

Abstract Proceedings of  
**ESDA 2024**



**7<sup>th</sup> International Conference on  
Energy Systems Drives and  
Automation**

[www.actsoft.org/esda2024](http://www.actsoft.org/esda2024)

**14<sup>th</sup> to 15<sup>th</sup> of December, 2024**



**Organizer:**

**Applied Computer Technology,  
Kolkata, West Bengal, India.**

**Joint-Organizer and Venue:**

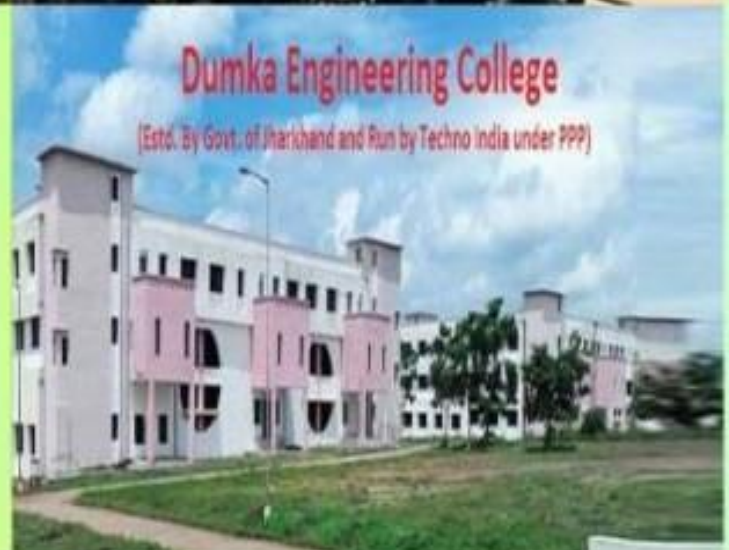
**Dumka Engineering College, Dumka Town,  
Dist: Dumka, Jharkhand, India.**

**In Association with:**

**International Association of Science,  
Technology and Management**

**Dumka Engineering College**

*(Estd. By Govt. of Jharkhand and Run by Techno India under PPP)*



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Proceedings of

**7<sup>th</sup> International Conference on**

**Energy Systems Drives and Automations**

**ESDA2024**

**14<sup>th</sup> and 15<sup>th</sup> December, 2024**



Organizer:

**Applied Computer Technology**

Kolkata, West Bengal, India.

[www.actsoft.org](http://www.actsoft.org)

Joint-Organizer:

**Dumka Engineering College,**

Dumka, Jharkhand, India.

(Estd. by Govt. of Jharkhand, man & management by Techno India Group under PPP, Affiliated to Jharkhand University of Technology, Ranchi)

**In Association to:**

International Association of Science, Technology and Management



**ACT**



 **Springer**

# ESDA2024

7<sup>th</sup> International Conference on

Energy Systems Drives and Automation

14<sup>th</sup> and 15<sup>th</sup> December 2024

Venue: Dumka Engineering College, Dumka Town, Dist: Dumka, Jharkhand, India.



Proceedings Book with abstract of papers

Published date: 14<sup>th</sup> December 2024

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Applied Computer Technology,

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## Inaugural Song:

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### **Prayer**

Translated in English

By

Hillol Ray

<http://www.iwvpa.net/rayh>

<http://www.iwvpa.net/rayh/index-hra.php>

Desires are all yours, you  
are the universal star-  
You do your own works, God,  
People say, I do them from a far!!

You stuck elephant into clay,  
And push a handicap to ascend hill-  
To some, you offer “Brahmo” feet,  
And make others descend  
downhill!!

I am a machine, you are the machinist, I  
am the home, you are the homemaker-

I am the chariot, you are the charioteer,  
You drive as you like, and I am a happy taker!!

“Milestone”

June 25, 2019

Garland, Texas, USA

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## **Editorial**

About 80 papers are received and 65 are selected for presentations in ESDA2024. Most of the abstracts of the papers in this book are in the areas of: energy systems, automations, control systems, Solar Energy, Bio Mass Energy, Electrical Vehicle Systems, Fuel Cells, Smart Grid Technologies, Micro Grid Technologies, Electric Conversion Systems, soft computing and optimization techniques, Hybrid Energy Systems, Energy Conservation and Auditing, Energy Storage and Battery Management, Conventional and Special Electrical Machines, Application of Control Theory, Industrial Drives, High Voltage Engineering, memory and storage circuits and devices etc.

With due thanks and best wishes to all our team members including the Chief Guest, Keynote Speakers, invited speakers, Chair persons, Authors, participants etc. for sparing their valuable time for preparing the papers of this abstract book.

These abstract proceedings are prepared with the abstracts of all papers for the delegates of the conference and for listing the abstracts only either in offline/online. As most of the revised and extended versions of the papers will go for either SCIE Journal or Scopus indexed Book chapters. We have not given any ISBN number to this book as because, these papers will go for further online publications.

**The Editors, ESDA2024**

**Dr. Dipu Sarkar (Department of EEE, NIT, Chumukedima, Dimapur, Nagaland, India.)**

**Dr. Chandramauleshwar Roy (Department of ECE, Associate Professor, VIT, Chennai, Tamil Nadu, India.)**

**Dr. Saumen Dhara (Department of EE, GKCEM, Baruipur, Kolkata, West Bengal, India.)**

**Mr. Arup Halde (Scientist, ACT, Belghoria, Kolkata, West Bengal, India)**



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Speech of: **Prof. Dulal Acharjee**  
Executive Chairman, ESDA2024 and  
Director, Applied Computer Technology, Kolkata, West Bengal, India.



Today, we are here to inaugurate the 07<sup>th</sup> International Conference on 'Energy Systems Drives and Automation', in short ESDA2024. It is a series of conference and is organized annually. To promote research works in these fields and gradually improving the research works is the main motto and objective of this conference.

Through our long observations we feel that many areas related to research works yet to be developed and these are: research supporting staff, Scientist and technicians should be recruited in each departments who will support technical works of the research projects. Some points are mentioned here: data collection, data file preparation for reusing, Keeping data in repository for other researchers. Another important issue is: creating video of research flow or output flow. Video is the best way of presenting any works to the audiences, animations of figures, exploring and expanding the inner components visually can explain the concept in a better way. We need to develop separate manpower who will be associated with the research fellows. Our company, Applied Computer Technology, ACT, provides these services and in future we shall expand these types of supporting services for the research fellows.

This conference is on energy system; harvesting natural resources to acquire required energy is the main theme of this conference like ESDA2024. So fast we can minimize the uses of coal, oil and gas is the best for the next generation. But simultaneously we should accelerate the uses of Wind, Sunlight, Tide, Water flows, pressure, vibrations etc. which are the physical properties of the nature and should be converted to power. The philosophy of generating of energy should be that the required energy to run a device should be collected from the adjacent surroundings of the device by conversion of adjacent natural properties to energy. For that, architecture and design of all electrical instruments should be made accordingly. Next concept of uses of energy should be of using hybrid sources of energy for running any fuel or battery based machine. Machine should run by hybrid sources of energy.

Next generation of automations will be controlled with the help of brain of machine where Artificial Intelligence based programming will make the system more and more intelligent to take decision about the events. Controlling of heavy machines like Crane, motor of Ship and rock cutting drilling machines etc. will be able to work with more efficiently with the combinations of proper hardware and software. Slogan should be 'more brain, less manual labour'.

About 80 papers are submitted and about 52 papers will be presented in this conference. Hope, by your active participation, researchers will be able to make a network with the related professors which may help them to furnish their research projects. In future, these inventions would be patented within machines and the World would be a better sustainable and peaceful space for the human being.

With warm wishes and kind regards,  
Date: 14/12/2024

Prof. Dulal Acharjee.

## Message from Guest of Honour

Dr. Yogesh Vijay Hote  
Professor, Department of Electrical Engineering  
Indian Institute of Technology, Roorkee



With great joy, I write this message for the 7<sup>th</sup> International Conference on Energy Systems Drives, and Automation (ESDA2024). My heartfelt congratulations to the organizers, “Applied Computer Technology, Kolkata, West Bengal” and “Dumka Engineering College, Jharkhand” for spearheading this significant initiative.

This conference serves as a vital platform for knowledge exchange among faculty members, researchers, students, and industry practitioners in the fields of energy systems, drives, and automation. The diverse range of topics covered, including Renewable Energy, Electric Vehicles, and Wireless Power Transfer, aims to address some of today's most pressing challenges in these domains.

Additionally, the conference offers an exceptional opportunity for participants to publish their work in SCIE-indexed journals and Springer-Nature's Lecture Notes on Electrical Engineering series.

I extend my best wishes to the organizing team and all the participants for their ongoing success and eagerly anticipate the transformative ideas and innovations that will emerge from this event. May the ESDA 2024 leave a long-lasting impact and inspire future advancements.

With warm wishes and kind regards,  
Date: 14/12/2024

Dr. Yogesh Vijay Hote

## Message of Guest of Honour:

Dr. Manish Kumar Jha  
Associate Professor  
Department of Humanities, Social Sciences and Management  
NIT Jamshedpur



Good Morning to all of you. At the outset, I am grateful to the organizer for inviting me here. I will share my views on Climate change, clean energy and sustainable development. 7<sup>th</sup> goal of SDG is Ensure access to affordable, reliable, sustainable and modern energy for all.

The last decade has been witnessed numerous significant progress in various fields such as science, medicine, and technology however at the same time, today's society is encountering various problems. Worldwide various reports stress, climate change, as one of the major problem of present society. There is no economy or individual that is unaffected by climate change. Global warming and temperature is continually rising.

One of the most effective solutions to combat climate change is the transition and adoption to clean and renewable energy sources. Clean energy contributes to minimal greenhouse gas emissions, while renewable energy is derived from natural resources such as sunlight, wind, and water. Reduction in greenhouse gas emissions and increased awareness about this can make a significant difference.

In this direction, this International Conference on 'Energy Systems, Drives & Automations will provide a global platform where, leading researchers, scientists, and industry experts will explore the latest innovations in clean energy, sustainable society and SDG. The conference will showcase cutting-edge technologies, policies, and strategies aimed at promoting sustainability across various aspects of Energy Systems, Drives & Automations'. Renowned scientists and researchers will deliver on emerging trends and will provide a unique platform for interdisciplinary collaboration, knowledge exchange and sustainable future.

I congratulate the organizer Dumka Engineering college, and all the associated faculty and officers for organizing this wonderful conference and wish its grand success.

With warm wishes and kind regards,  
Date: 14/12/2024

Dr Manish Kumar Jha

## Message of General Chair, ESDA2024

Prof. Pradip Kumar Sadhu  
Professor, department of Electrical Engineering  
Indian Institute of Technology (ISM)  
Dhanbad, Jharkhand, India.



Respected Chief Guest, distinguished dignitaries, esteemed speakers, participants, faculty members, and dear students,

Good morning to everyone. It is with immense pride and pleasure that I welcome you all to the inaugural session of the International Conference on Emerging Sustainable Development in Academia (ESDA 2024), hosted by Dumka Engineering College. This event marks a significant milestone in our institution's journey of academic excellence, and I am honoured to address this gathering as the General Chair of this prestigious conference.

### **The Vision and Purpose of ESDA 2024**

The theme of this conference, Emerging Sustainable Development in Academia, reflects the pressing need to align our educational and research pursuits with the global agenda of sustainability. As we face challenges like climate change, resource scarcity, and socio-economic disparities, academia must play a pivotal role in developing innovative and practical solutions.

