ELECTRIC ECO

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

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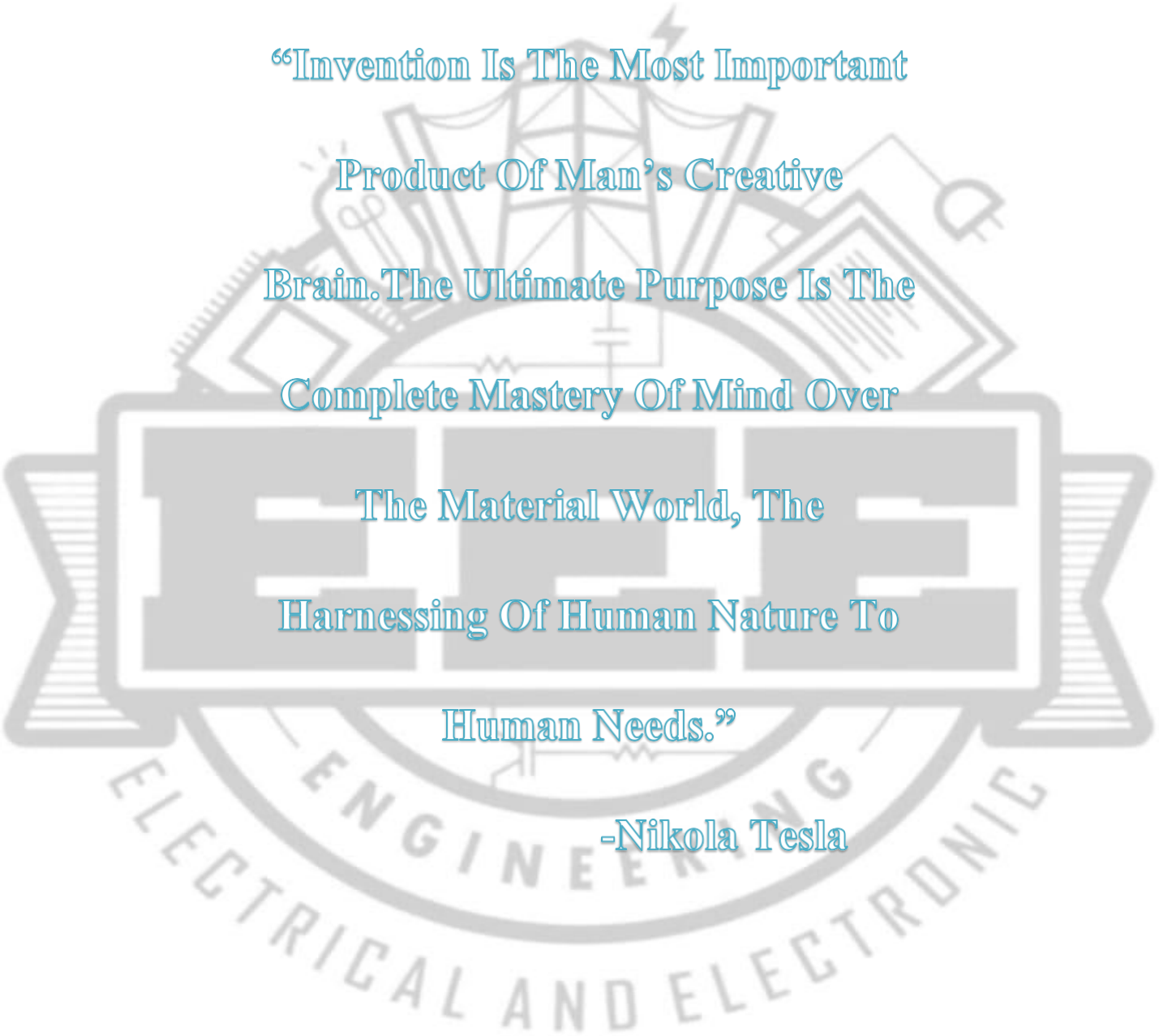

"Invention Is The Most Important Product Of Man's Creative Brain.The Ultimate Purpose Is The Complete Mastery Of Mind Over The Material World, The Harnessing Of Human Nature To Human Needs."

