

TECHNICAL MAGZINE

2024-25

ELECTRICAL ENGINEERING DEPARTMENT



EDITION 4

VOLUME 2

Vision Mission

Institute Vision

To emerge Learning Center of Excellence in the National Ethos in domains of Science, Technology and Management

Institute Mission

[M1] To strive for rearing standard and stature of the students by practicing high Standards of professional ethics, transparency and accountability.

[M2] To provide facilities and services to meet the challenges of Industry and Society.

[M3] To facilitate socially responsive research, innovation and entrepreneurship.

[M4] To ascertain holistic development of the students and staff members by inculcating Knowledge and profession as work practices.

Department Vision

[M1] To disseminate knowledge replete with quality education in the field of Electrical Engineering in meticulous and methodical manner

[M2] To provide platform to address societal issues as well as challenges faced by industries.

[M3] To develop research culture and inculcate innovative and entrepreneurial skills.

[M4] To ensure overall development of students and staff by instilling knowledge and professional ethics as part of lifelong learning.

PROGRAM OUT COMES (POs)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4. **Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcome (PSO)

PSO 1: Formulate the solutions to Electrical and Electronics Engineering problems using the basic concepts.

PSO 2: Develop the process to interpret networks parameters in power system operation and control with their protection and driving mechanisms.

PSO 3: Apply Project based learning to conduct experiments with Electrical Machines, Power Electronics to develop energy efficient systems.

About TGPCET

Tulsiramji Gaikwad-Patil College of Engineering and Technology (TGPCET) was established in the year 2007 by Vidarbha Bahu-uddeshiya Shikshan Sanstha (VBSS), a registered society. It is a self-financed Private Engineering College, which is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU) Nagpur and is approved by All India Council for Technical Education, New Delhi. Also, college is approved by Directorate of Technical Education (DTE), Mumbai, Maharashtra State. The Institute is Accredited with A+ (3.32 CGPA) by NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC). An Autonomous Institute affiliated to RTM Nagpur University, Nagpur. B.Tech Mechanical Engineering and B.Tech Electrical Engineering programmes have been accredited by the NBA for 3 years (up to 30th June 2026) and recently B. TECH. Civil Engineering and B. Tech. Electronic and Communication Engineering programmes have been accredited by NBA for 3 years (up to 30th June 2028).

About Department

Electrical Engineering is the one of core branch of Engineering. **The Department is NBA Accredited from session 2023-24.** The basic infrastructure like electrical power plays the major role in the developing economy. The knowledge of fundamentals of electrical engineering is essential for almost all streams. The Department Of Electrical Engineering provides in depth education & prepares its students for all the possible future career & developments in technology. Department has a fine blend of experienced as well as young dynamic enthusiastic personalities as faculty for providing quality education at both B.E.(Electrical) and M.Tech.(Integrated Power System). It aims to promote research and teaching activity based on advanced and novel teaching methods. Technical experts from the industries and institution also contribute to the institute with their knowledge and experience.

The specious infrastructure, well equipped laboratories, meritorious students and academically qualified and enthusiastic faculty being the salient features of the Department. The college maintains good culture and discipline by having close association with each student through 'Teacher Guardian Scheme

FROM MANAGEMENT DESK



Dr. Mohan Gaikwad-Patil
Chairman, Gaikwad-Patil Group

“EDUCATION IS THE PASSPORT TO THE FUTURE, FOR TOMORROW BELONGS TO THOSE WHO PREPARE FOR IT TODAY.”

Dr. Mohan Gaikwad-Patil, with more than 35 years of experience in the education system to his credit, established the Gaikwad-Patil Group of Institutions in Nagpur to cater to the quality education needs of the youth in Vidarbha. His early experience teaching in an engineering college made him acutely aware of the dissonance between engineering education in the country and the requirements of the industry. He therefore began with the dream of starting an engineering college that equips students with knowledge, skills, and attitudes relevant to the industry. That dream has manifested today in the form of an educational group well known in the region for its constant striving to impart quality and industry relevant education to the students by teaching courses like B.Tech, M.Tech, Architecture, Polytechnic, MBA, MCA, Pharmacy, BAMS, Physiotherapy and Nursing. Hardly in his early forties.



Mr. Akash Gaikwad-Patil
Vice-Chairman, Gaikwad-Patil Group

**“EDUCATION IS NOT PREPARATION FOR LIFE,
EDUCATION IS LIFE ITSELF.”**

In a world brimming with challenges, the need for brilliant engineers who can think critically, solve problems creatively, and adapt to a rapidly evolving technological landscape has never been greater. At TGPCET, we are committed to providing an education that goes beyond textbooks. Our curriculum is meticulously crafted to equip students with the technical expertise, soft skills, and design thinking abilities necessary to thrive in the ever-changing engineering landscape.