ESDA 2024 is a platform that brings together academicians, researchers, industry professionals, and students to discuss, deliberate, and contribute to this noble cause. It is our collective effort to foster interdisciplinary collaboration and drive impactful outcomes that benefit both academia and society.

### **Acknowledging the Contributors**

This conference would not have been possible without the relentless efforts of the organizing committee, faculty members, and students of Dumka Engineering College. Your dedication and teamwork have brought this vision to life, and I commend you for your hard work and commitment.

I also extend my gratitude to the Jharkhand University of Technology for its guidance and support, as well as to our sponsors and partners for their invaluable contributions to this event.

### **Welcoming the Participants**

To all the participants and delegates, I extend a warm welcome. Your presence here enriches this conference and underscores its importance. Over the next few days, you will have the opportunity to engage with experts, present your ideas, and explore innovative solutions to pressing global challenges.

Let this conference be a space for learning, collaboration, and inspiration. Share your knowledge, listen actively, and take back insights that will shape your academic and professional journeys.

### **Recognizing the Role of Dumka Engineering College**

Dumka Engineering College, as an affiliate of Jharkhand University of Technology, has consistently strived to uphold high academic standards. Hosting ESDA 2024 is a testament to the institution's commitment to fostering research, innovation, and global engagement. This conference positions our college as a hub of intellectual activity and a contributor to the global discourse on sustainable development.

### **Encouragement to Young Researchers**

To the young researchers and students, this conference is an excellent opportunity to showcase your work and learn from the experiences of distinguished experts. Your curiosity, creativity, and passion are the driving forces behind innovation. Use this platform to network, seek mentorship, and broaden your horizons.

### **Looking Forward**

As we inaugurate ESDA 2024, let us commit ourselves to the larger purpose of advancing sustainability through education and research. I am confident that the discussions, collaborations, and ideas generated here will pave the way for meaningful contributions to academia and society.

### **Conclusion**

Once again, I welcome you all to ESDA 2024. Let us make this conference a memorable and impactful experience. I wish all the participants fruitful discussions and a successful event.

Thank you for your attention, and let the journey of ESDA 2024 begin!

With warm wishes and kind regards,

Date: 14/12/2024

Prof. Pradip Kumar Sadhu

## Keynote Talk

### **Selected Problems and Prospects of BPL PLC Application in MV Medium Mine Networks**

Dr. Bogddan Miedzinski,  
Institute of Vacuum Technology, Warsaw, POLAND.

Dr. Grzegorz Debita,  
KOMAG Mining Institute, POLAND.

#### Abstract:

Communication continuity and its appropriate quality in today's life are of prime importance. However, they become key factors in any emergency case. This applies, inter alia, to mine disasters when voice contact with injured persons is required. The situation is similar in the case of black-out and / or military threat under stoppage of electric energy.

Therefore, in such cases, the use of PLC technology in medium voltage cable networks as image and / or voice transmission channel seems to be as justified as possible. The cable networks in mines are laid underground, as are the urban networks in tunnels. They are robust and resistant to mechanical damage and can be effectively used as a transmission medium under energy stoppage and even in the case of conductors interruption. In order to demonstrate the validity and usefulness of the idea, the authors carried out appropriate tests for a selected fragment of 6 kV mining cable network when connecting a specially developed transmitter and a digital receiver to BPL modems.

## Keynote Talk

### **Futuristic Power System: Advancements Using AI Technologies**

Prof. Chandan Kumar Chanda  
Professor, Electrical Engineering Department, Indian Institute of Engineering Science and Technology, Shibpur, Botanical Garden, Howrah, India

#### Abstract:

This presentation explores the transformative impact of artificial intelligence (AI) on modern power systems, particularly in renewable energy integration. Traditional power grids face challenges such as limited renewable energy support, fluctuating power quality, and reliability issues. AI technologies are addressing these challenges by enhancing energy production forecasting, enabling predictive maintenance, and optimizing energy storage. AI applications like smart grid operations, demand forecasting, and decentralized energy management improve grid stability and efficiency. The presentation emphasizes AI's role in reducing carbon footprints and supporting a sustainable, resilient power grid for the future.

## Keynote Talk

### **Hybrid charging system for e- vehicles which allows charging in static as well as dynamic condition**

Prof. Pradip Kumar Sadhu

Professor, department of Electrical Engineering Indian Institute of Technology (ISM)  
Dhanbad, Jharkhand, India

#### Abstract:

Governments all across the world are planning to build carbon-neutral infrastructures to reduce dependency on fossil fuels in the transport sector following the sustainable development goals (SDGs). India is one of the largest vehicle markets in the world, with around 40 million customers needing mobility solutions. The major problem in utilizing EVs is the lack of reliable, accessible, and affordable commercial charging infrastructure, proving to be a hurdle in adopting electric vehicles as the principal mode of road transport. Electric vehicles (EVs) are emerging as a method of utilizing clean energy with a considerable reduction in greenhouse gas emissions and air pollution. However, the widespread adoption of EVs is impeded by lack of charging facilities, range anxiety, longer charging time and higher prices due to the requirement for larger batteries. The penetration of EVs in the market can be increased by creating an infrastructure that enables EV charging in dynamic as well as static conditions of the car. To provide maximum degree of freedom, the conventional plug-in charging facilities should be upgraded to wireless charging. While the utilization of renewable energy will make the transport sector more sustainable, bidirectional power flow will enable car owners to sell excess electricity from vehicle to grid (V2G). A working model of a hybrid renewable energy-driven bidirectional wireless charging system has been developed by a research group in the Department of Electrical Engineering, IIT (ISM) Dhanbad. In the proposed model, the inductive power transfer occurs between two mutually coupled coils through the air gap and asphalt. The charging coil can be kept under the road, parking lot, or garage. The proposed system works in cars with low, mid, and high ground clearance and therefore can be utilized for charging a wide variety of passenger automobiles, SUVs, and light trucks. The system underwent a trial at a laboratory scale and demonstrated satisfactory power transfer efficiency. The charging of vehicles is propelled by renewable sources of energy, including solar and wind energy and simultaneously allows electric charging of vehicles through power grids.

The IIT (ISM) Dhanbad funded project began on February 17, 2020 and after 30 months of rigorous experimentation, the working model was developed. A patent has been filed for the same with some added features of adjustable height for vehicles with different ground clearances. The researchers further plan to make the technology adjustable to the length of the vehicle.



Keynote Talk  
**The Emerging Future of Electric Vehicles (EVs) and Lithium-Ion Batteries in India**

Dr. Rajesh Dey  
Associate Professor, Gopal Narayan Singh University,  
Sasaram, Bihar, India.

**Abstract:**

The transportation landscape in India is undergoing a transformative shift with the increasing adoption of electric vehicles (EVs). This change is driven by the urgent need to reduce greenhouse gas emissions, decrease dependency on fossil fuels, and improve urban air quality. The core technology enabling this revolution is the lithium-ion (Li-ion) battery, which powers EVs with high efficiency and reliability. At ESDA2024, this talk delves into the advancements, challenges, and future prospects of EVs and Li-ion batteries in India.

India's EV market has experienced exponential growth in recent years, fueled by favorable government policies, technological advancements, and increased consumer awareness. The Government of India has launched several initiatives to promote EV adoption, including the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, which provides incentives for purchasing electric vehicles and setting up charging infrastructure.

This surge in EV adoption is also driven by urbanization and the need for sustainable mobility solutions in cities plagued by pollution and traffic congestion. Major Indian cities like Delhi, Mumbai, and Bangalore are witnessing a rise in electric two-wheelers and electric buses, which offer a cleaner and quieter alternative to conventional internal combustion engine vehicles.

The heart of any EV is its battery, and the development of advanced battery technologies is crucial for the success of EVs. Li-ion batteries are currently the most popular choice due to their high energy density, long cycle life, and relatively low self-discharge rates. However, researchers and manufacturers are continually striving to enhance these batteries to meet the growing demands of the EV market.

Recent advancements in battery chemistry have led to the development of Lithium Iron Phosphate (LFP) and solid-state batteries. LFP batteries are gaining popularity due to their safety, longevity, and cost-effectiveness. They are less prone to overheating and thermal runaway, making them a safer option for EVs. Solid-state batteries, on the other hand, promise even higher energy densities and faster charging times, which could significantly improve the range and convenience of EVs.

**Final Remarks**

The future of EVs and Li-ion batteries in India is bright, with immense potential to transform the transportation sector. Continued research and development, coupled with supportive policies, will ensure that India remains at the forefront of this technological revolution. By addressing the challenges and leveraging opportunities, India can achieve its vision of becoming a leader in electric mobility and sustainable transportation.

## Keynote Talk

### **Hydrogen Technologies as the Foundation of Economy Decarbonization**

Dr. Marta Zurek-Mortka

Department of Control Systems

Lukasiewicz Research Network – Institute for Sustainable Technologies, Poland

#### **Abstract:**

Hydrogen is one of the most promising energy sources in the fight against climate change because its combustion produces only water, with no carbon dioxide emissions. Decarbonizing the economy requires a shift from fossil fuels to clean energy sources, and hydrogen, thanks to its versatility, can be used in energy production, transportation, industry, and heating. A key role in this process is played by green hydrogen, produced through water electrolysis using renewable energy, which enables significant reductions in greenhouse gas emissions. Additionally, hydrogen can serve as an effective energy storage solution, allowing surplus energy from intermittent renewable sources, such as wind or solar, to be stored.

In the transportation sector, hydrogen presents an intriguing alternative to electric vehicles, particularly in areas where batteries are not efficient enough, such as heavy-duty transport, shipping, and aviation. In heavy industry, hydrogen can be used to reduce emissions in processes like steelmaking and chemical production, which are challenging to decarbonize through other means. One of the challenges related to hydrogen's widespread adoption is the development of infrastructure, including fueling stations and transmission networks, which are essential for its widespread use.

This presentation will delve into these innovations, highlighting their potential to revolutionize industry and the broader transportation ecosystem, while addressing the challenges and opportunities on the road to fully sustainable solutions. Also climate policies and regulations, such as those introduced in the European Union, play a crucial role in supporting the large-scale implementation of hydrogen technologies. Ultimately, adopting hydrogen technologies could not only accelerate the decarbonization process but also drive innovation, create new jobs, and contribute to transforming economies toward more sustainable development.

## Keynote Talk

### **Leveraging Demand Response for Energy Transition and Grid Stability**

Dr. Sandip Chanda

Associate Professor and Head

Ghani Khan Choudhury Institute of Engineering and Technology

A CFTI under Ministry Education. Govt. of India Narayanpur, Malda, West Bengal, India.

#### Abstract:

Demand response (DR) plays a crucial role in enabling the global energy transition and maintaining grid stability as renewable energy sources, such as wind and solar, become dominant. These renewable sources are inherently variable and intermittent, posing significant challenges to traditional grid operations. DR addresses these challenges by shifting or reducing electricity consumption during peak demand periods or when renewable generation is low, thus balancing supply and demand in real time. Through advanced technologies like smart meters, IoT devices, and AI-driven analytics, DR programs empower consumers to actively participate in energy markets while providing grid operators with tools to enhance reliability and flexibility. DR can serve various functions, from reducing peak load and mitigating grid congestion to supporting ancillary services like frequency regulation and voltage control. It also helps integrate decentralized energy resources, such as rooftop solar and battery storage, into the grid, making energy systems more resilient and adaptive.

