to identify the crack and this involves human error. So, the drawbacks in the existing method is reduced by the automatic system. Customized inductive sensor is designed and developed using ANSYS. A scaled down model of a cart is fabricated and the inductive sensor is assembled at beneath surface of the cart. The track is acting as part of the magnetic core for the inductive sensor and voltage is induced in the sensor. The sensor voltage is calibrated to distinguish the magnitude of voltage from the normal to crack.

Keywords: Early crack detection, Indian railways, inductive sensor, ANSYS.

Hybrid Variant Mouse with Detachable Digital Pen'elien'

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ABSTRACT:

ELIEN'   ELI+EN= ELI(tamil) -mouse ; EN-Pen. The 'ELIEN' is a hybrid variant of mouse with detachable digital pen. To make a more cost effective gadget than a digital pen tablet (ex: wacom digital writing pad) and modern mouse. Designing a 2 in 1approach of Mouse &pen where pen is meant for highly detailed work like writing & drawing (Editing) and Mouse is meant for convenient computer accessing& surfing. ELIEN allows a user to transform a mouse to a digital writing pen by detaching the pen from the mouse, it allows the user to change the way of using the computer in two different ways. As the mouse usage increases to a long period, the hand and wrist feels more discomfortness due to the numbness. So if there is a possibility of changing the hand's position we can reduce the pain. At that time the detached pen from the mouse will solve the issue as the pen usage is in vertical position, the blood flow from the wrist to the palm will be normalised there by reducing numbness. ELIEN is a reverse engineered redesigned concept of a generic mouse with a detachable pen like approach, where we use the prebuilt components like optical ic, push buttons, passive components from the mouse to incorporate inside a pen shaped shell. The mouse possess a individual left and right push button along with scroll encoder with free contact end, The pen is designed with Optical sensor IC, Multifunctional push buttons embedded with RP2040 microcontroller along with this it has free contact pin for contacting with the mouse when it is inserted in to it, so it is clear that the pen is the brain of the entire system.

Keywords: *Optical sensor IC, Multifunctional push buttons, free contact pin, hybrid variant, detachable*

digital pen, Mouse,2 in 1 approach, 'ELIEN'

Article ID: ICFEE021

Autonomous Hospital Cleaning Robot

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ABSTRACT:

Cleaning is a vital routine to eliminates dust and pathogens. Cleaning must be done without any deviations from the standards perfectly. To prevent infectious agents from medical waste, hospitals should be regularly well-maintained and cleaned as cleaning a hospital differs significantly from home or an office. According to Swachchta Abhiyaan guidelines, the Three-Bucket cleaning procedure should be ideally practised in all Public healthcare centres and Hospitals. This method focuses on preventing infectious agents from spreading through cleaning equipment like a mop and recommends certain cleaning regulations. The set of procedures in cleaning such places appear to be time-consuming, and the hospital janitors may become exhausted. These manual procedures cause fatigue, which in turn causes deviations from the norm. Caretakers must also be given appropriate aprons to wear while cleaning, else there are chances for caretakers also to get infected during pandemic situations. To address these issues, we have designed and build a prototype of an autonomous mobile robot with a manipulator that would clean hospital floors. The robot was discussed in terms of modelling, component selection, electrical connections, simulation and experimentation. The robot cleans the hospital floor using the three-bucket method, ensuring that the appropriate level of standards is met, the rate of infection is reduced, and caretakers and maintenance costs are reduced.

Keywords: Mobile Robot, Manipulator, 3-bucket method, Kinematics, 3D printing, Solid Modelling.

Techno-Economic and Environmental Investigation on the Implementation of Small-Scale Grid Connected Photovoltaic System for a City in Oman

Maryam Ahmed Yousif Al-Nofli[1], Ahmed Said Ahmed Al-Shahri[1], Joseph Sekhar Santhappan[1]

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ABSTRACT:

As part of Oman's vision 2040, electricity from renewable energy should replace 30% of the country's total power by 2030. Furthermore, the power for the electric vehicles is expected from renewable power. Recently the Oman Authority for Electricity Regulation (AER) revised the tariff system and due to this generating of energy from solar energy is becoming popular. To implement the PV technology, many challenges including cost of electricity, technological growth and policy must be addressed. Grid Connected PV (GCPV) system may be one of the options to overcome the above issues. It could decrease peak load demands, besides contributing eco-friendly power generation. This paper investigates the techno-economic and environmental aspects on implementing PV power for electrification of Suhar City which is situated in the northern part of Oman. Photovoltaic (PV) systems can be installed utilizing the available rooftop spaces in the premises and the empty land around the buildings. A 1400W PV system available in Sohar University (SU) was used to collect the required data. The system was simulated in HOMER Pro, and the major parameters needed for the proposed study were analysed. The results showed that the investment in PV system, in Sohar city can be promising. The system showed the yield factor as 1923.6 kW h/kWp/year. Moreover, the proposed system had a capacity factor of 21.7%. The cost of energy and payback period were 0.146 USD/kWh (0.056 OMR/kW h) and 4 years respectively. However, many other factors due to economic challenges, Government policies and social acceptance must be resolved to establish a viable market for PV technology in Oman.

Detecting and Ranging of Objects in 3D Printed Drone

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ABSTRACT:

Drones play a major role in major fields and the main motivation for developing drones is to reduce human activity in the unwanted areas. The main motivation towards the application of the proposed QuadDrone is precise altitude measurement and Object detection. The popularity of the drone is increasing and the control systems are becoming more advanced and less expensive. The Quaddrone is designed using SOLIDWORKS and fabricated using 3D printing technology. The drone body is fabricated using PLA (Poly Lactic Acid) material (Black) and ABS (Acrylonitrile Butadiene Styrene) material (white) is used to fabricate drone landing box. The printed parts are tested for dimensional accuracy and surface roughness. The QuadDrone is assembled with 3D printed parts and electronics components. The difficulties encountered while developing the drone are assembly errors, sizing issues, and weight balancing. The recent technologies like 3D printing, Rapid prototyping and Drone technology are used to develop the quaddrone. The performance to measure the altitude of QuadDrone and object detection with Lidar sensor is tested in the open environment and it will act as a precision altimeter and object identifier.

Keywords: *LiDAR Drones, Altitude Measurement Drones, 3D Printed Drone, Object identifier Drones, UAV LiDAR Mapping.*

Vehicle Fuel Theft and Tyre Pressure Monitoring Using IOT and GSM

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ABSTRACT:

In today's world, with the help of rapid technology advancements we can easily monitored the vehicles theft,fuel theft and tyre pressure monitoring at our fingertips with the help of the internet of things. Internet of things plays a vital in the emerging technological development. Generally our projects have focused on developing an enhancement of vehicle monitoring security system. The safety of vehicle fuel is extremely essential for public, so this project came to our notice due to alarming rate at which vehicles fuel are being stolen in our country. Vehicle thefts also increasing day by day, so our project consists of a RFID-based vehicle access system for controlling vehicle theft detection. Since tire is an essential part of the vehicle, our project included with Tire Pressure Monitoring System (TPMS) to monitor the pressure in the tire. By using various sensor, our project will overcome all of the above existing problems. The standard IOT devices available in the market are bulky and expensive. They are not easily afforded by the normal peoples. With the help of this device, we can control the fuel level, speed level,vibration level duration of working of the devices connected to it. In this project, web connection is established between the microcontroller and internet. The major value proportions of our project are cost effective, user friendly and easy affordability. This system looks very small and compact and can be mounted on vehicles easily Customer can't cheated by the fuel filling stations This project will be a great advantage to the normal peoples in controlling their home appliances easily and efficiently.

