ELECTRIC ECO

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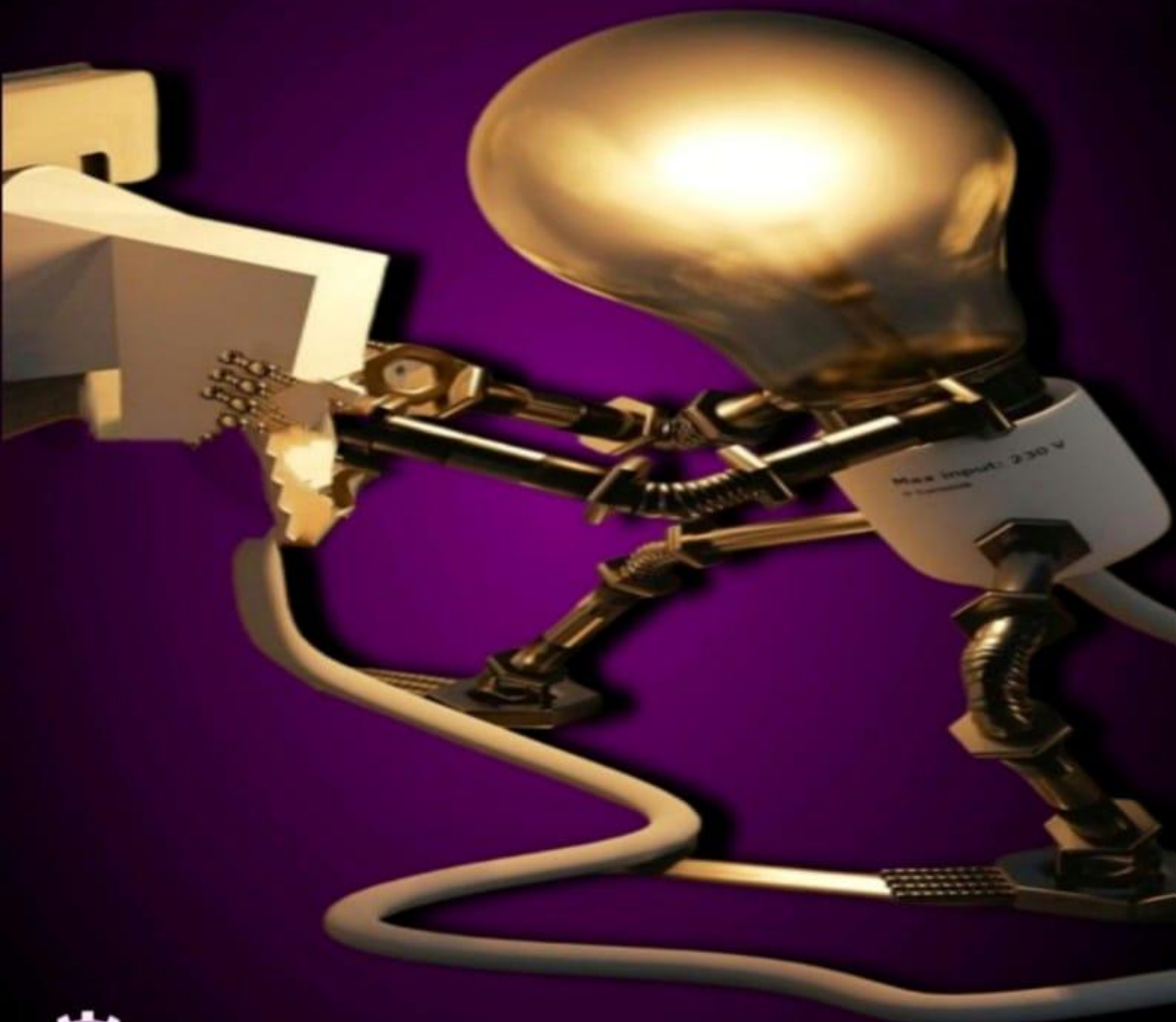

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

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

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

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ARTICLES

Li-Fi Technology: The Future of Wireless Communication

The radio frequency communication is problematic, such as underwater or in hospitals where electromagnetic interference can affect medical devices. Despite its promising potential, the widespread adoption of Li-Fi is still in progress, facing challenges like the need for direct line-of-sight and limited range compared to Wi-Fi. Li-Fi, or Light Fidelity, is a groundbreaking wireless communication technology that uses visible light to transmit data. Unlike traditional Wi-Fi, which relies on radio waves, Li-Fi uses light-emitting diodes (LEDs) to deliver high-speed internet connectivity. The concept of Li-Fi was first introduced by Professor Harald Haas in 2011 during a TED Talk where he demonstrated how an LED lamp could transmit more data than a cellular tower.

