ICETE 2026

2nd INTERNATIONAL CONFERENCE ON EMERGING TECHNOLOGIES IN ENGINEERING

7th March 2026 to 8th March 2026

THE BOOK OF ABSTRACT

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Organized By

PADMASHRI DR. VITTHALRAO VIKHE PATIL INSTITUTE OF TECHNOLOGY & ENGINEERING (POLYTECHNIC) LONI.

(Excellent Grade Institute & Best Campus Award (Polytechnic) in January 2019 by ISTE, New Delhi)

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The
Book of Abstracts

2nd ONLINE
International Conference
On
Emerging Technologies in Engineering
(ICETE 2026)

(7th March 2026 to 8th March 2026)

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Padmashri Dr. Vitthalrao Vikhe Patil Institute of Technology & Engineering (Polytechnic), Loni.
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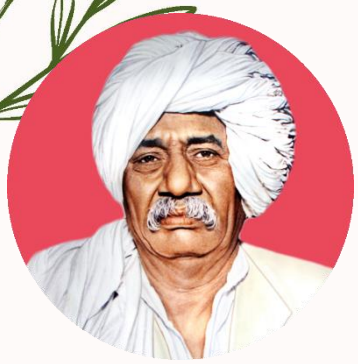

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ABOUT THE CONFERENCE

ICETE-2026 is being organized with a view on technological impact to foster research in the field of Engineering and science to promote awareness what are recent developments. The conference will bring in eminent personalities from academics and industry, wherein they will come together and brainstorm for holistic knowledge sharing. The objective is also to provide forum for preparation of latest documents, ideas and their applications for upcoming Post-graduate and Doctoral students as well. The conference focuses on the following areas and will include keynote and plenary talks along with technical paper sessions spread over two days.

MESSAGE FROM CEO

Dr. Sushmita Vikhe Patil
CEO, PRES,
Pravaranagar

Welcome to P.Dr.V.V. Patil Polytechnic. Our aim is to complement the curriculum of Technical education by integrating **"ICETE 2026"** with the awareness of self and the Technical. We strive to create a learning environment that elevates the collective consciousness of the community and inspires a sense of commitment towards mindful practices.

This is the land of **PRAVARA** where scholars from all over the world came and learned relentlessly for attainment and dissemination of knowledge. With such a rich legacy and history backing us, we at Pravara, have this hard responsibility of living up to this rich legacy and tradition. We are fortunate to be set up in the soil where Knowledge is the tradition; constant quest for the unknown is the quintessential strive. We are very confident of making a very significant contribution in creating a pool of effective leaders. ***PRAVARA*** – The **ICETE 2026** at P.Dr.V.V. Patil Polytechnic, call upon the community to join us in this noble pursuit of cultivating and sharing an ecosystem of **ICETE 2026**, ***International Conference on Emerging Technologies in Engineering 2026*** is one such step to create a platform where students, researchers, and practitioners can discuss the scientific avenues of **ICETE 2026** in technical context. At a time, when the physical and mental wellbeing of an individual is of utmost importance, **ICETE 2026** is the way forward. Hence, let us all be here – for ourselves and for each other.

MESSAGE FROM PRINCIPAL

Dr. V. R. Rathi
Principal

It is with great pleasure and immense pride that I extend a warm welcome to all participants, scholars, and experts attending the "*International Conference on Emerging Technologies in Engineering*" **(ICETE 2026)**.

As we gather here today, the world stands at the threshold of a new era, driven by remarkable advances in technology that are reshaping industries, economies, and societies. This conference is an opportunity to deliver into these groundbreaking innovations, explore the latest trends, and exchange ideas that will continue to define the future of technology and its applications.

Technological advancements, be it in Artificial Intelligence, Machine Learning, Robotics, or Sustainable Development, are transforming how we live, work, and communicate. The themes discussed in this conference reflect the current and future needs of our globalized world, offering a platform to share knowledge and foster collaborations that will enable us to build a better, more connected world.

The dynamic exchange of ideas, insights, and perspectives during the sessions will not only inspire further research and innovation but also deepen our understanding of the potential that technology holds for addressing global challenges. As we explore these themes in depth, let us remember that our collective efforts can lead to meaningful solutions that will benefit society as a whole.

I commend all the researchers, speakers, and participants for their dedication and hard work, and I encourage everyone to take full advantage of this invaluable platform to network, learn, and engage in productive dialogue. I look forward to the outcomes of this conference, which I believe will contribute significantly to the advancement of knowledge and the realization of new possibilities in the realm of technological development.

Wishing you all an enriching and insightful experience at the conference!

KEYNOTE SPEAKER

DR. Ir. MOHD. IQBAL, MT.

Associate Professor
Department of Mechanical and Industrial Engineering
Faculty of Engineering Syiah Kuala University,
Banda Aceh, Indonesia

DR. Ir. MOHD. IQBAL, MT. delivered an insightful keynote address at the 2nd Online International Conference on Emerging Technologies in Engineering held on 7th and 8th March 2026. In his talk, he highlighted recent advancements and emerging trends in Mechanical and Industrial Engineering, emphasizing innovation, sustainable technologies, smart manufacturing, and the integration of modern engineering solutions to address global industrial challenges. His session greatly enriched the conference by providing valuable academic and industry perspectives to the participants.

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ICETE26-ME-1

THE POTENTIAL OF TECHNOLOGY IN ENVIRONMENTAL RESTORATION

Prof.Rajendra Abasaheb Patare [1], Prof, Belkar Janardhan Ambadas [2]

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College of Agriculture, Loni [2]

ABSTRACT

Abstract: The global environment is currently experiencing a period of rapid deterioration. Projections suggest that if existing patterns of ecological decline are not reversed, a total environmental collapse is imminent. Historically, technological advancement has been identified as a primary catalyst for this degradation, leading to a prevalent academic and social perception of technology as a detrimental force rather than a beneficial one.

This research acknowledges that while technology has contributed significantly to environmental issues, the outcome—whether destructive or constructive—is ultimately determined by its application. It is the central argument of this study that technology, when strategically directed, possesses the capacity to rehabilitate ecological health. Although past misalignments of technological use have resulted in severe environmental consequences, a systematic repositioning of these tools can foster a sustainable future. Ultimately, this work asserts that technology has the latent potential to remediate the very damages it previously caused, provided it is governed by sound environmental frameworks.

Keywords: Technology, Environmental Restoration, Ecological Degradation, Sustainable Development, Technological Application.

Keyword: Technology, Environmental Restoration, Ecological Degradation, Sustainable Development, Technological Application.

ICETE26-ME-2

CRYOGENIC PROCESSING OF TI 6AL 4V ALLOYS: HYBRID APPROACHES AND AI ENABLED STRATEGIES FOR BIOIMPLANT DEVELOPMENT

Rahul Harishchandra Naravade [1], Mahesh Shaligram Harne [2], Vishnu S. Aher [3]

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Professor, Department of Mechanical Engineering, Amrutvahini College of Engineering and Research, Sangamner, India [2,3]

ABSTRACT

Cryogenic processing is an efficient post-treatment technique for improving the functional performance of Ti-6Al-4V alloys in biomedical applications. This review extensively examines its influence on surface wettability, corrosion resistance, and biocompatibility—three critical factors affecting implant integration and durability. Mechanistic considerations of phase stability, nanoscale surface modifications, and microstructural changes that enhance osseointegration and reduce ion leaching are discussed. To optimize surface properties for specific healthcare requirements, this review also examines hybrid approaches that combine cryogenic processing with additive manufacturing, advanced coating systems, and tribological enhancements. Furthermore, the incorporation of artificial intelligence–enabled optimization frameworks is presented as a means of ensuring consistency in implant manufacturing, forecasting performance outcomes, and expediting process design. Taken together, these methods establish cryogenic technology as a viable and sustainable pathway for the development of next-generation bioimplants.

Keywords: Cryogenic processing, Ti-6Al-4V alloy, Wettability, Biocompatibility, Corrosion resistance, Biomedical implants, AI-enabled optimization, Osseointegration

ICETE26-CM-BD-3

AI–IOT ENABLED INTELLIGENT EXAMINATION SYSTEM FOR SECURE AND SCALABLE ASSESSMENT IN EDUCATION 4.0

Mrs. Seema Amol More[1], Prof. Dr. Swati Nitin Sayankar [2]
Research Scholar, Department of Computer Sciences and Applications, Sunrise University, Alwar, Rajasthan, India[1]
Research Guide, Department of Computer Sciences and Applications, Sunrise University, Alwar, Rajasthan, India

ABSTRACT

The rapid evolution of Education 4.0, driven by Artificial Intelligence (AI) and digital technologies, is transforming teaching–learning and assessment practices in higher education. The widespread adoption of online and hybrid learning environments has created a critical need for reliable, scalable, and unbiased examination systems. This study proposes an AI–IoT-enabled intelligent examination framework designed to automate evaluation, enhance academic integrity, and support data-driven decision-making. The proposed system integrates machine learning algorithms to analyze student response patterns for objective and rapid grading, while Internet of Things (IoT) devices enable real-time monitoring and secure data acquisition during examinations. Natural Language Processing (NLP) techniques are incorporated for semantic answer evaluation and anomaly detection to minimize malpractice. The system architecture, implementation methodology, and functional components are presented, followed by a case study conducted in both classroom and online environments. Performance comparison with conventional assessment methods demonstrates significant improvements in evaluation speed, consistency, transparency, and operational efficiency. Additionally, the framework generates real-time analytics to provide actionable insights for instructors and administrators. The proposed solution supports the transition toward intelligent, secure, and scalable assessment ecosystems and contributes to the development of AI-driven, learner-centric evaluation models aligned with the vision of Education 4.0.

Keywords: Artificial Intelligence (AI) in Education, Intelligent Examination System, Internet of Things (IoT)–Based Assessment, Machine Learning–Based Evaluation.

ICETE26-MK-4

AUTOMATIC QUESTION GENERATION SYSTEM USING NATURAL LANGUAGE PROCESSING

Shital Sable [1], Chaitanya More [2], Ajinkya Deshmukh [3], Dr. Sanjay Kurkute [4], Ms. Shubhangi Bhise [5]

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ABSTRACT

Automatic Question Generation (AQG) plays a significant role in educational technology by reducing the manual effort required in preparing assessments, quizzes, and examinations. This paper presents the design and implementation of an **Automatic Question Generation System using Natural Language Processing (NLP)**. The proposed system automatically generates meaningful and relevant questions from a given input text. It involves key processes such as text preprocessing, sentence segmentation, keyword extraction, and syntactic analysis to identify important information from the text. Using NLP techniques, the system formulates different types of Wh-questions, including *what*, *why*, *when*, *where*, and *how*. The system is implemented using Python along with NLP libraries such as NLTK and spaCy. The project is currently under development and aims to assist educational institutions by providing an efficient, automated, and scalable solution for question generation, thereby enhancing learning and assessment processes.

Keywords: Natural Language Processing, Question Generation, NLP, Education Automation, Python, MCQs, BERT, Wordnet, NLTK, Deep learning, POS.

ICETE26-CM-BD-5

WIRELESS EME & IMU BASED HUMAN-COMPUTER INTERACTION SYSTEM

Divyansh Rahul Adhav [1], Stimeet Satish Adhav[2], Bhakti Ravindra Jadhav [3], Sakshi Anil Wagh [4],

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ABSTRACT

The Wireless EMG-based Game and Presentation Controller is a cost-effective Human– Computer Interaction (HCI) system that allows users to control computer applications using muscle signals. It uses Surface Electromyography (sEMG), a non-invasive method to detect electrical activity from muscle contractions. An ESP32 microcontroller combined with a MyoWare EMG sensor processes these signals and converts them into wireless control commands. Conventional input devices such as keyboards and mice can limit accessibility, especially for users with mobility impairments. To address this, the proposed system provides a portable and affordable alternative with dual operating modes. In BLE Keyboard mode, muscle gestures are translated directly into keyboard inputs using Bluetooth Low Energy (BLE). In BLE Streaming mode, raw EMG data is transmitted to a Python application for calibration, visualization, and flexible key mapping. The system focuses on low latency, reliability, and ease of use, making it suitable for gaming, presentations, and assistive applications.

Keywords: Surface Electromyography (sEMG), Wireless Controller, ESP32, Human- Computer Interaction (HCI), Bluetooth Low Energy (BLE), Gesture Recognition, MyoWare

ICETE26-CH-6

PRODUCTION OF PAINT FROM COW-DUNG

Mr.S.B.Divate [1], S.V.Vengala[2], P.Chaudhari [3], P.Sagar[4]

Asst.Prof. Chemical Engg. Dept. , PREC, Loni[1]

Students PREC, LO Chemical Engg. Dept. , PREC, Loni[2,3,4]

ABSTRACT

The production of paint from cow dung is an eco-friendly and sustainable approach aimed at reducing environmental pollution and promoting the utilization of natural waste materials. Cow dung, a renewable and biodegradable resource, contains fibrous matter, natural binders, and antimicrobial properties that make it suitable for use as a base material in paint formulation. In this process, cow dung is collected, dried, powdered, and treated to remove odor and impurities. Natural binders, pigments, and additives are then mixed to obtain a uniform paint with acceptable viscosity and adhesion properties. The developed cow dung paint is non-toxic, low-cost, and free from volatile organic compounds (VOCs), making it safe for indoor applications. This paint provides good thermal insulation, resistance to microbial growth, and a natural aesthetic finish. The study highlights the potential of cow dung paint as a sustainable alternative to conventional synthetic paints, supporting waste valorization and green manufacturing practices.

Keywords: Cow dung paint, Eco-friendly paint, Sustainable materials, Natural binder, Waste utilization, Green manufacturing, Low VOC paint

ICETE26-CM-BD-7

DISEASE DETECTION IN TOMATO LEAVES BY THE USE OF AN EFFECTIVENET-VIT HYBRID MODEL WITH ATTENTION-DRIVEN FEATURE FUSION

Mr.Pramod P. Gadekar[1], Dr. Omkar Pattnaik[2]

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Professor, Department of CSE, School of CSE, Sandip University, Nashik, India 2

ABSTRACT

Tomato crop health is often affected by various leaf diseases, which can cause significant yield losses if not detected early. This paper presents a conceptual design of a hybrid deep learning architecture aimed at improving disease classification accuracy by integrating Convolutional Neural Networks (CNNs) and Vision Transformers (ViTs). The proposed model employs Efficient Net for local feature extraction and ViT to capture broader spatial dependencies in tomato leaf images. An attention-based feature fusion mechanism is introduced to dynamically prioritize disease-affected regions. Data augmentation and focal loss are incorporated to enhance robustness and address class imbalance. Although empirical results are not yet available, this study lays the foundation for a practical and efficient disease detection framework in precision agriculture, with future validation and deployment planned.

Keywords: Sustainable agriculture, tomato crop disease detection, artificial intelligence, computer vision, machine learning, hybrid models.

