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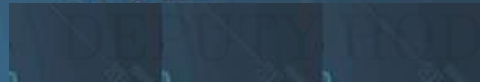
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Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu, India.

**FACULTY OF ENGINEERING AND
TECHNOLOGY
DEPARTMENT OF MECHANICAL
ENGINEERING**

MESSAGE:

HOD



EDITOR'S

ARTICLES CORNER

1. Emerging Career Opportunities in 2025
2. AI & Machine Learning in Predictive Maintenance of Mechanical Systems
3. Automation in Recycling: Sorting and Processing Waste Plastics
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5. Success Story of Mark Zuckerberg

Alumni Corner

PUBLICATIONS

EDITORIAL BOARD

HOD-DESK

MESSAGE



by,
Dr.K.RAJAN,
HOD/Mech Engg.

HOD message:

Greetings!

I am delighted that Dr. MGR University has provided us with the opportunity and vision to support the release of the Newsletter series throughout all quarters of each academic year. This platform serves as a valuable forum to connect with all stakeholders.

I am especially pleased to see our department releasing the Newsletter for the period of July 2023 to September 2023. Wishing for many more successful editions ahead and a wonderful reading experience for all!

MESSAGE

Message:

It gives us immense pleasure to be an integral part of this Newsletter—a powerful communication platform designed to meet the needs of the time. It serves as a bridge, delivering important messages about key events, achievements, and significant happenings to all concerned.

This initiative plays a vital role in fostering a sense of belonging among faculty, alumni, and students. Life does not offer rewinds, only flashbacks, and our talented alumni hold a wealth of experience and skills to share with current students through talks and newsletters.

We believe our efforts will be truly successful when, after reading these articles, you feel inspired and motivated to contribute even more to future editions. Let's continue this journey of knowledge sharing and collaboration!

EDITORIAL BOARD

Mr.W.Andrew Nallayan – Asst Prof

Mr.D.A.Vinoth – Asst Prof

Hari Krishnan D – III Mechanical Engineering

Aravinth.V – III Mechanical Engineering

Parimala Sowmyaa N.V – III Mechanical Engineering

Jai Kishore.M – III Mechanical Engineering



ACTION CORNER

SNIPPETS FROM PALS

ANDOUR UNIVERSITY

JULY TO AUGUST

DATE	EVENT TITLE	SPEAKERS	EVENT COORDINATE
8 August 2023	Guest Lecture on Fluid machinery and concepts	KANDEEBA.B, Assistant Professor, Dr. M.G.R Educational & Research Institute	
25 July 2023	Guest Lecture on Industrial Automation	S. KANDEEBAN Associate Professor Dr.M.G.R Educational & Research Institute	
17 August 2023	Interdisciplinary Talk on The Application of AI to mechanical	Om Ganapathy Assistant Professor Dr. M.G.R. Educational and Research Institute	
14 August 2023	Technical Talk on MEMS In Industrial Automation	J. Gangai Pandian Manager Maitravaruna Technologies Private Limited	

PALS: OCTOBER

EVENT: innoWAH! - AWARE WEBINAR FOR ENTREPRENEURS 04 - REFINING PROBLEM STATEMENTS

SPEAKER: Sri.Vallbha Deevi,
Mr.G.Ramkumar

DATE: 22.09.2023

VENUE: ZOOM

On 22nd September 2023, the innoWAH! AWARE Webinar for Entrepreneurs 04 took place, focusing on "Refining Problem Statements." The session featured two distinguished speakers: Sri Vallbha Deevi, Senior Data Scientist at Tiger Analytics, and Mr. G. Ramkumar, Executive Director at Indian Oil Corporation Limited (IOCL). The webinar provided valuable insights on how to refine and define problem statements effectively, a critical skill for entrepreneurs aiming to develop impactful solutions and drive innovation in their respective fields.

ARTICLES CORNER

Emerging Career Opportunities in 2025

by
Mr. Andrew Nallayan,
Asst. Professor/ Mech Engineering.



The job market is constantly evolving, driven by technological advancements, societal shifts, and global challenges. As we step into 2025, several emerging career opportunities are set to redefine industries, offering exciting prospects for job seekers. Whether you are a student planning your future, a professional looking to pivot, or an entrepreneur seeking investment ideas, staying ahead of these trends is crucial. Here are some of the most promising career paths for 2025:

1. Artificial Intelligence and Machine Learning Specialists

AI and ML continue to be at the forefront of technological innovation. Companies are integrating AI into various operations, from healthcare diagnostics to customer service automation. Professionals skilled in deep learning, natural language processing, and AI ethics will be in high demand. Certifications in AI, Python, TensorFlow, and data science can enhance job prospects in this field.