One of the major advantages of Li-Fi is its impressive speed. Li-Fi can theoretically achieve data transfer rates of up to 224 gigabits per second, making it significantly faster than current Wi-Fi technologies. Moreover, Li-Fi offers enhanced security, as light waves cannot penetrate through walls, reducing the risk of unauthorized access. This feature is particularly beneficial in environments where data security is paramount, such as government buildings or medical facilities.

Additionally, Li-Fi operates in areas Nonetheless, with continuous research and development, Li-Fi holds the promise of revolutionizing the way we connect to the internet, providing faster, more secure, and efficient wireless communication.

-BOLLEPALLI JAHNAVI

Transformation of The Grid: The Impact of Distributed Energy Resources on Bulk Power Systems

The integration of distributed energy resources (DERs), such as solar panels, wind turbines, and battery storage, is significantly transforming traditional bulk power systems. Historically, power systems relied on large, centralized power plants to generate electricity and distribute it via a complex network of transmission lines. However, with the rise of DERs, the grid is experiencing a shift towards a more decentralized energy landscape.

One of the primary impacts of DERs on bulk power systems is increased grid resilience. DERs provide localized power generation, reducing dependence on large power plants and transmission lines, which can be vulnerable to outages. This decentralized approach enhances the overall reliability of the grid, as power can be sourced from multiple locations, minimizing the risk of large-scale blackouts.

Furthermore, DERs promote sustainability by integrating renewable energy sources into the grid. They contribute to reducing greenhouse gas emissions and reliance on fossil fuels. This transition to greener energy sources is crucial for combating climate change and achieving environmental goals. Another key benefit is the potential for cost savings. DERs can reduce the need for expensive infrastructure upgrades and peak demand charges,leading to more efficient and cost-effective energy distribution.

While the integration of DERs presents challenges, such as managing variable energy supply and ensuring grid stability, advancements in smart grid technology and energy storage solutions are addressing these issues. The transformation of the grid through DERs holds great promise for a reliable, sustainable, and resilient energy future.

- KAREDLA SRI

Organic Light Emitting Diode (OLED): The Future of Displays

Organic Light Emitting Diode (OLED) technology represents a significant advancement in display technology, offering vivid colours, high contrast ratios, and energy efficiency. Unlike traditional LCD displays that require a backlight, OLED displays use organic compounds that emit light when an electric current is applied, allowing each pixel to produce its own light.

One of the key benefits of OLED technology is its ability to produce true black levels. Since individual pixels can be turned off completely, OLED displays can achieve perfect black, resulting in higher contrast ratios and more vibrant colors. This feature makes OLEDs particularly popular in high-end televisions, smartphones, and wearable devices.

OLED screens are also thinner and more flexible than their LCD counterparts. This flexibility has paved the way for innovative product designs, such as foldable smartphones and curved television screens. Additionally, OLED displays offer faster response times, making them ideal for gaming and other applications that require quick image transitions.

Another advantage of OLED technology is its energy efficiency. Because OLEDs do not require a backlight, they consume less power, which is beneficial for portable devices that rely on battery life.

While OLED technology has been around for a few years, continuous advancements and cost reductions are making it more accessible to consumers. As the technology evolves, OLEDs are expected to become the standard for high-quality, energy-efficient displays, shaping the future of visual technology.

-B MANOJ KUMAR

Distributed Generation (DG)

Distributed generation (DG) refers to the production of electricity from many small, decentralized sources rather than a few large, centralized power plants. This decentralized approach can include renewable sources like solar panels, wind turbines, and small-scale hydroelectric plants, as well as traditional sources like diesel generators and microturbines.