ICETE26-CH-8

REVIEW ON UTILIZATION OF CERAMIC MEMBRANE FILTRATION FOR INDUSTRIAL WASTE WATER TREATMENT

Mrs.Ashwini.G.Kharde[1], Mr.Abhishek.P.Nil[2], Mr.Vaibhav.A.Ghune[3]
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Students, Chemical Engineering Department, Pasmashri Dr. Vitthalrao Vikhe Patil institute of Technology & Engineering (POLYTECHNIC) Loni, India. [2,3]

ABSTRACT

An advanced separation technique that is frequently used for the treatment and purification of liquids in industrial processes, wastewater, and water is ceramic membrane filtration. The study, design, and performance assessment of ceramic membrane filtration systems are the main objectives of this project, which highlights how effective these systems are at eliminating bacteria, dissolved contaminants, and suspended particles. In contrast to polymeric membranes, ceramic membranes are made of inorganic materials like Titania, zirconia, or alumina, which offer superior mechanical strength, thermal stability, and chemical resistance. Contaminated water is passed through a ceramic membrane in an experimental setup under controlled pressure conditions. The results show that ceramic membrane filtration offers high filtration efficiency, a longer operational life, and ease of cleaning through chemical treatment and backwashing. Other parameters that are analyzed include flux rate, permeability, rejection efficiency, and fouling behavior. According to the study's findings, ceramic membrane filtration is an economical and environmentally friendly method of treating industrial effluent and purifying water, with a great deal of room for expansion. Ceramic membrane filtration (CMF) is a promising, sustainable technology for a variety of water purification needs. It uses strong, porous ceramic materials (such as alumina, silica, or waste composites) for physical separation, offering high thermal/chemical stability, long life, and high flux for water/wastewater treatment. It effectively removes contaminants like suspended solids, colloids, and dyes, though fouling can occur and requires pre-treatment or surface modification (e.g., with nanoparticles) to enhance hydrophilicity and minimize fouling.

Keywords: Ceramic, Membrane filtration, Porous, Alumina ceramic, Porosity, size distribution, Filtration Processes

ICETE26-CE-9

HARDENING OF RC BEAM & COLUMN CONNECTIONS BY USING FIBER SHEETS

Mahesh .A. Nawale [1], Prof.(Dr). Parikshit Joshi [2]

Research Scholar, Civil Department, Oriental University, Indore [1]

Professor, Civil Department, Oriental University, Indore [2]

ABSTRACT

Strengthening existing reinforced concrete (RC) structures has become a critical component of construction activity in India, driven largely by increased load specifications and frequent revisions to national design codes. Among the various structural elements, the beam-column joint represents the most critical zone in a moment-resisting frame. During seismic events, these joints are subjected to intense forces; however, the traditional design assumption of joint rigidity often fails to account for the high shear forces developed within the connection. This discrepancy frequently leads to brittle shear failure—a catastrophic and unacceptable mode of structural performance in seismic-prone regions.This paper evaluates the performance and strengthening of key structural parameters in RC joints using Carbon Fiber Reinforced Polymer (CFRP) and Glass Fiber Reinforced Polymer (GFRP). By addressing the deficiencies necessitated by updated Indian code provisions, this study provides insights into how fiber-reinforced polymers can mitigate brittle failure and enhance the overall seismic resilience of existing structural frameworks.

Keywords: Beam-column joints, Deflection, Epoxy resin, Fiber-reinforced polymers (FRP), Flexure, Reinforced concrete (RC), Shear strength, Strengthening, Ultimate load.

ICETE26-AE-10

DESIGN OF A SOLAR ASSISTED ELECTRIC VEHICLE FOR TRANSPORT AND SMART CAFE

Mr.M.B.Thorat, Mr.B.S.Andhale, Mr.A.L.Tambe,

Mr.S.J.Gadhe, Mr.G.S.Jambukar,

Lecturer, Student's, Automobile Engineering Department,
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ABSTRACT

This paper presents the design and development of a solar-assisted electric vehicle (EV) that integrates sustainable transport with mobile smart café functionality. The proposed system combines photovoltaic (PV) technology, advanced battery management, and modular café infrastructure to create a dual-purpose vehicle capable of reducing carbon emissions while offering entrepreneurial opportunities. The study outlines the technical design, energy management strategies, and socio-economic impact of deploying such vehicles in urban and semi-urban environments.

Keywords: Solar-Assisted EV, Photovoltaic System ,Battery Storage, BLDC Motor, Inverter, Energy Management, Smart Café, IoT Monitoring, Sustainable Transport, Renewable Energy

ICETE26-AE-11

FAULTY PRODUCT DETECTION AND SEPARATION SYSTEM

Mr.Atul K., Mr.Manish L., Mr.Prasad P., Mr.Swapnil P.,

Department of Automobile Engineering Padmashri Dr. Vitthalrao Vikhe Patil Institute of Technology & Engineering (Polytechnic), Loni 413736 India

ABSTRACT

All manufacturing factories must have a system to detect and separate defective products in order to maintain product quality and uphold a good reputation. Here, such a system is demonstrated using a mini-conveyor belt system. We propose designing and producing a mechanism to detect and separate defective products. Each product is different, and therefore there are different mechanisms to detect defective products. Here we detect a defect in a key based on its size and functionality. We use a sensor to detect every size and function of the key as the products move along the conveyor belt. The conveyor belt is designed to grab the key so that it does not fall or slip off the belt. A defective product with a size below the minimum limit is automatically detected while moving on the conveyor belt and separated through a conveyor arm. If the product passes the size inspection, another sensor performs its task to activate the lock, in order to open the locking mechanism and check whether it opens or not. If the product passes the test, it is sent for packaging; otherwise, the product is separated and sent back to the production line to correct the defect. Here we use wheels and a rubber belt to develop a mini-conveyor mechanism. This mechanism is driven by a motor. This system uses a servo-motor arm to separate the defective product.

Keywords: Error detection, Sensors, Motors, Manufacturing.

ICETE26-AE-12

VEHICLE ACCIDENT AVOIDANCE SYSTEM

Mr.M.B.Thorat, Mr.Vedant Mehetre, Mr.Aniket Ghorpade,
Mr.Abhishek Chaudhari, Mr.Akshay Lute

Lecturer, Student's, Automobile Engineering Department, P.D.V.V.P.I.Loni, India

ABSTRACT

Recently, the world is growing very fast in term of technology. One of the main goals of technology is to make life easier. Technology plays a very important role in every life sector such as health, security, education, safety, and etc. Human safety is one of the most important features that matters in the community. In this project, we present the importance and role of technology in protecting human life regarding vehicle and road safety. The aim of this project is to create a robotic vehicle that avoids accidents by detecting other nearby vehicles then either changing it is path to a lane where it is safe or stopping in worse case where there are cars in all nearby lanes. Car accidents have become one of the main causes of human death and various studies have shown that the driver interference is a cause for most of the car accidents. This project will be built using Arduino hardware. In the future the robot can be developed more using more accurate sensors and motors.

Keywords: vehicle; accident; path following; insert.

ICETE26-ME-13

A REVIEW ON UNIVERSAL PORTABLE LIFTING MACHINE

Patole Tejas Tukaram [1], Sase Lokesh Sandip [2], Bhalerao Aditya Sharad [3],

Student, Department Of Mechanical Engineering, P.Dr.V.V.P. Institute of Technology & Engineering(Polytechnic), Loni Bk.

ABSTRACT

Stairs are common in buildings but create difficulties in transporting goods and for people with mobility issues. Manual carrying of loads on stairs often leads to fatigue, inefficiency, and injuries. To solve this problem, stair-climbing machines have been developed using mechanisms such as wheels, tracks, or linkages.

Electric stair-climbing systems are widely preferred due to their clean operation, energy efficiency, and easy control. These machines use a battery-powered motor to move smoothly up and down stairs, making them suitable for industrial material handling, assistive wheelchairs, rescue operations, and domestic use.

Keywords: Stair Ascent Device, Electric Drive System, Battery Power Unit, Mobility Support, Stair Navigation, Motorized Lift Mechanism, Load Transport, Safety Features, Assistive Technology, Accessibility Solution

ICETE26-AE-14

EXPERIMENT IN TRIBOLOGICAL BEHAVIOUR OF VEGETABLE OIL WITH THE ADDITION OF NANOPART

MR.R.M.Kanae [1], MR.Krushna Kolse [2], MR.Rohit Harde [3],

MR.Dinesh Joshi [4], MR. Hitesh Sonawane [5],

Lecturer, Student, Automobile, Padmashree DR. Vitthalrao Vikhe Patil Institute of Tech and engineering. (Polytechnic), India/Loni

ABSTRACT

Due to the increasing demand for eco-friendly and sustainable engineering solutions, vegetable oils are gaining attention as an alternative to conventional mineral-based lubricants. However, the direct use of vegetable oils in mechanical systems is limited because of their comparatively lower thermal stability and load-carrying capacity. To overcome these limitations, this project focuses on improving the tribological performance of vegetable oil by adding a small amount of nanoparticles.

In this study, nanoparticles are dispersed in vegetable oil to prepare a nano-lubricant, and its friction and wear behaviour are evaluated under different operating conditions. The performance of the modified oil is compared with that of pure vegetable oil to understand the improvement in lubrication characteristics. The presence of nanoparticles helps in forming a protective layer between the contact surfaces, which reduces direct metal-to-metal contact and improves load-bearing capacity. As a result, a noticeable reduction in friction and wear is observed.

The outcomes of this project highlight that nano-additives can significantly enhance the performance of biodegradable lubricants without harming the environment. This approach not only improves machine efficiency and component life but also supports the development of sustainable and green lubrication systems for future engineering applications.

Keywords: Tribology; Vegetable oil lubricant; Nanoparticles; Nano-lubricants; Friction and wear; Green tribology; Sustainable lubrication; Eco-friendly lubricants.

ICETE26-AE-15

SOLAR OPERATED AC SYSTEM USING THERMAL PELTIER MODULE

Mr.A.D.Jape, Mr.S.S.Jadhav, Mr.O.S.Nalage, Mr.O.R.Kashid, Mr.T.N.Cholke

Lecturer, Student's, Automobile Engineering Department, P.D.V.V.P.I.Polytechnic, Loni

ABSTRACT

This project presents a solar powered air conditioning system using the Peltier effect for cooling. The system uses solar panels to generate electricity, which powers thermoelectric modules instead of conventional compressors and refrigerant gases. Unlike traditional air conditioners that use harmful gases like CFCs and consume high electricity, this system is eco-friendly and energy efficient. The Peltier module creates a temperature difference when electric current passes through it, producing a hot side and a cold side. The cold side Is used for cooling the air, while heat sinks and fans remove heat from the hot side. The system is compact, lightweight, portable, and requires less maintenance because it has no moving mechanical parts. This model is suitable for small rooms, remote areas, and places where electricity supply is limited. It reduces environmental pollution and helps in saving non-renewable energy resources. Though the efficiency is lower compared to conventional AC systems, it is a cost-effective and sustainable solution for future cooling needs.

Keywords: Solar Energy, Peltier Effect, Thermoelectric Cooling, Solar Air Conditioning, Heat Sink, Renewable Energy, Eco-Friendly System, Energy Efficiency, Photovoltaic Panel, Portable Cooling System.

ICETE26-CE-16

GIS-BASED SUSTAINABLE WATER DISTRIBUTION SYSTEM

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ABSTRACT

Water loss through aging infrastructure and pipe leakages represents a critical global challenge, resulting in significant economic losses and the depletion of vital natural resources. In India alone, residential leaks account for approximately 3.4 trillion liters of wasted water annually. Traditional detection methods often struggle with the vast, inhospitable terrains where water networks are frequently located, leading to delays in identifying and localizing leaks. This research proposes a sustainable framework for water distribution by integrating Geographic Information Systems (GIS) with advanced sensor technology. While various methods such as acoustics and ground-penetrating radar have been explored, this study addresses the research gap in GIS-based asset management. The methodology encompasses primary data collection, a comprehensive survey of existing infrastructure, and the deployment of a GIS-sensor integrated experimental setup to detect real-time leakages. The study is specifically focused on the Sangamner and Akole regions of Maharashtra, India, characterized by distinct terrain variations and a high frequency of distribution joints. By utilizing the spatial analysis capabilities of GIS alongside real-time sensor data, this research aims to enhance the operational effectiveness of water distribution networks.

Keywords: Water Distribution System, GIS, Leakage Detection, Sustainable Infrastructure, Asset Management, Sensors..

ICETE26-CE-17

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF FRESH CONCRETE WITH RETURNED FRESH CONCRETE (RFC) FOR WASTE REDUCTION AND COST EFFICENCY

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ABSTRACT

The construction industry is one of the largest contributors to economic development, yet it also generates significant material waste, particularly from Ready-Mix Concrete (RMC) operations. A considerable quantity of fresh concrete is returned to batching plants due to over-ordering, site delays, rejection, or changes in construction schedules. This Returned Fresh Concrete (RFC) is typically discarded, resulting in environmental pollution, increased disposal costs, and wastage of valuable resources. Addressing this issue is essential for achieving sustainable construction practices.

The present study, titled "Experimental Study on Partial Replacement of Fresh Concrete with Returned Fresh Concrete (RFC) for Waste Reduction and Cost Efficiency", investigates the feasibility of reusing RFC as a partial replacement in new concrete batches. The research aims to evaluate whether RFC can be effectively blended with fresh concrete while maintaining required performance parameters such as workability, setting time, compressive strength, and durability.

An M25 grade concrete mix was designed as per IS 10262:2019 with a water-cement ratio of 0.48. Trial mixes were prepared with varying proportions of RFC (10%, 20%, 30%, and 40%) at different return times (1 to 4 hours). Workability was assessed using the slump cone test in accordance with IS 1199:1959. To restore workability without increasing the water content, suitable chemical admixtures (superplasticizers) were incorporated. Cube specimens were cast for compressive strength evaluation, and durability testing is being conducted after the curing period. Optimization of mix proportions is planned using the Taguchi method to determine the most economical and performance-efficient combination.

A detailed cost analysis was carried out using data collected from multiple RMC plants, including Trimurti Ready Mix Concrete, Tejraj Readymix, Shaurya Infratech Ltd., and Bhate & Raje Construction Company. The analysis revealed that average daily wastage ranges from 3–8 m^3, leading to substantial financial losses. By incorporating RFC into new production, significant cost savings per day can be achieved, along with reduced raw material consumption and elimination of disposal expenses.

The expected outcomes of the study include improved sustainability, reduced environmental impact, lower embodied carbon emissions, conservation of natural resources, and enhanced economic efficiency in RMC operations. The research aims to contribute toward developing standardized guidelines for the safe, economical, and large-scale reuse of RFC in structural concrete applications.

ICETE26-CE-18

EXPERIMENTAL STUDY ON WASTE PLASTIC WAVE BREAKERS TO REDUCE THE EFFECT OF WAVES ON SEASHORE AND COASTAL AREAS.

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ABSTRACT

This experimental study investigates the use of plastic waste materials to develop eco-friendly wave breakers aimed at reducing the impact of ocean waves on coastal areas. With the increasing threat of coastal erosion and the accumulation of plastic waste in the environment, this research aims to develop a sustainable and eco-friendly solution that addresses both issues simultaneously. In this study, discarded plastic materials such as bottles, containers, and other non-biodegradable items were reused to fabricate modular wave breaker units. These units were tested under controlled laboratory conditions using a wave flume setup to simulate real marine wave action. Various parameters such as wave height reduction, energy dissipation, structural stability, and efficiency of the wave breakers were analyzed. The performance of plastic waste wave breakers was compared with conventional concrete structures to assess their relative effectiveness. The experimental results revealed that plastic waste wave breakers significantly reduced the wave height and energy reaching the shore, thereby minimizing the potential for coastal erosion. Additionally, their lightweight and buoyant nature made installation and maintenance easier and more economical. This research highlights the dual benefits of mitigating marine pollution by reusing plastic waste and providing an effective coastal protection technique. The findings suggest that plastic waste wave breakers can serve as a sustainable, cost-effective, and environmentally friendly alternative to traditional coastal defense structures, contributing toward circular economy principles and sustainable coastal management.

ICETE26-CH-19

VALORISATION OF FOOD WASTE INTO NATURAL DYES FOR SUSTAINABLE TEXTILE APPLICATIONS

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ABSTRACT

Environmental concerns, rising costs, and strict regulations associated with synthetic dyes have intensified the demand for sustainable alternatives in textile dyeing. In this study, natural dye is extracted from waste for eco-friendly approach. The dye was extracted from waste onion peel (Allium cepa L.) and used tea waste (Camellia sinensis (L.) Kuntze). The extracted dye was applied individually (Single Dyeing). These dyes were applied on fabric and results were evaluated. The spectrophotometer test was done on both the dyes, The dye obtained from onion peel has shown wavelength around 200,254,366 nm confirms the sustainable synthesis of yellow hue and wavelength obtained from tea waste dye is 206,272 nm confirms the sustainable brown dye. The utilization process covers both the aspects of eco-friendly approach as well as minimization of raw material cost making the dyeing process economically viable and sustainable

Keywords:-Sustainable, Onion Peel, Tea Waste, Eco-Friendly, Spectrophotometer.

