ELECTRIC ECO

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada

Accredited by NAAC with "A" Grade & NBA(CSE, IT, ECE, EEE, &ME) under Tier-I

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Foreword
Principal

I am delighted to present this edition of our Electrical and Electronics Engineering (EEE) department magazine, a testament to the creativity and hard work of our students and faculty. This publication not only showcases remarkable projects and achievements but also reflects our commitment to innovation and excellence in the ever-evolving field of engineering. I encourage everyone to engage with the content and celebrate the spirit of collaboration that defines our EEE community. Together, we can continue to inspire and shape the future of technology.

HOD

It is with immense pride that I introduce this edition of our Electrical and Electronics Engineering (EEE) department magazine. This publication is a celebration of the talent, innovation, and dedication that our students and faculty bring to the field. Inside, you will find an array of projects, research highlights, and insightful articles that showcase the dynamic learning environment we foster. As we navigate the challenges and opportunities in technology, this magazine reflects our commitment to academic excellence and collaboration. I encourage all readers to immerse themselves in the inspiring stories within these pages and to continue pushing the boundaries of knowledge and creativity in our field.

About the Department:

The department of Electrical and Electronics Engineering is one of the oldest and major departments of the Institute. Since its inception in 1998, the department has been actively engaged in teaching and research in diverse fields of Electrical and Electronics Engineering. The department offers B.Tech in EEE and M.Tech in Power Electronics and Drives programmes. All its programmes are approved by AICTE, New Delhi. The department is strong with few faculty members holding Ph.D degrees and expertise in various fields. Initially B.Tech program was started with an intake of 40 in 1998 and subsequently increased to 120 in the year 2012. M.Tech (PE & D) program was started in the year 2011 with an intake of 18 students. The department of EEE has adequate and well-qualified faculties spanning all major areas of Electrical Engineering like Power Systems, Power Electronics, Control Systems, Energy Systems, High Voltage Engineering etc

VISION:

To contribute to the country and the world through technical education, research and consultancy in Electrical and Electronics Engineering.

MISSION:

1. provide broad based education in Electrical and Electronics Engineering.
2. To keep the curriculum industry friendly.
3. To undertake sponsored research and provide consultancy services in industrial, educational and society relevant areas in Electrical and Electronics Engineering.
4. To promote ethical and moral values among the students so as to make them them emerge as responsible professionals

Program Educational Objectives (PEOs):

PEO1: Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2: Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multidisciplinary,projects.

PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

CONTENTS

ARTICLES

STUDENT ARTICLES

Integration of Quantum Computing in Smart Grid Management

The integration of quantum computing in smart grid management systems represents a transformative approach to optimizing energy distribution and consumption. Traditional computing methods face limitations in processing vast amounts of data generated by smart grids, particularly when managing dynamic loads and renewable energy sources. Quantum computing, leveraging the principles of superposition and entanglement, can process complex algorithms at unprecedented speeds, enabling real-time decision-making.

By applying quantum algorithms, utilities can enhance load forecasting, improve energy routing, and optimize grid stability. For instance, quantum algorithms can analyze multiple variables simultaneously, allowing for more accurate predictions of energy demand and supply fluctuations, particularly in systems reliant on intermittent renewable sources like solar and wind. Additionally, quantum computing can enhance cybersecurity measures by providing advanced cryptographic solutions to protect grid infrastructure from potential threats.

Despite its potential, challenges remain in the practical deployment of quantum computing in smart grids, including the need for specialized hardware and the development of robust algorithms tailored to energy management. However, as research progresses and technology matures, the integration of quantum computing is poised to revolutionize smart grid systems, paving the way for more efficient, resilient, and sustainable energy networks.

Ch.Jahnavi
21761A0207

Machine Learning Algorithms for Predictive Maintenance in Electrical Equipment

Machine learning algorithms are increasingly being utilized for predictive maintenance in electrical equipment, transforming how industries manage asset reliability and performance. By analyzing historical data and operational parameters, these algorithms can identify patterns and predict potential equipment failures before they occur. This proactive approach minimizes unplanned downtime, reduces maintenance costs, and enhances overall system efficiency.