In a traditional power grid, electricity is generated at large power plants and then transmitted over long distances to end-users. However, DG systems are typically located closer to the point of consumption. This proximity reduces transmission losses and enhances the reliability of power supply, especially in remote or rural areas.

Adopting DG can significantly reduce carbon emissions by integrating more renewable energy sources. It also allows for greater energy independence, as communities or individual households can generate and manage their power needs. Additionally, DG can provide resilience against grid failures or natural disasters, as power generation is not reliant on a single source. However, integrating DG into existing power distribution networks presents challenges. These include managing fluctuating power outputs from renewable sources and ensuring grid stability and reliability. Effective grid management systems and policies are essential to address these challenges and fully realize the benefits of distributed generation.

-Y.AKHILA

Wireless Transfer of Electricity: A Glimpse into the Future

The wireless transfer of electricity, first developed at the Massachusetts Institute of Technology by Professor Marin Soljacic and his team, marks a significant technological breakthrough. With the ability to transmit electricity wirelessly through materials like air, wood, granite, plastic, and grass, this innovation, while still in its early stages, has shown notable applications since 2020.

One of the most prominent uses is in wireless charging devices for smartphones, laptops, and earphones. This technology has been adopted by electronic companies, paving the way for a more convenient and cable-free future. Moreover, car manufacturers such as Toyota, Thoratec, and Intel have started incorporating this technology in their electric vehicles and wearable technology.

As the application of wireless power advances, it is expected to bring even more revolutionary changes in 2021 and beyond. The ultimate vision is to eliminate the need for power cables altogether, providing a seamless experience for consumers. While this goal may not be entirely achieved in the immediate future, the developments on the horizon promise an exciting era of innovation and convenience.

- VEMULA.AMARNADH

Battery Development in EVs

The year 2021 witnessed remarkable advancements in battery technology, especially for electric vehicles (EVs). Among the most notable developments was the progress in solid-state batteries. Unlike conventional lithium-ion batteries, solid-state batteries use a solid electrolyte, which offers numerous benefits including higher energy density, faster charging times, and significantly improved safety. These enhancements are crucial for extending EV range and reducing charging durations, helping to address common consumer concerns.

Another significant achievement was the improvement in battery recycling processes. Enhanced recycling techniques allowed for the efficient recovery of valuable materials like cobalt, nickel, and lithium from used batteries. This not only reduced environmental impact but also decreased dependency on mining new resources, promoting sustainability in the growing EV market.

Additionally, advancements in silicon anode technology played a pivotal role in increasing battery capacity. Silicon anodes can store more lithium ions than traditional graphite anodes, which translates to longer-lasting batteries and extended driving ranges for EVs. This innovation is poised to revolutionize the EV industry, making electric cars more efficient and appealing to a broader audience.

-P.HAVINASH

FACULTY PUBLICATIONS

K. Harinadha Reddy

Hybrid ROCOF Relay for Islanding Detection :

The Hybrid Rate of Change of Frequency (ROCOF) Relay for Islanding Detection, developed by K. Harinadha Reddy and his team, represents a significant advancement in the field of distributed generation (DG). Islanding occurs when a portion of the grid, powered by DG, becomes isolated from the main power network yet continues to supply electricity to local loads. This poses a risk to grid stability and safety. K. Harinadha Reddy's research addresses this issue through a hybrid islanding detection approach that combines passive and active ROCOF methods. Unlike traditional passive methods, which only rely on local parameter changes, this hybrid technique enhances detection accuracy by incorporating active monitoring. The result is a more efficient classification of islanding and non-islanding events.

The hybrid ROCOF relay detects zero power balanced islanding within 200 milliseconds and unbalanced islanding within 100 milliseconds, showcasing its effectiveness. This innovation is crucial for meeting IEEE 1547 DG interconnection standards, which require islanding detection within two seconds.

Implemented in a Matlab/Simulink environment, this approach promises a safer, more reliable integration of renewable energy sources into the grid, paving the way for a sustainable energy future.