2. Cybersecurity Experts

With the rise of cyber threats and data breaches, cybersecurity has become a critical domain. Companies are investing heavily in security infrastructure, creating a demand for cybersecurity analysts, ethical hackers, and risk management professionals. Certifications like Certified Ethical Hacker (CEH) and CISSP (Certified Information Systems Security Professional) are highly valuable in this sector.

3. Renewable Energy Engineers

As the world moves towards sustainability, renewable energy sources like solar, wind, and hydrogen power are gaining traction. Engineers specializing in renewable energy technology, smart grid systems, and energy storage solutions will be in high demand. Governments and private sectors are heavily investing in green technologies, making this an attractive career option.

4. Data Science and Analytics Professionals

The explosion of big data has created a need for professionals who can analyse and interpret vast amounts of information. Industries like finance, healthcare, marketing, and e-commerce rely on data-driven decision-making. Skills in SQL, Python, R, and visualization tools like Tableau or Power BI are essential for success in this field.

5. Healthcare and Biotechnology Careers

With advancements in gene therapy, personalized medicine, and telehealth, the healthcare and biotech industries are booming. Careers in genetic counselling, biomedical engineering, and telemedicine are expanding. The demand for healthcare professionals, including nurses, mental health counsellors, and medical researchers, will continue to rise.

6. Blockchain Developers and Specialists

Blockchain technology is not just limited to cryptocurrencies; it is revolutionizing supply chain management, finance, and digital identity verification. Blockchain developers, smart contract auditors, and decentralized finance (DeFi) experts will be among the most sought-after professionals in the tech space.

7. Space Technology and Aerospace Engineers

The growing interest in space exploration, satellite technology, and space tourism is creating opportunities for aerospace engineers, robotics specialists, and space researchers. Companies like SpaceX, Blue Origin, and NASA are pushing the boundaries of space technology, offering exciting career prospects.

8. Remote Work and Digital Nomad Careers

With the normalization of remote work, digital-based careers such as content creation, digital marketing, UX/UI design, and virtual assistance are flourishing. The gig economy and freelancing platforms are enabling professionals to work from anywhere, providing flexibility and global opportunities.



9. Smart Manufacturing and Robotics Technicians

Industry 4.0 has ushered in automation, IoT (Internet of Things), and AI-driven robotics in manufacturing. Robotics engineers, automation specialists, and industrial IoT experts will play a crucial role in optimizing production and reducing operational costs.

10. Environmental and Sustainability Experts

As climate change concerns grow, businesses and governments are prioritizing sustainable practices. Careers in environmental science, urban planning, ESG (Environmental, Social, and Governance) consulting, and carbon footprint analysis will see an upward trend.

Conclusion

The job landscape in 2025 will be shaped by technology, sustainability, and evolving global needs. To stay competitive, professionals should focus on continuous learning, acquiring relevant certifications, and staying adaptable to industry changes. Whether you're passionate about AI, green energy, or healthcare innovation, the future holds numerous opportunities for growth and success.



AI & Machine Learning in Predictive Maintenance of Mechanical Systems

Dr. Ashok Kumar, Professor MECHANICAL ENGINEERING

1. Introduction

Predictive Maintenance (PdM) powered by **Artificial Intelligence (AI) and Machine Learning (ML)** is revolutionizing industrial machinery maintenance. Traditional methods like **reactive maintenance** (fixing after failure) and **preventive maintenance** (routine checks) often lead to **high repair costs, unexpected downtimes, and inefficient resource utilization.**

AI-driven PdM leverages **sensor data, real-time analytics, and predictive models** to detect potential failures before they occur. This reduces **maintenance costs by up to 40%** and increases equipment lifespan while improving overall operational efficiency.