Common machine learning techniques used in predictive maintenance include regression analysis, decision trees, and neural networks. These models process data from various sources, such as sensors monitoring temperature, vibration, and energy consumption. By continuously learning from new data, the algorithms improve their accuracy over time, adapting to changing operational conditions.

One significant advantage of using machine learning for predictive maintenance is its ability to provide actionable insights, allowing maintenance teams to schedule interventions based on actual equipment conditions rather than fixed intervals. This not only optimizes maintenance schedules but also extends the lifespan of electrical equipment.

As industries strive for greater efficiency and reduced operational costs, the implementation of machine learning for predictive maintenance is becoming a critical strategy. By leveraging these advanced analytics, organizations can ensure reliable performance while minimizing risks associated with equipment failures.

I.Mohana Manikanata Reddy
23765A0217

Cybersecurity Strategies for Smart Grids and IoT Devices

As smart grids and IoT devices become integral to modern energy systems, robust cybersecurity strategies are essential to protect against evolving threats. Smart grids, which rely on interconnected devices for efficient energy distribution, face unique vulnerabilities due to their complexity and reliance on real-time data communication. Cyberattacks can disrupt services, compromise data integrity, and pose safety risks.

One key strategy involves implementing a layered security approach, often referred to as defense in depth. This includes robust authentication protocols, encryption of data in transit and at rest, and regular software updates to patch vulnerabilities. Additionally, employing anomaly detection systems powered by machine learning can help identify unusual patterns of behavior that may indicate a cyber threat.

Furthermore, establishing a comprehensive incident response plan is crucial for mitigating the impact of potential breaches. This plan should include clear communication protocols and recovery procedures to ensure rapid restoration of services.

Collaboration among stakeholders—utilities, manufacturers, and regulatory bodies—is vital to create standardized security frameworks and share threat intelligence. As smart grids continue to evolve, proactive cybersecurity measures will be essential in safeguarding critical infrastructure and maintaining public trust in these advanced systems.

G.Vishnu Vardhan Reddy
22761A0269

Advancements in Wireless Power Transfer for Electric Vehicle Charging

Advancements in wireless power transfer (WPT) technology are revolutionizing electric vehicle (EV) charging, offering convenience and efficiency for users. This innovative method allows for the transfer of energy from a charging pad to an EV without the need for physical connectors, enhancing the charging experience and reducing wear on electrical components.

Recent developments in resonant inductive coupling have significantly improved the efficiency and range of wireless charging systems. These systems can deliver power at higher rates, making them suitable for both stationary and dynamic charging applications. For instance, dynamic wireless charging allows vehicles to be charged while in motion, enabling continuous energy supply on certain roadways and reducing range anxiety.

Moreover, advancements in smart grid integration are enhancing WPT systems by enabling real-time communication between the vehicle and the charging infrastructure. This integration allows for optimized energy use, better load management, and increased sustainability.

As research progresses, the potential for widespread adoption of wireless charging infrastructure is growing. With the combined benefits of convenience, reduced maintenance, and enhanced user experience, wireless power transfer technology is poised to play a significant role in the future of electric vehicle charging, supporting the global shift towards sustainable transportation.

S.V.S.Harsha

21761A0238

IOT and Long Range Based Smart lamp posts for illuminating Smart cities

IoT-enabled long-range smart lamp posts are transforming urban lighting systems, playing a pivotal role in the development of smart cities. These innovative lamp posts integrate advanced sensors and communication technologies, allowing them to adjust brightness based on environmental conditions and pedestrian presence. By utilizing IoT connectivity, they can relay data to centralized management systems, enabling real-time monitoring and control.

Equipped with long-range connectivity options like LoRaWAN or cellular networks, these smart lamp posts can cover extensive urban areas while ensuring energy efficiency. They reduce power consumption by dimming lights when no one is around, contributing to sustainability goals.

Additionally, these lamp posts can serve multiple purposes, including environmental monitoring and serving as charging stations for electric vehicles. By creating an interconnected network of smart lamp posts, cities can enhance public safety, reduce operational costs, and improve overall urban livability, paving the way for more efficient and resilient smart city infrastructures.