Keywords: Portable IOT, GSM, IOT mobile application.

Design of Cost Efficient GPS Based Anti-Theft Detection System

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ABSTRACT:

A major issue today at many places like shopping malls and residential areas is that they have aconstant fear of having their places secured and safe when they are away. Even though there are a lot of other security systems like CCTV cameras, surveillance cameras with emergency call alerts, digital panel card readers, and home safety protection door lock systems, they don't distinguish between human and inhuman activity. It also takes more time to catch the thief. The paper focuses on designing a system to detect theft activities even before the commencement of theft. The proposed solution will eliminate the duration of finding the thief and communicate the theft occurrence instantaneously to emergency numbers (owners and police) using GSM. The designed system will be a hidden system where the owner gets information about the on-going theft. The proposed system reduces the overall cost through the incorporation of an inexpensive and accurate sensor.

Five Stage Double Active Bridge DC-DC Converter - for DC Microgrid

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ABSTRACT:

Recent days there are so many advancements and research going in renewable energy which made a switch from Fuel Vehicle to Electric Vehicle (EV) were the power electronic components place a vital role for controlling, switching and to keep the system balanced in any situation and using the inputs in a very efficient way. AC to DC and DC to AC conversion happens in a converter more often and step up, step down of voltages are also done to achieve the required target. Process like Rectification, Inversion and stepping up/down are also used in Electric Vehicle. Solid State Transformer (SST) consists of all the process like Rectification, Inversion and stepping up/down in a single system to minimize the loss and maximize the efficiency. 5 Level Dual Active Bridge is proposed in this paper improves the ability to regulate the power flow Thus, increasing in voltage levels, lets to improve the system efficiency. Before implementation of hardware the system has been built and tested using MATLAB simulation software.

Critical Experimental Work on Effect of Ceramic Tile Waste in Concrete As A Substitute to Aggregates

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ABSTRACT:

The use of waste materials such as ceramics as a building material alternative is gaining popularity these days. While some other ceramic product wastes, like sanitary wares and electrical insulators, have received substantial research, ceramic wall and floor tile wastes have received less attention. As a consequence, the focus of the research is on the mechanical characterisation of aggregate concrete made from waste ceramic wall and floor tiles. Ceramic wastes were collected from building and demolition sites and reduced to required size using a quarry metal hammer. According to industry standards, ceramic tiles were sieved into fine and coarse particles. Slump test was order to evaluate the fresh concrete workability. The impact of ceramic tile waste on the mechanical and micro level characteristics in concrete is the focus of this study. Concrete utilising ceramic waste as a substitute for cement and aggregate was found to have better mechanical properties. It was discovered that the use of ceramic waste in the building industry not only lowers the cost of construction materials, but also aids in the attainment of sustainability.

Keywords: *ceramic tile waste, fine aggregate, fresh concrete properties, material properties, mechanical Properties.*

PV Charging Station for Electric Vehicle with G2V and V2G

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ABSTRACT:

Electric vehicles have grown in favor among customers over the last several decades. Consequently, there has been a rise in demand for more efficient and environmentally friendly charging stations for electric cars. Though electric vehicles (EVs) are touted as an alternative to CO_2 emissions, the energy needed to charge an EV comes from fossil fuels. Efforts have been made to increase the sustainability and efficacy of electric vehicle charging infrastructure powered by solar energy. This article explores the use of a solar-powered charging station for electric cars with G2V and V2G charging options. MATLAB/Simulink is used to create and construct the suggested model. Input circumstances are varied, and the outcomes are calculated.

Keywords: *Solar Power; Electric Vehicle; Grid to Vehicle; DC-DC converters; Vehicle to Grid.*

Bi-Directional Control of Dc Motor with Tv Remote Using Arduino

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ABSTRACT:

The task is intended to drive an acceptance engine for the expected application in forward and turn around headings utilizing remote innovation. For a model, an exhaust fan can be utilized in both the bearings to outside air in and toss hot air out. This can be utilized if there should be an occurrence of ordinary exhaust a fan that pivots in a single course as it were. This proposed framework shows an innovation to turn a squirrel confine acceptance engine in both clockwise and counterclockwise courses. It likewise has the arrangement to control the course of the engine utilizing remote innovation. In remote innovation Global System for Mobile (GSM) is utilized to control the course of the enlistment engine. The proposed framework goes about as numerous entrance procedures. The proposed framework reenactment is approved under the product. It contains the power supply, regulator, transfer, and AC engine. The proposed framework is reenacted with the input of the order is surrendered to the virtual terminal and the three methods of activity are approved with the result of the regulator. The regulator executes the heap to turn "FORWARD" and "Switch" bearings.

Keywords: IR receiver module, Arduino UNO, coding and decoding.

Hybrid PV wind Battery Optimal Sizing using Horse-Herd Optimization

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ABSTRACT:

Hybrid systems are evaluated primarily on the GHG reduction reliability and cost of their system. It was decided that a rural Indian village would benefit from a grid-connected hybrid PV/WT battery system, the main objective of this investigation was to find the most cost-effective sizing of the parts for non-conventional energy-based hybrid systems. Maximizing the NCEF of the system was employed as the third fitness function to accomplish this aim by using the Horse herd optimization approach to minimize two other objective functions, COE and LPSP while maximizing the system's NCEF. Three scenarios were given in this report to investigate how a proposed hybrid system and the grid's capacity to sell or purchase energy from each other would affect the interplay between the two. Economically optimum solution (lowest COE), renewable energy utilization viewpoint (highest NCEF) and ecologically ideal option (lowest COE) were the three views of horse herd optimization outcomes and the overall system is simulated and tested in MATLAB/ Simulink.

Keywords: Horse herd optimization, PV system, Wind System, battery, hybrid system.

Article ID: ICFEE032

Mapping of Electric Utilities in Roadways using GIS in Erode City

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ABSTRACT

Urbanization has become a major phenomenon in India were lakhs are migrating every year increasing the traffic congestions. In many places over population has affected the local authorities even to provide basic transport services. Traffic problems in India are already an extensive task and will become much difficult due to urbanization and changing lifestyle of people. This analysis introduces a solution to the problem in transportation in erode city. In this project the electrical obstructions for transportation movement been identified and mapped by which they can be removed or altered in their routes. An integrated approach to electric utility mapping is more than the sum of its parts. Location and mapping teams need to participate in a multi-phased process that includes lobbying and action on their part. They must be involved from start to finish. This project aims at mapping the electric utilities such as electric poles and transformers in major roadways of Erode City [Corporation limits] using GIS. These utilities have been mapped and differentiated based on their impact to the traffic flow operations in the roads. Initially, locating the utilities has been done through GPS (Global Positioning Systems) which will be very useful for finding the accurate latitude and longitude values. And then, mapping of utilities is carried out through GIS (Geographic Information Systems) which give better results in mapping. The software used for mapping is QGIS. The electric utilities which are obstructions to traffic movement are all to be identified and mapped which will be later altered in their alignment or removed.