Dr. Anjali Gaikwad-Patil
President, Gaikwad Patil Institution

With first class post graduate degrees in English Literature, Mass Communication and Sociology, plus M. Phil. in English Literature and Ph. D. in English, Dr. Anjali Patil-Gaikwad is an academician of repute. In addition to regular participation and paper presentation in national and international seminars, she has also been organizing international seminars on teaching and learning of English as a Second Language every year

ACADEMIC PATRONS



Dr. P. L. Naktode
Principal

It is my privilege to warmly welcome you, which is an autonomous institution, having a commitment towards quality education. We work on the principle of "Learn to Grow" With this very inspiring thought, Vidarbha Bahu Uddeshiya Shikshan Sanstha Nagpur has laid a foundation to provide education in the field of engineering to the students to enable them to become good practicing engineer, capable manager and above all a good human being to build a stronger, vibrant and skilled India. Our dream is that TGPCET should play a definite role in shaping the careers of tomorrow's leaders and developing individuals to have their impact on global development



Dr. Pragati Patil
Vice-Principal

Welcome to Tulsiramji Gaikwad Patil College of Engineering and Technology (TGPCET) in Nagpur, Maharashtra, a leading educational institution. Inspired by the words of Shri APJ Abdul Kalam, "Dreams are not those which we see while sleeping, but dreams are those which do not let us sleep," TGPCET strives for ambitious goals through knowledge acquisition, hard work, and perseverance. Our institution has quickly emerged as one of Maharashtra's premier technical education institutions. We emphasize academic excellence and technical skill development to meet industry demands while instilling values of integrity, morality, and sustainability

HOD's Message



Prof. Ganesh Wakte

HoD,EE

I am pleased to present to you the IV TH volume of our technical magazine, showcasing the remarkable achievements, research, and innovations from the Electrical Engineering Department. This edition continues to reflect the dedication, hard work, and passion of our students and faculty, who strive to push the boundaries of knowledge in the ever-evolving field of electrical engineering.

As we navigate through a time of rapid technological advancement, it is crucial to stay at the forefront of developments, whether it be in renewable energy, automation, communication systems, or emerging technologies such as AI and IoT. Our department remains committed to fostering an environment of creativity, collaboration, and excellence, empowering the next generation of engineers to make significant contributions to society.

This volume features insightful articles, research papers, and project highlights that represent the diverse interests and expertise within our department. I encourage you to explore these contributions and celebrate the innovative spirit of our community.

I would like to extend my heartfelt gratitude to all contributors, editorial team members, and readers for their unwavering support. Together, we continue to create an inspiring and intellectually stimulating environment that will shape the future of electrical engineering.

Magazine Committee

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Assistant Professor

Students Co-ordinator



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Students Co-ordinator

Index

1.	Vision-Mission
2.	About TGPCET
3.	About Department
4.	Management Desk
5.	Messages from Principal, Vice-Principal
6.	HOD Message
7.	Magazine Committee
8.	Technical Article
9.	Innovative Ideas & Projects
10.	Faculty Publication
11.	Faculty Patents
12.	Faculty Books Published
13.	Faculty Achievements
14.	Students Achievements
15.	Departmental Best Projects
16.	Departmental Media Link

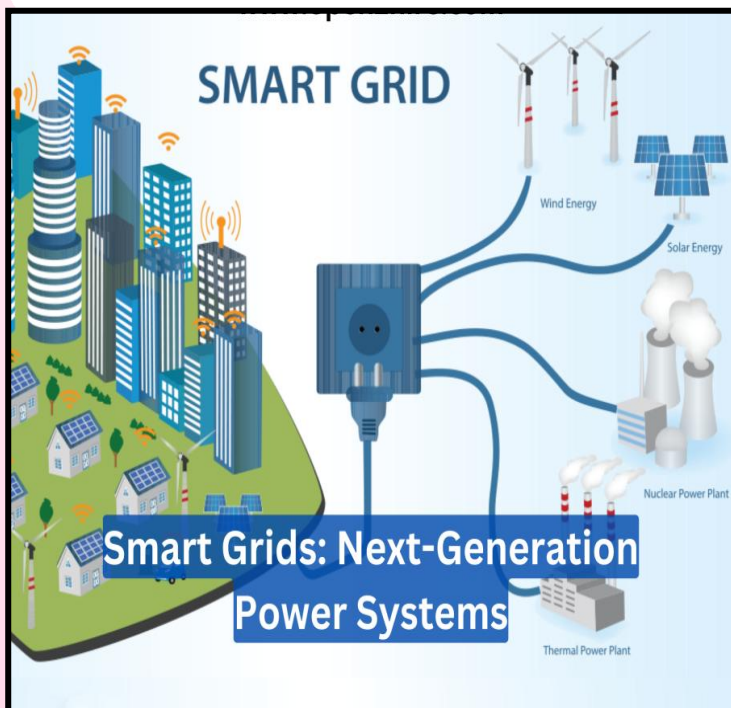
Technical Article

Sr. No.	Name of Articles
I.	The Smart Grid: Powering the Future
II.	Industrial Automation: Transforming Industries for a Smarter Future
III.	Powering the Future: How Artificial Intelligence is Transforming Electrical Engineering
IV.	Wireless Power Transfer: Revolutionizing Energy Transmission
V.	Wireless charging technology for electric vehicles (EVs)
VI.	What Is Renewable Energy?