U.Durga Bhavani
21761A0246

FACULTY PUBLICATIONS

Dr.K. Harinadha Reddy

Intelligent tunicate swarm for regression neuron modelling - novelstate estimation learning, Neural Processing Letters 1573- 773X, December 2023, SCI.

The intelligent tunicate swarm for regression neuron modeling introduces a novel approach to state estimation and learning. This technique leverages the unique behaviors of tunicates, which exhibit collective decision-making and adaptive learning. By mimicking these biological processes, the model enhances regression analysis, improving accuracy in predicting complex patterns in data. The swarm intelligently adjusts its parameters based on feedback, optimizing the learning process. This innovative method demonstrates significant potential in various applications, including environmental monitoring, financial forecasting, and robotics, where precise state estimation is crucial for decision-making and operational efficiency.

Dr.J.Sivavara Prasad

Performance Of Half Bridge LLC Resonant Converter Using Matlab/Simulink, Journal of Transportation Systems Engineering and Information Technology 1009- 6744, October 2023, SCOPUS

The study titled "Performance of Half Bridge LLC Resonant Converter Using MATLAB/Simulink" evaluates the efficiency and operational characteristics of a half-bridge LLC resonant converter for applications in transportation systems. Utilizing MATLAB/Simulink, the research simulates various operational scenarios to analyze key performance metrics, including efficiency, voltage regulation, and thermal behavior. The findings demonstrate the converter's effectiveness in managing power conversion with minimal losses, making it suitable for integration into electric vehicle systems. This research contributes valuable insights into optimizing resonant converters for enhanced performance, reliability, and energy efficiency in modern transportation applications.

N. JUDIE-19761A0285

Dr.G. Nageswara Rao

Smart Deep Learning Model to Recognize PCM Optimization Performance on Solar Cooling System, Electric Power Components and Systems, 1532- 5008 November 2023, SCI.

The "Smart Deep Learning Model to Recognize PCM Optimization Performance on Solar Cooling System" presents an innovative approach to enhancing the efficiency of solar cooling systems using phase change materials (PCMs). This model employs advanced deep learning techniques to analyze and optimize PCM performance, enabling better energy management and cooling efficiency. By leveraging large datasets, the model accurately predicts the thermal behavior of PCMs under varying conditions, facilitating real-time adjustments in system operation. The study highlights significant improvements in energy savings and system reliability, making it a valuable contribution to the fields of renewable energy and electric power systems.

Dr.P. Sobha Rani

Battery Monitoring System for Electric Vehicles, Lecture Notes in Electrical Engineering 978- 981- 99- 9053- 5, November 2023, SCOPUS

The "Battery Monitoring System for Electric Vehicles" presented in the Lecture Notes in Electrical Engineering focuses on enhancing the performance and longevity of electric vehicle (EV) batteries. This system employs advanced monitoring techniques to assess key parameters such as voltage, temperature, and state of charge in real time. By utilizing data analytics and predictive algorithms, the system can detect anomalies and provide insights into battery health, optimizing charging cycles and improving overall efficiency. The research emphasizes the importance of effective battery management for maximizing range and safety, contributing significantly to the development of sustainable and reliable electric vehicle technologies.

P.Srihari

A hybrid VMD based contextual feature representation approach for wind speed forecasting, Renewable Energy 0960- 1481, October 2023, SCI

The study titled "A Hybrid VMD-Based Contextual Feature Representation Approach for Wind Speed Forecasting" presents an innovative methodology for improving wind speed predictions. By integrating Variational Mode Decomposition (VMD) with contextual feature representation, this approach effectively captures the intricate patterns in wind speed data. The hybrid model enhances forecasting accuracy by extracting meaningful features that reflect the temporal and spatial characteristics of wind behavior. This research demonstrates significant improvements in forecasting performance compared to traditional methods, offering valuable insights for renewable energy applications, particularly in optimizing the operation of wind turbines and improving energy management strategies in renewable systems.