The lecture examines real-world examples of successful DR implementations, showcasing how utilities and policymakers worldwide have leveraged DR to optimize energy efficiency and reduce reliance on fossil-fuel-based peaking power plants. Despite its potential, challenges remain, including regulatory barriers, consumer engagement, and the need for robust technological infrastructure. The lecture also explores emerging opportunities, such as dynamic pricing models, AI-optimized demand forecasting, and innovative policy frameworks, which can accelerate DR adoption and effectiveness. By enabling a more dynamic and responsive energy grid, DR not only supports the integration of renewable energy but also fosters sustainability, reduces costs, and enhances energy security. As a cornerstone of modern energy systems, DR is essential for building a future-ready grid that can adapt to evolving demands and support global decarbonization goals.

## Keynote Talk

# **Thermoelectric Technology Innovation: Materials, Synthesis and Sustainable Applications**

Dr. Mohd Faizul Mohd Sabri

Professor, Department of Mechanical Engineering, Faculty of Engineering,  
University of Malaya, Kuala Lumpur, Malaysia.

### Abstract:

Aligning with UN Sustainable Development Goals for affordable and clean energy (SDG 7) and climate action (SDG 13), thermoelectric generators (TEGs) emerge as a promising sustainable technology in response to growing global energy demands and environmental challenges from fossil fuel consumption. By directly converting waste heat into electricity without CO<sub>2</sub> emissions, TEGs contribute to both clean energy access and climate change mitigation. The commercial viability of this technology heavily depends on advances in thermoelectric (TE) materials development and synthesis techniques.

Currently, the widespread adoption of thermoelectric devices is hindered by their relatively low conversion efficiency of ~10-15%. Recent materials innovation has focused on improving the dimensionless figure of merit (ZT), which determines device efficiency. ZT optimization involves balancing three interconnected material properties: the Seebeck coefficient, electrical conductivity, and thermal conductivity. In bulk TE materials, these parameters are interdependent, creating a fundamental challenge where enhancing one property often adversely affects the others, thus limiting overall performance.

This talk will present recent progress in thermoelectric materials development, synthesis methods, and device engineering toward achieving clean energy goals and reducing greenhouse gas emissions. We also explore innovative strategies and future research directions for advancing TE technology as a sustainable energy solution, with particular emphasis on materials optimization and environmentally compatible applications that support the transition to renewable energy sources.

**Prof. Chandan Kumar Chanda**  
Professor, Electrical Engineering Department,  
Indian Institute of Engineering Science and Technology,  
Shibpur, Botanical Garden, Howrah, India



He is working as a Professor (HAG) in the Department of Electrical Engineering, IEST, Shibpur, India. He has earned Ph.D. degree from the Department of Electrical Engineering, B.E. College (DU), Shibpur, India with specialization in Power Systems. Dr. C. K. Chanda has over 33 years of teaching and research experience in the diverse field of Power Systems Engineering and almost 5 years experience in industry. His areas of interest include Renewable Energy, Smart Grid, Resiliency, Power System Stability etc. He is a recipient of Tata Rao Gold Medal. He is actively involved in various research projects funded by Centrally Funded Organizations like DST, UGC. He has published 175 research articles in reputed National/International journals and conferences including 60 research papers in SCI /SCOPUS -indexed journals. He is a member of the Editorial Board and Guest Editor of numerous reputed Journals. He has authored and coauthored seven (7) books and three (3) edited books in reputed publishing houses like CRC Press, Mc Graw Hill, PHI, and Springer etc. He has contributed twenty-one (21) book chapters in International Proceedings. Thirteen (13) research scholars have got their Ph. D. degree under the supervision of Dr. Chanda. Currently seven (7) PhD students are pursuing research under him. He has visited different foreign countries including USA, UK, Australia, Japan, and China for academic purposes. He is a senior member of IEEE(USA), member of IET(UK), Fellow of Institution of Engineers (I), C-Engineering(I) and Life-member of ISTE. Besides his academic research activity, Zeev is also very active in commercializing his inventions into start-up companies. Zeev was and is involved in technologically leading of more than 10 startup companies.

**Dr. Rajesh Dey**  
Associate Professor,  
Gopal Narayan Singh University, Sasaram, Bihar, India.



His Post-Doctoral Fellow, IIUM Malaysia Associated with ELECTROVENT LLP as Director M.Tech & Ph.D From Kalyani Govt Engineering College Under Maulana Abul Kalam Azad University, 20 years of expertise in Teaching, Entrepreneurship, and 6 years of experience in Industry Guest Editor/, Reviewer- Springer Nature, Wiley, TMH, Elsevier etc. He has around 50 research papers in journals, conferences and book chapters He is co-author of around 12 Nos of edited and text books. His Research Interest Application of Batteries in EV, Sensor Technology, Adaptive Signal Processing, Biomedical Engineering, Embedded System, Robotics, Internet of things

**Prof. Pradip Kumar Sadhu**

Professor, department of Electrical Engineering,  
Indian Institute of Technology (ISM)  
Dhanbad, Jharkhand, India.



He received his Bachelor, Post-Graduate and Ph.D. (Engineering) degrees from Department of Electrical Engineering, Jadavpur University, Kolkata, West Bengal, India. Currently, he is working as a Professor (HAG) & Ex- Head of Electrical Engineering Department of Indian Institute of Technology (ISM), Dhanbad, India. Also, He served B.I.T., Mesra, Ranchi as faculty member of Electrical & Electronics Engg. Department. Prior to join B.I.T. Mesra, also he served the different industries for twelve years. He has total experience of 35 years, out of which 23 years in teaching and 12 years in industry. He has eighteen (18) Granted Patents. In addition, fourteen (14) more patents in his name are under process. He has several journal and conference publications in National and International level including IEEE Transactions on INDUSTRIAL ELECTRONICS, IEEE transactions on POWER SYSTEMS, IEEE Transactions on Instrumentation and Measurement, IEEE SENSORS JOURNAL, IEEE Access, Solar Energy, Renewable Energy, Building and Environment, Renewable and Sustainable Energy Reviews, IET Generation, Transmission & Distribution, IET Science Measurement & Technology, IET Smart Grid. He is principal investigator of a few Govt. funded projects. He has developed Hybrid charging system for e- vehicles that allows charging in static as well as dynamic condition; Technology for which the patent application has been filed can herald a new era for adoption of electric vehicles as principal mode of road transport. He is reviewer of various international journals like IEEE Transaction on Power Electronics, IEEE Transactions on INDUSTRIAL ELECTRONICS, Solar Energy, Renewable Energy, etc. He has guided 22 Nos. of doctoral candidates and a large no. of M. Tech students. Moreover, He has published four text books entitled, "Elements of Power Systems" under CRC Press, Taylor & Francis Group, "Modern Utilization of Electrical Power", "Elements of Electrical Machines", "Basic Electrical Engineering" under CBS Publication, with his co-author research scholar Soumya Das. His current areas of interest are Power Electronics Applications, Application of High Frequency Converter, Energy Efficient Devices, Energy Efficient Drives, Computer Aided Power System Analysis, Condition Monitoring, Solar Energy, Renewable and Sustainable Energy and Lighting & Communication Systems for Underground Coal Mines.

**Dr. Bogddan Miedzinski**

Professor of Electrical Engineering,  
Wroclaw University of Technology,  
Faculty of Electrical Engineering and  
Faculty of Geoen지니어ing, Mining and  
Geology; Institute of Vacuum Technology, Warsaw, POLAND.



Professor of Electrical Engineering with extensive experience in teaching, research, and in the field of cooperation with industry, cooperation with foreign countries and staff development (Wrocław University of Technology, Faculty of Electrical Engineering and Faculty of Geoen지니어ing, Mining and Geology; Institute of Vacuum Technology, Warsaw; Institute of Innovative Technologies EMAG, Katowice). • His portfolio includes over 300 publications, 6 books and monographs, and approx. 30 patents • A wide range of professional and scientific activities, including: power engineering, power engineering protection automation, electrical engineering and mining automation, sensor networks, fiber optic technology, and PLC technology in networks, especially medium voltage networks. Currently he is Emeritus Professor in Wrocław University of Science and Technology and professor in Karkonosze Academy of Applied Sciences in Jelenia Góra, Poland.



### **Dr. Marta Zurek-Mortka**

Senior Researcher, Lukaszewicz Research Network Institute for Sustainable Technologies, Radom, Poland,



She is a young researcher, which works as a specialist in the Institute for Sustainable Technologies in Radom in the Department of Control Systems. The institute belongs to the third largest research network in Europe called

Lukasiewicz Research Network (<https://lukaszewicz.gov.pl/en/>). She obtained a Doctor degree at the Faculty of Transport, Electrical Engineering and Computer Science at the University of Technology and Humanities Kazimierz Pulaski in Radom in the field of Electrical Engineering. She was an Erasmus Ph.D. Student at the Faculty of Electrical Engineering at the University of Ljubljana in Slovenia in 2019-2020. She is a Member of the Mazovia ICT Cluster, the Polish Association of Electrical Engineers, and a Member of the Expert Board of the European Commission and National Centre for Research and Development in Poland. She is also a Member of the Organizing Committees of International Conferences in Poland and India. The scientific interest includes among others electromobility, renewable energy, power electronic converters for electromobility and Renewable Energy Sources (RES), minimizing electromagnetic disturbances generated by power electronic converters, hydrogen technology. At the present, she is working on an innovative solution related to the use of thermoelectric generators for the production of electricity from waste heat. She is an author and co-author of over 25 publications in English and Polish language in Energies, ASTES Journal, elektro.info, and Springer, and also co-author of 4 patent applications. She participates in many national and international conferences and seminars, mainly organized in Asia.

### **Dr. Sandip Chanda**

Associate Professor and Head  
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Malda, West Bengal, India.



He is a B.E from Jadavpur University in Electrical Engineering. He completed his M.Tech Degree in Electrical Engineering from applied Physics Department of Science College, Kolkata and he was awarded Ph.D.(Engineering) from IEST, Shibpur (Formerly Shibpur B.E. College) in 2015. Dr. Chanda has 18 years of Teaching experience including 13 years of research experience in the field of Electrical Power System. He has worked 2.5 years as Principal and 8 years as head of Electrical Engineering Department of reputed engineering colleges. He has published 46 journals and conference papers in Elsevier, Springer, IEEE and in other reputed publications. He has also published 4 books on Smart Grid Research and 4 book chapters available in IET digital library and other reputed publications. Currently he is working as Dean of faculty welfare and Head of Electrical Engineering in Ghani Khan Choudhury Institute of Engineering and Technology, Malda, a CFTI under Ministry of Education, Govt. of India. His research area includes Power system Optimisation, Smart Grid, Renewable Energy Sources and Micro Grid.

**Dr. Grzegorz Debita,**

KOMAG Mining Institute, POLAND.

Research interests: PLC BPL, Modeling of transmission lines, FPGA, signal processing, optimization of telecommunications and telematics systems.



Dr. Ing. Grzegorz Debita born 13.03.1984 in Kamienna Góra graduated from the Wrocław University of Science and Technology at the Faculty of Electronics in the field of Telematics in 2008. He got his PhD title in 2010 in the discipline of Telecommunications. Employee of the Institutes of Telecommunications, Telematics and Acoustics, Informatics, Automation and Robotics and Informatics at the Wrocław University of Science and Technology in the years 2008-2016. Since 2016, Assistant Professor at the General Tadeusz Kościuszko Military University of Land Forces in the Department of Informatics and Modern Technologies. Winner of many domestic and foreign grants, including Leader of Polish Science, H2020 SME Instruments, Foundation for Polish Science and others from the National Center for Research and Development and the National Science Center. From 1.10.2024 Employee of the KOMAG Mining Institute as a researcher.