2. How AI & ML Work in Predictive Maintenance

AI-based predictive maintenance operates in four key steps:

A. Data Collection from Mechanical Systems

Modern mechanical systems use **Internet of Things (IoT) sensors** to monitor performance in real-time. These sensors gather critical parameters such as:

- **Vibration** (detecting misalignment, imbalance, and bearing failures)
- **Temperature** (overheating of motors, excessive friction)
- **Pressure** (hydraulic system leaks, air compressor faults)
- **Acoustic & Ultrasonic Signals** (detecting mechanical wear, leaks, or cracks)
- **Voltage & Current Signatures** (monitoring motor health, detecting electrical faults)

B. Data Processing & Feature Extraction

Collected sensor data is **pre-processed** to remove noise and extract meaningful features using:

- **Signal Processing Techniques** (Fourier Transform, Wavelet Transform)
- **Time-Series Analysis** (identifying patterns in vibration or pressure variations)
- **Statistical Analysis** (mean, variance, kurtosis for fault detection)

C. Machine Learning Models for Predictive Analysis

AI algorithms process sensor data and predict machine failures based on historical trends. The most commonly used ML models in PdM include:

1. Supervised Learning Models

- **Support Vector Machines (SVM):** Classifies equipment health status (Normal vs. Faulty).
- **Random Forest & Decision Trees:** Identifies specific failure causes based on sensor input.
- **Neural Networks:** Deep learning models for complex failure pattern recognition.

2. Unsupervised Learning Models

- **Anomaly Detection Algorithms:** Detect deviations from normal operating conditions using clustering techniques (e.g., K-Means, DBSCAN).

3. Deep Learning & Reinforcement Learning

- **Convolutional Neural Networks (CNNs):** Used in **thermal imaging** for bearing and gearbox fault detection.
- **Recurrent Neural Networks (RNNs) & Long Short-Term Memory (LSTM):** Analyze sequential time-series data for **trend forecasting**.

D. Predictive Analytics & Maintenance Scheduling

Once AI predicts potential failures, it **alerts maintenance teams** to take proactive actions. Maintenance is scheduled **only when needed**, reducing unnecessary downtime and repair costs. AI-powered dashboards display:

- **Remaining Useful Life (RUL)** of components
- **Failure probability trends**
- **Optimal maintenance windows**

3. Real-World Applications of AI in Mechanical Systems

AI-driven predictive maintenance is widely used across various industries:

Industry	Application	AI Role
Automotive	Engine health monitoring, brake system wear detection	Anomaly detection, thermal imaging
Aerospace	Aircraft turbine monitoring, fuel system optimization	Deep learning for vibration & acoustic analysis
Manufacturing	CNC machine failure prediction, robotic arm maintenance	Machine learning-based anomaly detection
Energy & Power Plants	Predicting failures in wind turbines & gas turbines	AI-based real-time performance monitoring
Oil & Gas	Pipeline corrosion detection, compressor efficiency monitoring	IoT-based AI fault prediction

4. Advantages of AI-Based Predictive Maintenance

5. Challenges & Future Trends in AI-Based PdM

Key Challenges

- **Data Scarcity:** AI models require large datasets for accurate predictions.
- **Integration with Legacy Systems:** Many industries still use outdated machinery.
- **Cybersecurity Risks:** IoT-based systems are vulnerable to hacking.

Future Trends

1. **Digital Twins:** Virtual replicas of machines for real-time monitoring & simulations.
2. **Edge AI for PdM:** AI computation at the edge (on-site) to reduce cloud dependency.
3. **Self-Healing Systems:** AI-driven automatic failure recovery without human intervention.
4. **AI-Powered Augmented Reality (AR):** AR-assisted predictive maintenance for technicians.

6. Conclusion

AI and ML in predictive maintenance are **transforming mechanical engineering** by improving **efficiency, reducing costs, and preventing equipment failures** before they occur. As AI technology advances, predictive maintenance will become even more **accurate, automated, and essential** for modern industries.



Automation in Recycling: Sorting and Processing Waste Plastics

By: Jai Kishore.M,

3rd Yr, Mechanical Engg.

Introduction

As the world continues to battle plastic pollution, automation in recycling has emerged as a game-changer. Traditional recycling methods are labour-intensive, inefficient, and often lead to contamination, reducing the quality of recycled materials. By integrating automation, industries can enhance sorting precision, boost processing efficiency, and ensure high-quality plastic recovery. This article explores the role of automation in plastic recycling, from advanced sorting techniques to innovative processing technologies.

Automated Sorting of Waste Plastics

Sorting is the most critical step in plastic recycling, ensuring different types of plastics are separated for effective processing. Advanced technologies have revolutionized this stage, significantly improving accuracy and speed.