Journal of Electrical Engineering & Technology Vol.17, No.0 Page 51-60, ISSN: 1975- 0102 https://link.springer. com/article/10.1007/ s42835-021-00856-9 Jan-22 SCIE

G.Nageswara Rao

Evolution of Estimation in Software Development using deep Learning:

The significant improvements in software development estimation using deep learning techniques. The study emphasizes the need for accurate estimation to manage resources, time, and costs effectively in software projects.

Their work focuses on leveraging deep learning models, particularly neural networks, to enhance the precision of software effort estimation1. Traditional methods often fall short due to the complex and dynamic nature of software projects. The integration of deep learning provides a robust framework for analyzing vast amounts of data, identifying patterns, and making more reliable predictions. Key parameters such as time, conditions, personnel, infrastructure, and risks were evaluated through deep learning models, leading to improved estimation accuracy. This approach not only helps in better project management but also boosts the efficiency and quality of software development processes. By utilizing modified neural networks for innovative methodologies in project estimation, reflecting a shift towards more data-driven and intelligent decision-making in the software industry.

Modified Neural Network Applied Nanoscience Available Online ISSN NO: 2190- 5517 https://doi.org/10.1 007/s13204-021- 02204-9 Feb-2022 SCIE

K. Ramalingeswar a Prasad

Intelligent Wearable Devices Enabled Automatic Vehicle Detection and Tracking:

The development of intelligent wearable devices that enable automatic vehicle detection and tracking. Their research focuses on integrating deep learning and Internet of Things (IoT) technologies to create a robust system for improving transportation safety and efficiency. The system uses intelligent wearable devices combined with video- enabled Unmanned Aerial Vehicle (UAV) networks. Deep Convolutional Neural Networks (DCNNs) form the backbone of the vehicle detection mechanism, accurately identifying vehicles in various environments, even under challenging conditions1. The tracking aspect leverages IoT for real-time data processing and communication, providing continuous monitoring and tracking of vehicles.

Their innovation is particularly useful in dynamic and crowded urban settings, where traditional surveillance systems may fall short. By utilizing wearable devices and UAV networks, the system ensures comprehensive coverage and enhanced reliability, making it an invaluable tool for traffic management and accident prevention.

This research highlights the potential of combining advanced technologies to address complex transportation problems, paving the way for smarter and safer urban mobility solutions.

Journal of Healthcare Engineering ISSN NO: 2040- 2295 Vol. 2022, Article ID 2592365, 14 page s, 2022. March2022 SCIE

P.Sobha Rani

Improved Bald Eagle Search for Optimal Allocation of DSTATCOM in Modern:

The research focuses on enhancing the allocation of Distribution Static Synchronous Compensators (DSTATCOM) in modern electrical distribution networks. Utilizing a novel meta-heuristic approach known as Improved Bald Eagle Search (IBES), this method aims to provide optimal reactive power compensation, reducing distribution losses and improving voltage stability.

Modern electrical distribution networks are planned to accommodate new loads, such as electric vehicles and agricultural demands. These networks often suffer from high distribution losses and low voltage stability due to their radial configuration and high resistance-to-reactance ratio. Incorporating DSTATCOM can help mitigate these issues. The IBES algorithm was specifically developed for optimal DSTATCOM allocation, achieving significant improvements over traditional methods. This approach has been tested on standard IEEE 33-bus systems, demonstrating superior computational characteristics and better performance in terms of loss reduction and voltage stability enhancement. The combination of IBES and DSTATCOM presents a promising solution for managing the emerging electrical loads and maintaining a stable, efficient power distribution network.

This innovative research provides a foundation for future advancements in electrical network optimization, highlighting the potential of meta-heuristic algorithms in addressing complex engineering challenges.

International Journal of Intelligent ISSN: 2185-3118. Vol.15, No.2, Page: 554-563, Feb-2022 Scopus

J.Sivavara Prasad & J.V.Pavan Chand

Hybrid Soft Switching Mode PWM Full Bridge DC–DC Converter with Minimized Switching Loss:

The Hybrid Soft Switching Mode Pulse Width Modulation (PWM) Full Bridge DC–DC Converter represents a significant advancement in power electronics. This converter employs a hybrid soft switching technique that combines Zero-Voltage Switching (ZVS) and Zero-Current Switching (ZCS) to minimize switching loss while maintaining high efficiency.