Research interests: PLC BPL, Modeling of transmission lines, FPGA, signal processing, optimization of telecommunications and telematics systems

**Dr. Afzal Sikander,**

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Dr. Afzal Sikander is working as Assistant Professor with the Department of Instrumentation and Control Engineering, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab, India. Previously, he was holding the position of Assistant Professor in the Department of Electrical Engineering, Government Engineering College, Bijnor, Uttar Pradesh, and Associate Professor in the Department of Electrical Engineering, Graphic Era University, Dehradun, Uttarakhand, India. He received B. Tech. degree in Instrumentation and Control Engineering from H.N.B. Garhwal University, Srinagar, Uttarakhand, in 2006 and M.Tech. degree from M. D. University, Rohtak, Haryana, with specialization in Instrumentation and Control Engineering in 2011. He also earned Ph.D. degree from the Department of Electrical Engineering, Indian Institute of Technology Roorkee, with specialization in Control Engineering in 2016. Dr. Sikander has over 12 years of teaching and research experience in the diverse field of Control Engineering. His areas of interest include control theory and applications, circuit design, model order reduction, optimization, robotics and renewable energy. He is actively involved in various research projects funded by CSIR, ISRO, MHRD, etc. He has guided 8 M.Tech. students whereas 2 Ph.D. research scholars, 1 JRF and 2 M.Tech. students are under process. He immensely contributed more than 67 research articles in reputed National and International journals and conferences including 19 research papers in SCI-indexed journals. He has received best paper award from Jamia Millia Islamia, New Delhi in 2014. He has authored two books on soft computing, Energy System Drives and Automation in Springer.

## **Dr.Mohd Faizul Mohd Sabri**

Professor, Department of Mechanical Engineering, Faculty of Engineering,  
University of Malaya, Kuala Lumpur, Malaysia.



He is currently a Professor and Deputy Dean of Research at the Faculty University Malaya. He is a registered Professional Engineer (PEng) with the Board of Engineers Malaysia and an ASEAN Chartered Professional Engineer (ACPE). He previously served as the President of the Malaysian Thermoelectric Society and held administrative positions including Head of the Department of Mechanical Engineering (2016-2019). He also serve as a program examiner for the Engineering Accreditation Council (EAC), Malaysia, contributing to the quality assurance of engineering education in the country. His research focuses on energy materials, electronics packaging (solder alloys) and MEMS. He has published over 200 ISI-indexed journal articles, 2 books, and 10 book chapters. His work has garnered over 4,400 citations with an h-index of 33. PROFESSOR IR. DR. MOHD FAIZUL BIN MOHD SABRI hold 7 patents related to his research areas. He has been invited to deliver 6 keynote talks at international conferences and 15 invited talks at local and international conferences. He has secured research grants totaling RM13.6 million and led projects worth RM1.6 million. DR. MOHD FAIZUL MOHD SABRI has served as an examiner for 29 PhD theses (16 international) and 25 Master's theses (1 international). His expertise is also recognized through his appointment as a reviewer for more than 35 journals and his role as an evaluator for national and international research funding applications. DR. MOHD FAIZUL MOHD SABRI has supervised more than 30 postgraduate students (specifically 19 PhD, 15 Master's completed, and 10 ongoing). He is currently an Adjunct Professor at the Vellore Institute of Technology, India.

Paper ID: 02

## **Analytical study on the behaviour of structural elements in adjacent buildings in case of seismic pounding**

Ankur Mishra (Assistant Professor)

Swami Keshwanand Institute of Technology Management &amp; Gramothan, Jaipur

Surbhi Sharma (Assistant Professor), Dr. Gireesh Kaushik (Assistant Professor)

Dept. of CSE, Manipal University Jaipur

**Abstract-** An abrupt release of energy in the Earth's lithosphere that results in seismic waves causes an earthquake, which is the shaking of the planet's surface. There are more than one million earthquakes worldwide per year, or two each minute. One of the deadliest possible natural disasters is a large earthquake that strikes a city. Building pounding can be particularly deadly in urban areas. This paper explains the need for design, analyse and methods for strengthening two hypothetically planned old RCC-framed structures of different story heights with sufficient separation to experience pounding between them. These structures are designed and analysed in ETABS for "1940 Imperial Valley", a time history seismic load, and gravity loads (Non-linear Dynamic Analysis). "Hertz Damp" equation is used to calculate the value of pounding force between structures and a Finite Element Impact Analysis is done in ANSYS Workbench on colliding elements to get the values of maximum stresses and their location in these elements. And as conclusion mitigations are provided to make these elements resist these stresses due to impact load. This project is to ensure structures are safe and sound to resist these extreme loading events in future where buildings are going to be built taller and closer due to the lack and increasing cost of land for a living.

**Keywords-** Seismic pounding, ETABS, Shear wall, ANSYS, RCC.

Paper ID: 08

## **An IoT-based Smart Hybrid Power Management System with Accurate Forecasting and Load Strategy**

Adarsh Kumar, Jagannath Samanta, Raj Kumar Maity

Department of ECE

Sneha Basak

Department of CSE

Haldia Institute of Technology, Haldia, Purba Medinipur, West Bengal, India

**Abstract-** Efficient use of renewable energy sources without limiting power consumption is the problem in demandside energy management. This paper presents the design and implementation of an IoT-driven hybrid power management system that seamlessly integrates solar and AC power sources. Leveraging the ESP32 microcontroller, this system is engineered to prioritize solar energy as the primary power source, switching to AC only when solar output is insufficient or an overload condition occurs. This dynamic switching mechanism not only ensures a consistent power supply but also optimizes energy usage, contributing to both cost-efficiency and environmental sustainability. Proposed design allows users to track power levels, receive notifications on power source switching, and manage overload conditions remotely.

**Keywords:** Hybrid Power, IoT, ESP32, Solar Energy, Mobile Application, Renewable Energy

Paper ID: 09

## **Enhancing Plant Disease Detection with Transfer Learning and Explainable Deep Learning Model**

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**Abstract-** Challenges such as timely and correct detection of plant diseases have thus inspired applying artificial intelligence (AI) in agriculture. Recent work has demonstrated that deep learning models, especially CNNs can be useful in diagnosing diseases in plants from images. Nevertheless, such models depend on significant amounts of labeled data, a situation that can be quite challenging in numerous circumstances. To address this challenge, transfer learning is an effective solution as it involves the utilizing of originally pre-trained models in the plant disease datasets and therefore demand little data resources. In this paper, a new method for identifying plant diseases using Transfer Learning along with Explainable Artificial Intelligence (XAI) is proposed. Furthermore, to improve the interpretability of the model, we employ XAI techniques to let the user understand which features and areas in the plant images are important to classify diseases. The framework is applied to several datasets containing plant diseases and demonstrates that improving classification quality, while maintaining moderate computational load is achieved through transfer learning. Thus, the integration of the XAI techniques enable agronomists as well as farmers to gain insights into the model decisions.

**Keywords:** Plant disease detection, deep learning, CNN, XAI, transfer learning, feature visualization and Agricultural AI.

Paper ID: 10

## **Abstractify AI: Efficient Summarization Model**

Juhi Singh, Shishir Singh Chauhan, Aneerban Saha, K. Krishna Koushika, Akshita Jain  
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**Abstract-** In the current full of data environment, the demand for concise and clear summaries of lengthy articles and narratives has become increasingly critical. This document examines the application of the T5 model in generating efficient summaries, drawing upon previous studies conducted in this field. The objective is to enhance the performance of the T5 model by increasing its accuracy, targeting a level of approximately 97% accuracy. The T5 model serves as an advanced resource in the field of Natural Language Processing, facilitating the transformation of intricate data into clear and concise summaries. This study aims to enhance text summarisation methodologies, particularly for extended texts, thereby improving content comprehensibility and accessibility. This approach effectively tackles the increasing demand for enhanced information processing capabilities in the digital era.

**Keywords:** Natural language processing; Text summarization; Abstractive summarization; Extractive summarization; Transformer; T5 Model.

Paper ID: 12

### **Non Contact Wireless Power transmission for Electric Vehicle**

Prabhakar Kumar, Rajverdhan Verma, Ritika Khandelwal, Prof. R. K. Saket and Prof. R.K. Srivastava

Department of Electrical Engineering, Indian Institute of Technology, Varanasi, UP, India,

**Abstract-** This paper investigates the pre-existing works on WPT and explores the design, modeling, and control of a novel low-frequency WPT system specifically designed for EV charging applications. Presents a unique combination of a magnetic gear and a DC generator for WPT, the system operates at a lower frequency compared to traditional inductive charging methods, mitigating potential safety concerns. The proposed model offers several advantages over existing technologies, including potentially higher efficiency, greater transmission distance, and reduced sensitivity to misalignment between charging coils.

**Keywords:** Non-contact power, Battery Charging, Magnetic Gear, Wireless Power Transmission (WPT)

Paper ID: 13

### **Performance Analysis of Grid Connected Permanent Magnet Synchronous Generator based WECS with Neural Network Based MPPT**

Lalrintluanga, Lianzampuii, H. Lallawmzuala, Hemant Kumar, and Subir Datta  
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**Abstract-** With the development in energy conversion process, various wind turbine models have been developed. This report is based on the project of using a PMSG in WECS. It is based on a grid connected system. Various control strategies are developed for the control of various components such as GSC (Grid Side Converter), MSC (Machine Side Converter), MPPT. Also, two types of MPPT are used, P&O (Perturb and Observe) and ANN (Artificial Neural Network) based MPPT's are utilized for the control of the system. Also, vector control is implemented for both GSC and MSC. These controllers ensure that the maximum energy is extracted from the wind and also the required power is generated at the grid side under varying wind speeds. MATLAB Simulink is used for the simulation purposes. Various results are obtained and the result of the two MPPT's are compared.

**Keywords:** PMSG, WECS, Neural Network, MSC, GSC.



Paper ID: 14

## **Reducing Switch Count in a Self-Balancing Nine-Level Switched Capacitor Inverter: A Modified Approach**

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K. Nageswara Rao

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**Abstract-** Renewable energy sources are becoming more and more popular as a way to minimize Environmental damage while meeting the world's expanding demand for electricity. However, for smaller size PV solar detached loads operating with AC or grid connection purposes, specific components are needed, like DC-AC converters, transformer/inductor-less operation, DC-DC front-end converters with high gain , and high voltage at a specified level. This study offers a less complicated, nine-level step-up quadruple boost inverter that solves the problem by using a switched capacitor approach. By utilizing the control scheme itself, the topology is intended to balance capacitor voltages without the requirement for sensors. For the suggested topology, a Phase disposition Pulse Width Modulation (PDPWM) control technique is employed. The operating modes of proposed multilevel inverter construction are main focus of study which also includes simulation experiments that carried out in MATLAB/Simulink. All things considered, this research presents a viable option for renewable energy systems that can assist in satisfying the demand for electricity while preserving the environment.

**Keywords:** Multi-level inverter, Total Harmonic Distortion (THD) reduction, Switched Capacitor technique Quadruple boost, Power quality, Inverter optimization.

Paper ID: 15

## **Causality Extraction and Reasoning from Text**

Kirti, karuna Sharma, Vibha Pratap, Isha Lohia, Anjali

Indira Gandhi Delhi Technical University For Women, Delhi, India.