Keywords: *Geographic Information Systems, Global Positioning Systems, Right of Way, State Highway, Major District Road.*

Automobile Service Stations' Service Quality and its Impact on Vehicle Owners' Satisfaction – an Indian Experience

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ABSTRACT:

The automobile industry in India is considered as one of the largest industries in the world. In the present scenario, the Indian automobile industry has grown up to the pinnacle to have a varied series of vehicles these days. In India, a very good number of automobile companies are running their operations on par with International standards and they have a wide range of models in different segments. Further, many of the Indian automobile manufacturers have extended their operations globally as well which obviously have paved way for additional investments in the Indian automobile sectors by the MNCs. In such a big automobile market scope for service stations are also very wide. The purpose of this study is to identify the impact of the service quality of automobile vehicle service stations' on vehicle owners' satisfaction. The researchers collected the data by administering questionnaire method and convenience sampling method. This study identified five important dimensions of automobile service stations' service quality. They are reliability, responsiveness, empathy, service and assurance. This study also found that except empathy all the other dimensions have significant influence on vehicle owners' satisfaction. This study finding would help the policy makers in general and the automobile service station managements in particular to formulate suitable policies.

Keywords: service quality, responsiveness, service, empathy, assurance.

Fuelling the Sustainability: Consumer Preferences on Electronic Vehicles in India

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ABSTRACT:

Due to growing urbanization and the increase of vehicles, most Indian cities endure traffic congestion and significant air pollution. As a result, alternate technology in autos, such as electric vehicles, may become necessary (EV). This study aims to identify consumer preferences toward electric vehicles in the Indian market(Kopal cheema,2019). This research conducted a survey and analyzed the opinions of people regarding their preferences for electric vehicles, demographics, and some of the demotivation which might be stopping them to switch to electric vehicles altogether. This research will help in determining different factors influencing the perception of consumers toward electric vehicles and what they expect when they think about purchasing a new electric vehicle. It is important to understand that electric vehicles are really getting popular now because of the rising fuel prices and environmental concerns. People are thinking about electric vehicles and replacing them with their regular petrol or diesel vehicles. In this research there might be some challenges or roadblocks in switching to electric vehicles. This research found out that despite a favorable attitude toward electric vehicles, individuals are hesitant to transition to electric vehicles due to different hurdles connected with them. This research found out that mostly the preferences of the consumers are good charging infrastructure, a good range of the electric vehicle, pocket-friendly vehicles are the most common preferences of consumers buying an electric vehicle.

Keywords: Electrical Vehicle, Pollution, Alternate Energy, Customer Preference

Article ID: ICFEE038

Solar Panel Cracks, Hotspots Detection Using Convolutional Neural Network

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ABSTRACT:

Quick detection of solar Photovoltaic (PV) panels is very important to identify the panel degradation and its performance. Faults in the PV equipment's causes panel degradation. The performance degradation is mainly due to hot spots and micro-cracks. Thus reduces the power generation and its efficiency. Advanced photovoltaic equipment is designed to detect these faults. In this research, impact of hotspot is analysed and a fault detection method is identified to detect the PV modules affected by these faults. The faults are also classified using convolutional neural network (CNN). An in-depth examination of selecting an efficient strategy to get an accurate outcome can be achieved by analysing these techniques. Parameters like percentage of power loss (PPL), Open-Circuit voltage (VoC), Short circuit current (Isc), Irradiance (Irr), Panel temperature and Internal impedance (Z) are used to detect the faults. Convolutional neural network has an accuracy of 87%.

Keywords: *PV Panels, Convolutional neural network, hotspots, micro cracks, iradiance.*

A Hybrid Energy Storage and Grid-Connected Photovoltaic Power Management System

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ABSTRACT:

The reliability and safety of the present electricity system is threatened by the introduction of microgrids into the distribution network. Power quality and system stability are substantially impacted by the irregular properties of renewable energy sources and unpredictable load fluctuations. As a result, in order for storage systems to coexist in microgrids, they must have high energy and high-power handling capacities. Grid-united PV system with hybrid storage of super capacitor and battery is the subject of this paper's design. With the combined battery and super capacitor storage system, power fluctuations are quickly controlled for the DC link voltage, therefore stabilizing the system and assisting in the smoothing of the PV power. Battery state of charge (SOC) may be used to determine an energy management strategy that is both effective and efficient for distributing electricity from the grid to the battery. The battery system is less stressed when the produced power and load requirements diverge unexpectedly when a super capacitor is used. According to simulation tests, the suggested energy management strategy performs and is effective.

Keywords: Battery, Super capacitor, hybrid AC DC microgrid, Energy Management system.

Design of Cascade H- Bridge Multilevel Inverter for Micro Grid System

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ABSTRACT:

Nowadays the electricity plays a vital role in everywhere, but it's available in different places with different kind of sources. Individual Inverters are used for all the sources, due to this there are more inverters and switches must be used. The Multi-Level Inverter is the most suitable solution for the problem. This Project presents a fifth stage Multi-level inverter utilizing switched-capacitor technique. Proposed topology employs Symmetric or Asymmetric DC voltage sources as input and generates a multilevel staircase output. The structure includes a front-end switched-capacitor based DC-DC converter and back-end H-bridge inverter. The front- end SC DC-DC converter feeds the DC voltage input to the H- bridge inverter which produces the corresponding bipolar levels. Inverters have the potential to be employed in AC micro grids where there are DC sources available. The inverter naturally solves the problem of capacitor voltage balancing as the capacitor is charged to a constant value twice every cycle.

Keywords: *Multilevel Inverter, Switched-Capacitor, H-bridge Multilevel Inverter, DC-DC Converter, Micro grid System.*

Integrated Energy Management and Monitoring System for Small Scale Industries

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ABSTRACT:

Integrated energy management and monitoring system is the combination of energy meters connected to various electrical devices of any small-scale industry so that optimum energy can be achieved and maintained. It is used to continually improve all variables affecting energy performance, and to minimize the energy cost and the waste without affecting the production and the quality. This paper proposes the outline and application of the Energy meter which is used to calculate various factors such as voltage, current, power factor, frequency, power, etc. of any individual electrical device. The system starts with the energy meter connection, connected to various electrical devices in small-scale industry. The major part of an energy meter is to monitor, acquire and interpret the power consumption data online through Modbus communication using RS485. Finally, the visualization and representation of data may be web-based or server-based, or cloud-based using the dashboard which is built using Node-red software. With these values we can implement the required maintenance and monitoring actions, most likely it is a remote monitoring system.

Keywords: *CT/Energy Meter, RS485, Node-red software, Energy units' consumption.*

Four Quadrant Operation and Speed Control of Three Phase BLDC Motor for Electric Vehicles

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ABSTRACT:

The renewable energy have become a necessary demand due to current demands on depletion of fossil fuels and environmental concerns, the globe has begun to move toward renewable energy sources in recent years. Over the years of recent development in electric vehicle technology the world have started to adapt accordingly. The solar-powered three-wheeler is the first step in bringing renewable source to automobiles in the modern world hence to the world. The batteries, over the years had a massive improvement making the vehicle even more suitable for day to day usage. It can be charged using normal 220 AC Volt. The solar cells are capable of increasing the running by 40% .The solar powered car was successfully assembled, operated, tested, and run. The batteries will continue to be charged by the solar panels.