ICETE26-ME-20

RENEWABLE ENERGY TECHNOLOGIES: PHYSICS OF SOLAR AND WIND POWER

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ABSTRACT

Renewable energy technologies, specifically solar and wind power are crucial to addressing the global energy crisis and mitigating climate change. This paper explores the physics behind solar cells and wind turbines, focusing on how they convert natural energy into usable electricity. Additionally, the potential of these technologies to reduce global dependence on fossil fuels is analyzed. By examining the mechanisms of energy conversion and their environmental and economic impacts, we understand how solar and wind power can contribute to a sustainable future.

ICETE26-CE-21

COMPARATIVE *STUDY AND BEHAVIOR OF VARIOUS NATURAL AND COMPOSITE COAGULANTS IN TREATMENT OF WASTE WATER*

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ABSTRACT

The treatment of wastewater has become an increasingly important global challenge due to growing industrialization, urbanization, and the associated environmental pollution. Among various treatment methods, coagulation is a widely adopted technique for the removal of suspended solids, colloidal particles, and dissolved contaminants. However, traditional coagulation agents often exhibit limitations in terms of efficiency, cost, and environmental impact. Recent studies have focused on the development and application of composite coagulating agents, which combine multiple materials to enhance coagulation performance and sustainability. This study aims to evaluate the efficacy of composite coagulants in wastewater treatment, focusing on their ability to remove contaminants, improve treatment efficiency, and reduce environmental impact. A range of composite coagulants, including combinations of inorganic salts (such as alum or ferric chloride) with natural or synthetic polymers, bio-based materials, and nanoparticles, were synthesized and tested in laboratory-scale experiments. Key performance indicators, including turbidity reduction, chemical oxygen demand (COD) removal, and pH stability, were assessed under varying operational conditions.

Keywords:. Coagulants, composition

ICETE26-MK-22

SMART SPRAYING ROVER]

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ABSTRACT

The modernization of agricultural practices is essential to address the challenges of food security and environmental sustainability. One of the most significant issues in contemporary farming is the inefficient application of pesticides, which often results in excessive chemical usage, increased operational costs, and severe ecological damage. This project presents the design and development of an Autonomous Pesticide Spraying Rover aimed at implementing precision agriculture through site-specific application.

The core of the system utilizes an ESP32-CAM module mounted on a mobile rover platform. The module serves as a wireless vision sensor, continuously capturing and streaming high-definition image frames of crop foliage via a Wi-Fi-based Access Point (AP) named "Rover_Connect". These frames are transmitted to a central computation unit (Computer) where they are processed using OpenCV and an online Large Language Model (LLM) server-based detection framework.

The system employs a sophisticated image processing pipeline that converts visual data into the HSV color space to detect necrotic or chlorotic spots on leaves. By comparing live data with established datasets using an object detection algorithm, the system identifies infected leaves in real-time. Upon successful detection, the central server sends a wireless feedback signal to the rover, triggering a 12V diaphragm pump and relay mechanism. This ensures that the pesticide is sprayed exclusively on the infected areas, reducing chemical waste by an estimated 60-70%.

Keywords: Precision Agriculture, ESP32-CAM, OpenCV, Autonomous Rover, Image Processing, Targeted Pesticide Spraying, IoT in Farming, SoftAP

ICETE26-ME-23

MULTICRITERIA DECISION MAKING (MCDM): METHODS AND APPLICATIONS IN MECHANICAL ENGINEERING

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ABSTRACT

Multicriteria Decision Making (MCDM) is a class of decision-making techniques designed to handle problems involving multiple, often conflicting criteria. In mechanical engineering research and practice, decisions such as material selection, process optimization, design alternatives evaluation, and sustainable manufacturing require simultaneous consideration of technical, economic, environmental, and social factors. This paper provides a comprehensive review of MCDM methods, algorithmic steps, strengths and limitations, and highlights selected applications in mechanical engineering. Contemporary challenges and future research directions are also discussed.

ICETE26-CE-24

COMPARATIVE SEISMIC PERFORMANCE OF STRUCTURE (G+10) WITH VARYING SHEAR WALL CONFIGURATIONS USING STAAD.PRO FOR REGULAR AND IRREGULAR BUILDINGS

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ABSTRACT

Earthquake resistance is a critical requirement in the design of multi-storey buildings, especially in seismic regions. This study presents a comparative seismic performance analysis of a G+10 reinforced concrete building with different shear wall configurations for both regular and irregular structures. The models are analyzed using STAAD.Pro by placing shear walls at various locations such as core, corners, and periphery, and results are compared with buildings without shear walls. Seismic analysis is carried out as per relevant Indian seismic codes. Key response parameters including node displacement, storey drift, base shear, and internal forces are evaluated. The results indicate that the inclusion and proper positioning of shear walls significantly improve the seismic performance of both regular and irregular buildings, with certain configurations showing better control over lateral displacement and structural stability.

Keywords: Seismic analysis, Shear wall configuration, Regular and irregular buildings, STAAD.Pro, G+10 building, Lateral displacement,

ICETE26-CH-25

INTENSIFICATION OF BIODIESEL PRODUCTION USING HYDRODYNAMIC CAVITATION: A REVIEW

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ABSTRACT

The pursuit of energy is a crucial component of economic and industrial development. Numerous energy sources, such as coal, fossil fuels, wind, solar, nuclear, natural liquid gas, etc., are required as the need for energy increases. Because of its clean, green, renewable, and biodegradable properties, as well as its ability to reduce carbon emissions, biodiesel is a promising alternative fuel. Oil, appropriate CH_3OH or C_2H_5OH, and a suitable catalyst are combined in the widely used alcoholysis process to create biodiesel. Alcoholysis reactions can be performed using an array of methods. namely, hydrodynamic cavitation, pyrolysis, mechanical stirring, and probe-type ultrasonic cavitation. One of the energy-efficient methods for the production of alkyl ester (biodiesel) is hydrodynamic cavitation (HC). Allowing the liquid to pass through constriction lowers the pressure, which creates cavities. This method saves time while producing a high yield. The conversion and yield of alkyl ester are influenced by the various operational factors, including cavitation number, intake pressure, and HC system geometry. This review paper provides a general overview of the HC process and how it is used to trans-esterify different kinds of vegetable oils in order to produce biodiesel. There has been a brief discussion of the impact of several catalyst types (acid, alkaline, and heterogeneous) as well as operational parameters including intake pressure, oil to alcohol molar ratio, reaction temperature, and kinetics. Biodiesel made using this innovative and improved method was shown to be both energy-efficient and time-saving, leading to a greener final product.

Keywords: Biodiesel, Hydrodynamic Cavitation, Fatty acid methyl ester, Alcoholysis, Trans-esterification

ICETE26-CH-26

DAIRY WASTEWATER TREATMENT BY HYDRODYNAMIC CAVITAION

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ABSTRACT

Hydrodynamic cavitation (HC) is a rapidly emerging technique with wide-ranging industrial and environmental applications. It involves the formation, growth, and violent collapse of microbubbles within a liquid as it flows through a region of reduced pressure, such as a venturi, orifice plate, or rotating equipment. The implosion of these cavities generates intense local conditions—high temperatures, pressures, shock waves, and reactive free radicals—that significantly enhance physical and chemical processes. Owing to these unique effects, HC has gained prominence as an efficient, energy-saving, and scalable method for applications including wastewater treatment, sludge disintegration, biofuel production, emulsification, and process intensification in chemical industries. This seminar report discusses the fundamental principles of hydrodynamic cavitation, device configurations, governing parameters, and key industrial applications, along with recent advancements and challenges. The present work overviews the factors affecting the performance of HC such as inlet pressure, solution temperature, initial pH and initial pollutant concentration. Furthermore, based on the literature reports, application of HC for degradation of different pollutants, such as pharmaceuticals, pesticide, phenolic derivatives and dyes, was reviewed. Emphasis is placed on the potential of HC as a sustainable technology for green processing and environmental remediation.

Keywords: Dairy wastewater; Wastewater treatment and remediation Hydrodynamic cavitation; Biological oxygen demand (BOD)

ICETE26-CM-BD-27

INTELLIGENT NEURODIAGNOSTIC PLATFORM FOR BRAIN TUMOR AND ALZHEIMER'S DETECTION USING DEEP LEARNING MODELS

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ABSTRACT

Early and reliable detection of neurological conditions, including brain tumors and Alzheimer's disease, is essential for improving patient outcomes and enabling effective treatment planning. This study introduces an intelligent neurodiagnostic framework that applies deep learning methods to automatically analyze brain MRI scans and categorize them as tumor-affected, Alzheimer's-affected, or neurologically normal. The proposed system is built upon Convolutional Neural Networks (CNNs), which are well suited for medical image analysis due to their ability to learn meaningful spatial and structural features directly from imaging data, eliminating the need for handcrafted feature extraction. Experimental results indicate that the developed model achieves accurate diagnostic predictions while significantly reducing analysis time compared to traditional manual diagnostic procedures. By combining the detection of brain tumors and Alzheimer's disease within a unified platform, the system offers a practical, economical, and reliable solution that supports clinicians in making timely and well-informed diagnostic decisions.

Keywords: Brain Tumor Detection; Alzheimer's Disease Diagnosis; Deep Learning; Convolutional Neural Networks; MRI-Based Analysis; Automated Medical Diagnosis.

ICETE26-CE-28

INTELLIGENT TRANSPORTATION SYSTEM

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ABSTRACT

Intelligent Transportation Systems (ITS) use advanced digital technologies to improve the way people and goods move from one place to another. By combining communication networks, smart sensors, GPS, and data processing tools, these systems gather live information about traffic conditions and road performance. This real-time data allows traffic authorities to manage congestion more effectively, improve signal timing, and quickly handle accidents or unexpected disruptions. Features such as smart traffic lights, automated toll collection, intelligent parking systems, and live public transport updates make traveling easier and more dependable for commuters. Beyond convenience, ITS also contributes to safer roads by alerting drivers to potential hazards and supporting better traffic control decisions. It helps lower fuel usage and reduce harmful emissions by minimizing unnecessary delays and stop-and-go driving. With the integration of artificial intelligence and predictive analytics, transportation systems can anticipate traffic trends and adjust strategies before problems become severe. As urban areas continue to grow, ITS plays a key role in shaping smarter, cleaner, and more sustainable transportation networks for the future.

Keywords: communication network, road performance, GPS technology, Public transport, road safety, sustainable transportation

ICETE26-MK-29

ADAPTIVE TRAFFIC SIGNAL AUTOMATION BASED ON VEHICLE DENSITY USING AI AND EMBEDDED SYSTEMS

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ABSTRACT

Rapid urbanization and exponential growth in vehicle population have resulted in severe traffic congestion across metropolitan and semi-urban regions. Conventional traffic control systems operate on fixed-time signal mechanisms, which fail to adapt to dynamic traffic conditions, leading to unnecessary waiting times, fuel wastage, and increased carbon emissions. This research proposes an intelligent and adaptive traffic signal automation system based on real- time vehicle density detection using image processing and artificial intelligence. The system utilizes a Raspberry Pi as the central processing unit and a camera module to capture live traffic footage at intersections. Computer vision techniques implemented using OpenCV and a pre- trained object detection model are employed to detect and count vehicles in each lane. Based on real-time density estimation, the system dynamically adjusts green signal duration, prioritizing lanes with higher congestion levels. Experimental prototype testing demonstrates improved traffic flow efficiency and reduced idle time compared to traditional timer-based systems. The proposed model offers a cost-effective, scalable, and smart solution suitable for integration into modern intelligent transportation systems and smart city infrastructure.

Keywords: Adaptive Traffic Control, Raspberry Pi, Vehicle Detection, Open CV, YOLO, Intelligent Transportation Systems, Smart Cities

ICETE26-CE-30

EXPERIMENTAL CHARACTERIZATION OF FAILURE PATTERNS IN SLABS WITH VARIED SHAPES AND SUPPORTS"

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ABSTRACT:

Yield Line Theory is a powerful upper-bound method for determining the ultimate load-carrying capacity of RC slabs. In review of recent innovations in reinforcement patterns (hybrid geogrids, orthotropic layouts) and varying support conditions (flexible beams, point supports, and bridge barriers), highlighting the transition from manual derivation to Automated Discontinuity Layout Optimization (DLO). This summarizes the application of Yield Line Theory (YLT) to various Reinforced Concrete (RC) slab configurations. Yield Line Theory, an upper-bound plastic analysis method, is essential for determining the collapse loads of slabs where elastic methods are overly conservative or complex.

Keywords: Yield Line Theory, Discontinuity Layout Optimization (DLO), collapse loads, **upper-bound** plastic analysis etc.)

ICETE26-ME-31

DESIGN AND IMPLEMENTATION OF AN SMART DRAINAGE MONITORING AND AUTOMATED CLEANING SYSTEM

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ABSTRACT

Urban drainage systems often suffer from clogging, rising water levels, and hazardous gas accumulation, leading to health risks and inefficient wastewater flow. To address these issues, this work proposes an IoT-based Smart Drainage Monitoring and Automated Cleaning System using the ESP8266 microcontroller. The system monitors water levels with an ultrasonic sensor and detects harmful gases using an MQ-135 sensor, while a servo mechanism removes floating debris to prevent blockages. Sensor data is transmitted to an IoT dashboard for real-time monitoring and instant alerts during abnormal conditions. Prototype testing demonstrated reliable sensing, timely alerts, and effective debris removal, offering a safe, cost-effective, and scalable solution for modern drainage management.

Keywords: Intelligent Drainage Monitoring, Obstruction Identification, Toxic Gas Detection, Automated Debris Removal, Environmental Risk Monitoring..

ICETE26-AE-32

PERFORMANCE TESTING OF BIOFUEL BLENDS ON SMALL CYLINDER PETROL ENGINES

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ABSTRACT

In the 21st century fossil fuel crises are arising day to day due to drastic consumption and fossil fuel prices are also increasing. On the other side the exhaust emission affected our greenhouse gases anodising global warming. Ethanol is found to be an alternative fuel and additive. It is renewable, bio-based and Eco-friendly fuel for spark-ignition (SI) engines. The most attractive properties of ethanol are that it can reproduced from renewable energy sources such as sugarcane, cassava, many types of waste biomass materials, corn and cellulosic materials. Further, Ethanol can be used as an additive for reducing exhaust emissions like carbon dioxide. Ethanol has higher evaporation heat, octane number and flammability temperature which can improve engine performance and reduces exhaust emissions. In this study, the effects of gasoline and gasoline–ethanol blends (E5, E10 and E15 and E20) on engine performance and pollutant emissions were investigated experimentally in a spark-ignition engine. The experimental results show that E5 and E10 were found to be the best blend out of all blends which improved performance and reduced emission like CO, HC, CO2 and NOX level.

***Keywords*:**:Biofue lblends, Smallpetrol engine, Spark ignition (SI) engine,Engineperformance analysis, Brake thermal efficiency, Brake power, Specific fuel consumption (SFC).