Technical Article

The Smart Grid: Powering the Future

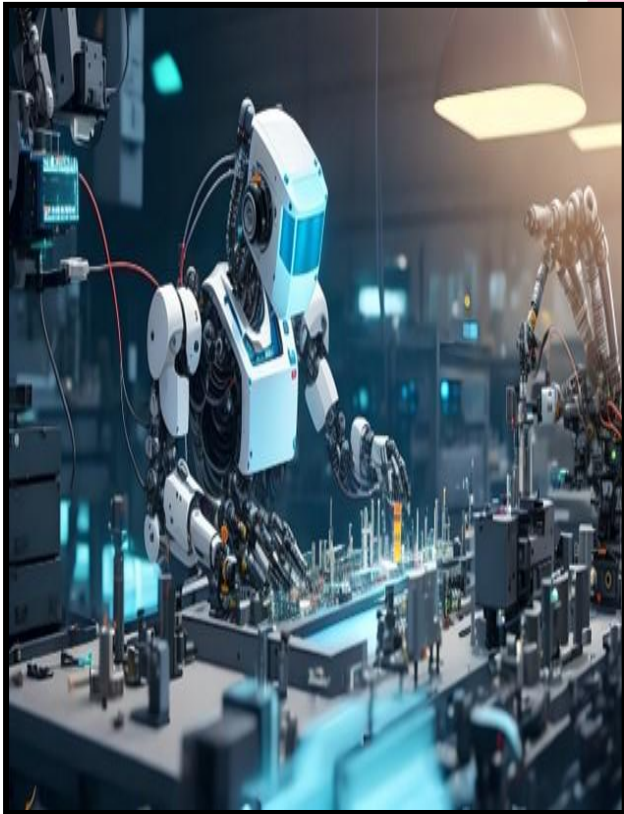
The global energy sector is undergoing a transformative shift with the advent of Smart Grid technology. The Smart Grid represents a modernized electrical grid that leverages digital communication, automation, and data analytics to improve energy efficiency, reliability, and sustainability. By integrating advanced metering infrastructure, demand response mechanisms, and distributed energy resources, the Smart Grid is reshaping how electricity is generated, distributed, and consumed. A Smart Grid is an intelligent electricity network that utilizes two-way digital communication between utilities and consumers.



This network enables real-time monitoring, data collection, and automated decision-making to optimize power distribution. Unlike traditional grids, which rely on centralized power generation and unidirectional energy flow, Smart Grids incorporate decentralized energy sources, such as solar panels and wind farms, to enhance flexibility and resilience.

Presented by
Ms. Alisha Khobragade

Industrial Automation: Transforming Industries for a Smarter Future



Industrial automation has revolutionized the manufacturing sector by improving efficiency, productivity, and quality while reducing costs and environmental impact. This paper explores the evolution of industrial automation, from mechanization to computerization and robotics, and examines the current trends and technologies driving the Industry 4.0 revolution

The benefits and challenges of industrial automation, including increased efficiency, enhanced quality, and reduced costs, as well as the need for high initial investments, complexity, and cyber security risks, are discussed. Finally, the future directions of industrial automation, focusing on the integration of artificial intelligence, machine learning, and the Internet of Things (IoT), are outlined. Industrial automation is revolutionizing the way industries operate, enhancing productivity, efficiency, and safety. The use of advanced technologies such as robotics, artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT) is significantly reducing human intervention in industrial processes.

Presented by
Ms. Rasika Daf



Powering the Future: How Artificial Intelligence is Transforming Electrical Engineering

The integration of Artificial Intelligence (AI) in electrical engineering is revolutionizing the way we design, operate, and maintain power systems. This transformation is enabling the creation of more efficient, sustainable, and resilient electrical grids. AI-powered technologies such as predictive maintenance, smart energy management, and real-time fault detection are optimizing energy distribution, reducing power outages, and promoting renewable energy integration.



This article explores the current state of AI in electrical engineering, its applications, and future directions, highlighting the potential of AI to power a more sustainable and connected future. The electrical engineering landscape is undergoing a rapid transformation due to advancements in Artificial Intelligence (AI). AI-driven solutions are improving power system efficiency, reliability, and sustainability. With the increasing global demand for energy and the push for cleaner alternatives, AI is playing a crucial role in optimizing operations, reducing energy waste, and ensuring grid stability.