In the proposed converter, the primary switches utilize ZVS, while the secondary switches employ ZCS, enabling seamless operation across a wide load range. This approach reduces switching stress and improves overall system efficiency by reducing both conduction and switching losses1. The converter is specifically designed to handle high input currents, making it suitable for various applications, including electric vehicle chargers and renewable energy systems.

One of the key features of this converter is its ability to maintain efficiency even under fluctuating loads. The combination of ZVS and ZCS ensures that the converter can operate at higher frequencies without significant losses, thus achieving better performance compared to traditional hard-switching converters. Additionally, the use of low-voltage rating MOSFETs and diodes further contributes to minimizing conduction losses, enhancing the overall efficiency of the system.

This innovation paves the way for more efficient and reliable power conversion solutions, addressing the growing demand for energy-efficient technologies in modern electrical systems.

2021 International Conference on Computing Sciences (ICCS) ISBN NO: 978-1- 6654-9446-5 DOI: 10.1109/ICC S54944.2021.0003 4 June 2022 Scopus

K. Nagalinga Chary

GSM Technology Modeling of an Arduino-based Smart Energy Meter:

The integration of Global System for Mobile Communications (GSM) with Arduino for energy metering offers a novel solution to modernize and improve the accuracy of electricity billing systems. This system employs an Arduino UNO board and a GSM module to create a smart energy meter. The primary advantage is the ability to transmit real-time energy consumption data to utility providers and users via SMS, eliminating the need for manual meter readings.

In this setup, the smart energy meter continuously monitors electricity usage and sends periodic updates through the GSM network. Users can receive alerts on their mobile phones, including low balance notifications, power cut alerts, and consumption reports. This system not only facilitates prepaid energy metering but also includes anti-tamper mechanisms to detect unauthorized access or electricity theft.

The use of GSM technology in an Arduino-based energy meter significantly enhances the efficiency and transparency of energy consumption tracking. It ensures timely information dissemination, thereby enabling consumers to manage their energy usage more effectively. This innovation represents a substantial step towards more intelligent and automated energy management systems, contributing to improved sustainability and customer satisfaction.

DICKENSIAN JOURNAL ISSN NO: 0012- 2440, Vol.22, No.5, Page: 369-372. 2022.
DOI:10.12001.DK.J 2022.V22.I5.218 May-2022 Online Publication

PATENTS

Name of Inventor : Dr. K. Harinadha Reddy

Title of Patent : KMC-ML Based HPCSP Islanding Detection Algorithm To Estimate The Dg Integrated Network State

Published Year & Month: January-2022

PATENT APPLICATION ID: 202141054714

Status : Published

The KMC-ML Based Hybrid Pattern Classification and Signal Processing (HPCSP) Islanding Detection Algorithm offers a cutting-edge solution for estimating the state of Distributed Generation (DG) integrated networks. By merging K-Means Clustering (KMC) and Machine Learning (ML) techniques, this algorithm enhances the detection of islanding conditions, which occur when a segment of the power grid becomes isolated yet continues to operate independently.

This advanced algorithm employs HPCSP methods to analyze and classify grid patterns, identifying potential islanding scenarios with high accuracy. The KMC technique aids in clustering similar grid states, while ML models refine the classification process by learning from historical data and improving detection sensitivity. This combination ensures minimal non-detection zones (NDZ) and rapid response times, which are critical for maintaining grid stability and safety.

The KMC-ML Based HPCSP algorithm not only meets IEEE 1547 standards but also addresses the complexities of modern power systems with a high penetration of DG sources. Its implementation paves the way for more reliable and efficient management of distributed energy resources.

Name of Inventor : **Mrs.T.Naga Durga**

Title of Patent : A Method For Efficient Optimization Of Photovoltaic Strings For Maximum Power Output

Published Year & Month: February 2022

PATENT APPLICATION ID : 202241007411 A

Status : Published

The method for optimizing photovoltaic (PV) strings focuses on enhancing energy extraction to achieve maximum power output. By employing advanced algorithms like Grey Wolf Optimization (GWO), this approach addresses the issue of partial shading, which often limits the efficiency of PV systems.