ICETE26-ME-33

DESIGN AND DEVELOPMENT OF A SOLAR-POWERED AIR PURIFICATION SYSTEM FOR SUSTAINABLE INDOOR AIR QUALITY IMPROVEMENT

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ABSTRACT

Air pollution presents significant health and environmental challenges due to rising levels of particulate matter (PM2.5 and PM10), harmful gases, and allergens in indoor and outdoor environments. Conventional air purifiers rely on grid electricity, increasing energy consumption and environmental impact.This study proposes a solar-powered air purification system that operates using photovoltaic energy. The system combines a solar panel, charge controller, rechargeable battery, and a multi-stage filtration unit including a pre-filter, HEPA filter, and activated carbon filter. It effectively removes dust, fine particles, odors, and toxic gases from indoor air. Optional sensors and microcontroller-based automation enable real-time monitoring and energy-efficient performance, offering a sustainable solution for improving indoor air quality.

Keywords: Solar energy, air purification, HEPA filter, indoor air quality, PM2.5, renewable energy, sustainable technology.

ICETE26-ME-34

PERFORMANCE EVALUATION OF EXTREME PRESSURE PROPERTIES OF CASTOR OIL WITH NANO-ADDITIVES

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ABSTRACT

The growing demand for environmentally sustainable and high-performance lubricants has led to increasing interest in bio-based oils as alternatives to conventional mineral oils. Among various vegetable oils, **castor oil** has gained significant attention due to its excellent lubricity, high viscosity index, biodegradability, and renewable origin. However, despite its favorable properties, castor oil exhibits limitations under extreme pressure (EP) conditions, particularly in high load and high temperature applications. To overcome these limitations, the incorporation of nano-additives has emerged as a promising approach to enhance tribological performance.

The present study focuses on the performance evaluation of extreme pressure properties of castor oil blended with nano-additives. The primary objective of this research is to investigate the effect of selected nanoparticles on the load carrying capacity, wear resistance, friction characteristics, and anti-seizure performance of castor oil under extreme pressure conditions.

Nanoparticles such as hexagonal boron nitride (hBN), molybdenum disulfide (MoS_2), and zinc dialkyldithiophosphate (ZDDP) based nano-formulations were selected due to their well-known solid lubricant behavior and anti-wear characteristics. These nano-additives were dispersed in castor oil in varying weight percentages using ultrasonication to ensure uniform distribution and stability. The prepared nano-lubricant samples were subjected to tribological testing using a Four-Ball Tribotester under standardized testing procedures for extreme pressure evaluation.

The experimental parameters included applied load, rotational speed, test duration, and temperature, maintained as per ASTM standards for EP testing. Key performance indicators measured during the experiments included:

- Wear scar diameter (WSD)
- Coefficient of friction (COF)
- Weld load
- Seizure load
- Load wear index (LWI)

The results demonstrated a significant improvement in extreme pressure performance with the addition of nano-additives compared to pure castor oil. The incorporation of nanoparticles enhanced the load carrying capacity and reduced the wear scar diameter substantially. Among the tested nano-additives, MoS_2 and hBN showed remarkable reduction in friction coefficient due to their layered crystal structure, which facilitates easy shearing between contact surfaces. ZDDP contributed significantly to anti-wear film formation by creating a protective tribo-chemical layer on the metal surfaces.

The mechanism responsible for performance enhancement can be attributed to multiple nano-scale phenomena, including:

- **Rolling effect** – Spherical nanoparticles act as nano ball bearings.
- **Protective film formation** – Formation of tribo-chemical reaction layers.
- **Mending effect** – Filling of surface asperities and micro-cracks.
- **Polishing effect** – Smoothing of surface roughness during sliding contact.

The optimal concentration of nano-additives was found to exist within a specific range. Beyond this range, agglomeration of nanoparticles led to reduced performance due to instability and sedimentation. Therefore, proper dispersion techniques and concentration control are critical in achieving maximum tribological benefits.

Surface morphology analysis using optical microscopy revealed smoother wear tracks and reduced surface damage in nano-enhanced samples. The presence of protective tribo-films was confirmed through comparative wear scar observations.

From an environmental perspective, the use of castor oil as a biodegradable base

lubricant combined with nano-additives presents a sustainable solution for industrial lubrication applications. This study supports the feasibility of replacing conventional petroleum-based extreme pressure lubricants with bio-based nano-lubricants in selected engineering applications such as automotive gear systems, metal forming processes, and heavy load machinery.

Keywords: Castor Oil, Nano-Additives, Extreme Pressure (EP) Properties, Tribological Performance, Four-Ball Tribotester, Wear Scar Diameter (WSD), Coefficient of Friction (COF), Load Carrying Capacity, Molybdenum Disulfide (MoS_2), Hexagonal Boron Nitride (hBN), Zinc Dialkyldithiophosphate (ZDDP), Bio-Lubricants, Nano-Lubrication, Anti-Wear Properties, Tribo-Film Formation, Sustainable Lubricants.

ICETE26-AE-35

PORTABLE CHARGING VAN

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ABSTRACT

The project titled “Portable Charging Van System for Electric Vehicles" showcases a pioneering solution in the realm of sustainable transportation. In this innovative endeavor, a solar car has been meticulously designed, leveraging the abundant energy of the sun for both propulsion and extending support to other electric vehicles . The solar car is equipped with a 6V solar panel, charging a 4.5V battery, and driven by four 4V motors, controlled seamlessly by a standard RC transmitter and receiver.

A key highlight of this project is the incorporation of a wireless charging system at the car's rear, capable of wirelessly transferring power to other electric vehicles in need. This functionality is particularly useful when encountering stranded or discharged electric cars on the road. In such situations, the solar car get call by the needy vehicle, navigates to its location, and initiates wireless charging, effectively reviving the stranded vehicle and enabling it to resume its journey.

Keywords: Solar-Powered EV , Wireless Power Transfer , Inductive Charging , Car-to-Car Charging , Electric Vehicle (EV) , Renewable Energy , Battery Management System , Sustainable Transportation

ICETE26-CE-36

ADVANCE CONCRETE AND INNOVATIONS

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ABSTRACT

Advances in construction technology, materials, and equipment have brought remarkable changes to civil engineering practice, yet concrete continues to serve as the backbone of modern infrastructure. As economies expand and societal expectations grow, the need for infrastructure that is not only durable but also efficient and sustainable has become increasingly important. This growing demand has driven rapid development in the construction sector, where the performance and quality of concrete remain central to the safety, service life, and reliability of civil engineering structures.

In recent years, concrete technology has progressed far beyond traditional formulations. Modern concrete materials are designed to offer superior mechanical strength, improved durability, and longer service life compared to conventional mixes. These advancements are made possible through the use of innovative admixtures, refined production methods, and environmentally responsible materials. The result is concrete that performs better under harsh environmental conditions, requires less maintenance over time, and adapts more effectively to complex and demanding structural designs. This paper provides a detailed review of emerging trends in concrete technology, with particular focus on how advanced materials are enhancing civil engineering applications. It explores their mechanical behavior, structural performance, and durability characteristics, while also examining their practical implications for the construction industry. In addition, the study considers the opportunities and challenges associated with implementing these modern materials in real-world projects. By offering a clear overview of current developments, this review aims to support researchers and practitioners in understanding the potential, limitations, and future direction of advanced concrete materials in contemporary civil engineering.

Keywords: advanced, sustainable, and high-performance concrete technology

ICETE26-MK-37

SMART HELMET FOR ACCIDENT DETECTION AND ALERT SYSTEM

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ABSTRACT

Road accidents involving two-wheelers account for a significant number of fatalities each year, primarily due to delayed medical assistance after an accident. To address this issue, this paper presents the design and implementation of a Smart Helmet for Accident Detection and Alert System that enables rapid detection of accidents and automatic notification to emergency contacts. The proposed system integrates sensors such as an accelerometer and vibration sensor to detect sudden impact or abnormal motion patterns associated with accidents. A microcontroller processes sensor data in real time and triggers an alert when accident conditions are detected. A GPS module is used to obtain the precise location of the accident, while a GSM communication module sends an alert message containing the location coordinates to pre-registered emergency contacts and medical services. Additionally, the system ensures rider safety by verifying helmet usage before vehicle ignition. Experimental results demonstrate that the proposed system can accurately detect accident scenarios and provide timely alerts, thereby reducing response time and potentially saving lives. The Smart Helmet system offers a low-cost, reliable, and efficient solution for enhancing road safety for two-wheeler riders. The system employs a threshold-based algorithm to distinguish between normal riding and crash events, minimizing false alarms. A critical delay mechanism allows the rider to cancel alerts in non emergency situations, enhancing reliability and practical usability in real-world scenarios

Keywords:- Smart Helmet, Accident Detection, GPS, GSM, IoT, Road Safety, Emergency Alert System, Embedded Systems, Two-Wheeler Safety

ICETE26-CE-38

ECO-FRIENDLY PAVER BLOCKS USING PLASTIC AND RUBBER WASTE

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ABSTRACT

The rapid accumulation of plastic and rubber waste has created serious environmental challenges, necessitating sustainable alternatives in construction materials. This study focuses on the manufacturing of eco-friendly paver blocks using waste plastic and rubber as partial replacement materials. The paver blocks were produced using a controlled thermal mixing and moulding process in which melted waste plastic acted as the primary binding agent. Three mix proportions were investigated, and the optimized composition consisting of 30% waste plastic, 65% sand, and 5% rubber waste demonstrated superior performance. The manufactured blocks were evaluated through compressive strength, water absorption tests to assess their mechanical and durability characteristics. Experimental results indicated improved strength, low water absorption, and satisfactory resistance to aggressive environmental conditions. The elimination of cement and water in the manufacturing process further enhances sustainability by reducing carbon emissions and resource consumption. The developed eco-friendly paver blocks are suitable for light-traffic applications such as pedestrian pathways and residential pavements, offering an effective solution for waste utilization and sustainable infrastructure development.

Keywords: Eco-friendly paver blocks, waste plastic, rubber waste, sustainable construction, waste utilization

ICETE26-MK-39

CARECONNECT: VOICE-INTERACTIVE ASSISTIVE WEARABLE WITH REAL-TIME TRACKING

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ABSTRACT

The project "CareConnect: Voice-Interactive Assistive Wearable with Real-Time Tracking" is designed to assist individuals with visual and speech impairments by providing a smart, wearable solution for daily use. The system integrates an ultrasonic sensor for obstacle detection, a GPS module for real-time location tracking, and a voice module for interactive audio guidance. Controlled by a microcontroller (Arduino/ESP32), the device processes sensor data and enables communication via Wi-Fi or GSM connectivity.

This wearable device ensures safe navigation, effective communication, and continuous monitoring, enhancing the independence and safety of users. Compact, affordable, and energy-efficient, CareConnect demonstrates how modern IoT and embedded technologies can create inclusive solutions that empower differently-abled individuals.

***Keywords*:** Assistive Technology, Wearable Device, Ultrasonic Sensor, GPS Tracking, Voice Feedback, IoT, ESP32, Visually Impaired, Speech Impaired.

ICETE26-ME-40

REGENERATIVE BRAKING SYAYEM

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ABSTRACT

In recent times, there's the lack of dependable indispensable energy sources, adding effectiveness and reducing exhaust gas emigrations has come the focus of the ultramodern automotive exploration. marketable vehicles similar as exchanges and delivery vehicles lose a tremendous quantum of kinetic energy during frequent retardation and constant drive at low pets on designated megacity routes, which results in advanced power consumption to on- road vehicles. Regenerative energy technology is one of the crucial features of galvanized vehicles. It allows the vehicle to capture a tremendous quantum of the kinetic energy lost during retardation or braking for exercise. Current retardation exploration indicates that around 50- 80 of retarding energy loss of marketable vehicles occurs in the frontal axle and the retardation energy loss varies slightly under different cargo countries. thus, the maturity of the regenerative energy eventuality is need to taped. Regenerative retardation is veritably important, step toward our eventual independence from fossil energies. These kinds of thickets allow batteries to be used for longer ages of time without the need to be plugged into an external bowl. These types of thickets also extend the driving range of completely electric vehicles. Regenerative retardation is a way to extend range of the electric vehicles. In numerous cold-blooded vehicles cases, this system is also applied cold-blooded vehicles to ameliorate energy frugality.

Keywords: Regenerative, Braking, Kinetic energy recovery system(K.E.R.S.), Motor, Hydraulic Power Assist.

ICETE26-MK-41

FARMER-DRIVEN CROP PRICE AND MARKETPLACE PLATFORM

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ABSTRACT

Indian agricultural markets often suffer from limited price transparency, delayed in- formation flow, and over-dependence on intermediaries, leading to unfair pricing for farm- ers. Existing digital platforms provide crop price information but lack mechanisms for price verification, personalized alerts, and real-time buyer–farmer interaction. This re- search presents *MandiConnect*, a farmer-driven digital crop price and marketplace plat- form aimed at improving transparency, trust, and efficiency in agricultural trade. The system provides real-time mandi prices along with daily market statistics such as mini- mum, maximum, and average crop prices. A unique Agree/Disagree feedback mechanism enables collective price verification, helping farmers identify authentic market prices. Additionally, a notification system alerts farmers when buyer demand is posted for their preferred crops and markets. The platform is implemented using a modular architecture with REST-based APIs and secure role-based authentication. Experimental observations indicate improved farmer awareness, faster response to buyer demand, and enhanced participation in agricultural markets.

Keywords: Agricultural Marketplace; Crop Price Transparency; Farmer-Centric Plat- form; Price Verification; Digital Mandis.

ICETE26-CE-42

COMPRESSIVE STRENGTH IMPROVEMENT OF M30 GRADE CONCRETE AS A PARTIALLY REPLACEMENT OF COARSE AGGREGATE WITH E-WASTE PLASTIC

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ABSTRACT

This project studies the compressive strength of M30 grade concrete by partially replacing coarse aggregate with E-waste plastic at 15%, 25%, and 35%. The main aim is to reduce environmental pollution caused by electronic waste and to check whether E-waste plastic can be used in concrete without reducing its strength. Concrete cubes are cast and tested for compressive strength after 7 and 28 days of curing. The results are compared with normal concrete to find the optimum replacement percentage. This study promotes sustainable construction and proper use of E-waste materials.

Keywords: M30 Grade Concrete, Compressive Strength, E-waste Plastic, Partial Replacement, Coarse Aggregate, Sustainable Construction, Waste Management, Eco-friendly Concrete.

ICETE26-MK-43

BLOCKCHAIN-BASED CARBON CREDIT MANAGEMENT FRAMEWORK FOR IOT-ENABLED EMISSION MONITORING SYSTEM

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ABSTRACT

The rapid growth of Internet of Things (IoT)–enabled devices in industrial and environmental monitoring has created a pressing need for accurate and trustworthy carbon emission management. Traditional carbon credit systems are largely centralized, often resulting in limited transparency, delayed verification, and increased risk of data manipulation. To address these challenges, this paper proposes a decentralized blockchain-based carbon credit management framework integrated with IoT-based emission monitoring devices. In the proposed system, IoT sensors continuously collect real-time emission and energy consumption data, which is securely transmitted and recorded on a blockchain network using cryptographic techniques to ensure data authenticity and integrity. Smart contracts automatically validate the collected data, calculate carbon emissions based on predefined regulatory standards, and allocate or deduct carbon credits accordingly. The decentralized and immutable nature of blockchain enhances traceability, prevents tampering, and enables transparent auditing and secure carbon credit transactions without reliance on intermediaries, while also supporting automated compliance monitoring and efficient management of the entire carbon credit lifecycle. Prototype evaluation demonstrates improved transparency, reduced verification delays, stronger data integrity, and lower fraud risk compared to conventional centralized systems, highlighting the potential of integrating blockchain and IoT as a scalable and secure solution for sustainable environmental governance and next-generation carbon trading mechanisms.

Keywords : Blockchain, Internet of Things (IoT), Carbon Credit Management, Smart Contracts, Emission Monitoring, Decentralized Ledger, Carbon Trading, Data Integrity, Automated Compliance, Environmental Sustainability.