Presented by
Mr. Rushikesh Sonarka

Wireless Power Transfer: Revolutionizing Energy Transmission



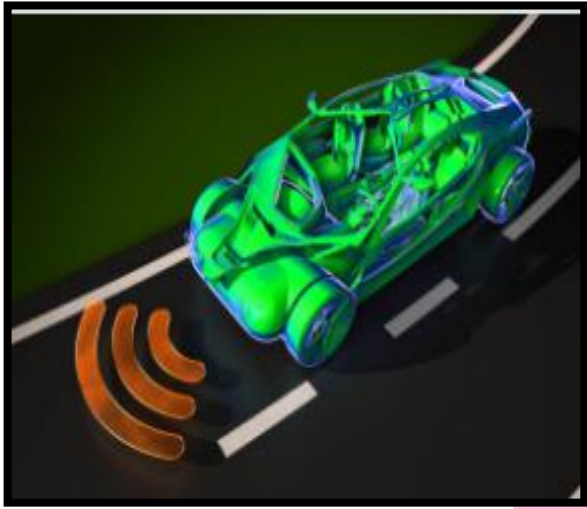
Wireless Power Transfer (WPT) is a revolutionary technology that enables the transfer of electrical energy without physical contact, transforming the way we power devices and systems. This article explores the principles, applications, and advancements of WPT, including magnetic resonance coupling, inductive coupling, and capacitive coupling.

We discuss the benefits of WPT, such as increased convenience, reduced maintenance, and improved safety, as well as its potential applications in various fields, including consumer electronics, medical devices, electric vehicles, and industrial automation. The article also highlights the current challenges and future directions of WPT research, paving the way for a wireless and sustainable energy future. In an era of increasing technological advancements, Wireless Power Transfer (WPT) is emerging as a groundbreaking innovation that eliminates the need for traditional wired connections to transmit electricity. WPT technology enables the transfer of energy across air or other mediums, offering a seamless and efficient method to power various device



Presented by
Mr. Rohit Bhojar

Wireless charging technology for electric vehicles (EVs)



Wireless charging technology for electric vehicles (EVs) has gained significant attention due to its convenience and potential to enhance vehicle adoption. Integrating renewable energy sources with wireless charging can further promote sustainability and reduce dependence on fossil fuels

This article explores the feasibility, advantages, challenges, and future prospects of implementing wireless charging for EVs using renewable energy sources such as solar, wind, and hydroelectric power. As the world transitions towards sustainable energy solutions, electric vehicles have emerged as a promising alternative to traditional fuel-powered cars. However, the efficiency and accessibility of EV charging infrastructure remain critical concerns. Wireless charging technology eliminates the need for physical connectors, offering a seamless charging experience. When combined with renewable energy sources, wireless charging presents an eco-friendly and efficient solution to meet the growing energy demand of EVs. Wireless power transfer (WPT) is the core technology behind wireless EV charging. It operates on the principle of electromagnetic induction or resonant inductive coupling.



Presented by
Mr. Saurabh Bhoyankar

WHAT IS RENEWABLE ENERGY?

Renewable energy is derived from natural sources that are replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat. Unlike fossil fuels, which are finite and emit greenhouse gases when burned, renewable energy sources are sustainable and have a much lower environmental impact. The shift to renewable energy is crucial for mitigating climate change, reducing pollution, and ensuring a sustainable energy future.



Types of Renewable Energy

- Photovoltaic (PV) Systems:

These systems convert sunlight directly into

electricity using solar cells made of semiconductor materials. PV panels can be installed on rooftops, ground mounted, or integrated into building materials. Onshore Wind: Onshore wind farms are located on land and use wind turbines to convert wind kinetic energy into electricity. They are widely used due to their relatively lower cost and ease of installation. Off shore Wind: Off shore wind farms are located in bodies of water, where wind speeds are generally higher and more consistent than on land. Offshore wind turbines can generate more electricity but are more expensive to install and maintain. Renewable energy encompasses a diverse array of technologies that harness natural, inexhaustible sources to produce clean and sustainable power. Each type of renewable energy has its unique advantages and challenges, and the optimal mix of these resources will vary based on geographic, economic, and technological factors. The transition to renewable energy is essential for addressing climate change, reducing pollution, and ensuring a sustainable and resilient energy future.

Innovative Ideas & Projects

IoT-Based Attendance System Using a Fingerprint Sensor



The IoT-Based Attendance System Using a Fingerprint Sensor is a smart and efficient solution for tracking student attendance with high accuracy and security. This system utilizes an ESP32 microcontroller connected to an R307 fingerprint sensor to verify students' identities and log their attendance in real time. Once a student scans their fingerprint, the system matches it with pre-enrolled data, displays the result on an I2C 16x2 LCD screen, and automatically updates a Google Sheet using IFTTT we books.