-Nikola Tesla

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.

DR.K.Appa Rao
Principal

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.

DR.J.Siva Vara Prasad
HOD

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

Solar-Powered Ev Charging Stations With Iot Integration

As the demand for electric vehicles (evs) surges, the need for efficient and sustainable charging infrastructure becomes increasingly critical. Solar-powered ev charging stations equipped with internet of things (iot) integration represent a groundbreaking solution to address this need. These stations harness solar energy to provide clean, renewable power for evs, reducing reliance on traditional energy sources and minimizing carbon footprints.the integration of iot technology enhances the functionality of solar charging stations. Smart sensors and connected devices monitor energy production, consumption, and station usage in real-time. This data allows for optimized energy management, ensuring that the available solar energy is utilized effectively. For instance, during peak sunlight hours, excess energy can be stored or redirected to charge multiple vehicles simultaneously, maximizing efficiency.

Moreover, iot-enabled charging stations can offer users real-time information through mobile applications, including charging status, availability, and estimated wait times. This transparency improves user experience and encourages more drivers to switch to electric vehicles. Additionally, the data collected can be analyzed to predict demand patterns, allowing for strategic placement of future stations and optimizing the grid's overall performance.

M.Kalayan
20761A0236

Optimal Standalone Hybrid Renewable System

An optimal standalone hybrid renewable system combines multiple energy sources—typically solar, wind, and sometimes biomass or hydro—to create a reliable and efficient energy solution for off- grid applications. These systems are designed to maximize energy generation while minimizing costs and environmental impact. By integrating various renewable sources, they can harness the strengths of each, ensuring a consistent power supply even when one source is less available.

Solar panels are often the backbone of these systems, converting sunlight into electricity during the day. Wind turbines complement this by generating power from wind, which can be particularly beneficial in regions where wind patterns are strong. The synergy between solar and wind ensures that energy production is more reliable throughout the day and across different seasons.

Additionally, incorporating energy storage solutions, such as batteries, allows excess energy to be stored during peak generation times and used when demand is high or when renewable sources are low.

To optimize the performance of a hybrid system, advanced control strategies and energy management systems play a crucial role. These technologies monitor energy production and consumption in real-time, allowing for dynamic adjustments that enhance efficiency. By intelligently distributing power according to availability and demand, these systems can significantly reduce reliance on fossil fuels, thereby lowering greenhouse gas emissions.

Ch.Abhinay Kumar
21761A0208

K.Akash
21761A0222

DC to DC Converter Using Dual Rectifier and Microinverter

A dc to dc converter utilizing a dual rectifier and microinverter architecture is an innovative solution designed to enhance the efficiency and versatility of power conversion in renewable energy systems. This configuration primarily addresses the need for optimizing energy flow from various sources, such as solar panels or battery storage, to load demands in electrical systems.

The dual rectifier component of the converter efficiently processes both positive and negative voltage inputs, ensuring that it can handle a wide range of input sources. By converting alternating current (ac) generated from renewable sources into direct current (dc), the dual rectifier enhances the overall energy conversion efficiency. This is particularly important in applications where solar panels generate variable power output due to changing sunlight conditions.

Complementing the dual rectifier is the microinverter, which plays a crucial role in managing the energy output at a granular level.
Unlike traditional inverters that manage power from a group of solar panels, microinverters are attached to individual panels. This allows for optimized energy harvesting, as each panel operates independently.
The microinverter converts the dc power produced by the panels into usable ac power, enhancing system reliability and maximizing energy production even in partially shaded conditions

Shaik Shabeer
21761A0286

M.S.S.Reddy

21761A0276

Advanced Artificial Intelligence in the Electrical Sector

Advanced artificial intelligence (ai) is revolutionizing the electrical sector by enhancing efficiency, reliability, and sustainability. Ai technologies, including machine learning and data analytics, are increasingly being integrated into various aspects of electrical systems, from grid management to predictive maintenance and energy consumption optimization. One of the most significant applications is in smart grid technology, where ai algorithms analyze vast amounts of data from sensors and smart meters to predict energy demand patterns. This predictive capability allows utilities to optimize energy distribution, reduce outages, and enhance grid stability.