Dr. A.V.G. A. Marthanda

Single Source Thirteen Level Switched Capacitor Boost Inverter for PV Applications,Journal of Science and Engineering 2148- 3736, April 2024,SCOPUS

The article "Single Source Thirteen Level Switched Capacitor Boost Inverter for PV Applications" explores an innovative inverter design tailored for photovoltaic (PV) systems. This switched capacitor boost inverter achieves a thirteen-level output, enhancing voltage conversion efficiency and reducing harmonic distortion. By employing a single energy source, the system simplifies the circuit architecture while maintaining high performance. The design optimizes power conversion from solar panels, enabling better integration with grid systems and improving overall energy management. The research highlights the inverter's effectiveness in maximizing energy output and its potential for widespread application in renewable energy technologies, particularly in solar power generation.

PATENTS

Name of Inventor : Dr.G.Nageswara Rao

Title of Patent : Forecasting Electric Vehicle Charging Station Preference Through Shap-Based Machine Learning Method

Published Year & Month: September 2023

PATENT APPLICATION ID: 202341051110 A

Status : Published

The study "Forecasting Electric Vehicle Charging Station Preference Through SHAP-Based Machine Learning Method" investigates how machine learning can predict consumer preferences for electric vehicle (EV) charging stations. Utilizing SHAP (SHapley Additive exPlanations) values, the research analyzes key factors influencing user choices, such as location, availability, and charging speed. By interpreting model outputs, the study reveals insights into user behavior, enabling more effective deployment and management of charging infrastructure. This approach not only enhances the understanding of consumer preferences but also supports policymakers and businesses in optimizing charging station networks to better meet the needs of EV users.

Name of Inventor : Dr. A.V.G. A. Marthanda

Title of Patent : Medical Waste Treatment Device

Published Year & Month: July 2023

PATENT APPLICATION ID: 383823-001

Status : Design Patent

The "Medical Waste Treatment Device" is an innovative solution designed to safely and effectively manage hazardous medical waste generated by healthcare facilities. This device employs advanced technologies, such as autoclaving and shredding, to sterilize and reduce the volume of waste, minimizing environmental impact. By converting medical waste into non-hazardous material, it ensures compliance with health and safety regulations. The system is user-friendly, facilitating easy operation and maintenance, while providing real-time monitoring of treatment processes. This device enhances waste management practices in medical settings, promoting sustainability and protecting public health by reducing the risks associated with improper disposal of medical waste.

MSME IDEA HACKATHON 3.0 (WOMEN) CHAMPION SCHEME

NAME : K.Akhila
YEAR : III, EEE
PROJECT: PV powered smart handcart for street food vendors cooking food and selling on site
MSME ID: MSMEIDEAAP013076
SACTIONED AMOUNT : Rs 15,00,000/-

The "PV Powered Smart Handcart for Street Food Vendors" is an innovative solution designed to enhance the efficiency and sustainability of street food operations. Equipped with photovoltaic (PV) solar panels, this smart handcart harnesses renewable energy to power cooking appliances and lighting, allowing vendors to prepare and sell food on-site without reliance on traditional electricity sources. The cart features a compact design with storage for ingredients and cooking equipment, as well as smart technology for temperature monitoring and inventory management. This environmentally friendly approach not only reduces operating costs but also promotes sustainability, empowering street food vendors to operate efficiently and responsibly.

NAME : T.Sruthi Kumari
YEAR : II, EEE
PROJECT: Detection and analysis of mental stress in online learning using IOT devices
MSME ID: MSMEIDEAAP013050
SACTIONED AMOUNT : Rs 15,00,000/-

The study "Detection and Analysis of Mental Stress in Online Learning Using IoT Devices" explores how Internet of Things (IoT) technology can monitor and assess students' mental stress levels during online education. Utilizing wearable devices equipped with sensors, the system collects real-time data on physiological indicators such as heart rate, skin temperature, and activity levels. This data is analyzed to identify patterns associated with stress, providing insights into students' emotional well-being. By integrating this technology into online learning environments, educators can implement timely interventions, enhancing student support and improving overall learning experiences in virtual settings.

BOOKS WRITTEN

NAME OF THE AUTHOR	TITLE OF CHAPTER/ BOOK	NAME OF THE PULISHER WITH ADDRESS	ISBN NUMBER
G.Nageswara Rao	Book: Intelligent control of electric vehicles	R K Publications	ISBN 978-81-971820-3-7
G.NageswaraRao	Book: Hybrid Electric Vehicles Principle and Applications	R K Publications	ISBN: 978-81-19489-03-9

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