Keywords: *Brushless DC motor, lead acid battery, MATLAB, Speed control of brushless dc motor, electric vehicle, Vehicle dynamics.*

Evaluation of Improved Scatter-Search and Hybrid Petrinets for Optimization and Scheduling of Flexible Manufacturing Systems in Ceramic Industries

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ABSTRACT

Several optimization issues in industrial engineering (particularly in production systems) are extremely complicated and difficult to address using traditional optimization approaches. The use of meta-heuristic approaches to handle such difficult optimization issues is gaining popularity. For optimization and scheduling of flexible manufacturing systems, a meta-heuristic technique called Scatter-Search (SS) and the Hybrid Petrinets with Improved Scatter Search (PNISS) algorithm is used. In contrast to conventional evolutionary methods, the Improved Scatter Search (ISS) and Hybrid Petrinets with Improved Scatter Search algorithm allows a wide exploration of the search space through intensification and diversification. It also features a unifying concept for linking solutions, and it uses adaptable memory to prevent producing or integrating duplicate solutions at different phases of the issue. The results achieved by Improved Scatter Search and Hybrid Petrinets with Improved Scatter Search are compared to the results obtained by the different known meta-heuristic approaches. When compared to Dispatching Rules and PNDR, the PNISS performs better for the majority of the goal functions and may offer a superior solution. When compared to other strategies, the findings were understandable and encouraging in terms of optimality and the superiority of the hybrid PNISS (PN with Improved Scatter Search).

Keywords: *Flexible manufacturing systems, Petri nets, Improved Scatter Search, Hybrid Petrinets, Ceramic industries.*

Design and Fabrication of Passive Safety Devices for Heavy Vehicles to Prevent Human Accidents Using AI

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ABSTRACT

Every day, the incidence of fatal road accidents increases, posing a serious threat to public health. Accidents on the road can happen for a number of reasons. Implementing engineering measures, enforcing traffic laws, and making autos safer can all help to make roads safer. Drivers are regularly distracted, diverting their concentration away from the road. Accidents can happen for a variety of causes, including poor visibility, hazardous road design, or other drivers' negligence. When people fall beneath a car and are crushed by the vehicle's enormous tires, they die. A passive safety system is constructed by using the YOLO (object classifier) method and triggering the defender mechanism to recognize individuals when they fall beneath the vehicle. This is an algorithm that detects and recognizes various objects in an image (in real-time). To immediately activate the defense, pneumatic cylinders are used. The defender is made to push the victim out of the tyre, preventing humans from being crushed.

Keywords: YOLO, Road safety prevention, Defender plate, Solenoid valve.

Smart Road Safety System for Hilly Regions

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ABSTRACT

Safe drive on the roads is the objective of the accident avoidance system. Nowadays all the people need to travel safely and need to have guaranteed to their lives. Most vehicle accidents occur due to human error in one way or in another way. Especially on hilly tracks, the accident hot spots are in hairpin bends. Vehicle drivers need to be alerted to avoid accidents on the ghat roads. The proposed system identifies only the four-wheelers and above fourwheelers. The proposed system contains a camera that is installed on the up-hill side of the hairpin bend, which is used to detect the vehicles approaching the bend. Based on the algorithm programmed in the microcontroller, the warning light for vehicles on the other side is turned ON.

Keywords: Accident, hairpin bends, deep learning, ghat roads, road safety, YOLO algorithm.

Ambulance Routing and Patient Monitoring Using Machine Learning

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ABSTRACT

Many people are unaware of their life while travelling on roads. The reasons behind the carelessness are fast driving, drunk driving and so on. It leads to either minor injury or major problems. The minor injury may need only assisted support or treatment on the spot. The major accident may need immediate treatment and should be transferred to the nearby hospital. The best way of ambulance routing for emergency requests is necessary to save a patient's life. Once the accident took place, ambulances are ready to pick up the patients on the spot to the nearby hospital. In some cases, patients attain unconsciousness and go to critical states. The attender/nurse collects the patient's details through pulse sensor and temperature sensor. With the help of this, the patient will be admitted in the nearby hospital where the treatment will be better and has good feedback from the other patients. The project deals with enhancing the response time performance of the emergency services by utilizing ambulance routing and patient monitoring using Machine learning. The used algorithm in machine learning is Linear regression. With this defined algorithm, data are collected and send to the machine to analyze the hospital near the surroundings.

Keywords: Pulse sensor, Temperature sensor, Ambulance, Thingspeak, Machine Learning, Linear Regression.

Article ID: ICFEE047

Smart Technology for Smart Environment and Smart Cities

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ABSTRACT

Standing in a long queue in front of a billing counter is a great disappointment while maintaining a social distance from the customer. To overcome this problem that made the customers struggle, a Smart Trolley is introduced in such big malls. This system uses the combination of IoT and RFID technology to sense the product price and quantity and displays the total cost on the LCD in the trolley and transmits the data to the bill section through the cloud. Implementing this type of trolley in real-time will be convenient for both the labourers and customers. The main advantages are reduction in manpower and simplicity in operations. This idea comes with a scanner to check the individual and the added total price of the product to the customer directly. The cost of the entire product purchased in the trolley is known directly to the customer before the bill counter. This system may avoid confusion when the customers have insufficient money. This system uses RFID. It has a dual advantage: the radio frequency can prevent the product from bringing theft. Moreover, this method also paves ways for digital bill transactions, which hopefully saves time.

Patient Health Monitoring Using IOT

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ABSTRACT

This study is to present fostering another framework that screens heartbeat rate and furthermore internal heat level simultaneously through Think talk. The heartbeat sensor was at first intended to gauge inward temperature and heartbeat pace of the human body which is profoundly connected with heatstroke and respiratory failure access. The comprehension behind this ongoing review is to decide the effect of the execution of this checking gadget on the youngster's internal heat level state. Heatstroke conditions can be brought about by body overheating were typical because of drawn-out openness to or actual effort in high temperatures. This is the most significant type of intensity injury, heatstroke and it can happen to assume internal heat level ascents to 104 F (40 C) or higher. The outcomes got unquestionably implied that the internal heat level expanded essentially when youngsters also open to the climate and cardiovascular failure cases make the people heartbeat in the risky rate at some unacceptable second. Hence the significance of this gadget assessed through teachers, guardians and understudies points of view was 90% individually.

Keywords: *Arduino UNO, ESP8266, Pulse Sensor, Temperature Sensor.*

Mist Cooled Condenser in Domestic Refrigeration

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ABSTRACT

There is a rapid increase in the use of electrical and thermal energy in residential buildings, and new technologies are being developed to meet the demand. . The improvement of refrigeration system performance has been chosen as one of the important areas for research among the numerous techniques. Because of the increased use of small-scale appliances and their impact on global energy needs, more research on small-scale systems with water-cooled condensers is required to minimise energy consumption in residential constructions. The mist boosts efficiency by facilitating extra-quick cooling on the condenser coil. The refrigerant is also cooled down to provide a better chilling impact to the items in the cold storage system. Copper has a tendency to lose or acquire heat more quickly than other metals. This study of a household refrigerator indicated that using R134a as the refrigerant improved performance significantly. The daily power usage of the mist cooled condenser refrigerator may be reduced by 8 to 12 percent. This is frequently due of the reduction in compressor effort. The COP is increased from 30 to 35% better than the domestic refrigerator.