Moreover, ai-driven tools enable proactive maintenance of electrical infrastructure. By employing predictive analytics, utilities can monitor equipment health in real-time, identifying potential failures before they occur. This approach minimizes downtime, reduces maintenance costs, and extends the lifespan of critical assets. Additionally, ai algorithms can optimize energy consumption in buildings by analyzing usage patterns and making real-time adjustments to heating, ventilation, and air conditioning (hvac) systems, thereby improving energy efficiency and reducing costs for consumers.

In renewable energy, ai plays a crucial role in maximizing output from sources like solar and wind. Advanced algorithms can forecast weather conditions, allowing for better integration of renewable resources into the grid and ensuring a stable energy supply. Furthermore, ai enhances the development of energy management systems that facilitate the smooth operation of decentralized energy resources, such as home solar panels and battery storage systems.

Sk.Sameer

20761A02B2

PROJECTS

Design and Development of Next Generation E-bicycle.

In today's contemporary society, where emphasis is placed on health-conscious, cost-effective, and environmentally friendly modes of transportation, electric bicycles have gained prominence. This project focuses on design and development of an electric bicycle powered by electrical energy for battery charging. Our primary objectives include implementing robust charge monitoringsystems and safety measures to mitigate overheating risks. Moreover, we introduce radio-frequency technology for the locking system and GPS technologyfor theft prevention and location tracking. Through these innovations, we aim toenhance both the security and user experience of electric bicycles, contributing to a more sustainable and efficient transportation landscape.

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20761A02B2-SK SAMEER

20761A02A1-N.AKHIL

20761A0290-K SAI

IOT BASED TRANSFORMER LOAD CONITORIN AND CONTROLLING WITHALERTING SYSTEM USING ARDUINO NANO AND GSM

such as voltage and current and broadcast these real-time values via the network, coupled with the temperature at the power plant. This project will also safeguard the electrical circuits by using a relay. When the electrical parameters surpass the specified levels, this relay is actuated. This technology can continually update the real time electrical parameters. This system may be programmed to transmit alarms when the relay trips or when the voltage or current exceeds predetermined limitations. It also has a cooling system (cooling fan).

When the temperature of the transformer exceeds the prescribed limit, this cooling fan activates and blows cold air, bringing the temperature down to normal. This project makes use of an arduino, and because this is a prototype of the planned idea, we have utilized an arduino nano for demonstration purposes. The arduino can effectively communicate with the many sensors in use.

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P.HAVINASH-20765A0217
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FACULTY PUBLICATIONS

Dr.B. Pangedaiah

Absolute positive sequence voltage difference based passive islanding detection in micro grids ieee transactions on industry applications 1939- 9367 january 2024 ,sci

In this paper, a new passive islanding detection method is developed for a grid integrated hybrid distributed generation (dg) system that utilizes absolute positive sequence voltages difference mean (apsvdm) from the point of common coupling (pcc). Islanding is recognized when the magnitude of the apsvdm exceeds the threshold over a specified delay time. Under different operating situations, including zero power mismatches, the proposed technique effectively distinguishes between cases of islanding (is) and non-islanding (nis) cases. As a result, non-detection zone and false tripping caused by various nis events are eliminated. The technique suggested is straightforward and needs no classifier to implement. This method does not depend on the specifics of the utility network, and it can be used with any number and type of dg units. When compared to times reported in the literature, the achieved detection times show that the proposed method is superior. Opal-rt, a hardware-in- the-loop (hil) environment, and matlab are used to Validate the results of the experiments.

Dr.J. Siva Vara Parasad

Smart And Intelligent Gsm Based Meter Reading System Journal Of Technology 1009- 6744 March 2024, SCOPUS

This paper presents a smart and intelligent gsm-based meter reading system aimed at revolutionizing traditional metering methods. As urbanization increases and energy consumption rises, efficient monitoring of utility meters becomes critical. The proposed system utilizes gsm technology to facilitate real-time data transmission from utility meters, such as electricity, water, and gas, to a centralized server. This automation eliminates the need for manual readings, thereby reducing labor costs and human error while ensuring timely data collection. The system features a microcontroller interfaced with the utility meters and a gsm module, enabling periodic transmission of consumption data.