With WiFi connectivity, attendance records are seamlessly stored in the cloud, ensuring accessibility and reliability. The system is designed to handle a large number of students, making it ideal for educational institutions. Additionally, it offers easy customization, troubleshooting options, and a user friendly setup process. By eliminating manual attendance marking, this project enhances efficiency, reduces errors, and provides a modern, automated solution for attendance management. Additionally, the system offers high flexibility and customization, allowing administrators to update student records, modify authentication parameters, and adjust fingerprint confidence thresholds for optimal performance. The use of the ESP32 microcontroller ensures low power consumption and efficient processing, making it a cost effective and scalable solution for institutions of all sizes. The integration with Google Sheets via IFTTT enables real-time monitoring and easy access to attendance data from anywhere, facilitating better record management. Furthermore, the project can be extended by incorporating features such as RFID-based authentication, face recognition, or SMS notifications to parents, making it a versatile and future-ready attendance

Presented by

Aditya Kundalkar, Karan Yengandewar, Anant Suryawanshi, Prathamesh Harane

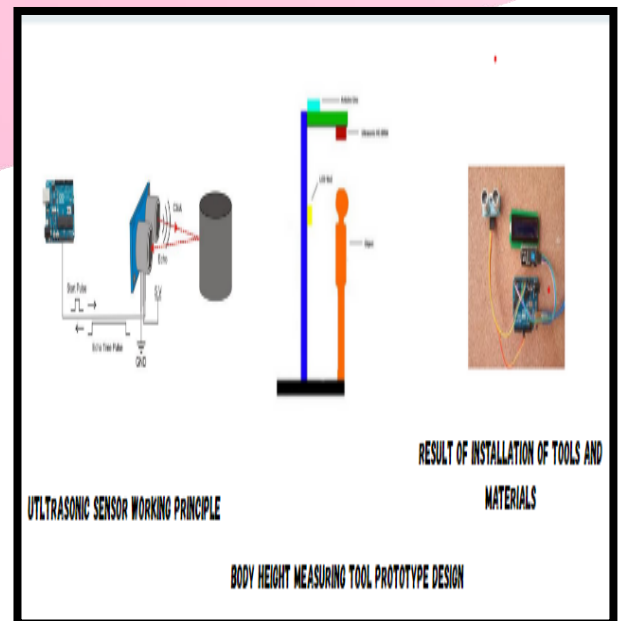
IOT Based Height Measurement System

Introduction

Length and height are physical quantities that are often measured for various purposes that require human body height data. The rapid development of information and communication technology in the current era has had an impact on globalization, business competition, job demands, and increasing patterns of human life. Related to some understanding of body height, measuring instruments, and microcontrollers, this research was conducted to make a digital body height measuring instrument based on the Arduino Uno microcontroller with display information using an LCD, this tool is expected to help the body height measurement process become easier, more practical, and get more accurate results

Methodology

All the information required to produce the study's results is described in the methodology flowchart as shown. To be specific, the experimental setup contains all of the essential systems and components for the development of human height measurement. Measurement of body height in general is still done manually with various materials and shapes. Body height measurement tools that are used by most people are still manual. There are various ways to measure body height, some are drawn like a tape measure, and some are shaped like a ruler attached to the wall. Several models or types of body height measurement tools that are often found around us include wall stickers, plan toys jungle height charts, nordic growth charts, and stature meters.



Presented by

1. Prof. Ganesh Wakte, HoD
2. Prof. Mrunali Kite, Assi. Prof.
3. Mr. Alok Meshram, 6 Sem
4. Mr. Harshal Borkar, 6 Sem
5. Mr. Harshal Jagnik, 6 Sem

IoT-Based Water Quality Monitoring Using ESP32 and Sensor

Water quality monitoring is essential for ensuring safe and clean water for various applications, including drinking, agriculture, and industrial use. Traditional water quality monitoring methods are often time-consuming and require manual sampling, leading to delays in detecting contamination



This project proposes an IoT-based water quality monitoring system using the ESP32 microcontroller and multiple sensors to provide real-time data on water parameters. The system utilizes sensors such as pH, turbidity, dissolved oxygen (DO), temperature, and total dissolved solids (TDS) to measure key water quality parameters. The ESP32 collects sensor data and transmits it wirelessly to a cloud platform or a mobile application using Wi-Fi connectivity. Users can remotely access water quality data, receive alerts for abnormal values, and analyze trends for better decision-making. This smart water monitoring system enhances efficiency, reduces manual labor, and enables proactive measures to ensure water safety. The real-time data collection and analysis make it a valuable solution for industries, municipal corporations, and environmental monitoring agencies.

Presented By:-

- 1) Rohit Bhoyar
- 2) Saurabh Bhoyarkar
- 3) Anushka Shinde
- 4) Payal Kumbhare
- 5) Pranjali Ganer