Keywords: R134a, Mist cooled condenser, Domestic Refrigerator, Global Warming, Energy saving.

Eco-Efficient Concrete: a Sustainable Reutilisation of Ceramic Tile Waste Powder (CTWP) as a Partial Replacement for Cementitious Material in a Recycled Fine Aggregate Concrete

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ABSTRACT

The waste generated from the construction will not only leads to environmental crisis but also project overrun. The environmental problems results in increase of pollution that leads society to unfit for living organisms. Many investigations have been carried out on the area of Construction Waste (CW) which includes Concrete, steel, bricks & ceramics. At the end of 2025, the volume of CW generated will nearly double to 2.2 billion tons worldwide. Construction waste contributing 40% of depleting earth's environment. The research was comprised of two Phases. Phase one focuses on reduction of the material waste generated from the construction that can be reutilized as Fine aggregate in concrete of different proportions 25%,50%,75% and 100%. Phase two aims to decrease the amount of CO_2 emission from the cement and that can be achieved by utilization of construction waste material - Ceramic tile waste powder (CTWP) as a substitute for cement in varying proportions 0%,10%,20%,30% and 40%. The research showed the performance of Eco-Efficient Concrete with different proportions of CTWP and Recycled Fine Aggregate (RCFA) through measured properties. The use 30% CTWP & 100% RCFA replacement level adequate for compressive strength improvement at 28 days is 24.8N/mm2. The simultaneous use of increased percentage of CTWP & RCFA at different replacement levels enhances the durability Properties.

Keywords: *Construction Waste, Ceramic tile, Recycled Aggregate, Eco-friendly, Sustainable Development.*

Spatial Analysis of Ground Water and their Treatment with Low-Cost Ceramic Membrane

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ABSTRACT

Urbanisation is major reason for the contamination of Ground Water (GW) due to the movement of people from rural area to urban areas. The GW quality worsening due to the water security issues in Erode by the rapid growth of number of Tannery and Dyeing industries around the city limits. These waters contain harmful chemicals and toxins which makes the water more degrades the quality of water which affects the aquatic animals and plants. Now a days, People in urban cities are exposed to more polluted water without realizing its potential danger to health. The Spatial analysis of GW which is determined by the values of pH, Turbidity, TDS, TSS, Alkalinity, Nitrate, Sulphate, Chlorides, Phosphates, Dissolved Oxygen, Chromium and Lead and mapping done with sample taken from different locations. The intensity of the chemical parameters above the permissible limits which cause disturbance in living beings. With the help of GIS technologies, identifies the areas where the ground water quality is depleted more. The GW is treated with help of Ceramic membranes as it has good chemical stability, as heavy metal plays a major role in water treatment. Heavy metal ion separation from contaminated water are all discussed as low-cost ceramic membrane applications. This study highlights the future scope and challenges of improving low-cost ceramic membranes that aid in the treatment of water pollution levels at various sampling locations in Erode municipal corporation with the goal of creating a water quality map identifying areas that are highly polluted using Arc GIS.

Keywords: *Spatial Analysis, Urbanisation, water quality, ceramic membrane.*

Article ID: ICFEE054

Sludge Valorization Analysis using Machine Learning for Pollution Reduction

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ABSTRACT

Environmental chemists, engineers, and water authorities face a significant issue in the treatment of textile effluent. Non-biodegradable dyestuffs are commonly employed in textile dyeing and printing processes. The electrocoagulation technique has proven to be the most efficient wastewater treatment method. Sludge is generated by an EC process and is considered waste, leading to increased operational expenses due to waste disposal. Sludge comprises valuable materials such as nutrients or metals collected during water purification, but also metals from the electrodes used in an EC system, such as aluminium or iron. The generated sludge can also be used as an adsorbent for the removal fluoride and direct red 28 dye. As a result, when the textile wastewater is purified, the sludge is turned into an adsorbent. Machine Learning is used to improve the capabilities of a data-driven application, and accuracy is the best way to anticipate. For data received from the Mendeley Data Website, the accuracy score of the Artificial Neural Network was 90%. This will reduce trash generation and allow for successful sludge reuse, resulting in lower pollution levels.

Keywords: Textile Waterwater Sludge, Machine Learning, Artificial Neural Network (ANN), Random Forest Regression(RFR), Decision Tree(DT), Environmental Pollution.

Study on Engineering Strength Properties of Ceramic Waste Powder Stabilized Expansive Soil Using Machine Learning Algorithms

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ABSTRACT

In recent years, the geotechnical engineers prefer the environmentally friendly and sustainable techniques in order to improve the engineering characteristics of Expansive soil. The major objective of this paper is to study the engineering properties of Expansive soil with CWP. A series of laboratory tests such as pH and electrical conductivity test, Unconfined Compression Test, Splitting Tensile Test, Free swell Index tests, Swelling Pressure, California – Bearing Ratio Test and Atterberg's limit were carried out in order to evaluate the engineering behaviour of Expansive soil with Ceramic Waste Powder (CWP). The experimental test result shows that the CWP significantly improves the engineering characteristics of soil. CWP inclusion in expansive soil was tested at 0%, 5%, 10%, 15%, 20% and 25%. The maximum compressive strength and tensile strength are achieved at 20% inclusion of CWP to the expansive soil. The maximum compressive strength and tensile strength at optimum CWP content of 20% are 641kPa and 78 kPa respectively. The free swell index percentage decreased from 2.7% to 0.5% notably that signifies the replacement of swelling particles of expansive soil to non – swelling particles of CWP. Using the Simple Regression Algorithm, Lasso Algorithm, Ridge Algorithm, and Support Vector Machine (SVM) Algorithm, multiple models for predicting CBR of an expanding soil stabilized with Ceramic Waste Powder have been proposed in this article. Hence, the CWP can be used as a soil stabilizing material in the field applications.

Keywords: *Expansive soil, CWP, Strength Properties, Support Vector Machine.*

Article ID: ICFEE056

Effect of C2-C5 Alcohol Blends with Diesel and Camphor Oil as Additive on the Performance and Emission Test in Diesel Engine

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ABSTRACT

The design of internal combustion has developed in many countries, so adopting the highly optimized with increased engine performance and emissions has become essential. To enhance the property of the base fuel diesel, the alcohol namely ethanol and pentanol with camphor oil as an additive and this alcohol are blended with pure diesel fuel for the enhancement of improved performance of the engine and exhaust emission. The emission and the performance of the engine of a diesel engine which is found fuelled with varying proportions of alcohol will give the best physiochemical property values. By blending these alcohols with diesel we can considerably reduce the amount of (NOx, HC and CO) and increase the engine efficiency. This project aims at attaining high brake thermal performance.

Keywords: Internal Combustion engine, Thermal efficiency, Mechanical efficiency, Diesel engine.