ICETE26-MK-44

GESTURE SENSE: TRANSLATING SIGN LANGUAGE INTO TEXT AND SPEECH

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ABSTRACT

Communication barriers between hearing- and speech-imaired individuals and the general population present a significant social challenge, as sign language—primarily based on structured hand gestures and facial expressions—is not widely understood by most people. This paper introduces *Gesture Sense*, an intelligent assistive system designed to translate sign language gestures into real-time text and speech, enabling seamless communication between impaired and non-impaired individuals. The proposed system employs a wearable smart glove integrated with motion and flex sensors to capture hand movements accurately, and the collected data is processed using embedded hardware and gesture recognition algorithms to identify predefined sign patterns. Once recognized, the gestures are converted into readable text and synthesized speech, allowing users to express their thoughts clearly and efficiently. The system is designed to be portable, affordable, and user-friendly, making it suitable for daily communication and emergency situations while reducing reliance on human interpreters. Experimental evaluation of the prototype demonstrates reliable gesture recognition, low response time, and stable real-time performance. By bridging the communication gap and enhancing accessibility, the proposed solution contributes to assistive human–computer interaction technologies and supports the development of an inclusive environment that improves the quality of life for hearing- and speech-impaired individuals.

Keywords: Sign Language Recognition, Gesture Translation, Smart Glove, Assistive Communication, Speech Synthesis, Human–Computer Interaction, Text Conversion, Embedded Systems, Wearable Sensors, Gesture Recognition Algorithms, Real-Time Communication, Accessibility Technology, Sensor-Based Interface, Inclusive Technology

ICETE26-ME-45

INNOVATIVE MULTI-FUNCTIONAL FARMING MACHINE

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ABSTRACT

The Small and marginal farmers often cannot afford multiple self-propelled machines for tillage, planting, interculture and transport, which results in low mechanization and high labour cost. This work presents the design and prototype fabrication of an innovative walk-behind multi-functional farming machine that uses a compact chassis, differential-based wheel drive and modular tool-carrier frame to perform several field operations with a single low-power engine. Power from a petrol engine is transmitted through a centrifugal clutch, chain–sprocket reduction and a custom gearbox–differential unit to two spoked drive wheels, while a swivelling caster wheel in front improves balance and maneuverability on uneven soil. The fabricated frame, measuring approximately 1.0 m × 0.9 m, is built from welded mild-steel rectangular sections to reduce material cost while providing adequate stiffness for carrying interchangeable implements such as cultivator tines, ridger, seed-cum-fertilizer attachment and a small transport trolley. Differential steering allows one wheel to be slowed or stopped while the opposite wheel continues to rotate, enabling near-on-the-spot turning in narrow plots and around field obstacles without excessive operator effort. Initial trials on prepared soil indicate that the prototype can achieve effective traction and smooth turning at walking speed, demonstrating the potential of the proposed configuration to deliver more field functions at lower per-operation cost than conventional single-purpose machines for smallholders.

Keywords: Multi-functional farming machine, smallholder mechanization, differential steering, centrifugal clutch drive, implement carrier

ICETE26-CM-BD-46

SMART CROP PRICE PREDICTION AND PROFIT FORECASTING

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ABSTRACT

Agriculture is a crucial sector for economic stability and food security, yet farmers often face financial uncertainty due to fluctuating crop prices, unpredictable weather conditions, and changing market demand. Traditional agricultural decision-making relies largely on experience and local market knowledge, which may not accurately reflect future market trends. To address this challenge, this paper presents the Smart Crop Price Prediction and Profit Forecasting System, a data-driven software platform designed to predict future crop prices and estimate potential profits using machine learning techniques.

The proposed system integrates historical crop price records, seasonal trends, regional demand patterns, soil parameters, fertilizer usage, and real-time weather data obtained through REST APIs. Data preprocessing techniques such as cleaning, normalization, and feature selection are applied to prepare structured inputs for model training. Machine learning algorithms including Linear Regression, Random Forest Regression, Support Vector Machine (SVM), Gradient Boosting, and Long Short-Term Memory (LSTM) networks are employed to capture both linear and non-linear patterns influencing crop price fluctuations.

In addition to price prediction, the system includes a profit forecasting module that computes expected revenue by combining predicted prices with user-input parameters such as cost of cultivation, irrigation expenses, labor charges, fertilizer cost, and estimated crop yield. This allows farmers to evaluate profitability and select suitable crops before cultivation begins. The system architecture consists of a user interface, data acquisition and preprocessing modules, a machine learning-based prediction engine, a profit analysis component, a centralized database, and a

visualization dashboard. Experimental results demonstrate improved forecasting accuracy and effective financial planning compared to traditional methods. The proposed system supports data-driven decision-making, reduces agricultural risk, and contributes to sustainable and smart farming practices.

Keywords: Crop Price Prediction; Profit Forecasting; Machine Learning; Smart Agriculture; LSTM; Random Forest; Decision Support System.

ICETE26-CE-47

USE OF INDUSTRIAL WASTE BY PRODUCT FOR MODIFYING PROPERTIES OF EXPANSIVE SOIL

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ABSTRACT

Black Cotton Soil (BCS) is an expansive soil widely found in many regions of India and is known for its high swelling and shrinkage behavior due to the presence of montmorillonite minerals, which causes cracks, differential settlement, and instability in structures. Rapid industrialization has also led to the accumulation of large quantities of industrial waste in landfills, creating environmental concerns such as soil and groundwater pollution. This project focuses on the utilization of industrial waste by-products, such as Calcium Carbide Residue (CCR), to stabilize Black Cotton Soil. The main objectives are to use industrial waste effectively, reduce the shrinkage and swelling properties of BCS, and increase its strength and engineering performance. For this study, soil samples were tested for basic properties and then mixed with varying percentages (5%, 10%, 15%, and 20%) of CCR. Laboratory tests including Atterberg limits, Free Swell Index and Unconfined Compressive Strength (UCS) test were conducted after curing periods of 7, 14, and 28 days. The results showed a significant decrease in plasticity and swelling characteristics and a noticeable increase in Maximum Dry Density and compressive strength with increasing CCR content and curing time, with maximum improvement observed at 28 days. The study concludes that the use of industrial waste by-products like CCR is an economical, sustainable, and effective method for improving the properties of Black Cotton Soil while also reducing landfill burden and promoting environmentally friendly construction practices.

Keywords: Black Cotton Soil (BCS), Industrial Waste By-Products, Soil Stabilization, Calcium Carbide Residue (CCR), Plasticity Index, Free Swell Index, Unconfined Compressive Strength (UCS), Sustainable Construction, Waste Utilization.

ICETE26-ME-48

METAL MATRIX COMPOSITES: A STUDY ON A356–MWCNT ALUMINIUM NANOCOMPOSITES

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ABSTRACT

The development of lightweight structural materials with superior mechanical and tribological performance is critical for advanced aerospace and automotive applications. Aluminium Metal Matrix Nanocomposites (AMMNCs) have gained significant attention due to their enhanced specific strength and stiffness. Among casting alloys, A356 Aluminium alloy offers excellent fluidity, corrosion resistance, and heat-treatable capability; however, its mechanical performance under demanding service conditions remains limited. The incorporation of Multi-Walled Carbon Nanotubes (MWCNTs) as nano-scale reinforcements provides a promising strategy to improve the mechanical efficiency of the A356 matrix due to their high Young's modulus (~1 TPa), exceptional tensile strength, and high aspect ratio. This paper presents a structured processing framework for the development of A356–MWCNT nanocomposites, emphasizing material selection criteria, dispersion strategies, and fabrication methodologies including stir casting and powder metallurgy. Critical challenges such as wettability, nanotube agglomeration. Theoretical strengthening mechanisms to explain the expected enhancement in mechanical behavior. Furthermore, recommended mechanical and microstructural characterization techniques are outlined to establish a correlation between processing parameters and composite performance. The study provides a technical foundation for future experimental validation and optimization of A356-based Aluminium nanocomposites for high-performance structural applications.

Keywords- Metal Matrix Composites; A356 Aluminum Alloy; Multi-Walled Carbon Nanotubes (MWCNTs); Stir Casting; Powder Metallurgy; Microstructural Characterization

ICETE26-CM-BD-49

IOT-BASED REMOTE PATIENT MONITORING SYSTEM

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ABSTRACT

The rising incidence of chronic diseases and the increased demand on healthcare infrastructure require an intelligent approach to remote patient monitoring. The following paper proposes an IoT-based Remote Patient Monitoring System that has the capability to remotely track critical physiological parameters of patients, such as heart rate, blood oxygen saturation (SpO2), blood pressure, body temperature, and blood glucose levels. The proposed system employs an ESP32 microcontroller that is connected to biomedical sensors such as MAX30102 and DS18B20 to collect patient health data. The collected data is processed and securely transmitted to a cloud-based mobile and web platform for access by doctors and caregivers remotely.

The proposed system has an automated alert system that sends instant alerts to healthcare providers when critical physiological parameters exceed predetermined limits. The proposed system is also equipped with a communication module that employs a General System Mobile (GSM) module to communicate with the server when internet connectivity is unstable. The proposed system has placed emphasis on secure data transmission, integrity, and confidentiality. The proposed framework is also capable of exploring non-invasive biomedical sensors and has the potential to integrate Artificial Intelligence and Edge-based Machine Learning to detect anomalies and predict health outcomes. The proposed system is cost-effective and has the potential to solve existing challenges, such as a shortage of doctors and restricted access to healthcare during pandemics. The proposed model has the potential to contribute to the evolution of smart digital healthcare infrastructure.

Keywords: Internet of Things (IoT), Remote Patient Monitoring, ESP32, Healthcare Analytics, Edge Computing, Machine Learning, Smart Healthcare, Telemedicine.

ICETE26-ME-50

DEVELOPMENT OF MOBILE BASE SCREW JACK SYSTEM FOR VEHICLE LIFTING

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ABSTRACT

Vehicle tire replacement using a conventional manual screw jack requires significant physical effort and time, which can be difficult for elderly people, women, and physically challenged individuals. To address this issue, this project presents the development of a mobile-controlled scissor screw jack system for vehicle lifting. The manual scissor jack is converted into an electrically operated system using a DC motor, motor driver, and ESP32 microcontroller. The lifting and lowering operations are controlled wirelessly through a smartphone application using Bluetooth or Wi-Fi communication. Power is supplied from the vehicle's 12V source, making the system suitable for emergency roadside use. The proposed system reduces human effort, improves safety, and decreases lifting time compared to conventional jacks. This project offers a cost-effective, user-friendly, and reliable solution for modern vehicle lifting applications.

Keywords: DC motor, chain sprocket , wireless control system , jack model , Wi-Fi communication , Arduino microcontroller.

ICETE26-CM-BD-51

SMART HELMET FOR SANITATION WORKERS: THERMAL + GAS WARNING SYSTEM.

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ABSTRACT

Sanitation workers operate in confined environments such as sewer lines, drainage tunnels, and manholes, where exposure to toxic gases and oxygen deficiency poses serious health risks. Conventional safety equipment lacks real-time monitoring and early warning capabilities. This study proposes an IoT-based Smart Helmet that detects hazardous gases and monitors temperature and humidity in real time. The system integrates MQ-2 and MQ-135 sensors to identify methane (CH_4), carbon monoxide (CO), and ammonia (NH_3), along with a DHT11 sensor for environmental monitoring. Sensor data are processed using an Arduino/NodeMCU microcontroller, which activates local alerts (buzzer and LED) and sends SMS notifications via GSM module (SIM800L) when safety thresholds are exceeded. Experimental testing under simulated confined conditions showed gas detection within 2–3 seconds and alert transmission within 5 seconds. The proposed solution is cost-effective, portable, and suitable for large-scale deployment to enhance sanitation worker safety.

Keywords: Smart Helmet; Sanitation Workers; Gas Detection; IoT; MQ Sensors; Worker Safety; Confined Space Monitoring.

ICETE26-CH-52

EXTRACTION OF PECTIN FROM ORANGE PEELS

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ABSTRACT

The present research focuses on the recovery of pectin from orange peel residues generated during juice processing operations. Citrus peel waste, often discarded as an agro- industrial by-product, represents a rich and underutilized source of valuable polysaccharides, particularly pectin. In this study, pectin extraction was carried out using a continuous solvent reflux and siphoning method under controlled acidic pH and elevated temperature conditions. The effect of key process parameters such as pH, temperature, extraction time, and solid-to- liquid ratio on pectin yield was systematically evaluated to determine optimal conditions.

The results demonstrated that sweet orange peel is a promising and cost-effective raw material for pectin production, yielding approximately 16% pectin under optimized conditions. The extracted pectin exhibited a degree of esterification ranging from 5% to 71%, indicating variability based on extraction parameters. The final product was obtained as a light brown powder with good gelling ability.

To assess its functional performance, the extracted pectin was utilized in edible film formation in combination with herbal infusions. The developed films showed properties comparable to those prepared using commercial pectin and exhibited notable antioxidant activity. These findings highlight the potential of orange peel waste valorization through sustainable extraction approaches. The recovered pectin can be effectively applied as a gelling and stabilizing agent in food systems and also holds promise for pharmaceutical and related industrial applications.

Keywords: Pectin extraction, citrus peel waste, agro-industrial by-products, solvent reflux method, edible films, waste valorization.

ICETE26-CM-BD-54

ONEGATE - A SMART RESIDENTIAL AND PROPERTY MANAGEMENT SYSTEM

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ABSTRACT

Onegate is a web-based Residential and Property Management System that integrates property searching and housing management into a single unified platform for a single owner managing multiple residential units. The system digitizes visitor logging, maintenance tracking, and community communication while providing property information within the same application. It consists of four panels where users initially log in through a common interface and receive access based on their assigned role—User,Watchman, Resident, or Secretary. Role-Based Authentication enhances security, prevents unauthorized access, and ensures data integrity. The Watchman panel manages digital visitor entry and exit records, the Resident panel provides access to property details and notices, and the Secretary panel handles maintenance and administrative operations. Developed using React.js for the frontend and Java Spring Boot with RESTful APIs for the backend, the system ensures scalability, secure data handling, transparency, and improved operational efficiency within residential communities.

Keywords: Web-Based Application; Residential Property Management; Role-Based Authentication; React.js, Java Spring Boot, RESTful APIs; Data Security & Scalability.

ICETE26-CE-55

ARTIFICIAL INTELLIGENCE IN CONSTRUCTION INDUSTRY

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ABSTRACT

Artificial Intelligence (AI) is rapidly redefining how the construction industry plans, manages, and delivers projects. For decades, construction has been characterized by fragmented processes, heavy reliance on manual labor, frequent delays, rising costs, and inconsistent quality outcomes. The integration of AI offers a practical way to overcome these long-standing challenges by using data to guide smarter decisions throughout the project lifecycle. Technologies such as machine learning, computer vision, robotics, natural language processing, and predictive analytics are enabling more efficient and accurate operations. In the design phase, AI supports automated optimization and seamless integration with Building Information Modeling (BIM), allowing teams to identify design conflicts and improve planning before construction begins. During execution, real-time monitoring systems and predictive models analyze both historical and live data to anticipate schedule delays, identify structural weaknesses, allocate resources effectively, and streamline supply chain activities. This data-driven approach promotes proactive management rather than reactive problem-solving.AI-powered robotics and autonomous machinery further enhance on-site performance by improving precision and minimizing workers' exposure to hazardous tasks. These advancements contribute not only to higher productivity but also to safer working environments. However, despite its clear advantages, implementing AI in construction remains challenging due to high initial investment requirements, limited availability of high-quality data, workforce skill shortages, and organizational resistance to change.

This paper examines the practical applications, advantages, and current limitations of AI in the construction sector. It emphasizes that thoughtful and strategic

adoption of AI technologies can strengthen efficiency, encourage sustainable practices, and support digital transformation. Ultimately, integrating AI effectively has the potential to elevate construction performance and foster long-term innovation across the industry.