Additionally, a user-friendly mobile application allows consumers to monitor their usage patterns, receive notifications for unusual consumption, and access billing information.
Through data analytics, the system provides insights into usage trends, empowering users to manage their consumption more effectively.

By integrating gsm technology, the system ensures robust and reliable communication, even in remote areas where traditional connectivity may be limited. Furthermore, its scalability allows for easy deployment across various utilities, making it a versatile option for modern metering needs. The findings indicate that implementing a gsm-based meter reading system significantly enhances operational efficiency, reduces costs, and contributes to sustainable energy management practices.

Palle deepak reddy & munigoti srinivasa giridhar,

Leveraging renewable energy sources for sustainable traction vehicles indonesian journal of electrical engineering and computer science 2502-4752 april 2024, **scopus**

This paper explores the integration of renewable energy sources in the design and operation of sustainable traction vehicles, emphasizing their potential to reduce carbon emissions and dependence on fossil fuels. As the transportation sector faces increasing pressure to transition to greener alternatives, leveraging renewable energy sources such as solar, wind, and biofuels emerges as a viable solution.

The study examines various energy conversion technologies and storage systems, highlighting their role in enhancing the efficiency and performance of traction vehicles. Through a comprehensive analysis, the paper illustrates the advantages of hybrid systems that combine traditional power sources with renewable technologies, showcasing case studies of successful implementations in electric and hybrid vehicles. These examples demonstrate significant improvements in energy efficiency and operational sustainability. The integration of advanced battery management systems and regenerative braking further optimizes energy usage, contributing to a more sustainable transport ecosystem.

Dr.A.V.A.Marthanda,

A Comprehensive Review On Different Types Of Fuel Cell And Its Applications Bulletin Of Electrical Engineering And Informatics 2302-9285 April 2024, **Scopus**

This comprehensive review examines various types of fuel cells and their diverse applications, highlighting their potential as a sustainable energy solution. Fuel cells are electrochemical devices that convert chemical energy directly into electrical energy, offering high efficiency and low emissions compared to conventional combustion engines.

The review categorizes fuel cells into several types, including proton exchange membrane fuel cells (pemfcs), solid oxide fuel cells (sofcs), alkaline fuel cells (afcs), and phosphoric acid fuel cells (pafcs), detailing their operating principles, advantages, and limitations. It also explores the applications of fuel cells across different sectors, including transportation, stationary power generation, and portable energy systems. The integration of fuel cells in vehicles, such as buses and cars, showcases their role in reducing greenhouse gas emissions and enhancing energy security.

Furthermore, the review discusses their use in backup power systems and remote locations where conventional energy sources are unavailable. Challenges such as cost, infrastructure, and fuel supply are addressed, alongside current research trends aimed at improving fuel cell efficiency and durability. The findings emphasize the need for ongoing research and development to overcome these barriers and promote the widespread adoption of fuel cell technology, serving as a valuable resource for researchers, engineers, and policymakers interested in advancing a cleaner energy future.

PATENTS

Name Of Inventor :Dr.G.Nageswara Rao

Title Of Patent : A Deep Learning Approach For Implementing Iot In Hybrid Electric Vehicles For Energy Management

Published Year & Month: March 2024 Patent

Application Id: 202441021004 A

Status : Published

This paper explores a deep learning approach to implement internet of things (iot) technologies in hybrid electric vehicles (hevs) for optimal energy management. As the automotive industry shifts towards more sustainable solutions, effective energy management systems become crucial in enhancing the efficiency and performance of hevs. The proposed system utilizes iot sensors and devices to gather real-time data on various parameters, including vehicle performance, energy consumption, and environmental conditions.