1. AI-Powered Optical Sorting

Modern recycling facilities use **AI-powered optical sorting machines** that rely on high-speed cameras and machine learning algorithms to identify and sort plastics by type and colour. These machines can distinguish between PET, HDPE, PVC, and other polymers with over 90% accuracy, minimizing contamination.

2. Near-Infrared (NIR) Spectroscopy

NIR sensors are used to detect the molecular composition of plastics. When plastics pass through an NIR scanner, the device analyses their spectral signatures, ensuring precise classification. This is particularly useful in handling mixed plastic waste streams.

3. Robotic Sorting Systems

Robotic arms equipped with AI and computer vision can swiftly pick and place plastics into designated bins. These systems adapt to changes in waste composition and operate at higher speeds than manual labour, improving sorting efficiency.

Automated Processing of Waste Plastics

Once sorted, plastics undergo processing stages such as cleaning, shredding, and pelletizing. Automation plays a key role in optimizing these steps.

1. Automated Washing Systems

Automated washing lines use water jets, detergents, and friction separators to remove contaminants such as labels, adhesives, and food residues from plastics. These systems operate continuously, reducing downtime and improving cleanliness.

2. High-Efficiency Shredding and Granulation

Industrial shredders with automated controls break plastics into smaller flakes, preparing them for further processing. AI-powered granulators ensure uniform size reduction, enhancing the efficiency of downstream recycling processes.

3. Advanced Extrusion and Pelletizing

Automated extrusion systems melt shredded plastics and reshape them into uniform pellets, which serve as raw materials for new plastic products. Temperature control, material blending, and filtering processes are all optimized through automation, ensuring superior output quality.

Benefits of Automation in Plastic Recycling

- **Increased Efficiency:** Automated systems operate faster and with higher accuracy than manual sorting and processing.
- **Reduced Contamination:** AI and sensor-based sorting improve material purity, enhancing the quality of recycled plastics.
- **Cost Savings:** Automation reduces labour costs and minimizes waste, making recycling more economically viable.
- **Environmental Benefits:** By improving recycling rates and reducing landfill waste, automation helps lower carbon footprints and conserve natural resources.

Conclusion

Automation is transforming the recycling industry, making plastic waste management more efficient, cost-effective, and environmentally friendly. As technology advances, automated sorting and processing systems will continue to evolve, driving the world closer to a sustainable circular economy. Investing in automation is not just a step toward smarter recycling but a commitment to a cleaner and greener planet.



INSPIRING PAPER CRAFT - A HOBBY

by, N.V.Parimala Sowmyaa, 3rd Yr, Mechanical Engg.

The Art of Paper Craft: A Journey of Creativity and Transformation

There is something deeply satisfying about the crisp, familiar feel of an old newspaper. Whether lost in thought, watching TV, or simply seeking a moment of calm, my hands instinctively reach for its pages—rolling, folding, and shaping them into miniature works of art. This readily available, unassuming material, so easy to transform into delicate shapes or fine cylindrical rolls, has become my favorite medium for crafting. With just a little creativity, even discarded paper can be reborn into something beautiful.

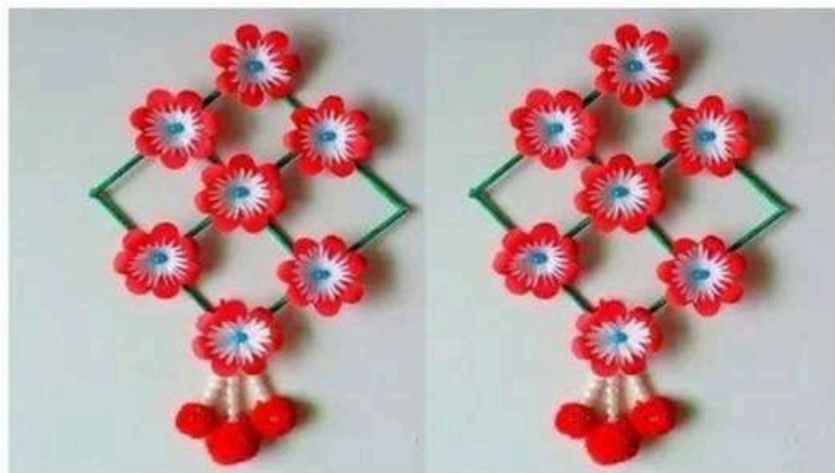
Origami—the enchanting art of folding a single sheet of paper into intricate forms—has long captivated me. With nothing but imagination and a few precise folds, an ordinary page transforms into a graceful swan, a playful fox, or a delicate butterfly. Each creation carries its own charm, proving that the possibilities of paper are as limitless as our creativity. It's a form of magic, where a flat surface can take on infinite dimensions, shaped only by patience and vision.