Keywords: Artificial Intelligence, project lifecycle, Building Information Modeling (BIM), sustainable practices.

ICETE26-ME-56

TITLE OF EXPERIMENTAL INVESTIGATION AND OPTIMIZATION OF LASER BEAM MACHINING PARAMETERS FOR STAINLESS STEEL-304

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ABSTRACT

Laser Beam Machining (LBM) is an advanced non-traditional machining process widely adopted for precision cutting of difficult-to-machine materials. This paper presents an experimental investigation on laser cutting of AISI 304 stainless steel with emphasis on surface roughness, kerf width, and heat affected zone (HAZ). Taguchi L9 orthogonal array was employed to design experiments by varying laser power, cutting speed, and assist gas pressure. Statistical analysis using ANOVA was carried out to identify the most influential parameters. Results indicate that cutting speed significantly affects surface roughness, while laser power has a dominant influence on kerf width and HAZ. The optimized parameter combination resulted in improved cut quality and reduced thermal damage, making the process suitable for sustainable manufacturing applications.

Keywords: Laser Beam Machining, Stainless Steel, Taguchi Method, ANOVA, Sustainable Manufacturing

ICETE26-CM-BD-58

CLINICAL DATA-DRIVEN FRAMEWORK FOR RISK ASSESSMENT AND MEDICAL DIAGNOSIS RECOMMENDATIONS IN INTENSIVE CARE UNIT

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ABSTRACT

The rapid growth of digital healthcare systems has resulted in the generation of massive volumes of clinical data in hospitals and intensive care units (ICUs). Efficient utilization of this data for predictive diagnosis and risk assessment has become an important research area. This study presents a clinical data-driven framework designed to support risk prediction and medical diagnosis recommendations for critically ill patients using structured and unstructured clinical information. The proposed framework integrates feature engineering techniques with a hybrid deep learning model combining Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) networks. The MIMIC-III dataset is used as the primary data source to evaluate the effectiveness of the model. A structured preprocessing mechanism is introduced to improve data quality and reduce computational complexity. Experimental outcomes demonstrate improved prediction accuracy and efficient identification of patient risk levels. The proposed system supports clinicians in making informed decisions and provides a reliable approach for early risk detection in ICU environments

Keywords: Clinical data mining, ICU risk prediction, MIMIC-III, machine learning, deep learning, feature engineering, healthcare analytics.

ICETE26-MK-59

FOLDABLE SMART BLIND STICK WITH GPS, DISTANCE SENSING, WATER DETECTION, AND WEB-BASED ALERTS.]

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ABSTRACT

Visually impaired people face significant challenges in safe and independent navigation, especially in unfamiliar environments. The Smart Blind Stick is designed to enhance mobility and safety for visually impaired individuals by integrating modern sensing and communication technologies. This project proposes a smart assistive device that combines distance sensing, water detection, GPS tracking, and web-based alert systems.

The blind stick uses an ultrasonic sensor to detect obstacles in the user's path and provides instant feedback through buzzer or vibration alerts, helping avoid collisions. A water detection sensor identifies water or wet surfaces, alerting the user to prevent slipping or falling hazards. The system also incorporates a GPS module to track the real-time location of the user.

In emergency situations, location data is transmitted via a microcontroller with internet connectivity to a web-based platform, allowing caregivers or family members to monitor the user's position remotely. Alerts are generated automatically when predefined conditions are met, ensuring quick assistance.

The proposed system is low-cost, portable, energy-efficient, and user-friendly, making it suitable for everyday use. This smart blind stick significantly improves independence, safety, and confidence for visually impaired individuals while enabling effective remote monitoring through web-based alerts.

Keywords: Smart Blind Stick, Assistive Technology, Ultrasonic Sensor, GPS Tracking, Water Detection Sensor, Obstacle Detection, Web-Based Alerts, Internet of Things (IoT), Visually Impaired Assistance, Real-Time Monitoring

ICETE26-ME-60

OPTIMIZATION AND EXPERIMENTAL VALIDATION OF ACID PRETREATMENT AND BASE-CATALYZED TRANSESTERIFICATION FOR BIODIESEL PRODUCTION FROM PONGAMIA PINNATA OIL

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ABSTRACT

Global primary energy demand has increased from 6,629.8 Mtoe in 1980 to 12,239.2 Mtoe in 2012 and is projected to rise by 53% by 2030, while fossil fuels are expected to maintain 75% dominance in the global energy supply through 2040. This escalating dependency on non-renewables necessitates sustainable, engine-compatible, low-carbon alternatives to petroleum diesel. Biodiesel from non-edible oil-bearing feedstocks presents a promising pathway due to its non-competition with food resources and adaptability to marginal lands. In this study, seventeen non-edible biodiesel feedstocks-including Jatropha, Karanja, Neem, Mahua, Castor, Rubber Seed, Polanga, Linseed, and Jojoba were comprehensively assessed across the full biodiesel production chain: seed drying (≤8% moisture), oil extraction (mechanical 70-85% vs. solvent 95-98% recovery), acid esterification reducing FFA from 5-25% to <1%, and alkaline transesterification achieving ASTM D6751, EN 14214 and IS 15607 standards. Fuel property evaluation showed ranges of density (868-915 kg/m³), viscosity (4.0-13.5 mm²/s), flash point (151–178°C), cloud point (8-16°C), pour point (1-11°C), cetane number (41-55), and calorific value (38.1-39.8 MJ/kg). A new weighted multi-criteria decision framework, integrating performance–emission–vibration priorities, identified calorific value (0.3933) and viscosity (0.1933) as the most influential parameters, followed by cetane number (0.1533). Advanced multivariate analytics-correlation heatmaps, radar profiling, and PCA clustering-validated the scoring and revealed a consistent high-performance biodiesel cluster led by Jatropha (score 0.8309), Karanja

(0.7634) and Neem (0.7146) with desirable combustion properties (viscosity 4.5-4.8 mm^2/s, cetane ≥52, calorific value ~39.4–39.8 MJ/kg). Castor was least suitable (0.2311) due to its very high viscosity (13.5 mm^2/s) despite acceptable heating value. The findings demonstrate strong novelty in combining a scientifically weighted evaluation model with multivariate clustering to classify biodiesel suitability, enabling precise identification of the most engine-compatible non-edible biodiesel candidates. The recommended fuels—especially Jatropha, Karanja, and Neem—offer improved combustion, reduced emissions, and enhanced energy security, supporting their adoption as sustainable drop-in substitutes for conventional diesel..

Keywords: Advancement in Production Process, Renewable energy, Renewable fuels, Nonedible feedstock, Transesterification, Non-edible biodiesel, Fuel property evaluation, Diesel Engine, Performance, Emission, Vibration, Multi-criteria decision analysis, Principal component analysis, Sustainable diesel alternative

ICETE26-MK-61

VOICE CONTROL SMART WHEELCHAIR

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ABSTRACT

The Voice Control Smart Wheelchair with Obstacle Detection is an intelligent assistive device designed to provide safe and independent mobility for physically disabled and elderly individuals. The primary objective of this project is to develop a wheelchair that can be operated through voice commands while ensuring user safety through automatic obstacle detection.

The system uses a voice recognition module to receive commands such as forward, backward, left, right, and stop. These commands are processed by a microcontroller (such as Arduino or ESP32), which controls the movement of DC motors through a motor driver circuit. To enhance safety, ultrasonic sensors are integrated into the system to continuously monitor the surroundings. If an obstacle is detected within a predefined distance, the system automatically stops or changes direction to prevent collision.

This project reduces dependency on caregivers and improves the quality of life for users by offering a convenient, hands-free control mechanism. The proposed system is cost-effective and suitable for use in homes, hospitals, and rehabilitation centers. Future enhancements may include GPS tracking, IoT connectivity, and mobile application integration for improved monitoring and control.

Keywords: Voice Recognition, Wheelchair, Obstacle Detection, Ultrasonic Sensor, Microcontroller (Arduino / ESP32), Assistive Technology, Motor Driver, Three Wheel Chassis, Arduino

ICETE26-MK-62

TEMPERATURE CONTROLLED SMART WATER HEATER

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ABSTRACT

The Temperature Controlled Smart Water Heater is an intelligent and energy-efficient system designed to maintain water at a desired temperature automatically. Conventional water heaters often lead to overheating, energy wastage, and safety risks due to the lack of precise control. This project aims to overcome these limitations by integrating a temperature sensor, microcontroller, and automatic switching mechanism.

The system continuously monitors the water temperature using a temperature sensor such as LM35 or DS18B20. The sensed temperature is processed by a microcontroller (e.g., Arduino), which compares it with the user-defined set temperature. Based on this comparison, the controller automatically turns the heating element ON or OFF through a relay module, ensuring accurate temperature maintenance. An LCD display provides real-time temperature readings and system status.

This smart water heater enhances safety by preventing overheating and reduces electricity consumption by operating only when necessary. The proposed system is suitable for domestic, commercial, and industrial applications where controlled and efficient water heating is required. Overall, the project demonstrates the practical implementation of embedded systems in improving energy management and user convenience in modern appliances.

Keywords: Smart Water Heater, Temperature Control, Microcontroller, Arduino, Temperature Sensor, DS18B20, Relay Module, Embedded System, Energy Efficiency, Automatic Control System, Overheat Protection, Smart Home Technology

ICETE26-MK-63

WI-FI CONTROLLED AQUATIC GARBAGE COLLECTOR ROBOT

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ABSTRACT

Floating solid waste in rivers and ponds has become a major environmental concern, especially in small waterways where conventional cleaning machines cannot operate efficiently and manual cleaning exposes workers to contaminated water. This paper presents the design and development of a compact, low-cost Wi-Fi controlled river cleaning robot capable of collecting floating debris from shallow water bodies. The system is built using an ESP8266 microcontroller acting as an embedded web server, allowing real-time control through a standard mobile phone browser using an IP address, eliminating the need for a dedicated application. A differential drive mechanism using dual DC motors enables navigation, while a front-mounted motorized conveyor collects and stores floating waste. The robot was tested in a controlled environment and successfully demonstrated stable wireless operation and effective waste collection. The proposed solution improves safety, reduces manual effort, and provides an affordable and scalable approach for decentralized water cleaning in rural and urban areas.

Keywords: River Cleaning Robot; ESP8266; IoT Control; Water Pollution; Surface Waste Collection; Low-Cost Automation; Smart Sanitation .

ICETE26-MK-64

AUTOBILL-AI POWERED INSTANT CHECKOUT SSYTEM USING RASPBERRY PI

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ABSTRACT

AutoBill is an AI-powered instant checkout system designed to eliminate manual billing queues using computer vision and Raspberry Pi. The system automatically detects products, identifies their prices using machine learning, and generates a real-time bill without human intervention. This paper presents the design, methodology, hardware architecture, soft- ware implementation, and results of the AutoBill system The system can also be connected to a cloud server for data storage, digital payment integration, and inventory manage- ment.The system can also be connected to a cloud server for data storage, digital payment integration, and inventory management. The detected item is then matched with a local product database containing details like product name, price, and stock quantity. Keywords: —Instant Checkout, Raspberry Pi, Artificial In- telligence, Computer Vision, Retail Automation, Deep Learning.

ICETE26-MK-65

AUTONOMOUS MULTI-FUNCTIONAL ROBOT FOR DRAINAGE LINE INSPECTION, BLOCKAGE DETECTION AND CLEANING OPERATIONS

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ABSTRACT

The project aims to develop an autonomous multi functional robot capable of navigating drainage lines, inspecting for blockages, detecting obstructions and executing cleaning operations. By integrating sensors, imaging, and actuators, the system reduces human exposure in hazardous drainage environ ments, enhances inspection accuracy and speeds up maintenance operations. The prototype design includes locomotion suited to drainage pipelines, live video feedback, blockage detection using ultrasonic/infrared sensors, and a mechanical cleaning mechanism. Drainage systems are vital to urban sanitation but often suffer from blockages that cause overflow, contamination and costly maintenance. To address this, the project presents an autonomous multifunctional robot designed for inspection, blockage detection and cleaning within drainage lines. The system integrates a locomotion platform tailored to pipeline traversal, ultrasonic and infrared sensors for obstruction detection, a camera module for live video feedback and a mechanical cleaning mechanism to remove debris. When deployed, the robot navigates autonomously through drainage pipelines, streams real-time video to operators, identifies blockages via sensor feedback and activates the cleaning module to restore flow. By reducing human entry into confined hazardous spaces and automating inspection and cleaning operations, the system significantly improves safety and operational efficiency. The prototype's performance in sim ulated drainage environments proves its potential for application in urban maintenance regimes.

Keywords: Drainage inspection robot, Autonomous robot, Blockage detection, Cleaning system.

ICETE26-MK-66

SMART HEALTH MONITORING SYSTEM

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ABSTRACT

The adoption of healthcare monitoring technologies in hospitals and medical centers has increased rapidly in recent years. Along with this growth, portable monitoring devices using advanced technologies have become highly important worldwide. The development of Internet of Things (IoT) technology has transformed healthcare services from traditional in-person consultations to remote monitoring & telemedicine solutions

This project focuses on developing a dependable health monitoring system using IoT technology, an Arduino microcontroller, and an Android application. The system is designed to measure vital health parameters such as heart rate, and blood oxygen saturation (SpO_2) in both clinical and home environments. It also ensures real-time transmission of sensor data to a central device for continuous observation. The experimental results indicate that the system provides readings nearly equal to standard medical instruments, demonstrating high accuracy. With this smart monitoring system, doctors and family members can remotely observe and track a patient's health condition from any location.

Keywords: IoT, Heart Rate, Blood Oxygen Saturation (SpO_2), Remote Health Monitoring.

ICETE26-MK-67

AUTOMATIC CAR PARKING SYSTEM

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ABSTRACT

The Automatic Car Parking System is a smart solution designed to manage vehicle parking efficiently using sensors, controllers, and automation technology. The main aim of this project is to reduce human effort, save time, and optimize the use of available parking space. In this system, sensors such as ultrasonic or infrared detect the presence of vehicles at the parking entry and in parking slots. A microcontroller or PLC processes the sensor signals and controls the operation of barriers, motors, and display units.

When a vehicle approaches the parking area, the system automatically checks for empty slots and guides the driver through indicators or a display system. If a space is available, the gate opens automatically; otherwise, the system shows that the parking area is full. The project improves safety, minimizes traffic congestion, and reduces manual errors in parking management.

This automatic parking system is useful for malls, offices, apartments, and smart city applications. It demonstrates the use of mechatronics concepts such as sensors, actuators, embedded systems, and automation to create an efficient and intelligent parking solution.

Keywords: Smart Water Heater, Temperature Control, Microcontroller, Arduino, Temperature Sensor, DS18B20, Relay Module, Embedded System, Energy Efficiency, Automatic Control System, Overheat Protection, Smart Home Technology

ICETE26-ME-68

A REVIEW ON SMART SELF-ADJUSTING SHOCK ABSORBER USING MAGNETO-RHEOLOGICAL (MR) FLUID

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ABSTRACT

Magnetorheological (MR) fluid–based shock absorbers are smart suspension systems that provide real-time adaptive damping. They use a special fluid containing magnetic particles whose viscosity changes instantly when exposed to a magnetic field. By controlling the electric current in an electromagnetic coil, the damping force can be adjusted quickly according to road conditions.

Compared to conventional shock absorbers, MR dampers offer faster response, better ride comfort, improved vehicle stability, and lower energy consumption. They are widely used in automotive, railway, military, industrial, and structural applications. Although challenges such as higher cost and heat generation exist, ongoing research aims to improve efficiency and expand their use in advanced transportation and engineering systems.