By applying advanced deep learning algorithms, the system analyzes this data to optimize the energy distribution between the electric motor and internal combustion engine. This optimization not only improves overall energy efficiency but also extends battery life and enhances the driving experience. Additionally, the deep learning model can facilitate predictive maintenance by identifying potential issues before they escalate, reducing downtime and maintenance costs.

INNOVATIVE IDEAS (MSME)

1. Smart Electric Tricycle

The smart electric tricycle is an innovative solution that enhances urban mobility while promoting sustainability. Combining the efficiency of electric propulsion with the stability of a three-wheeled design, it caters to diverse user needs, from daily commuters to delivery services. Equipped with features like regenerative braking, smart navigation, and connectivity options, this vehicle ensures smooth and efficient rides while providing real-time data on traffic conditions and battery life. Its eco- friendly motor significantly reduces carbon emissions, aligning with global efforts to combat climate change. The tricycle's design accommodates varying load capacities, making it ideal for transporting goods or multiple passengers. Additionally, the integration of smart technologies allows for remote monitoring and maintenance, ensuring longevity and reliability. As urban areas become increasingly congested, the smart electric tricycle represents a practical alternative to traditional transport methods, fostering cleaner, greener cities and enhancing the quality of urban life.

R.Sai Kiran

2.Smart Street light Management System

The smart street light management system is an innovative solution designed to optimize urban lighting and enhance energy efficiency. Utilizing advanced sensors and iot technology, it enables real-time monitoring and control of street lights, ensuring they operate only when needed by adjusting brightness based on ambient light levels and pedestrian activity. This significantly reduces energy consumption and operational costs.

Additionally, the system can integrate environmental sensors to monitor air quality, temperature, and noise levels, providing valuable data for city planners. With features like emergency alert systems, it enhances public safety by quickly notifying authorities of incidents. Remote management capabilities allow city officials to efficiently identify malfunctioning lights and schedule maintenance, minimizing downtime. By harnessing data analytics, cities can optimize their lighting infrastructure, reducing energy waste while improving visibility and safety for residents. Ultimately, the smart street light management system contributes to sustainable urban development, enhancing the overall quality of life in cities and creating safer, more environmentally friendly urban environments.

V.Rajasekhar Reddy

3. Emergency Vehicle Traffic Control signal

The smart emergency vehicle traffic control signal is an advanced system designed to enhance the response times of emergency vehicles, such as ambulances, fire trucks, and police cars, while ensuring the safety of all road users. Utilizing real- time data and communication technologies, this system prioritizes the passage of emergency vehicles by automatically altering traffic signals along their route. When an emergency vehicle is detected, the system triggers a series of pre- programmed traffic light changes, turning lights green and allowing for safe and expedited passage through intersections.

This not only minimizes delays but also reduces the risk of accidents during critical response situations. The system can integrate with existing traffic management systems, using sensors and gps tracking to monitor traffic conditions and adjust signal timings accordingly. Additionally, it provides real- time alerts to other drivers, informing them of the approaching emergency vehicle, thereby promoting compliance and safety.

Ch.Abhinay Kumar

BOOKS WRITTEN

NAME OF THE AUTHOR	TITLE OF CHAPTER/ BOOK	NAME OF THE PULISHER WITH ADDRESS	ISBN NUMBER
C.V.Narasimha Raja S.Lavanya Kota	Electric Vehicles integration on Distribution grid issues and methods to Mitigate impact of EV on Power Quality: A Review	Design Thinking: Trans-Disciplinary Challenges & Opportunities in Engineering (Volume 2)	ISBN: 978-93-5915-224-0
J.V.Pavan Chand K.Narasimha Rao	MRAS based control of Grid-Connected VSC HVDC with Flywheel Energy Storage System for Offshore Wind Farms	Design Thinking: Trans-Disciplinary Challenges & Opportunities in Engineering (Volume 2)	ISBN: 978-93-5915-224-0
Dr.Madhavi Mallam Dr.K.Ramalingeswara Prasad Mr.Mallam Sreenu Dr.Y.Narendra Kumar	Electromagnetic Fields – Theory And Practices	Deccan Academic International Publishers	ISBN: 978-81-967409-3-1

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