Effect of Hybrid Ceramic Addition on Al7075 for Prompt Utilization in ceramic Appliances

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ABSTRACT

In recent engineering applications, lightweight aluminium composites are becoming more popular as an alternative for ferrous metals. The high cost of component manufacture has kept particulate metal matrix Composites from being widely used in engineering applications. One such challenge is achieving consistent reinforcement distribution across the matrix, which has a direct impact on composite material attributes and quality. The goal of this research is to characterise Stir cast Al-7075/B4C/ Si3N4 reinforced Hybrid Composites. In addition to its use in the automotive, defence, and aerospace industries, Al 7075 is a castable alloy with reasonable strength and hardness. Hard ceramic reinforcements increase the microstructure, mechanical, and wear qualities of the material. B4C and ZrB2 particles were incorporated into the Al matrix at different weight percents, such as 2, 4, 6, and 8. The microstructure, and properties of mechanical as well as wear of ZrB2 and B4C particle composition were examined. As per ASTM guidelines, specimens were prepared and investigated. SEM and XRD were used to investigate the castings' morphology. Hardness and strength rise as the amount of B4C-ZrB2 in the composite increases. The Al7075 + 8% B4C + 1% ZrB2 composite outperform all others. A pin on-disc wear testing machine has been utilized to estimate the friction and wear parameters of composites in multi-pass dry circumstances at room temperature in air with varied loads and sliding velocities while maintaining a constant Sliding Distance (SD). With increasing sliding distances, the specific wear rate increases and the coefficient of friction decreases. B4C-ZrB2 particles increased the wear resistance of proposed material and reduced wear surface impairment. With the 8 wt percent B4C results the wear rate decreased as the sliding distance and load rose. Because of its outstanding mechanical and wear properties, the hybrid Al7075- B4C- ZrB2 material is the excellent choice of upper wing requirements.

KeyWords: *Al7075- B4C- ZrB2 Hybrid Composites, wear properties, microstructure, compression test, friction.*

Performance of Deep Learning approaches for Detection and Classification of Ceramic Tile Defects

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ABSTRACT

Ceramic tiles are in high demand in the infrastructure and building development industries due to its low cost, ease of installation, maintenance, moisture resistance, and availability in a broad range of colors, textures, and sizes. Automated facilities, which produce hundreds of tiles every segment, require a tremendous volume of output. Because of the large number of tiles produced and the frequency with which they are produced, it is impossible to manually examine them for faults, necessitating the use of a rapid, efficient, and reliable automated the process. However, while the process of detecting flaws and categorizing them (or classification) is not as efficient as it might be, recent advances in computing technology, mathematical modelling, and high-resolution picture capture equipment have given rise to new prospects in the subject. Many literatures on using these systems for the same goal are currently accessible. Deep learning is a type of artificial intelligence that helps people make decisions. In production applications, image detection of faulty Ceramic Tile Surfaces is a critical skill. Deep learning is now being studied for its potential application in automated defect identification. As a result, we propose Deep Learning approaches that make advantage of the transform domain properties of the tiles picture. The model's capacity to learn via the system makes it versatile and dynamically customizable. Different categorization methodologies for different deep learning based fault detection and classification approaches are examined in this study.

Emergency Air Filling System in Vehicles

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ABSTRACT

In recent days, many vehicles get punctured while travelling in terrain and hilly areas. The availability of mechanical workshops in these regions is significantly rare. So, the driver has to make a call for mechanic's assistance otherwise he/she, is supposed to move the car to the Hills foot in search of a workshop. Crucially, this is not possible in the night time and during the rainy season. To avoid this problem, we have developed a project to fulfil their needs. This system helps to fill the air in the vehicle tires and promotes them to run for some distances. Thus, it helps the driver to get to the mechanic's workshop. This project is a fusion of mechanical and electrical setup. Some of the mechanical components like compressors, stands, gear is used, whereas in electrical setup it consists of pressure sensors, microcontrollers, connecting wires and other components. In addition to that, pneumatic components like a solenoid valve, a double acting cylinder, and tubes are used. While travelling, the air in the tires is reduced. At that time, the driver comes out and measures the pressure inside the tire with the help of a pressure sensor. If the pressure is above or below the set pressure, the pneumatic cylinder will get retracted or extracted. The pressure is set in the program of the microcontroller and the pressure is obtained; the cylinder gets retracted. The entire process depends on the microcontroller. Initially, the compressor, cylinder and crankshaft are meshed by the gears connected to them. Notably, the cylinder is positioned between the compressor and the crankshaft.

Keywords: Punctured, Mechanical workshop, Electrical setup, pressure sensor, pneumatic components, microprocessor.

Semi-Automatic Water Jar Cleaner

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ABSTRACT

Bottle washing machines are used in different industries for efficient and speedy cleaning of the water jar. It also purifies the water jar to prevent the taint of water. Water is an indispensable resource and it needs to be purified. There are several processes used in water industries, like water jar cleaning, water purification, water bottle filling and packaging. The idea of our project is water jar (20 Litre) cleaning. Based on the life cycle and cost method we implemented the optical setup. Motor, Pump, Arduino and motor driver have been used in this project. Motor is used to rotate the water jar and it operates throughout the process. Two pumps are used in this project. One pump is to pass the water solution, another pump is to pass an alkaline solution. Pure water mixed with base solution is called alkaline solution and its PH ranges from 7 to 8. Arduino is an embedded system and it controls the overall progress of the system. Pump is fixed under the metal frame and the metal frame is made up of stainless steel to avoid rust formation. In order to tackle the electrical resistance shocking into the project the Water cleaning process will take only 30 seconds and it also reduces the manual work. When the system is turned on, the pump pushes the water into the water jar strenuously. On the inner side of the water jar we use a brush to remove the dust. After the process, the water is collected or flushed out through the pipe underneath the bottle. There is no complex Arduino programming involved in this project, only simple Arduino programming is used.

Keywords: Alkaline solution, Water jar, ATMEGA328 Microcontroller, Semi-automatic cleaning.

Techno-Economic and Environmental Studies on a Solar Photovoltaic Powered 3.5 KwAir Conditioning System for Desert Dwellings

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ABSTRACT

Sultanate of Oman, a country of subtropical dry climate and extreme temperature variations is keen in to escalating the percentage of green electricity component in power systems and reduce the global warming potential of its energy sector. Literature shows that more than 40 % of the total electricity demand is from residential customers and out of this, 70 % is owing to space-cooling loads. Average annual solar irradiance in major part of the country is 5.8 kWh/m2/day which attracts Photo Voltaic (PV) technology for power generation. Since the electricity tariff has been changed recently, replacing the grid electricity with the Solar PV power could be an attractive option. Therefore, the feasibility of using PV power for a 3.5 kW domestic cooling system was modelled in RETScreen software, and the major parameters related to feasibility were calculated. A 3 kW PV array with 300 W modules was uses as the powerplant. Capacity factor in the region was taken as 20%. Total annual electricity exported to the air conditioning system was calculated as 5431 kWh. Annual income which can be generated from the PV electricity while exporting to the grid was 679 $. When the Natural gas based combined cycle power plant is replaced with PV, the emission of Green House Gases (GHG) will be controlled and it accounts to 3 tons of CO_2 (tCO_2). Financial analysis of the project showed that the simple payback period could be 11.7 years with a negative Net Present value (NPV) of 785 $ without any subsidy for the investor and without considering any GHG reduction income. RETScreen financial feasibility analysis showed that the project could be feasible if the authorities give a subsidy for the investors, atleast 20 % in the initial investment and adopt GHG reduction rate of 20 $/t$CO_2$. Simple payback period became 8 years with a positive NPV of 1615$. The analysis revealed that project could be attractive and feasible with the subsidies and policy making for the GHG credit rates along with the expected project life of 25 years.