**Abstract-** Automatically deriving causal linkages from textual data has become increasingly crucial for applications such as knowledge-based reasoning and decision-support systems. Using a combination of rule-based frameworks and deep learning models, especially the RoBERTa transformer model, this study offers a novel method for reasoning and causality extraction from text. Our method accurately detects complicated causal patterns, situational dependencies, and cause-effect pairs by fine-tuning RoBERTa for causal relation recognition. We also present a reasoning technique that reveals implicit causal information, improving the interpretability and usefulness of text-derived knowledge. Our methodology improves current methods in terms of accuracy and robustness, as demonstrated by extensive testing on common datasets. This research expands the field of textual reasoning and creates new opportunities for automated reasoning in practical applications by providing a scalable and effective framework.

Paper ID: 16

## Comparative Study of Suicide Detection Using Machine Learning

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**Abstract-** Suicide is a critical public health issues and it impacts people globally. Traditionally, the method used for detection is through self reporting and this can lead to missing early signs. The growing incidences of mental health issues make the availability of suitable text-based technologies necessary for risk detections. This study evaluates various machine learning approaches, Logistic Regression, Linear Support Vector Classifier, Random Forest, XGBoost, Naive Bayes, Vader and Conditional Random Fields (CRF) for their efficiency in identifying suicidal intent. Although some ML models suggest good accuracy in recognizing the patterns within textual data, the performance was still low. Based on these results, we present here an advanced method that integrates CRFs with Term Frequency-Inverse Document Frequency (TF-IDF) and (Vader) sentiment analysis technique. CRF is a sequential model that captures contextual relationships between words in a sentence and VADER is a tool for sentiment analysis that evaluates the whole text or parts of it, assigning a sentiment score to it, thereby making sense of overall emotional tone. We have used TF-IDF and Vader here for Feature Extraction to improve the accuracy of the model. This hybrid approach presented here has performed significantly better than other ML models that we encountered in our research. The basis of such performance may conclude the potential of contextual and sentiment-based analyzers for better suicide detection accuracy.

Paper ID: 17

## Predictive Model for Power System Fault Analysis

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**Abstract-** This paper presents a predictive model of a system with conventional and renewable power generating sources. A PV Array (PVA) and Wind Turbine Generator (WTG) feeds power at one of the buses and two conventional generators feeds power to other buses. The training of the predictive model was done using the analysis of occurrence of faults on different buses and corresponding effects on other healthy buses. The accuracy of the predictive model was checked and found that very promising.

Paper ID: 18

## **Study of Various Aspects of Load Frequency Control of Multi Area Hybrid Power System**

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**Abstract-** An analytical analysis of load frequency control, or LFC, in contemporary power systems is presented in this research. The study also discusses the use of artificial intelligence in determining the PID (proportional integral derivative) controller's optimal parameters for a suggested power system. In this case, a two-area hybrid power plant integrated with a PID controller is the suggested power system. To minimize the time domain objective function, the best parameters are found using Particle Swarm Optimization (PSO), Ant Lion Optimization (ALO), and Grey Wolf Optimization (GWO). The most effective technique for improving the PID controller variables is determined by analysing the outcomes of the suggested optimization approaches using the MATLAB Simulink 2019 program.

**Keywords:** Keywords Load frequency control, Multi area power system, Ant lion optimization, Transient analysis

Paper ID: 21

## **GuardianShield: Real Time Transaction Security**

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**Abstract-** In the rapidly evolving digital landscape, the increase in credit and debit card transactions has brought about a surge in fraudulent activities, posing significant challenges to both consumers and financial institutions. Traditional fraud detection methods often fall short in effectively countering these sophisticated threats. This research paper introduces GuardianShield, a real-time transaction security system that leverages advanced machine learning techniques, specifically ensemble methods, to enhance fraud detection capabilities. By combining multiple models, the ensemble approach improves the accuracy and robustness of detecting fraudulent transactions while minimizing false positives and negatives. GuardianShield is designed to process transaction data in real-time, enabling prompt identification and prevention of fraudulent activities. This system not only adapts to evolving fraud tactics but also contributes to building consumer trust by protecting financial assets. The findings of this research underscore the importance of innovative technologies and continuous improvement in fraud detection strategies to maintain the integrity of digital payment systems.

**Keywords:** Credit Card Fraud, Fraudulent Activities, Random Forest, Adaboost, Ensemble Method.

Paper ID: 23

### **Feasibility of Buck/Boost of DC Voltage using DC Series Machine**

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**Abstract-** Presently in the field of electrical engineering Electrical Vehicle industries are on high demand , and the most important part of EV is Battery and its Charging process. Liion Battery is the most used battery because of its high power density, but for Hybrid EV, NiCd Battery is used and it has low power density and low operating voltage because in hybrid EV battery is charged with the help of regenerative braking. In this paper feasibility studies of DC voltage boosting using DC series generator has been analyzed.

**Keywords:** Motor-Generator (MG) set, Electric vehicle (ev), Hybrid electric vehicle (HEV).

Paper ID: 24

### **Performance Analysis of Floating solar PV system for Humid and Saline conditions**

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**Abstract-** FSPV systems may represent a feasible solution to the problem of insufficient renewable energy sources, in particular, in regions with very limited land resources. Again, even when these systems are proven effective and economically building them is justified, some external factors can affect their performance, like humidity and salinity in places like the coast and tropics, as a couple of examples. The objective of this paper is to analyze the performance of an FSPV system concerning these humid and saline risks and how these environmental factors affect energy efficiency, degradation rates, and operational lifespan of the FSPV system. Simulation models considering real environmental parameters related to performance have been developed aimed to assist on performance prediction and its quantification as is; highlights potential mechanisms of failure and it outlines ways to reduce their negative impacts. It is observed that while using FSPV systems in humid environments they indicate no deterioration despite forecasting structural damage, but exposure to salts induced damages would become obsolete. The perspective achieved fills in knowledge gaps for the design and operationalization of deployment and maintenance aspect of FSPV systems especially in inhospitable environmental application.

**Keywords:** Floating Solar Photovoltaic (FSPV) Systems, Renewable energy, Land resource optimization, Humidity effects, Salinity effects, Coastal environments, Tropical regions.).

Paper ID: 25

## **Acute Toxicity and other Impurities Prediction in Groundwater Through Machine Learning**

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**Abstract-** Prospective demographic development that is environmentally friendly and wholesome is significantly influenced by the condition of the water. The UNESCO Multifunctional Hydrological Programme (MHP)'s International Incentives on Water Quality (IIWQ) states that each of industrialized and underdeveloped countries must approach watershed-quality problems from a broad perspective. One of the main sources of drinking water, drinking water, is suffering from the fast commercial and population growth in many emerging nations. Traditional mathematical methods are typically employed alongside to the traditional actual biochemical testing procedure to assess the purity of the water. It does, however, take a lot of time. Throughout recent years, artificial intelligence (AI)-based methods have emerged as superior choices for evaluating and predicting the potency of drinking water when provided with data regarding its chemical structure. In this research, we're offering an examination into (AI)-based descriptive geological assessments in an example study including Indian localities employing information obtained through the Indian government and the Central Groundwater Board of India database. The goal problem is organized as a categorization that comprises various categories for determining the groundwater's appropriateness for human intake, in accordance with WHO recommendations. Numerous artificial intelligence (AI) techniques are employed, such as decision trees, logistic regression, AdaBoost, XGBoost, K-NN, and Support Vector Machine (SVM) variations. According to forecasting findings, 96% of the Water Quality Classes were correctly identified by the Adaboost, XGBoost, and Polynomial SVM models. This would make it easier to select the best source for intake.

**Keywords:** Water quality analysis, Drinkability prediction, Machine learning, AdaBoost, SVM, XGBoost.

Paper ID: 26

## **Design, Development and Implementation of IOT Based Smart Shoe for Visually Impaired People**

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**Abstract-** This paper presents an innovative technology called the "smart shoe," designed to assist people with visual or hearing impairments in navigating their surroundings more easily. Equipped with advanced sensors and mini-computers, the shoe can detect uneven surfaces or obstacles in the wearer's path. It provides feedback through vibrations or sound alerts to help guide them. Developed with ease of use and practicality in mind, this device aims to empower users, fostering greater confidence and independence. The goal of this technology is to create a more inclusive and secure environment for those with sensory challenges.

Paper ID: 27

## **A Novel Methodology For Optimum Renewable Penetration To Analyze System Performance With Unified Power Flow Controller**

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**Abstract-** The present electrical system demands the inclusion of alternate energy sources to the grid due to raise in electrical load. The objective of the present work is to integrate renewable energy sources (RES) to the electric system along with the Flexible Alternating Current Transmission System (FACTS) devices and to analyze the effect on cost of fuel and power losses. For this purpose, a real time Andhra Pradesh System (APS) has been considered. The wind rich locations are identified for wind resource availability. The Clearness Index (CI) is used to identify the areas with more sun hours. A new Persistent – Extreme Learning Machine (P-ELM) algorithm is proposed to predict available RES powers over a period in the identified areas. The forecasting accuracy also has been evaluated with the experimental setup. It has been observed that the running cost is minimum when the wind, solar powers with UPFC combination is connected to the system. At the same time, the losses are observed to be more in the case when the wind generation with UPFC is integrated to the system.

**Keywords:** Renewable Energy Power, Forecasting, Optimal Power flow, Persistent – Extreme Learning Machine algorithm, Flexible Alternating Current Transmission System.

Paper ID: 28

## **A Novel Hybrid MPPT Approach for Tip Speed Ratio and Pitch angle control in Wind Energy Conversion System using Sea Lion – Puma Algorithm**

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**Abstract-** The research focuses on optimizing Wind Energy Conversion Systems (WECS) using advanced hybrid algorithms to enhance efficiency and stability. Key components optimized include Maximum Power Point Tracking (MPPT), tip speed ratio (TSR) control, and pitch angle control. The hybrid algorithms used are Sea Lion Optimization Algorithm - Puma Hybrid Algorithm (SLOA\_PA) for MPPT, Democratic Joint Operation Algorithm (DJOA) for TSR, and Flower Pollination Algorithm - Vampire Bat Algorithm (FPA\_VBA) for pitch angle control, each inspired by natural behaviors such as sea lions, dragonflies, flowers, and vampire bats. The study demonstrates significant improvements in WECS performance by maximizing power output and maintaining system stability under varying wind conditions, showcasing the potential of these optimization techniques in advancing wind energy systems. The tracking efficiency of the proposed hybrid algorithms together reaches up to 92.62% with an actual power output of 14,975.261 W and a low power loss of 1,105.267 W.

**Keywords:** WECS, PMSG, Boost Converter, MPPT, TSR, Pitch Angle Control, SLOA\_PA, DJOA, FPA\_VBA.

Paper ID: 29

## **Block Switching of short secondary SLIM/DSLIM**

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**Abstract-** For linear induction motors (LIMs), the block switching strategy is an essential method to improve their performance, control accuracy, and efficiency in applications including industrial automation, electromagnetic launchers, and transportation systems. In order to maximise power delivery and reduce energy loss during operation, this article investigates the design, analysis, and implementation of a block-switching mechanism for LIMs. The suggested technique divides the primary winding into distinct blocks and successively activates each one in response to the secondary mover's position and speed. By ensuring that only the essential core parts are turned on, this method lowers power waste and improves system responsiveness.