Gas or Smoke Leakage Detector with a Cooling Fan



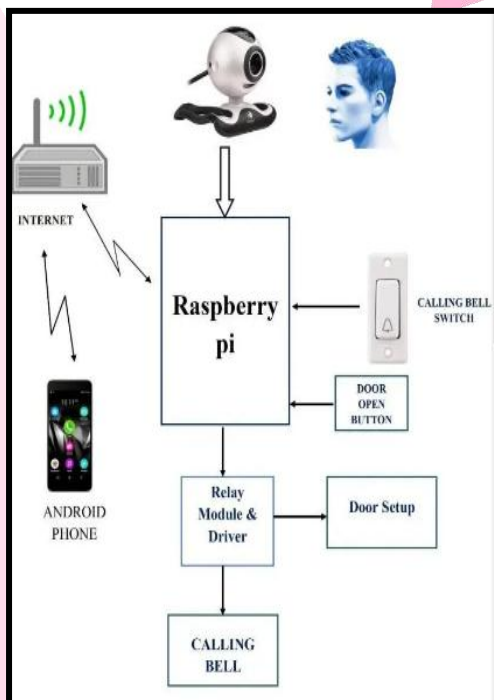
A Gas or Smoke Leakage Detector with a Cooling Fan project is designed to detect the presence of harmful gases or smoke in the environment and take immediate action to mitigate the risks. The inclusion of a cooling fan adds a unique feature of controlling temperature or airflow when high levels of heat or gas leakage are detected. This type of project has a variety of applications, including in homes, factories, chemical plants, and areas with high fire or gas risk. Here's a detailed breakdown of the background and working mechanism of such a project

Presented By:-
1.Anurag Kohadkar

IoT Based Smart Door Bell System

Introduction

Traditional doorbell systems lack advanced features such as remote monitoring, real-time communication, and automation, which are essential for modern security and convenience. An IoT based smart doorbell system addresses these limitations by integrating internet connectivity, sensors, and smart devices to enhance home security and user interaction. The problem lies in the need for a smart, reliable, and accessible system that can notify homeowners about visitors in real time, allow two-way communication, and offer features like motion detection, video streaming, and cloud storage. This project aims to identify the key components, technologies, and architecture required for developing an effective IoT-based smart doorbell system. The system should ensure user convenience, data security, and ease of integration with existing smart home environments



The project focuses on enhancing traditional doorbell systems using Internet of Things (IoT) technology to improve home security and convenience. Traditional doorbells lack features such as remote access, video monitoring, and real-time communication. An IoT based smart doorbell addresses these gaps by allowing homeowners to receive notifications, view live video, and communicate with visitors remotely via smart phones. This system combines sensors, cameras, wireless connectivity, and cloud services, making it a modern solution for smart homes and improved safety.

Faculty Publications

Sr. No.	Name of Student/Faculty	Department	Title of Paper	Name of Journal/Conference
1	Dr. Prashatant Thakre	Electrical Engineering	Comparative study of ARC elongation of Flat and inclined splitter plates in arc chamber of moulded case circuit breaker	Sigma Journal of Engineering & Natural Sciences
2	Prof. Ganesh Wakte	Electrical Engineering	Multi-Port DC-DC Power Converter for Renewable Energy Application	International Journal for research in applied science and Engineering Technology.
3		Electrical Engineering	Harmonic Suppression methods in Electric Vehicle Charging Networks: A comprehensive Review.	Internal Journal of Technical Education (IJTE) ISTE New Delhi
4	Prof. Chetan Jambhulkar	Electrical Engineering	Multi-Port DC-DC Power Converter for Renewable Energy Application	International Journal for research in applied science and Engineering Technology.
5	Dr. Pratik Ghutke	Electrical Engineering	Epicyclic gear Train-Based Device to harvest Electric energy from Pressure Energy Towards Sustainable Environment	Recent advances in power sestem EPREC 2024
6	Dr. Pratik Ghutke	Electrical Engineering	Harmonic Suppression methods in Electric Vegicle Charging Networks: A comprehensive Review.	Internal Journal of Technical Education (IJTE) ISTE New Delhi
7	Prof.Kishor Dhore	Electrical Engineering	A Study on Vehicles to Grid Technology Its scope	International Scientific Journal of Engineering and Management
8	Prof.Ashvini Admane	Electrical Engineering	Review papers on Smart Home Automation using Cloud Computing and ESP32	Journals of Engineering Science
9		Electrical Engineering	Smart Home Automation using Cloud Computing and ESP32	International Journal of Engineering Research & Science & Echnology

The Art of Process Improvement in Operations Management: Delve into the Art and Science of Improving Processes to Achieve Operational Excellence

Authors : Dr. Pratik C. Ghutke

Journal: Journal of Neonatal Surgery

Date of Publication:2025

At the core of operational excellence lies process improvement, enabling organizations to enhance efficiency, cut expenses, and provide exceptional customer value. This article delves into the multifaceted realm of process improvement, examining innovative approaches like Lean Manufacturing, Six Sigma, Total Quality Management (TQM), and Business Process Reengineering (BPR). By combining theoretical knowledge, practical applications, and success stories from the real world, this research demonstrates how companies can leverage process enhancements to achieve remarkable outcomes. The study also tackles obstacles such as change resistance, leadership's influence, and the incorporation of state-of-the-art technologies. Process improvement has emerged as a potent catalyst for innovation and expansion by merging technical accuracy with creative problem-solving.