Analysis of Automatic Pneumatic Internal Pipe Scrap Removing Machine

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ABSTRACT

Automation takes place in almost every field in order to replace the manual labour. Great effort and amount of time is needed when the work is carried by human workers which is reduced by a machine. This project aims to do removal of Scrap inside the pipelines using pneumatic technology. We use a pneumatic round scrap file, which is a metal pipe file machine tool that uses pneumatic pressure to file metal. This equipment is designed specifically for large-scale manufacturing and addresses the fastest and most efficient method of filing metal. In a grinding action, the slow speed activity occurs. The unit's operation is reduced to a few basic steps involving a cylinder block and piston arrangement. In the engineering area, there are numerous types of filing machines that are used to meet the needs. Pneumatics systems are extensively used in a wide range of factories and industries and manufacturing sectors. Pneumatics systems are highly noted for their reliability, simplicity, and ease of operation. Also, they are highly suitable for rapid and fast application of force. The purpose of this project is to therefore build a simple and easily operated pneumatic scrap removing machine, which can be used in the pipeline industries with less cost and low man power and increasing the productivity

Keywords: *Scraps, Pneumatic system, Cylinder block and piston arrangement.*

Prediction of Output Responses Through Multi-Objective Optimization Technique for Cryogenically Treated Tialn Coated Inserts During Milling Operation

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ABSTRACT

This work aims to focus effectively onTiAlN coated and cryogenically treated tungsten carbide insert performs when dry milling of EN8 medium carbon steel.The two levels of input process parameters like as cutting speed (500, 750 rpm), feed rate (0.10, 0.15 mm/rev), and depth of cut (0.50, 0.75 mm) were considered, whereas tool wear, material removal rate and surface roughness as output responses. L_8 Orthogonal array was generated for input parameters through Taguchi's DoE andoutput responses were measured experimentally when machining performed on EN8 steel. In a single response optimization, surface roughness, tool wear and MRR were observed as better experimental performance setson 1st,7th and 6th respectively when applied to Taguchi and Artificial neural network technique. The resulting output responses were examined using DEAR algorithm and Taguchi's method as multi-response performance index(MRPI).The optimized parameters were observed ascutting speed: 750 rpm; feed rate: 0.15 mm/rev; depth of cut: 0.50 mm. The micro-hardness was measured for untreated and cryogenic treated tools, whereas cryogenic treatment takes at various intervals of 6, 18 and 30 hours possess 0.63, 15.32 and 9.46% higher than that of untreated inserts respectively. As a result, 18 hours cryogenic treated tool possess effective output responses are among other intervals experimentally.

Keywords: TiAlN Coating, Cryogenic treatment, Taguchi analysis, ANN, DEAR approach.

Smart Vehicle Parking Fee Collection System Using IOT

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ABSTRACT

Nowadays congestion of traffic level increases with the increasing development of population rapidly. With respect to the amount of population, the utilization of personal vehicles also increased. Due to more use of cars the traffic congestion occurred on the road. Most of the people chooses personal vehicles than public transportation. It is very difficult and time consuming to find parking space in most metropolitan areas, commercial areas, especially during the rush hours. It is often costly in almost every big city in all over the world to find proper and secure parking space. Designing of an automated parking fee calculation using RFID technology at the parking IoT. Moreover, since the Vehicle parking fee collection according to the time is done manually in existing system. There is a lot of chances to cheat the amount since it done manually. In order to overcome this manual corruption, we proposed a project is a smart parking system that delivers information to people finding an accurate amount for parking time at online. Hence, through Cayenne webpage we can monitor the total amount provided for our parked time period and user also can hear the SMS through GSM module.

Dry Sliding Wear Behavior of Al6061- Reinforcement with Graphite and Palm Stalk Ash

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ABSTRACT

In this research, an attempt to improve and examine the wear behavior and the metal composite properties of [AL6061] with two different fillers such as graphite and by adding the reinforcement particles of palm stalk ashes. An effort is made to examine the inclusion of reinforcement particles into the metallic matrix to enhance the specific wear properties and the method to investigate the corrosion test related to the characteristic of composite materials which is used for engineering application. Al6061 of newly developed on a metal matrix composite with the weight percentage of graphite (0.7%) which is kept constant for all specimens and the reinforcement of palm stalk ash which has percentage of weight are (0.7%, 1.4%, 2.1%, 2.8%, 3.5%) where all different range of amount added to improve the performance and physical properties of the material. Reinforced composites were preheated in the electrical furnace at 150°C to remove the moisture for about an hour. The reinforcement was added into molten aluminium in the stir casting furnace. This composite casting method was done by the process of stir casting. In this paper, wear behaviour and the corrosion rate of a AL6061 metal composite reinforced with different dissipate materials are studied.

Performance Analysis of ETSC Based Greenhouse Solar Dryer for Drying of Ivy Gourd

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ABSTRACT

The most used renewable energy source is solar energy. The unpredictable and intermittent character of solar radiation, on the other hand, necessitates the usage of conventional energy sources. In this study, the energy analysis has been performed while drying ivy gourd (Coccinia grandis) in an indirect solar dryer under both natural and forced convection, and the results were compared for a better assessment of the indirect solar dryer's performance and to optimise the drying process by considering the quantity of energy. In forced connection indirect solar dryers, a solar evacuated tube collector with blower is utilised, but this fitting was eliminated in natural convection trials. Under forced convection, the average solar collector efficiency and drying efficiency were 73.28 % and 24.82 %, respectively, whereas natural convection had 61.49 % and 20.12 %. According to the results of this energy analysis, forced convection performed better than natural convection. The quantity of heat energy obtained by the solar collector and the amount of energy utilised for drying using energy analysis.

Keywords: *Solar Dryer, Ivy Gourd, Convection Method, Energy Analysis.*

Article ID: ICFEE067

Study on the Characteristics of Air Pollutants and its Prediction in the North Sipcot Industrial Areas

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ABSTRACT

Air pollution is the contamination of air by the substances in the form of solid, liquid or gas, that causes harmful effect on human and environment. The particles that cause pollution are known as air pollutants. The major air pollutants are particulates (PM10 and PM2.5), SO2, NO2, Cox, O3. Industries contributes about 51% of the total air pollution in India. Air pollution from industries cause major damage to the human and environment. Erode is a district of Tamil Nadu that has lots of industries causing damage to the surrounding areas thereby polluting the water bodies and natural resources around it. Monitoring the emissions from industries can help in prediction of future emissions thereby reducing its effects on human and environment. Hence an attempt is made to predict the emissions from industrial areas in and around Erode district. Air pollution from industries is monitored for a period of seven months at a frequency of two days in a week. The obtained ambient air quality result is first studied to know the characteristics of pollutants and further used for prediction studies. The preliminary analysis of prediction is performed using linear prediction method. From the results of the preliminary analysis, it is found that the future emissions are within the prescribed limit. Suggestions and recommendations regarding the control of air pollution and awareness on the tools and techniques available to reduce the pollution rate can be given to the industries.