Keyword : Magnetorheological Fluid, Smart Shock Absorber, Semi-Active Suspension, Adaptive Damping, Electromagnetic Control, Vibration Control

ICETE26-CM-BD-69

SMART DEVICE FOR ALZHEIMER PATIENTS WITH GEO-FENCING ALERT

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ABSTRACT

Alzheimer's disease patients are prone to disorientation and wandering, which can result in severe safety risks. To address this challenge, this project proposes a Smart Device for Alzheimer's Patients with Geo-fencing Alerts, designed to provide continuous monitoring and timely notifications for caregivers. The system integrates an Arduino microcontroller, GPS module, and GSM module to capture real-time patient location and compare it with predefined geo-fence boundaries. If the patient remains inside the safe zone, no action is taken; however, once the patient crosses the boundary, an SMS alert containing the patient's live coordinates is automatically sent to the registered caregiver or family member. This ensures quick response, enhances patient safety, and reduces caregiver anxiety. In addition to the hardware, the system incorporates a multi-role management web application that improves usability and scalability. Admins can authorize dealers and register devices, dealers can assign devices to specific users, and caregivers can log in to track live patient location, maintain health data logs, and receive timely alerts. The system leverages a Point-in-Circle geo-fencing algorithm as its core logic to determine whether the patient is inside or outside the safe zone, offering a simple yet effective solution for real-time boundary monitoring. By combining IoT hardware and smart software, this device ensures safety, quick alerts, and ease of monitoring, ultimately providing peace of mind to families and reducing the risks associated with patient wandering.

Keywords: Alzheimer's Patients; Smart Device; Geo-Fencing; GPS Tracking; GSM Alert; Arduino; Point-in-Circle Algorithm; Patient Monitoring; Caregiver Support; IoT Healthcare; Safety Solution.

ICETE26-CM-BD-70

MEDILEDGER – SMART BLOCKCHAIN PRESCRIPTION & HEALTH MANAGEMENT SYSTEM

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ABSTRACT

MediLedger is a secure and user-friendly digital healthcare system developed to address the growing challenges of traditional paper-based prescriptions and health record management. Conventional prescriptions are often prone to loss, duplication, and tampering, which compromises patient safety and leads to inefficiencies in healthcare delivery. MediLedger aims to overcome these challenges by introducing blockchain-based prescription records that are authentic, tamper-proof, and accessible only to authorized entities such as doctors, patients, and pharmacies.

Beyond prescription management, MediLedger extends its services into essential health management modules to provide a more comprehensive digital healthcare solution. Patients can maintain detailed health records, track vital signs, set reminders for medication, and manage vaccination logs in a structured manner. In emergency situations, an automatically generated QR code enables healthcare providers and first responders to access limited yet lifesaving information, such as blood group, allergies, and critical health conditions, without exposing the complete medical history. This ensures quick action while protecting patient privacy.

The system integrates modern technologies to deliver both security and efficiency. By adopting the MERN stack (MongoDB, Express.js, React, Node.js), MediLedger ensures scalability, cross-platform compatibility, and ease of use. Blockchain technology, implemented using Polygon or Ethereum, provides a secure layer that prevents data manipulation or unauthorized access to prescriptions, thereby building trust between patients and healthcare providers. Notifications and authentication mechanisms are handled using Firebase, further enhancing real-time communication and secure access.

Overall, MediLedger creates a reliable framework that bridges the gap between traditional healthcare practices and modern digital systems. It not only streamlines prescription management but also strengthens patient engagement in their own health management, resulting in safer, faster, and more transparent healthcare interactions.

Keywords: Blockchain; Secure Prescriptions; Patient Records; Vitals Tracking; Vaccination Logs; Emergency QR; Tamper-Proof Data; Healthcare Interoperability .

ICETE26-ME-71

EVALUATION MECHANICAL PROPERTIES OF METAL BASED COMPOSITE MATERIAL

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ABSTRACT

A composite material is formed by combining two or more distinct materials that remain chemically separate and insoluble in one another. When these different phases are combined, the resulting material exhibits enhanced structural and functional properties compared to the individual constituents acting alone. In particular, ceramics and metals can be strengthened by the addition of reinforcing particles, leading to the development of Metal Matrix Composites (MMCs).

Aluminium-based metal matrix composites reinforced with single or multiple particulates—often referred to as hybrid metal matrix composites—have gained significant attention due to their superior performance characteristics. These materials are increasingly utilized in aerospace, marine, automotive, structural, underwater, and transportation applications. Experimental observations commonly indicate that the incorporation of reinforcement particles reduces the overall density of the composite while improving hardness. Because of their adaptable and enhanced properties, aluminium alloys are widely selected as matrix materials for fabricating various types of MMCs. Compared to conventional metals, metal matrix composites generally demonstrate improved strength, toughness, stiffness, wear resistance, corrosion resistance, creep resistance, fatigue performance, machinability, and overall mechanical behaviour. The present study focuses on investigating different combinations of reinforcement materials used in aluminium matrix alloys for the production of aluminium metal matrix composites through the stir casting process.

Keywords: Aluminium Alloy, Reinforcements, Stir Casting, Mechanical Properties

ICETE26-ME-72

DESIGN AND DEVELOPMENT OF VERTICAL / ROTARY CAR PARKING SYSTEM

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ABSTRACT

Due to rapid urbanization and increase in the number of vehicles, parking space has become a major problem in cities. Conventional parking systems require large land area and are inefficient in crowded places. The Vertical / Rotary Car Parking System is designed to overcome this problem by utilizing vertical space effectively.

In this system, cars are parked one above the other in a vertical arrangement using a rotary mechanism powered by an electric motor. The system operates automatically and allows easy parking and retrieval of vehicles with minimum human effort. It reduces land usage, saves time, and improves parking efficiency.

Keywords: Vertical Car Parking System, Rotary Parking Mechanism, Space Optimization, Automated Parking, Electric Motor Drive, Mechanical Design, Urban Parking Solution, Smart Parking System

ICETE26-MK-73

DESIGN AND IMPLEMENTATION OF A WIRELESS UNIVERSAL REMOTE CONTROLLER FOR HAPTIC INTERFACES USING LORA TECHNOLOGY

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ABSTRACT

This paper presents the design and implementation of a wireless universal remote controller for haptic interfaces using LoRa (Long Range) technology. Conventional remote control systems are often limited by short communication range, high power consumption, and reduced reliability in non-line-of-sight environments. To overcome these limitations, the proposed system integrates capacitive touch-based haptic inputs with long-range, low- power LoRa communication. An ESP32 microcontroller is employed in both the transmitter and receiver units to process control commands and manage wireless data exchange. The transmitter encodes touch inputs and transmits them over LoRa, while the receiver decodes the commands and controls electrical appliances using relay modules. Real-time feedback is provided through LCD displays, and bidirectional communication ensures command acknowledgment and improved system reliability. Experimental evaluation demonstrates stable communication, low latency, and reliable performance even in non-line-of-sight conditions with minimal energy consumption. The modular and scalable architecture makes the system suitable for smart home automation, industrial control, and remote monitoring applications where secure, long-range, and energy-efficient wireless control is required.

Keywords: LoRa Technology, Wireless Universal Remote Controller, Haptic Interface, ESP32 Microcontroller, Long-Range Communication, Home Automation, Low-Power Wireless Systems

ICETE26-MK-74

SMART ENERGY MANAGEMENT AND OVERLOAD CONTROL OF HOSTEL MANAGEMENT USING IOT.

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ABSTRACT-

The uninterrupted rise in electricity use in hostels results in irregular power consumption & enhanced electricity expenses due to extreme usage of power-intensive devices. This paper presents a Smart Energy Management & Overload Control System based on Internet of Things (IoT) technology to monitor & control energy use at the particular room level. The system uses a PIC18F4520 microcontroller integrated with current & voltage sensors to measure real-time electrical parameters/aspects such as voltage, current, power, & energy. The compiled data is illustrated on an LCD & transferred to an IoT web server through a GSM/Wi-Fi module for remote monitoring.

Whenever an overload condition/situation is detected, warning alerts are sent to the respective room occupant. If repeated contraventions occur, the system automatically breaks the power supply using a relay mechanism. This method ensures equitable energy distribution, reduces electrical hazards\dangers, & encourages energy-effective practices in hostels.

Keyword: Overload Detection, Internet of things, Energy Management, Remote monitoring, Embedded system, Hostel Energy Management, Smart switch control, Automation, Wireless communication, Sensor's(Current sensor, Voltage sensor), Real-time data monitoring

ICETE26-MK-75

AUTOMATIC WATER TANK CLEANING SYSTEM

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ABSTRACT-

Water tanks are generally used in homes, apartments, industries, & hospitals to store water. Over time, dirt, algae, & bacteria collect inside the tank, making the water insecure for use. Manual cleaning is difficult, time-consuming, & unhygienic.

The Water Tank Cleaning System is an automated solution that cleans the tank using a motor-driven brush, water jets, & a control unit. The system removes dirt without human entry into the tank, ensuring better hygiene, saving time, & reducing water wastage. This project gives a safe, efficient, & low-cost method for regular tank cleaning.

Keyword: Water Tank Cleaning, Automation, DC Motor, Microcontroller, Hygiene, Water Safety

ICETE26-MK-76

SMART WASTE MANAGEMENT ROBOT

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ABSTRACT-

A Smart Waste Management Robot is a machine designed to collect & separate waste automatically. It uses sensors, camera, and a microcontroller to detect various types of waste like wet, dry, & metal. The robot moves around using wheels and avoids obstacles with the help of ultrasonic sensors. When it finds waste, it picks it up & puts it into the correct bin using a robotic arm or sorting system.

This system helps decrease human effort and keeps the environment clean. It also uses IoT technology to monitor the waste levels in bins & send alerts when they are full. The smart waste management robot is helpful in places like colleges, hospitals, railway stations, & smart cities. It increase cleanliness, saves time, & supports better waste management practices.

Keyword::Smart Waste Management, Waste Segregation, IoT (Internet of Things), Robotics, Artificial Intelligence, Sensors, Microcontroller, Automation, Environmental Protection, Smart City

ICETE26-ME-77

SMART SOLAR TRACKER USING ARDUINO

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ABSTRACT

Solar energy is one of the most promising renewable energy sources available today. However, the efficiency of conventional fixed solar panels is limited because they cannot continuously face the sun as its position changes throughout the day. To overcome this limitation, this paper presents the design and development of an automatic solar tracking system using an Arduino microcontroller. The system uses Light Dependent Resistors (LDRs) to detect the direction of maximum sunlight intensity. Based on the sensor input, the Arduino controls servo motors that rotate the solar panel to maintain optimal alignment with the sun. This improves the overall energy conversion efficiency of the solar panel. The system operates automatically without human intervention and is built using low-cost and easily available components. The proposed system demonstrates a significant improvement in energy capture compared to fixed solar panels and provides an effective solution for improving solar energy utilization.

Keyword: Solar Energy, Solar Tracking System, Light Dependent Resistor (LDR), Servo Motor, Renewable Energy, Automatic Control System, Energy Efficiency.

ICETE26-MK-78

OBSTACLE AVOIDING FIREFIGHTING ROBOT

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ABSTRACT-

Fire accidents are a leading cause of life & property loss, and direct human involvement in fire-prone areas is often hazardous. The Obstacle Avoiding Firefighting Robot is an autonomous system developed to detect & extinguish fires while navigating safely in complex environments. Equipped with flame & temperature sensors, ultrasonic obstacle detection, & a water pump or sprinkler system, the robot identifies fire sources & takes action to control or extinguish them. A microcontroller processes sensor data & controls motor movement, the extinguishing mechanism, & obstacle avoidance strategies. The robot's chassis, wheels, & power supply enable stable & continuous operation in indoor\outdoor fire-prone areas. By integrating automation, robotics, & sensor technologies, this system enhances firefighting efficiency, reduces human risk, & gives a cost-effective solution for harmful fire situations.

Keyword:DC Motors with Motor Driver (L298N /L293D), Water Pump / Servo Motor with Sprinkler System, Chassis / Robot Frame, Microcontroller (e.g., Arduino UNO / NodeMCU / Raspberry Pi, Power Supply (Battery Pack), Wheels and Castor Wheel, Fan (optional), Connecting Wires, Breadboard, and Switches, Ultrasonic Sensor, Flame Sensor / Temperature Sensor

ICETE26-MK-79

TEMPERATURE CONTROL AND MONITORING SYSTEM

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ABSTRACT-

Temperature control & monitoring systems are useful in industrial, commercial, & residential applications for maintaining optimal environmental or process conditions. These systems use sensors to measure the current temperature & compare it with a desired setpoint. A controller processes this information & adjusts heating\cooling elements to maintain the target temperature. Continuous monitoring permits the system to respond dynamically to environmental changes, ensuring stability, efficiency, & safety. By automating temperature regulation, these systems decrease energy consumption, prevent equipment damage, & maintain product quality. They are generally applied in HVAC systems, manufacturing processes, food storage, & laboratory environments.

Keyword: Temperature Sensor, Controller, Heating Element, Power Supply, Actuators / Relays, Wiring and Connectors, Cooling Element, Display / Monitoring Interface Ultrasonic Sensor, Flame Sensor / Temperature Sensor

ICETE26-MK-80

VEHICLE ANALYSIS ON TOLL

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ABSTRACT-

Vehicle analysis at toll plazas is a smart system used to monitor and manage vehicles passing through toll gates. It helps in identifying vehicle types, collecting toll fees automatically, and reducing traffic congestion.

Modern toll systems use technologies like cameras, RFID tags (such as National Payments Corporation of India FASTag system), sensors, and IoT devices to detect vehicle numbers, classify vehicles, and deduct toll charges without stopping vehicles.

This system improves traffic flow, reduces waiting time, saves fuel, and increases toll collection accuracy. It also helps in detecting overloaded vehicles and improving road safety. Overall, vehicle analysis at toll plazas makes transportation faster, safer, and more efficient.

Keyword: Toll Plaza Automation, Vehicle Classification, Traffic Monitoring, RFID Technology, FASTag System, IoT (Internet of Things), Automatic Number Plate Recognition (ANPR), Smart Toll Collection, Traffic Management, Overload Detection, Computer Vision, Cashless Payment System,

ICETE26-CE-81

COMPARATIVE EVALUATION OF TENSILE PROPERTIES OF FE 550D GRADE REINFORCEMENT BARS FROM SELECTED MANUFACTURERS

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ABSTRACT

The tensile behaviour of reinforcement steel critically affects the performance and safety of reinforced concrete structures. This study presents a comparative evaluation of the tensile properties of Fe 550D grade reinforcement bars manufactured by four selected producers: Rajuri, Pollad, Icon, and Uma. Samples of each brand were tested in accordance with the Indian Standard IS 1786:2008 to determine key mechanical properties including yield strength, ultimate tensile strength, percentage elongation, and ductility characteristics. Tensile tests were conducted using a calibrated universal testing machine under controlled laboratory conditions. The results demonstrate that all four manufacturers' products conform to the minimum requirements for Fe 550D grade; however, distinct differences were observed in the extent of post-yield elongation and energy absorption capacity, which are critical for seismic performance. Rajuri and Icon bars exhibited relatively higher tensile strength and ductility, whereas Pollad and Uma showed satisfactory but comparatively lower elongation indices. Statistical analysis confirms that the inter-manufacturer differences are significant with respect to ductility parameters. The findings highlight the importance of rigorous quality control and consistent manufacturing practices to ensure that reinforcement bars not only meet standard specifications but also deliver reliable performance under demanding structural conditions.