Like many, my journey began with the simple pleasure of folding a paper boat, watching it float, and marvelling at its simplicity. But curiosity soon took over, pushing me to explore beyond the basics. I found joy in crafting intricate butterflies, detailed dino baskets, and pop-up greeting cards—each piece reflecting a growing love for the art. The best part? The delight on the faces of those who received them, especially my mom, my first and most cherished audience.

Over time, my passion expanded beyond traditional folds into more complex, structured creations using rolled newspaper tubes. This shift opened an entirely new dimension to my craft. One of my proudest achievements is a fully crafted dining table, made entirely from meticulously rolled newspaper tubes. I have also experimented with flower vases, artistic lamp shades, and even an outdoor swing—all proving that paper, when handled with care and precision, can be transformed into something strong, functional, and stunning.

The process of crafting with paper is both meditative and deeply rewarding. With patience, a keen eye for detail, and a spark of creativity, even the most ordinary scraps can be shaped into extraordinary art. Best of all, this beautiful craft comes with almost no cost, proving that creativity thrives not in expensive materials but in the willingness to see potential where others see waste.

As I continue this artistic journey, I look forward to sharing my creations, techniques, and inspirations. If you, too, find joy in shaping paper into something extraordinary, let's embark on this creative adventure together. After all, with a single fold, a new possibility is born.



Success Story of Elon Musk

by, Hari Krishnan D, 3rd Yr, Mechanical Engg

Mark Zuckerberg: The Visionary Behind Facebook

Mark Zuckerberg, the co-founder of Facebook (now Meta), is a name that resonates with innovation, ambition, and digital revolution. His journey from a college student with an idea to becoming one of the world's most influential billionaires is nothing short of extraordinary.

Early Life and Education

Born on May 14, 1984, in White Plains, New York, Mark Zuckerberg displayed an early talent for programming. By middle school, he was already developing computer programs, including a messaging system for his father's dental office.

As a teenager, Zuckerberg created a music recommendation system called Synapse, which Microsoft and AOL tried to acquire. However, he turned down the offers and instead chose to continue his education at Harvard University in 2002, majoring in psychology and computer science.

The Birth of Facebook

During his time at Harvard, Zuckerberg built several social networking projects, including Facemash, a website that allowed students to rate their classmates' appearances. Though it was shut down due to privacy concerns, it showcased his ability to create engaging digital platforms.

In 2004, Zuckerberg, along with friends Dustin Moskovitz, Eduardo Saverin, Andrew McCollum, and Chris Hughes, launched The Facebook from his dorm room. Originally limited to Harvard students, the platform quickly expanded to other Ivy League universities and eventually became available to the public.

Recognizing its potential, Zuckerberg dropped out of Harvard in 2005 and moved to Silicon Valley to focus on growing Facebook.

The Rise of Facebook (Now Meta)

Under Zuckerberg's leadership, Facebook transformed from a simple social networking site into a global tech powerhouse. Key milestones include:

1. 2006 – Facebook introduced the News Feed, revolutionizing how users interacted with content.
2. 2007 – Facebook launched an advertising platform, making it a major player in digital marketing.
3. 2012 – Facebook went public with an IPO, raising \$16 billion, making it one of the largest tech IPOs in history.
4. 2014 – Zuckerberg acquired WhatsApp for \$19 billion and Oculus VR for \$2 billion, expanding Facebook's influence into messaging and virtual reality.
5. 2021 – Facebook was rebranded as Meta, marking a shift toward the metaverse, an immersive virtual world powered by AR and VR technology.

Challenges and Controversies

Despite Facebook's massive success, Zuckerberg faced multiple challenges:

- Privacy concerns & data scandals, including the Cambridge Analytica case in 2018, which raised global concerns about data security.
- Regulatory scrutiny, with governments investigating Facebook's influence on elections, misinformation, and monopolistic practices.
- Competition, with rivals like TikTok, Snapchat, and Twitter challenging Facebook's dominance.