Keywords: *Industrial air pollution, PM10, PM2.5, SO2, NO2, monitoring, prediction*.

Home Rehabilitation System Motivating Stroke Patients

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ABSTRACT

Stroke is a common cause of sudden physical incapacity, resulting in a variety of disabilities. Stroke rehabilitation is, in general, a process that necessitates a lot of direct attention. Physiotherapists are usually in charge of physical treatment. Long and extensive therapy sessions frequently lead to patients who are losing interest in continuing their therapy, and as a result, patients are unable to return to their previous state. As the number of strokes climbs, therapists are under increased strain, and the majority of the reconstruction is still in the planning stages, a creative application of game technology to promote stroke rehabilitation could be advantageous.

The objective of the proposed system is to assist persons with stroke disability in recovering their disabled portions using game based and wearable technology. Stroke affects the human brain, resulting in a variety of health issues. The proposed device is intended for persons who have problems with their upper limbs, it encourages the stroke victims to practise in order to reclaim their body's disabled components. The proposed system comprises of a set of computer games that will be kept at the patient's residence for them to play at their leisure. The games that have been implemented are specifically developed for the goal of rehabilitation. Stroke patients have limited mobility and so, patients prefer to be at home rather than in a health care facility or rehabilitation centre. Patients can use the device to participate in activities by moving their injured body parts. As a result, patients' muscles are toned again, blood circulation is improved, and the patient's shoulders are strengthened.

Keywords: Stroke Rehabilitation, upper limb, disabilities, game, wearable technology.

Deepfake Detection using LSTM

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ABSTRACT

Deep learning has gotten so powerful, and it might be unthinkable in the new trends of technology. In recent months, free deep learning-based software tools have made it easier to make credible face exchanges in films with little signs of manipulation, nicknamed it as deepfakes. Manipulation of the social media has proven the decades that using powerful graphical effects may nevertheless, more often developments in machine learning had results in huge demand for realism the fake content as well as the issues made by it is tremendous. They are apparently artificial intelligence-generated media (popularly referred to as deepfake). To avoid the spreading of fake news among the society and there should be some replica for this issue.

It is simple to generate the deepfake using machine intelligence technologies. Detecting these deepfake, on the other hand, is a huge challenge, because the algorithm for detecting the deepfake is tough to train. The proposed model extracts feature at the frame level using a convolutional neural network (CNN). The job mostly entails identifying the face, combining the cropped faces into a single movie, and calculating the quantity of deepfake in the inputted video. It can detect the temporal anomalies caused by deepfake generating techniques. When compared to many phone videos acquired via a conventional data collection, this is the predicted result. The proposed solution shows how, by using a simple design, the system can achieve competitive results in this job.

***Keywords:** Journal, Deepfake detection*

Certain Investigation about Failure Analysis and Robust Design of Helicopter Structural Blades for Enlightening Aerodynamic Performance

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ABSTRACT

The area of this project is to analyze the blades of helicopter. Previously, the main helicopter blades were made of T6-aluminum. Over the years, helicopter blades have been fashioned from a number of materials. There were four types of blades. They are of wooden blades, metallic blades, nonmetallic blades and composite blades. Wooden blades were used on the first helicopters, such as the Bell 47, which was released in 1946 and was the first helicopter licensed for civilian use. Metal blades came to arise as a result of the challenges associated with wooden blades. One of the most significant advantages of moving to metal blades was the ability to replace individual blades rather than the entire set. A metal blade that has cracked or been broken in a vital area may fall apart catastrophically. Because there would be no previous warning, a pilot would be unable to take any evasive action. Honeycomb construction was adopted soon after, signaling a significant shift in helicopter blade design. This allowed for a better shape for the blades, which improved performance while also increasing strength. Non-metallic blades constructed of composite materials were thus introduced, providing ample notice if a problem developed. Fiberglass skins were used on the first non-metallic blades to prevent catastrophic failure in two ways. Today, composite materials such as titanium, aluminum, stainless steel, carbon fiber, and fiberglass are used to cover a foam or Nomex core in helicopter blades. This has resulted in various advances to helicopter rotor-blade design, the most noteworthy of which is their extremely slow failure rate.

Keywords: Helicopter blades, fiber glass, carbon fiber, aluminum, titanium.

Response Surface Methodology on EDM Process Parameters of Copper Electrode with AISI-301 steel

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ABSTRACT

Electric Discharge Machining has become a significant and cost-effective way of cutting electrically conductive materials that are both brittle and robust. It is widely used in comparison to various machining methods for manufacturing sections, dies, moulds, where complicated dimensions and challenging shapes are difficult to machine. The AISI-301 stainless steel workpiece was chosen for this trial due to its erosion resistance capabilities and wide range of applications. AISI-301 stainless steel is used in a variety of industries today, including construction, transportation, medical instrument manufacture, and industrial components. The discharge current (Ip), pulse on time (Ton), and pulse off time (Toff) were chosen as the vital variable parameters in the EDM process. A well-known Taguchi approach is used to generate an L18 orthogonal array for input parameters in the experiment methodology. Material Removal Rate (MRR), Tool Wear Rate (TWR), and surface roughness (SR) will be measured experimentally and the factors will be optimized using RSM methodology for the impact of the varied boundaries mentioned above following machining responses. While machining on our research findings, discharge current is the most prime concern. Copper electrode will be used as the tool material. After obtaining the intended output using RSM methodology, the optimization was justified because the desired output was obtained after machining. The most significant characteristics of MRR, TWR, and SR were discovered using ANOVA.

Keywords: *Electric Discharge Machining, AISI301, RSM, Material Removal Rate, Tool Wear Rate, Surface Roughness.*

Smart Logistics: Futuristic Challenges and Opportunities

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ABSTRACT

Smart logistics is a powerful tool for tackling the demands of evolving customer needs, seizing new technological breakthroughs, and facilitating new revenue streams. On the other side, the demand for corporate sustainability introduces additional standards for production and logistical activities. This study deals with the issue, and also technological components, and presents a framework for understanding and relating the many elements of smart logistics. Based on the year and publishers, this review paper objectively covers the main innovations, implications, and applications of smart logistics. The content analysis highlights significant technical difficulties, promotes development and sustainability in logistics, and emphasizes advanced management systems in the deployment of smart logistics. The study also examined the need for more research & innovation in smart logistics.

Keywords: Smart Logistics, Cyber Physical System (CPS), Information and Communication Technology (ICT), Sustainability and Supply chain.

Design and Analysis of Impact Attenuator using Metal Matrix Composites

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ABSTRACT

Metal Matrix Composites (MMCs) are utilized in the utilization of vehicle organizations owing to their preferred Strength overweight extent and high temperature obstruction. The objective of this research is to create a honey comb design, analyze and fabricate impact attenuator using metal matrix composites. As per the Government Order, all the bumpers in the passenger vehicles were removed, the alternate for the bumpers are attenuators, which absorb the impact force. An attenuator is a recently presented part in automobile, which is utilized to retain the front facing sway power of the vehicle. It is fixed in the front finish of the vehicle or vehicle, so it is effectively assimilating the front facing effect of the vehicle. In this paper we have carried out to change the material of the attenuator with Aluminum Silicon Carbide (AlSiC) in the spot of Aluminum composite 3003.

Keywords: Metal matrix, AlSiC composites, Attenuator.