Keywords: keywords for your study: Reinforcement steel, Fe 550D grade, tensile behavior, Yield strength, Ultimate tensile strength, Percentage elongation, Ductility

ICETE26-CH-82

FORWARD OSMOSIS MEMBRANE ENHANCED WITH CELLULOSE ACETATE AND H-BN FOR WASTEWATER TREATMENT IN THE TEXTILE SECTOR

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ABSTRACT

Textile wastewater is recognized for having a lot of reactive colors, organic compounds, and salts, which are bad for the environment.The purpose of this work was to design and evaluate a forward osmosis membrane made of cellulose acetate-hexagonal boron nitride (CA-hBN) to deal with textile effluents.Analyzing the membranes made was done by FTIR, XRD, water contact angle, TEM, tensile strength analysis, FE-SEM, and AFM techniques.The CA–hBN membrane displayed an average water flux of 6.27 LMH, with a remarkable COD rejection rate of 96.34% and a color reduction rate of 52.4%, while retaining a moderate RSF value of 2402 mg m^{-2} h^{-1} and a low flux drop rate of 12.86%.According to these data, the membrane has the ability to treat textile effluent sustainably by effectively eliminating colors and organic contaminants while allowing water to pass through.To decrease reverse solute flux and fouling, the study underlines the need of optimizing draw solutions and membrane design.The textile sector has the possibility to recapture water and minimize pollution at an industrial scale through this promising technique given by this research.

Keywords: CA–hBN Forward osmosis membrane, COD rejection, Color removal, Reverse solute flux, Textile wastewater treatment, Water flux.

ICETE26-AE-83

EXPERIMENTAL INVESTIGATION OF SINGLE PHASE STEEL JOINT WITH LASER WELDING

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ABSTRACT

Laser welding is an advanced joining process widely used in modern manufacturing industries due to its high precision, deep penetration capability, and minimal heat-affected zone. The present study focuses on the experimental investigation of a single-phase steel joint fabricated using laser welding. The objective of this research is to evaluate the mechanical and metallurgical characteristics of the welded joint under controlled laser parameters, such as laser power, welding speed, and focal position.

Experimental tests were carried out on single-phase steel specimens, and the welded joints were analyzed to determine tensile strength, hardness distribution, microstructural changes, and weld bead geometry. The influence of heat input on joint integrity and defect formation was also examined. The results indicate that optimization of the laser parameters significantly improves joint strength and reduces porosity and distortion. Microstructural examination reveals a refined grain structure in the fusion zone due to the rapid cooling rates associated with laser welding.

The study concludes that laser welding is an appropriate and efficient method for producing high-quality single-phase steel joints with superior mechanical performance and minimal thermal damage, making it highly applicable in automotive, aerospace, and structural engineering applications.

Keywords: Laser welding, Single-phase steel, Welded joint, Mechanical properties, Microstructure analysis, Heat-affected zone (HAZ), Tensile strength, Hardness test, Welding parameters, Metallurgical characteristics.

ICETE26-AE-84

A REVIEW OF NANOMATERIALS AS LUBRICANT ADDITIVES FOR TRIBOLOGICAL AND THERMOPHYSICAL ENHANCEMENT

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ABSTRACT

Rapid advances in nanotechnology have significantly increased interest in the use of nanomaterials as lubricant additives to improve tribological and thermophysical properties. Nanoparticles such as metal oxides, layered materials, and hybrid nanostructures have demonstrated significant reductions in friction and wear, as well as improvements in heat transfer properties. This review article summarizes and critically analyzes current experimental and literature-based studies on nanomaterial-based lubricants. The focus is on friction and wear mechanisms, dispersion stability, optimal concentration, improvement of thermophysical properties, sustainability aspects, and challenges for practical applications in the automotive and mechanical engineering sectors.

Keywords: Nanomaterials, Nano-lubricants, Tribology, Friction, Wear, Thermophysical Properties, Sustainability

ICETE26-MK-85

AEGIS ROVER PROJECT : ENHANCING CAMPUS LABSAFETY

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ABSTRACT-

The AEGIS Rover Project implements an autonomous robotic system, inspired by NASA's AEGIS framework, to improve campus laboratory safety. The rover navigates lab environments using advanced navigation sensors & vision systems, detects environmental hazards such as chemical leaks, smoke, fire, or temperature anomalies, & communicates real-time alerts via IoT modules. Equipped with onboard AI processing, it individually assesses risks & triggers appropriate responses, reducing human dependency. Integration with existing lab safety systems enhance compliance, operational efficiency, & data-driven hazard management. The AEGIS Rover provides a proactive & intelligent solution for safer & smarter academic laboratories.

Keyword:

- Mobile robot platform (wheeled or tracked base)
- Navigation sensors (LIDAR, ultrasonic, wheel encoders, IMU)
- Environmental sensors (gas detectors, temperature, humidity, smoke/fire sensors)
- Vision system (cameras with computer vision)
- Onboard computer & AI processor (embedded controller, AI algorithms)
- Communication module (WiFi & Bluetooth for data transmission)
- Power supply (rechargeable batteries, charging options)

ICETE26-MK-86

AUTOMATIC INTELLIGENT WASTE BIN"

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ABSTRACT

Waste Management has become very important in our day-to-day life due to rapid urbanization and increased in waste management In Conventional waste bins, it uses manual handling process, which leads to unhygienic conditions because of open bins manual handling, overflowing waste, mixing of waste and bad odor The automatic intelligence waste bin is smart, system used in many application likes in hospitals, campuses, smart city. It used sensor, based system to automate the waste removing & improve cleanliness through Internet of Things (IoT) Technology.

This smart waste system uses an ESP32 microcontroller to process inputs from multiple sensors placed around the bin.These sensors detect the presence of a user and automatically open the lid using a motor-driven flap mechanism, enabling touch-free waste removing. The pick-and-place arrangement is used for to direct the waste into the correct compartment, by sorting the wet and dry waste.

An OLED display provides real-time system status, while motor drivers control the movement of the mechanical components. In smart waste bin we uses 12V lithium ion battery and Wi-Fi system to send the alert notifications to an Android mobile application when the bin is full.

This project offers a hygienic, efficient, and low-cost solution for modern waste management. It reduces human effort, promotes cleanliness, supports waste segregation, and can be implemented in homes, campuses, hospitals, and smart city environments.

Keywords :Smart Waste Management, ESP32, IoT, Automation, Sensors, Hygiene, Android Application

ICETE26-ME-87

CORROSION MECHANISMS OF METALS: ELECTROCHEMICAL FUNDAMENTALS, ENVIRONMENTAL EFFECTS, AND RECENT ADVANCES

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ABSTRACT

Corrosion of metals remains one of the most critical challenges in applied chemistry, significantly impacting infrastructure, energy systems, transportation, and manufacturing industries. A mechanistic understanding of corrosion processes is essential for the rational design of durable materials and effective mitigation strategies. This review comprehensively examines the electrochemical fundamentals governing metallic corrosion, including thermodynamic stability, electrode potentials, Pourbaix diagrams, and kinetic principles such as Butler–Volmer behavior and mixed potential theory. Major corrosion mechanisms uniform corrosion, galvanic corrosion, pitting, crevice corrosion, intergranular corrosion, and stress corrosion cracking—are critically analyzed with emphasis on anodic dissolution, cathodic reactions, passive film breakdown, and localized electrochemical heterogeneities.

The influence of environmental parameters such as pH, chloride concentration, temperature, dissolved oxygen, and flow conditions is systematically discussed to highlight their role in accelerating or modifying degradation pathways. In addition, recent advances in mechanistic investigation techniques, including electrochemical impedance spectroscopy, in-situ surface characterization, and computational modeling approaches such as density functional theory and multiscale simulations, are reviewed. Emerging insights into corrosion behavior of advanced materials, including high-entropy alloys and additively manufactured metals, are also addressed. By integrating classical electrochemical theory with modern analytical and computational developments, this review identifies current knowledge gaps and outlines future research directions toward predictive, mechanism-based corrosion control strategies.

Keywords:, Corrosion mechanisms , Electrochemical corrosion , Pitting corrosion , Stress corrosion cracking , Passive films , Environmental effects , Electrochemical impedance spectroscopy

ICETE26-CH-88

SUSTAINABLE TREATMENT OF DAIRY WASTEWATER USING A SIMPLE MEMBRANE SETUP

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ABSTRACT

The dairy industry generates a large amount of wastewater containing high organic load, suspended solids, fats, and proteins, which, if not properly treated, poses serious environmental challenges. Therefore, sustainable and cost-effective treatment technologies are essential, particularly for small and medium-scale dairy operations. This study investigates the treatment of dairy wastewater using a simple, single-stage ultrafiltration system equipped with polyethersulfone and polyvinylidene fluoride membranes under laboratory-scale conditions. The incoming wastewater had a high organic load, characteristic of small-scale dairy industries. The system's performance was evaluated based on permeate flux, pollutant removal, and fouling behavior. Optimal performance was achieved at a transmembrane pressure of 2 bar, resulting in average chemical oxygen demand and **total suspended solids** removal efficiencies of 78% and 97% for polyethersulfone, and 73% and 95% for polyvinylidene fluoride, respectively. The flux decline was primarily reversible, governed by cake-layer formation, and was effectively mitigated by a two-step **sodium hydroxide** citric acid cleaning procedure, restoring over 90% of the initial flux. The system operated with low specific energy demand and treatment cost, highlighting its potential in decentralized and small-scale dairy industries. These results confirm that simplified ultrafiltration systems can provide reliable effluent quality, operational stability, and economic feasibility for sustainable wastewater management in the dairy sector.

Keywords: Ultrafiltration. Polyether Sulfone Membrane, Polyvinylidene Fluoride Membrane, Fouling Behavior, Flux Recovery, Transmembrane Pressure, Wastewater Reuse, Sustainable Treatment.

ICETE26-ME-89

REVIEW ON WATER QUALITY MONITORING

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ABSTRACT

Water quality monitoring is essential for ensuring safe drinking water, protecting aquatic ecosystems, and managing industrial and agricultural impacts. With increasing contamination from heavy metals, nutrients, pathogens, pharmaceuticals, and emerging pollutants, rapid, accurate, and cost-effective monitoring methods are critical. This review provides a comprehensive overview of conventional laboratory-based techniques, including spectrophotometry, chromatography, and atomic spectroscopy, and compares them with advanced sensor technologies such as electrochemical sensors, optical sensors, biosensors, and nanomaterial-enhanced detection systems. Emphasis is placed on real-time and smart monitoring approaches, including Internet of Things (IoT)-enabled devices, portable sensors, and data-driven platforms that integrate machine learning for predictive water quality assessment. The review also highlights challenges in sensor sensitivity, selectivity, calibration, and environmental interference, while discussing future directions for sustainable, integrated, and high-performance monitoring systems. A graphical abstract visually summarizes the progression from pollution sources to detection methods, data analysis, and water safety decisions, providing a clear roadmap for researchers and practitioners. This work serves as a critical resource for understanding the current landscape of water quality monitoring and identifying opportunities for innovation in analytical and smart sensing technologies.

Keywords:, Water quality monitoring, Electrochemical sensors, Biosensors, Nanomaterial-based detection, Emerging contaminants, IoT-enabled monitoring, Machine learning in water analysis, Heavy metal detection

ICETE26-ME-90

A REVIEW ON DESIGN AND DEVELOPMENT OF COST EFFECTIVE AUTOMATIC AUTOMOBILE BRAKE FAILURE INDICATOR.

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ABSTRACT

Brake failure is one of the major causes of road accidents, often resulting from poor maintenance, improper usage, or manufacturing defects. To enhance vehicle safety and protect human life, continuous monitoring of the braking system is essential. This work presents an intelligent brake failure monitoring and safety system that continuously checks the brake condition during vehicle operation. A sensor mounted on the brake mechanism detects brake wire damage or abnormal brake behavior and sends signals to a microcontroller for analysis. In the event of brake failure, the system immediately activates audio-visual alerts using a buzzer and LED to warn the driver. Simultaneously, an auxiliary secondary braking unit powered by a 12-V battery and disc brake mechanism is activated to slow down and stop the vehicle safely. This system ensures timely warning, effective control, and enhanced passenger safety, thereby significantly reducing accidents caused by brake failure.

Keywords: Brake Failure Indicator, Auxiliary Braking System, Vehicle Safety, Brake Condition Monitoring, Microcontroller, Sensor-Based System, Audio-Visual Alert, Two-Wheeler Safety, Accident Prevention.

LOKNETE. DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA
RURAL EDUCATION
SOCIETY

THE PRAVARA STORY . . .

Pravara Rural Education Society (PRES) was set up to utilize education for nation building, integrated rural development and women empowerment. Creating versatile and socially responsible professional leaders for holistic and sustainable development is the cornerstone of our belief system. PRES' commitment to excellence has won numerous awards and accolades even as alumni adds feathers to our proud cap.

Debt, starvation and inflation had ravaged farmers around Loni in the slowdown following the Second World War. The tough times got a tough man going. Convinced of the power of unity, Padmashri Dr. Vitthalrao Vikhe Patil braved innumerable obstacles to establish Asia's first cooperative sugar factory in 1950. Even the poor donated. Soon, the plant created prosperity for hitherto debt-ridden farmers !

A shrewd visionary, he realized financial upliftment was not enough. Having faced acute shortage of well-educated manpower when setting up the factory, he knew only quality education would truly and completely set people free. Once again, he took the plunge, convincing people on the merits of education by visiting their homes personally. And once again, people placed their faith and funds in him !

From humble beginnings - the Pravara Public School started with 27 students and a handful of teachers in 1964 - PRES has expanded into 102 institutes spread across Loni, Sinnar, and Ahmednagar. A 2,500+ strong faculty nurtures over 42,000 students, the next generation of the country from KG to PG to Ph.D.

Our story takes another pioneering turn in 1981. Industry had run into skilled manpower scarcity while unemployment confronted rural youth who were put off by the long waiting period till graduation after 10th standard. But government diploma colleges only offered limited seats. It was then that late Padmabhushan Balasaheb Vikhe Patil established Maharashtra's first private diploma engineering college. The rest is history !

ABOUT INSTITUTE

Padmashri Dr. Vitthalrao Vikhe Patil Institute of Technology and Engineering (Polytechnic), Pravaranagar (Loni) was established in August 1981. It is one of the first of its kind established on No Grant Basis in the State of Maharashtra. The necessity to establish a technical institution in the rural area was felt long back by the great visionary Late Padma Bhushan Dr. Balasaheb Vikhe Patil. He was of the firm opinion that it is essential to provide higher educational facilities to the rural youths because they are not in a position to compete with their urban counterparts in the race to secure admission in technical institutions due to lack of proper facilities and guidelines.

Ever since, the Pravara Rural Education Society established in the year 1964, striving to bring the education to the door steps of the rural masses. The Pravara Rural Education Society lays special emphasis on the education of women as well.

Late Padmashri had realized that unless the women folk of the rural area are properly educated, real progress of the rural area is not possible. Under the dynamic leadership of the Chairman of Pravara Rural Education Society, Hon'ble Shri. Radhakrishna Vikhe Patil, , the Pravara Rural Education Society has become one of the prominent institutions in rural area providing educational facilities in almost all faculty.

The education in general and technical education in particular is a vital component of Human Resources Development which has dynamism to change the quality of life in rural area. The institute has therefore played a very significant role in imparting technical education at middle level, particularly to the rural youths. Many of these young engineers have become entrepreneurs and have created employment opportunities in the rural area, thereby restricting the flow of rural youths to urban areas to some extent.

This polytechnic is consistently training the youth to make them employable or to become self-employed person. In addition to running formal diploma courses, we take care of overall development of the students by way of training them on soft-skill, industrial training , industrial visits, expert lecturers & value addition courses etc. Our institute is taking an active part in the overall development of the rural region in its humble way.

Pravara Rural Education Society has been awarded as the Best Educational Institution by Govt. of Maharashtra in 2003 and certified by ISO 9001-2000 organization in 2007, and "Dr.A.P.J.Abdul Kalam innovation in governance" award-2016, (Excellent Education Institute) by Indo-US foundation, New Delhi, in 2016.

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