However, through strategic acquisitions, continuous innovation, and adaptation to digital trends, Zuckerberg has kept Meta at the forefront of the tech industry.

Philanthropy and Personal Life

Beyond business, Mark Zuckerberg and his wife, Priscilla Chan, have dedicated billions to philanthropy. Through the Chan Zuckerberg Initiative (CZI), they focus on education, medical research, and social justice causes.

Zuckerberg has also pledged to donate 99% of his Facebook shares over his lifetime to improve global issues.

Lessons from Zuckerberg's Journey

Mark Zuckerberg's story offers key lessons for aspiring entrepreneurs:

Start Young & Innovate – He turned an idea into a global platform at just 19 years old.

Take Risks – Dropping out of Harvard was a gamble that paid off.

Adapt to Change – From social networking to AI and the metaverse, he constantly evolves.

Resilience – He faced controversies but kept moving forward.

Conclusion

From a Harvard dorm room to a multi-billion-dollar empire, Mark Zuckerberg's journey proves that vision, persistence, and innovation can change the world. His story continues to inspire millions to think big, take risks, and redefine the future of technology.



ALUMNI CORNER

My college journey

BY, Rajnish Pandey

Mechanical Engineering

January 2011 - December 2015



My Journey at Dr. MGR University: Growth, Friendships, and Success

College is more than just academics; it's a journey of transformation, self-discovery, and lifelong connections. My experience at Dr. MGR University has been nothing short of incredible, shaping me into the person I am today. From the nervous excitement of my first day to the triumph of landing my first job, every moment has been filled with challenges, learning, and growth.

Stepping onto campus for the first time, I was both thrilled and overwhelmed. The vibrant atmosphere, diverse students, and impressive infrastructure instantly made me realize that this was where I was meant to be. Adjusting to the academic rigor and new social environment was tough, but as days passed, I found my rhythm—balancing lectures, assignments, and friendships. The late-night study sessions, group discussions, and interactions with professors pushed me to think critically, improving both my knowledge and problem-solving abilities.

Beyond academics, the extracurricular activities at Dr. MGR University played a crucial role in my personal development. As a member of the Society of Mechanical Engineering, I got hands-on experience in real-world engineering projects. My participation in technical competitions, cultural fests, and community service projects helped me develop leadership, communication,

and teamwork skills. One of my most cherished memories was competing in a national-level technical event, where my team secured second place after months of hard work and dedication. Another proud moment was presenting a research paper at a student conference, an experience that boosted my confidence and fueled my passion for innovation.

As my final year approached, I was filled with nostalgia and excitement, but also a sense of responsibility for my future. The campus placements were a defining moment, and the nervous anticipation of interviews turned into joy when I received my offer letter from a top energy company. That achievement was the result of years of perseverance, guidance from mentors, and unwavering support from my family and friends.

Looking back, I am incredibly grateful for everything Dr. MGR University has given me—knowledge, skills, friendships, and unforgettable experiences. The lessons I've learned, the challenges I've overcome, and the memories I've created will stay with me forever. As I step into the professional world, I carry with me the confidence and determination to chase my dreams, knowing that my time at this university has prepared me for whatever lies ahead.

PUBLICATIONS

STAFF PUBLICATIONS JUL-SEP 2023

1. Performance, Combustion and Emission Characteristics of a Diesel Engine with the Effect of TiO₂ Nano Additives in Diesel-Tamarind Oil Blends

M. Prabhakar, Department of Mechanical Engineering, Aarupadai Veedu Institute of Technology, Vinayaka Mission's Research Foundation, Deemed to be University, Tamilnadu, India.

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Original Article

Performance, Combustion and Emission Characteristics of a Diesel Engine with the Effect of TiO₂ Nano Additives in Diesel-Tamarind Oil Blends

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2. PROCESS PARAMETERS OPTIMIZATION IN SINGLE STAGE INCREMENTAL FORMING OF AISI 304 SHEET METAL USING ANALYTIC HIERARCHY PROCESS AND VIKOR METHOD

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PROCESS PARAMETERS OPTIMIZATION IN SINGLE STAGE INCREMENTAL FORMING OF AISI 304 SHEET METAL USING ANALYTIC HIERARCHY PROCESS AND VIKOR METHOD

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3. Audible pedestrian warning system using embedded system

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Audible pedestrian warning system using embedded system

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