Comparative study of ARC elongation of flat and inclined splitter plates in arc chamber of moulded case circuit breaker

Authors : Dr. Prashant Thakre

Journal: SCOPUS

Date of Publication: 3, 2025

The components that make up a power system are generation, transmission, distribution, and substation. When a failure occurs in the electrical grid, the whole system must be protected by a reliable protection mechanism. Due to its affordability and reliability, the low-voltage circuit breaker (LVCB) has become a widely adopted safety device in various low-voltage distribution systems. In recent years, there has been significant attention directed towards the low-voltage circuit breaker. To prevent electrical overload or short circuits, moulded case circuit breakers (MCCBs) are employed in low-voltage electrical systems. This device prevents electrical system damage by instantly turning off the power in the case of a malfunction or overcurrent scenario. Industry identified a problem of heating in the MCCB arc chamber due to a large arc quenching time in operation. An electric arc always carries out the interruption process of the current in the MCCB. To overcome this issue, the effect of inclination and blow out coil voltage on arc extinction phenomenon of splitter plates in arc chamber is analysed using ANSYS software in this research work. MCCB model has current rating 200 A, rated voltage is 500V and breaking capacity of 65 kA is considered for modelling and simulation. A splitter plate with a taper angle along the direction of the arc shows the better results in the 2-D analysis of MCCB model.

Computational Forecasting of Power Prices Using Artificial Neural Networks

Authors : Prof. Ganesh Wakte

Journal: SCOPUS

Date of Publication: 3, 2025

In the restructured power markets, the primary responsibility is setting the price of electricity. Thus, it has become increasingly important to accurately and precisely forecast power prices. An Artificial Neural Network (ANN) that was developed specifically for temporary price prediction in restructured electricity markets is presented in this paper. An input level, two hidden layers, and output layer comprise the four levels of the suggested ANN model, which is a perceptron neural network. Instead of using traditional back propagation for ANN training, using Levenberg-Marquardt retrogression (LMBP) methodology is used to accelerate convergence. The performance and efficacy of the suggested ANN model may be shown by training it on the Ontario power market. MATLAB is used to train the model

Multi-Port DC-DC Power Converter for Renewable Energy Application

Authors : Prof. Ganesh Wakte , Prof. Chetan Jambhulkar

Journal: International Journal for Research in Applied Science & Engineering Technology

Date of Publication: 3, 2025

As traditional energy sources diminish, renewable energy sources such as wind and solar power are crucial for sustainable power generation. The intermittent nature of these sources means that their output must be conditioned to meet grid requirements, typically through power converters. Current systems use separate converters for wind and solar, leading to high component counts and inefficiencies. The suggested system integrates various energy sources using a four-port converter: two input ports of wind and solar power, a bidirectional storage port, one an isolated load port. By adopting zero voltage switching, the system reduces costs, improves power flow management, and ensures seamless integration of renewable sources with the grid. This setup allows for more intelligent power flow between household users, the grid, and distributed generation units. The resulting DC voltage from the converter can be used directly for DC loads or converted to AC for household use, optimizing efficiency and resource use.

Keywords: Renewable Energy Integration, Four-Port Converter, Zero Voltage Switching, Flexible Output etc.

Epicyclic Gear Train-Based Device to Harvest Electric Energy from Pressure Energy Towards Sustainable Environment

Authors : Dr. Pratik Ghutke

Journal: SPRINGER

Date of Publication: 23 JAN 2025

The demand for the consumption of energy is increasing and there are various ways to produce it. The energy sources which are in high demand today are the non-renewable energy sources but it creates harmful effects on the atmosphere. Hence the very much required sources today are the environment friendly resources. India is now the fourth largest energy generating country in the world. Our Prime Minister also has stressed upon and supports the green energy renewable source plants to generate electricity. This research deals with the model which is designed and fabricated to produce electricity by utilizing the energy from the movement of footsteps and by vehicular movement through epicyclic gear train arrangement. The designed model consists of gearing mechanism, lever and a track. It is required to attach our designed system where there is maximum mobility of people and vehicular movement such as areas near malls, national highways and temple roads. Due to the motion on the track, the pressure energy of the foot and vehicle wheels transfers to rotational energy through the epicyclic gearing attachments. This rotational energy is in turn utilized to rotate the armature of the generator to generate electricity and that electricity is stored in the battery and used depending on future needs. The lever arm and track are placed with a 0.040m gap so that when load is applied on the track, it will deflect downward and touches the lever ram to rotate the wheel. Our designed system generates electricity without creating any problem to environment