**Keywords:** Linear induction motor (LIM), Block switching, Double sided LIM (DSLIM).

Paper ID: 30

## **Design and Optimization of a Surface Acoustic Wave (SAW) Device via Delay Length and Electrode Pair Variation**

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**Abstract-** This paper highlights details about SAW filters, regarding their design, underlying physics, and simulation. This paper first outlines the basic features, applications, and limitations of SAW filters, in conjunction with a classification framework for acoustic devices. Then, it studies the theoretical aspects of surface waves, discussing the operational principles and generation of SAW waves. Design principles such as mathematical modeling of a SAW filter, geometry, and critical design calculations are presented. Optimization of SAW sensors is discussed in great detail through the piezoelectric substrate, material properties, and fine-tuning of the IDT. The optimization continues to multiple types of IDTs including selection of materials, delay length, and the number of finger pairs changing to optimize the performance. The geometry, materials, and boundary conditions were defined for advanced simulation using both COMSOL Multiphysics and FEM. Frequency and eigenfrequency domain analyses focusing on plots of S11 and displacement about the updated SAW device give insight into the dynamic behavior of the filter. Results from the simulations are thus presented to afford a practical understanding of the device's performance. In this regard, the paper is a fine blend of theory and experimentation wherein the understanding about SAW filters is effectively carried out with both theoretical deliberations and practical simulations. The important findings of this study make the work highly useful for optimizing or applying SAW filters in diversified technological domains, benefiting researchers and engineers in the field.

**Keywords:** Surface Acoustic Waves, IDT, FEM, COMSOL Multiphysics.

Paper ID: 31

## **Automated Journalism: A Systematic Review of Scopus-Indexed Publications from 2011-2023**

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**Abstract-** Over the years, scholars are studying the intersection of artificial intelligence and journalism. And recent research show that this trend is continuously gaining traction. A thorough analysis of studies conducted on the subject from 2011 to 2023 revealed some fascinating insights. The study involved a systematic review of 126 research articles published in the Scopus database. The validation process was rigorous and involved strict criteria for inclusion and exclusion, database identification, and search engine utilization. The study found that Spain leads the world in publications related to AI in journalism. The number of publications on the topic increased significantly from 2019, reaching a staggering 24 in 2023. One striking observation was that most of the research is published in prestigious journals. This shows that AI in journalism is a serious phenomenon of dialogue and research among scholars and experts. The study also revealed that there is a prevalent pattern of having only one individual signing as an author. Overall, the study provides compelling evidence that AI in journalism is a continuously emerging field that is generating significant interest and research. The insights gained from this analysis will undoubtedly help improve the utilization of artificial intelligence in journalism, directing to much more advanced and effective reporting.

**Keywords:** Artificial intelligence, Systematic literature review, Automated journalism, Algorithmic Journalism, Computational Journalism, Scopus

Paper ID: 32

## **AI – SHAP implementation for Toxic Text Classification**

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**Abstract-** By combining cutting-edge natural language processing methods with the AI-SHAP framework, this study offers a novel approach for identifying and evaluating toxic language in digital communication. The research not only improves the interpretability of hazardous text categorization models by utilising AI-SHAP, but it also explores the complex linguistic subtleties and contextual complexities that underlie toxic behaviour in online contexts. This method clarifies the fundamental causes of toxic communication through thorough assessments on a variety of datasets, opening the door for the creation of practical tactics to promote safer and more welcoming online communities. It makes use of a novel approach AI-SHAP framework to examine and identify harmful language used in online communications. It also uses advances natural language processing techniques for reliable text analysis.

**Keywords:** Toxic Language, Natural Language Processing, AI-SHAP Framework, Logistic Regression.



Paper ID: 33

## Predictive Analysis of Cyberbullying on X Data using Multi-Model Supervised Techniques

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**Abstract-** The increasing frequency of negative online behaviour has drawn a lot of interest to predictive analysis of cyberbullying on Twitter data. This research suggests a unique method for predicting incidents of cyberbullying on Twitter by using a multi-model supervised strategy. The proposed approach aims to enhance efficacy and enhance the precision of cyberbullying detection through the integration of textual, social, and network attributes. The models are trained and assessed using Twitter data sets that include both cyberbullying and non- cyberbullying events. Sentiment analysis, bag-of-words, and semantic similarity are examples of textual features; follower count and account age are examples of social features. Analysing the user's interaction patterns and network structure is part of network features.

The models are created and assessed using a variety of machine learning algorithms, including support vector machines (SVM), random forests (RF), and neural networks (NN). The outcomes of the experiments show that the combined strategy outperforms the individual models in terms of predictive performance. The significance of feature selection in enhancing model accuracy is further emphasised by the study. This research helps establish practical tactics and countermeasures to lessen the negative impacts of cyberbullying by precisely detecting incidences of cyberbullying on Twitter.

**Keywords:** Support Vector Machines, Random Forests, neural networks, textual features, social features, network features, cyberbullying prediction, Twitter data, multi- model supervised approach, and feature selection.

Paper ID: 34

## The Convergence of AI and 5G/6G: Challenges, Opportunities, and Future Directions

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**Abstract-** The convergence of Artificial Intelligence (AI) and advanced 5G/6G networks represents the next paradigm in communications, promising unprecedented real-time processing capabilities, network management, and diverse application support. This review paper examines the scope and impact of AI-driven architectures in 5G/6G networks, addressing core challenges, recent advancements, and future directions. Key challenges include computational and latency constraints, security and privacy issues, energy efficiency, and interoperability with diverse AI models. Despite these challenges, opportunities are plenty. AI promises automated and optimized network management, stronger security solutions, enhanced user experiences, and more sustainable, energy-efficient operations.

The paper also outlines future research areas important to realize the full potential of AI in next-generation networks. These include developing next-gen AI models suited to 6G's anticipated scale, advances in edge AI hardware, and policy frameworks aimed at addressing ethical and privacy concerns. This convergence stands to benefit both industry and academia, stimulating networks that are not only faster and more efficient but also adaptable, secure, and sustainable. Ongoing research and collaborative innovation will be key to overcoming technical as well as ethical challenges, guiding the evolution of intelligent, AI-driven 5G/6G networks.

**Keywords:** AI, 5G/6G, real-time processing, network security, network slicing, sustainability.

Paper ID: 35

### **Automatic dirt cleaning system for PV farms**

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**Abstract-** Solar energy is used worldwide and is increasingly popular for generating electricity, and heating or desalinating water. Since 1995, photovoltaic modules have been generating power as a reliable and widely recognized technology. There are two primary factors that can impact the efficiency of solar energy generated by photovoltaic modules: environmental factors, which include temperature, humidity, wind speed, precipitation, and wind speed; and non-environmental factors, which include dust accumulation, bird droppings, and air pollution. Bird dropping, dirt deposits, and dust collection are a few main factors that contribute to solar panels' poor efficiency. Regular cleaning is required for solar panels to operate at their best. The design, development, and analysis of portable solar panel cleaning apparatus, which is adaptable to any type of solar photovoltaic (PV) farm, is the main emphasis of this work.

**Keywords:** Renewable energy, PV cell, Automation, Sensors.

Paper ID: 39

### **Automated AI Controlled Solar array Cleaning Robot**

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**Abstract-** Keeping solar panels clean is vital as we use more solar power as clean, renewed energy. In this research, the authors have developed a neat solution called the AI-controlled Automated Solar Panel Cleaning Robot (AISPCR). This robot can move on its own to clean solar panels, making them work better and last longer. The robot uses special sensors, like cameras, to see how dirty the panels are. It then uses brushes or wipers to clean them without causing damage. The robot works when the weather is suitable for cleaning. The ASPCR is designed to be eco-friendly. It uses solar power for its energy and is smart about how it cleans. It learns and adjusts to different panels and places, ensuring it cleans right. Tests show that the robot boosts solar panels' energy, improving the whole system. Because the robot can clean itself, we don't need as much manual work for big solar power setups. This saves money and makes renewable energy production more sustainable.

**Keywords:** AI, Automated System, PV Array, Renewable Energy.

Paper ID: 40

## **Climatic Influence Analytics on Solar PV and EV Charging in Grid Connected Networks**

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**Abstract-** On-field performance of a solar PV plant completely relies on solar radiation intensity and its availability. During the operation, the electrical properties of a solar PV module vary against the standard test conditions due to weather parameters such as ambient temperature, humidity, rainfall, wind and dust. Ambient temperature deeply affects the performance of the SPV module because solar photovoltaic modules have a negative temperature coefficient for output power. The present experimental study attempts to quantify the effect of operating temperature on the rooftop grid-connected solar PV system efficiency. Study displays that as the cell temperature rises the efficiency of solar PV module falls. Impact of dust on the output power of the system was also analyzed by calculating the soiling rate (SR). A loss of 13.8% in the efficiency of the PV system was recorded over the month. The study will assist in the selection of appropriate solar PV technology to deliver more reliable performance at the selected site for the installation considering temperature variations and impact of soiling.

**Keywords:** Solar PV System, Ambient Temperature, Efficiency Loss, Cell Temperature.

Paper ID: 41

## **Optimal Placement of Multiple FACTS Devices in Multi-Area Transmission System for Enhancing System Security**

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**Abstract-** This paper presents a comprehensive analysis of the optimal placement of flexible alternating current transmission systems (FACTS) devices in multi-area transmission system to enhance power flow and improve system security. By examining two distinct test systems characterized by low power flow in critical lines, we employ advanced modelling and simulation techniques, specifically Newton Raphson method for load flow analysis to evaluate the impact of various FACTS devices including the Phase Shifting Transformer (PST), Unified Power Flow Controller (UPFC), and Optimal Unified Power Flow Controller (OUPFC), our simulation results reveal substantial enhancements in power transfer capabilities and overall system stability, demonstrating that strategic placement of PST, UPFC, OUPFC devices can effectively mitigate congestion and improve reliability in multi-area transmission networks. This method ensures more efficient utilization of transmission capacity. The results demonstrate significant improvements in power flow management and system performance following the optimal deployment of FACTS devices, with a focus on increasing power flow in underutilized lines. The proposed method is validated using both the IEEE 14-bus and 30-bus test systems, showing promising results in enhancing system stability and improving overall transmission system efficiency.

**Keywords:** Phase Shifting Transformer (PST), Unified Power Flow Controller (UPFC), Optimal Unified Power Flow Controller (OUPFC), FACTS, Power Flow Distribution, Multi-area Transmission System, Newton-Raphson.

Paper ID: 42

## **Effect of Polyelectrolyte Porosity on the Osmotic Energy Generation in Bio-inspired Nanochannel**

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**Abstract-** In this numerical study, the osmotic energy generation in a bio-inspired nanochannel is investigated through the alteration of the porosity of the polyelectrolyte layer (PEL). Using software centered on the finite element approach, the related transport equations have been numerically solved. Together with changes in reservoir concentration, it has been found that the PEL porosity significantly influences the axial electric field intensity and cationic concentration field. When the reservoir concentration is below the critical limit, it comes to light that the power density increases with PEL porosity. The current design is appropriate to develop a high power density generating device since the power density is determined to be higher than the commercial limit.

**Keywords:** Bio-inspired nanochannel, ionic transport, Osmotic energy generation, Power density.

Paper ID: 43

## **Streaming Potential Mediated Electrical Energy Generation in Plants**

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**Abstract-** In a two-dimensional numerical framework, we have investigated the electrical energy generation in plants due to the flow of ionic nutrient solutions in the xylem vessel. During the study, the diameter, zeta potential, and pressure drop of the xylem vessel are varied within the realistic range to analyze their influence on streaming potential induced electrical energy generation. The results essentially manifest that the energy generation rate increases with the magnitude of zeta potential, xylem diameter, and pressure drop. The present analysis has yielded a maximum power density in the order of  $10^{-7}$  W/m<sup>2</sup>. Albeit, the energy conversion efficiency is observed less, obtaining even such a small amount of electrical power from plants at the cost of abundantly available natural energy, could be an innovative approach to generating clean renewable energy.