Traditional maximum power point tracking (MPPT) techniques struggle under partial shading conditions, leading to multiple peaks in the power output curve. The GWO method, inspired by the hunting strategies of grey wolves, effectively navigates these challenges by balancing diversification and intensification in the search space.

This optimization strategy ensures that PV strings operate at their global maximum power point, regardless of shading conditions. Simulation results demonstrate that GWO outperforms conventional techniques like Perturb and Observe, reducing power loss and enhancing overall system efficiency. This method represents a significant advancement in the field of renewable energy, contributing to the reliability and effectiveness of solar energy systems.

Name of Inventor: **K.Ramalingeswara Prasad**

Title of Patent: Machine Learning And Iot Based Intelligent System For Monitoring Health Of Vehicle Battery

Published Year & Month: March 2022

PATENT APPLICATION ID: 202211011330 A

Status: Published

A smart system integrates Machine Learning (ML) and the Internet of Things (IoT) to effectively monitor vehicle battery health. By deploying sensors to measure parameters like voltage, current, and temperature, real-time data is collected and transmitted to a cloud platform for analysis. Machine learning algorithms, such as Decision Trees or Random Forests, process this data to predict the battery's state of charge (SoC) and state of health (SoH).

This approach allows for proactive maintenance by identifying potential issues before they escalate. The system can also send alerts to users about necessary actions, such as charging or replacement. This intelligent monitoring ensures optimal battery performance, prolonging its lifespan and enhancing the reliability of electric vehicles.

By combining advanced ML models with IoT capabilities, this solution provides comprehensive, real-time insights into battery health, promoting efficient energy management and reducing the risk of unexpected failures.

BOOKS WRITTEN

Name of the Author: Dr.G. Nageswara Rao

Title of the Book / Chapter: Study on Modelling and Analysis of a Dynamic Voltage Restorer (DVR) and Sinusoidal Pulse Width Modulation (SPWM) Based Controller

Name of the Publisher with Address: New Approaches in Engineering Research. Vol. 11, B.P Publishers, West Bengal ,India

Print ISBN: 978-93-91882-99-0

eBook ISBN: 978-93-91882-95-2

DOI: 10.9734/bpi/naer/v11/12141D

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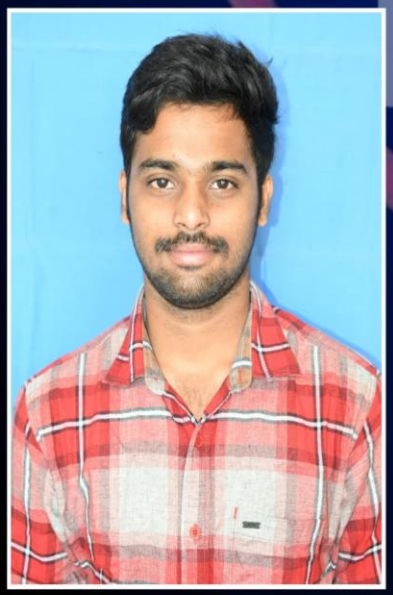

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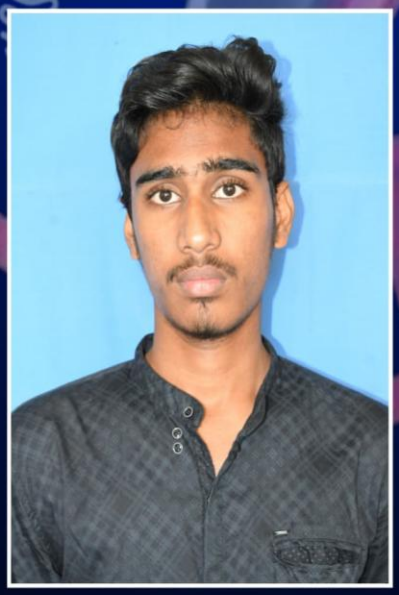

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