Patents

Sr. No	Name of Applicant	Title of Patent	Patent Application No	Publication Date	Status
1.	Dr. Pragati Patil, Dr. Pratik Ghutke	AI-Driven System for Project Allocation and Supervision in Predetermined Programs	202521002 690	07/02/20 25	Published
2.	Dr. Pratik Ghutke, Dr. Pragati Patil, Prof. Roshan Chandekar	Intelligent System for Financial Risk Analysis and Prediction Using Advanced Computational Techniques	202521002 926	07/02/20 25	Published
3.	Dr. Atul Tekade, Dr. Pratik Ghutke	System and Method for Business Decision-Making Using Machine Learning Algorithms for Data Analysis	202521003 041	07/02/20 25	Published
4.	Dr. Pragati Patil, Dr. Atul Tekade, Dr. Pratik Ghutke	AI-Based System and Method for Automated Business Process Re-Engineering	202521003 045	07/02/20 25	Published
5.	Dr. Anup Gade, Prof. Ritesh Banpurkar, Dr. Pratik Ghutke	System and method for personalized learning paths in management and Computer Applications	202521004 187	14/02/20 25	Published
6.	Dr. Pratik Ghutke, Dr. Pragati Patil, Dr. Vijay Talodhikar	AI Enabled Chat bots For Enhancing Learning Experience of Students	202521004 188	14/02/20 25	Published
7.	Dr. Pratik Ghutke, Prof. Ganesh Wakte, Prof. Ritesh Banpurkar	AI-Powered System for Early Identification of Entrepreneurial Potential in Students	202521006 423	21/02/20 25	Published
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Sr. No	Name of Applicant	Title of Patent	Patent Application No	Publication Date	Status
13	Dr. Pratik Ghutke, Dr. Atul Tekade, Dr. Radharaman Shaha	Intelligent Performance Assessment System for Business and Computer Application Students	2025210084 54	21/02/20 25	Published
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17	Dr. Pratik Ghutke, Prof. Kunal Sawalakhe, Prof. Chetan Jambhulkar	AI-Driven Personalized Business Case Generation System for MBA Education	2025210211 68	21/03/20 25	Published
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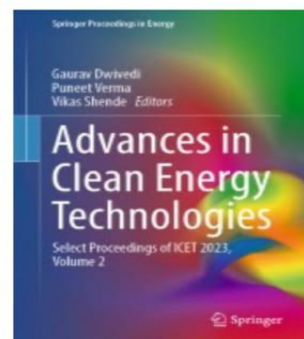
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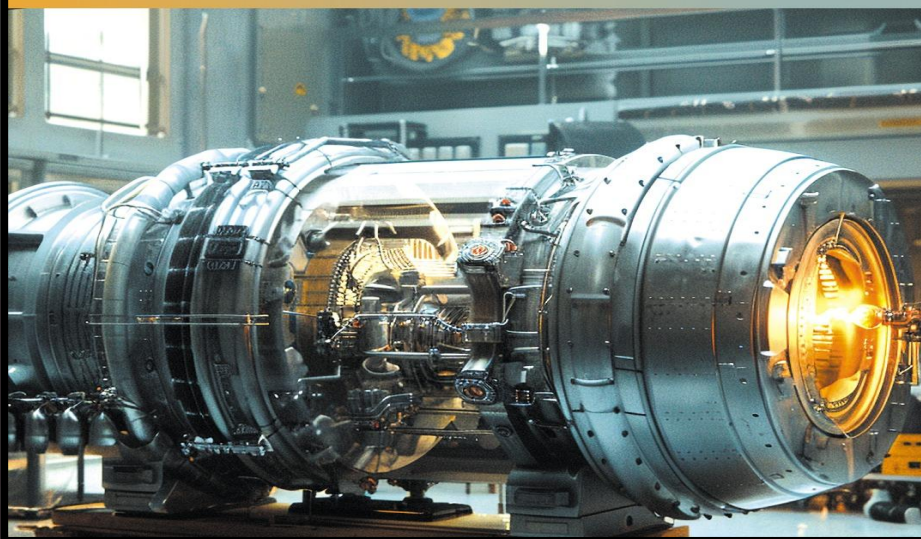
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Students Achievements

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Sr. No.	Name of Students
1	ADITYA MESHRAM
2	DIKESH MOHADIKAR
3	TABREJ KHAN
4	SUMIT RAMTEKE
5	ASHISH DADMAL



Departmental Best Project

Sr. No.	Name of students	Projects Topic
1.	Prajwal Shekhar Urkude, Ritul Ajabrao Chinchulkar ,Swapnil Pandurang Surtikar, Vaishnav Satish Bhakte	Fire Detector Sensor
2	Aditya Suresh Kundalkar, Alok Duleshwar Meshram, Anant Baburam Suryawanshi Karan Sandip Yengandewar Prathamesh Jayantrao Harane Subodh Gangadhar Savarkar	Wireless Vehicle charging System
3	Nikita Rajendra Sahare Sanjivani Ravindra Chavhan Shreya Raju Dhavande Sonali Vilas Meshram Yashashri Dhananjay Neware	Automatic Door Opening using Aurdiuno and PIR sensor
4	Kunal Suresh Gowardipe Sanket Vilas Pulate Tanmay Bharat Bobade Yash Balaji Boddewar	IOT Base Energy meter Monitoring with theft Detection
5	Bhairavi Ravindra Narange Ritu Sanjay Bopche Nikhil Pushparaj Bhoyar Komal Uttam Dhobale Manasvi Sunil Shambharkar	IOT base plant Watering System
6	Rinku Rameshwar Lonare Trupti Someshwar Mankar Nandini Jagdish Sakhare Monika Dudharam Kamble Kanchan Ramdas Nirwan	Digital Name Plate

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