**Keywords:** Xylem, Zeta potential, Streaming potential, Renewable energy.

Paper ID: 44

## A Smart Door Control System Utilizing Green Energy for Enhanced Passenger Elevator Safety

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**Abstract-** Technology often has to be modernized because people want to get forward in life and make things easier, which makes people more comfortable and less stressed. One of the numerous technologies made by humans to increase their level of comfort in daily life is the automatic sliding door. Optical or motion detection sensors are the primary means of operating most of the sliding doors now in use which are not smart as they only controls the opening or closing action of the door depending upon the availability of passenger where the number of passenger is not taken into account. Laser sensors, which are likewise reasonably priced, can be used to accomplish the same results and the number of passengers can be counted on basis of which the door control system and the motor control system of the elevator can be operated. Depending on the use and installation location, sliding doors come in a variety of styles. Here an elevator sliding door was designed which was controlled by laser sensor whose sensed value is fed to the micro controller for processing the data. The sliding door motor drive is being regulated by variable voltage variable frequency (VVVF) drive based on the data that has been analyzed and matched with the preset data of number of passengers. The whole control system along with the motor drive is driven by the electrical power output of a PV solar system which makes it ecofriendly and economical too in the long run.

**Keywords:** Elevator Door, Laser Diode, Microcontroller, PWM, Sliding Door, Solar Energy.

Paper ID: 47

## Optimal Placement of SVC In Distribution System By Using Bus Incidence Matrix-Based Load Flow Solution

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**Abstract-** The Analysis of distribution systems, Distribution systems are a critical link between the bulk power system and end consumers. Distribution circuits include primary feeders and lateral distributors, forming radial distribution systems known for their simplicity and cost-effectiveness. The Fast Decoupled Newton method [1], effective in transmission systems, faces convergence challenges in radial distribution systems due to high R/X ratios and disrupted Jacobian matrix diagonal dominance. Non-Newton methods [2, 3], such as forward/backward sweeps, have been proposed to address these issues.

Recent research explores innovative solutions for distribution system topology but often requires new data formats or manipulations. A literature review reveals various load flow solution techniques for distribution systems, but these methods suffer from computational complexity and increased processing time.

This project introduces a load solution methodology based on the Bus incidence matrix. The methodology calculates nodes beyond the branch incidence matrix (NBIM), node voltage magnitudes, and branch power losses. The effectiveness of the methodology is demonstrated through testing on 15 nodes, 33 nodes, and 69 nodes radial distribution system. The proposed approach shows potential for making load flow analysis in distribution systems more efficient.

Incorporating a Static Var Compensator (SVC) further enhances the methodology by improving voltage regulation, optimizing reactive power flow, and reducing power losses. The dynamic control of the SVC contributes to enhanced power quality and system stability in distribution systems.

**Keywords:** SVC, Radial Distribution Systems, Bus Incidence Matrix.

Paper ID: 48

## 512 Byte Low Leakage Cache Memory Design

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**Abstract-** This paper presents a comprehensive comparison and analysis of various SRAM configurations, specifically focusing on 6T, 7T, and 8T SRAM cells, with an emphasis on their performance at low operating voltages. As mobile and portable applications increasingly demand low-power ICs, the need for efficient SRAM designs has become more pressing. In this work, we propose a 7T SRAM memory cell that improves power efficiency and stability compared to traditional 6T SRAM designs. We also explore the 8T SRAM configuration, which is known for its enhanced read stability, and benchmark its performance alongside the 6T, 8T and 7T cells. A detailed study is conducted on the influence of process, voltage, and temperature (PVT) variations, and their impact on the stability and power consumption of the cells. Simulations are carried out using HSPICE software, and results indicate that the 7T and 8T SRAM designs perform better than the conventional 6T SRAM at low voltages, showing reduced power consumption and increased stability across various operating conditions.

**Keywords:** SRAM, LOW POWER CONSUMPTION, READ/WRITE STABILITY, MONTE CARLO SIMULATION, SUBTHRESHOLD OPERATION.

Paper ID: 50

## Energy Optimization and Management of Vehicle to Grid systems for Wind Power Integration

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**Abstract-** Energy management between electric vehicles and the grid system for hybrid integration is the primary goal of this Endeavour. Amidst ecological degradation and the depletion of fossil fuels, the global renewable energy generation scale, particularly for wind power, has grown significantly in recent years. However, when connected to the power grid, the randomness, intermittent nature, and uncertainty significantly impair the power system's dependability and lead to several issues. Therefore, in order to guarantee the safety and stability of the power system, grid-connected electricity must fall within specific bounds. Additionally, increasing the rate at which hybrid power generation is incorporated into the power system has become extremely. A method for mitigating the oscillations of large-scale wind power is examined through the utilization of vehicle-to-grid (V2G) systems. Battery cells are gradually being replaced by electric vehicles (EVs) as energy storage components in an effort to lower the investment costs of energy storage. Furthermore, as the number of EVs rises, its operability gets increasingly better. Therefore, an energy management and optimization system is created and modeled in order to overcome the voltage variations and manage the energy quickly in this approach. In this method, we are going to discuss about how the energy management takes place when the power is supplied from wind to grid system. Energy management plays a key role in the power system. So, we are going to consider mainly 3-cases based on the equal distribution of power to the connected loads. They are 1) connecting to wind, 2) connecting to solar and connecting to 3) Hybrid System. In the first case the energy management is obtained by considering the power from wind to grid system and the supply of power to loads, Electric Vehicles and to the consumer loads. In the second case the energy management is obtained by considering the power from solar to grid system and the supply of power to loads, Electric Vehicles and to the consumer loads. In the third case we will connect both solar and wind as a hybrid resources to grid system and the supply of power to loads, Electric Vehicles and to the consumer loads.

**Keywords:** Electric Vehicle (EV), Solar Photo Voltaic (SPV), Wind Turbine (WT), Hybrid Energy Resource (HER), Grid connected system, Matlab/Simulink.

Paper ID: 52

## PSO-ANFIS Assisted Load Frequency Controller Design for Enhancing Resilience in a Multi-Area Power System

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**Abstract-** For years, researchers have aimed to create a robust electricity grid. Modern power systems are large and complex, facing numerous uncertainties and disruptions. Ensuring sustainability under such conditions requires careful planning and control actions. Frequency stability is crucial for a resilient power system. With the constant variation in load patterns in a large grid, maintaining frequency stability is essential. Load Frequency Control (LFC) helps to maintain the balance between power generation and load to keep system frequency within standard limits. The main challenge in LFC using conventional PID controllers is selecting optimal controller gains. Improper gains can cause significant transient oscillations, potentially leading to widespread outages during rapid load changes. This research analyzes an interconnected two-area power system's frequency responses to various load disturbances. MATLAB/Simulink was used for system modeling. Initially, the system was tested under specific load conditions using a conventional PID controller, with a Particle Swarm Optimization (PSO) technique for optimal tuning to minimize settling time and undershoot. Additionally, an intelligent Adaptive Neuro Fuzzy Inference System (ANFIS) controller was developed for the same system. Simulation results show that the ANFIS controller produces a superior dynamic frequency response in comparison with the conventional PID controller..

**Keywords:** Resiliency, Load Frequency Control, Area Control Error, ANFIS, Tie Line Power.

Paper ID: 53

## A Practical MI-Driven BCI Framework for Real-Time Motorized Wheelchair Control Using Reduced-Channel EEG and Hybrid Deep Learning

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**Abstract-** In this study, these two groups of MI signal feature parameters were found to be highly effective and efficient for providing a suitable MI-BFC and feasible motorized wheelchairs control to the quadriplegics suffering from severe motor disabilities. Three MI tasks left-hand imagery, right-hand imagery and rest associated with wheelchair commands turn left, turn right and stop are classified with the help of an eight channel EEG setup which has its focus on motor and pre-motor cortices. Frequency, spatial and time domain characteristics of EEG signals are described by advanced features like PSD, CSP and quantum entropy. By bringing down dimensionality, Uniform Manifold Approximation and Projection (UMAP) enhances efficiency as well as preserves necessary structures to perform the specific task. A fusion of spatial and temporal features using the CNN-LSTM model attains high precision, recall, and F1-scores as well as 94.8% accuracy on the classification. This configuration effectively provides for low-latency real-time deployment; however, it does so without infringing on user comfort and system access. Outcomes of experiments prove the framework adequacy, its perspectives of becomes a practical tool, and its capacity to work on a variety of scales and withstand substantial challenges. Further studies will focus on AS's reliability in a range of users and evolving scenarios and integrating learning that enables personalisation. This work is partially sponsored by the development of user-friendly and effective BCI driven mobility solutions for the impaired.

**Keywords:** Motor Imagery (MI); Brain-Computer Interface (BCI); Electroencephalography (EEG); Motorized Wheelchair Control; CNN-LSTM Hybrid Model; Dimensionality Reduction (UMAP).

Paper ID: 54

### **Smart Agriculture: Cost Optimization through IoT-enabled Remote Monitoring, Animal Deterrence, and Precision Irrigation**

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**Abstract-** India's agriculture industry has a difficult time cutting expenses without sacrificing crop production. This research suggests uses of Internet of Things (IoT) devices to propose a framework for cost optimization in agriculture. We introduced a multifaceted strategy that incorporates: Using cameras to monitor fields remotely and monitor crops in real time, Automated systems for discouraging animals with remote-controlled buzzers, utilizing intelligent sensors and actuators to manage irrigation precisely with our IoT-based system, farmers can keep an eye on their fields from a distance, identify possible problems, and take preventative action to avoid damaging their crops. The technique minimizes agricultural losses from animal encroachment, maximizes crop utilization, and lowers labour expenses. Our pilot study's findings show a notable decrease in the expenses related to: Labour, Use of water and Crop loss. Our research indicates that the suggested IoT-enabled framework can significantly optimize agricultural expenses, improving their profitability and sustainability. By advancing smart agriculture techniques, this research opens a new door for upcoming advancements in resource management and cost optimization in farming.

**Keywords:** smart-farming, animal deterrence, renewable energy, precision Irrigation and cost optimization.

Paper ID: 55

### **An accurate and explainable approach towards cardiac disease detection using Bidirectional long short-term memory**

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**Abstract-** Cardiovascular disorders (heart diseases) are the most prevalent cause of death on a global scale. So early detection and classification increase the likelihood of survival. In the essence of machine learning techniques, there is always a need for an accurate and explainable predictive model for detecting different diseases, like cardiac disorders. The work carried out in this paper stacks bidirectional long short-term memory with deep learning to propose two models. The first model is to detect a cardiac disease with a binary label classification, while the second one classifies the cardiac disease, which is a multi-label classification problem. Bidirectional LSTM is used as an approximate algorithm for feature extraction. Deep learning is used for classification purposes. The proposed models are trained and validated over the PTB-XL dataset. The performance of these models is evaluated and compared against state-of-the-art methods. The comparison shows the proposed model outperforms other methods in terms of accuracy, precision, f1-score, and recall. SHAP is used to make these models explainable which in turn help to annotate different diseases on the ECG report.

**Keywords:** Cardiovascular disease, ECG, deep learning, bidirectional LSTM, Explainable AI, SHAP.



Paper ID: 57

### **Improvement of transient stability of a solar power system using VSG**

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**Abstract-** The integration of solar power into modern power systems presents challenges in maintaining transient stability due to the lack of rotational inertia in conventional inverter-based systems. Virtual Synchronous Generators (VSGs) offer a promising solution by emulating the dynamic characteristics of traditional synchronous generators, including inertia and damping. By incorporating VSG technology, solar power systems can respond more effectively to disturbances, enhancing stability and reliability. This approach bridges the gap between renewable energy sources and grid stability requirements, supporting a seamless transition to a sustainable energy future while addressing critical challenges such as frequency deviations and voltage stability during transient conditions.

**Keywords:** Solar energy, MPPT algorithm, virtual synchronous generator.

Paper ID: 58

### **Integration of Wind Energy into Smart Grid Using Virtual Synchronous Generator for Improvement of Transient Stability**

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**Abstract-** This paper explores the integration of wind energy into a smart grid system using a Virtual Synchronous Generator (VSG) to improve transient stability. MATLAB Simulink is used for modeling and simulating the system, focusing on overcoming the challenges posed by the low inertia of wind turbines, which can lead to instability during transient disturbances such as sudden load changes or faults. Wind turbines, unlike conventional synchronous generators, have limited mechanical inertia, which can cause slower response times and increased voltage fluctuations. To address this, the VSG concept is applied, effectively simulating the characteristics of a synchronous generator to provide virtual inertia and damping, enhancing the grid's ability to recover quickly from disturbances. Additionally, Maximum Power Point Tracking (MPPT) is employed to optimize power generation, ensuring the wind turbine operates at its maximum capacity under varying wind conditions. The results demonstrate that integrating VSG with MPPT significantly improves transient stability, while also maximizing the efficiency and reliability of wind energy in the grid.

**Keywords:** Wind energy, Virtual synchronous generator, MPTT, Matlab, Transient stability.

Paper ID: 59

## **Advancing Dynamic Energy Management: A Comprehensive Survey on Model Predictive Control (MPC) for Smart Power System Networks**

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**Abstract-** The rapid evolution of modern power systems, driven by the integration of renewable energy sources, distributed energy resources (DERs), and electrified transportation, demands advanced energy management strategies to ensure operational efficiency, reliability, and sustainability. Model Predictive Control (MPC) has gained prominence as a versatile and robust optimization framework for dynamic energy management in such systems. This paper presents a comprehensive survey of MPC-based approaches tailored for smart power system networks, focusing on their methodological advancements, applications and challenges. Key areas of application, including renewable energy integration, micro grid optimization, demand-side management, and electric vehicle (EV) coordination, are systematically analyzed. The paper highlights recent innovations in MPC formulations, such as distributed, hierarchical, robust, and stochastic MPC, which address critical issues like computational complexity, scalability and uncertainties in energy supply and demand. Furthermore, the role of emerging technologies such as machine learning and Internet of Things (IoT) in enhancing predictive capabilities and computational efficiency is discussed. The survey identifies key challenges, including real-time implementation, communication delays and cyber-physical vulnerabilities and explores potential solutions. Future research directions are proposed to address these challenges, with a focus on integrating advanced MPC techniques into scalable, secure, and intelligent energy management frameworks. This study underscores the pivotal role of MPC in shaping the next generation of smart power system networks, offering insights into its potential to drive energy efficiency and resilience in increasingly complex power systems.

**Keywords:** Energy Management Systems (EMS), Model Predictive Control (MPC), distributed energy resources (DERs), micro grid optimization, demand-side management.

Paper ID: 60

## **Reasons of Uncertainties in PV System Yield Predictions and Assessments**

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**Abstract-** Renewable energy sources are receiving increasing attention these days, particularly in view of the serious environmental damage that greenhouse gas emissions resulting in climate change. Consequently, numerous investors have pledged toward boosting their investments in renewable energy initiatives globally, particularly in photovoltaic and concentrated solar power plant projects. The solar PV technologies are beneficial methods of using an economic, replenish able, and natural energy source to generate electricity. However, different design parameters and environmental factors affect the performance of PV systems and the financial viability of such projects. The variability of these factors contributes to the uncertainty in predicting PV yield and therefore impact project viability. This review paper addresses several critical issues impacting solar photovoltaic systems performance, including soiling, module degradation, economic constraints, and partial shading.

**Keywords:** Photovoltaic, Soiling, Degradation, Partial Shading, Uncertainty analysis.

Paper ID: 61

## **Reasons of Uncertainties in PV System Yield Predictions and Assessments**

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**Abstract-** Power outages caused by several disruption in the grid system reduced the reliability level of a network and also satisfactory level at consumer end. The objective of any power system is to deliver electricity to its consumer in a reliable and economic way. To maintain smooth operation of a system, some new methods are needed to incorporate with the power distribution system. Network reconfiguration is one of the methods which can be used to predict the loss as well as reliability index of any particular system. This reconfiguration involves deliberately positioning switches throughout the system to alter the network's topology. By opening or closing tie and sectionalizing switches, the topological layout undergoes changes, which leads to an improved voltage profile through loss reduction. This research aims to analyze network reconfiguration approach in a standard test bus system by using minimum spanning tree algorithm. This algorithm focuses on the way to find out optimum distribution of power during power outage condition.

Paper ID: 62

## Power Quality Improvement: A Fuzzy Logic Approach to DVR-Based Voltage Sag Mitigation

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**Abstract-** Voltage sags, characterized by temporary drops in voltage levels, are among the most prevalent and disruptive power quality disturbances in modern electrical systems. These events, caused by factors such as short circuits, sudden load changes, and network faults, pose significant risks to sensitive equipment and industrial processes, leading to operational disruptions and financial losses. Ensuring stable voltage levels is critical for maintaining high power quality standards and uninterrupted operations in today's interconnected and digital environments. Dynamic Voltage Restorers (DVRs) have emerged as effective solutions for mitigating voltage sags by injecting compensatory voltage to stabilize the load-side supply. However, conventional DVR controllers, like proportional-integral (PI) and proportional-integral-derivative (PID) controllers, often face challenges in adapting to dynamic and complex sag conditions. To address these limitations, this study proposes a DVR system enhanced by a fuzzy logic controller (FLC). Fuzzy logic offers a rule-based, adaptive approach, enabling the DVR to respond effectively to varying sag scenarios and improve voltage regulation. Presented FLC is working in different voltage sag ranges in an effective manner. Proposed FLC is adequate, effective and efficient one as it provide required level of voltages by operating in 3 modes (Low compensation, medium compensation and high compensation). This ensure the electric power saving too and hence more efficient than other controller. The research investigates the performance of the FLC-enhanced DVR in mitigating voltage sags under diverse fault conditions.

**Keywords:** Power quality; Voltage sag; Short circuit fault; Dynamic voltage restorer; Sag mitigation; Fuzzy logic controller.

Paper ID: 63

## Review on EV Fast Charging, Stability and Deployment

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**Abstract-** The rapid growth of electric vehicles (EVs) necessitates the development of robust charging infrastructure. This paper focuses on reviewing advanced charging infrastructure, including converter topologies and quick-charging technologies to meet future demands. The burgeoning popularity of electric vehicles (EVs) necessitates a robust and efficient fast charging infrastructure. This review delves into the technological advancements and practical hurdles associated with high-power charging systems. We examine the latest charging technologies, their impact on EV battery life, and the critical factors influencing widespread deployment. By analyzing the interplay of technology, economics, and policy, this paper offers insights into overcoming stability challenges and optimizing fast charging networks to support the transition to sustainable transportation.

**Keywords:** Electric vehicle charging station, EV Charging Level, Charging facility, Real-world implementation.

Paper ID: 64

## End-to-End ML Pipelines in the Cloud: Best Practices for Data Ingestion, Processing, and Deployment

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**Abstract-** End-to-end machine learning (ML) pipelines have become crucial for deploying and scaling artificial intelligence (AI) solutions across industries. Cloud platforms provide an optimal environment for these pipelines by offering scalable infrastructure, integrated services, and flexibility in handling large datasets. With the growing complexity of data sources, modern ML pipelines must support efficient data ingestion, processing, and deployment mechanisms to meet performance and business requirements. This paper explores the essential components and best practices for designing such end-to-end ML pipelines within the cloud, focusing on three critical stages: data ingestion, processing, and deployment. Each stage plays a pivotal role in ensuring the smooth and effective operation of ML workflows, with cloud services enhancing automation, scalability, and integration with external systems. The study provides practical insights, discussing the benefits of leveraging specific cloud-native services for tasks such as automated data extraction, transformation, feature engineering, and real-time model deployment.

The research also emphasizes the architectural considerations required to build robust ML pipelines in the cloud, taking into account aspects like distributed data processing, model versioning, and continuous monitoring of deployed models. By utilizing real-world examples of cloud services like AWS Glue, Google Cloud Dataflow, and Azure Machine Learning, the paper illustrates the efficiency and flexibility cloud platforms offer in managing complex ML workflows. The guidelines presented focus on optimizing the pipeline's performance, ensuring scalability, and maintaining data security throughout the lifecycle. To aid understanding, the study incorporates tables comparing key cloud services, diagrams that map out pipeline work flows, and flowcharts that outline the step-by-step progression of data from ingestion to deployment. Through this comprehensive approach, the paper aims to equip readers with the knowledge to implement efficient and scalable ML pipelines in cloud environments.

**Keywords:** Cloud computing, Machine learning, Data ingestion, Data processing, Deployment, End-to-end ML pipelines.

Paper ID: 65

## Accelerating Machine Learning Models with Cloud-Based GPU Computing

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**Abstract-** The growing complexity of machine learning (ML) models, particularly deep learning (DL), has intensified the demand for computational power capable of handling vast data processing tasks and parallel operations. Traditional CPUs, while effective for general computing, struggle to keep up with the immense workloads required by these models. Cloud-based GPU computing has emerged as a transformative solution, offering a scalable and efficient way to accelerate the development, training, and deployment of ML models. GPUs, with their parallel processing capabilities, significantly reduce the time required for training and inference, making them an essential tool in modern ML workflows. Cloud platforms, such as Amazon Web Services (AWS), Google Cloud, and Microsoft Azure, now provide on-demand access to high-performance GPUs, allowing developers and researchers to scale their computations without investing in expensive hardware. This shift toward cloud-based GPU computing has enabled organizations to optimize ML tasks, improving overall performance while minimizing costs and resource constraints associated with on-premises infrastructure.

This paper delves into the critical role of cloud-based GPUs in enhancing ML model performance, focusing on their architecture, performance benchmarks, and the economic viability of utilizing such resources. The advantages of cloud-based GPUs in handling large datasets and complex computations are explored through various benchmarks and case studies. Additionally, the paper reviews the latest advancements in cloud platforms and GPU offerings, emphasizing the potential for further optimization through the adoption of advanced techniques such as model parallelism, batch size tuning, and cost-saving strategies like spot instances. Through a comprehensive evaluation of different ML tasks, we highlight the performance gains achievable with cloud-based GPU solutions and offer practical insights into how developers and organizations can best leverage these technologies to accelerate their AI workflows efficiently.

**Keywords:** Cloud computing, GPU acceleration, machine learning, deep learning, model training, performance optimization.

Paper ID: 66

**EV Battery Charging System and Impact of Uncoordinated Charging on Distribution Network**Promit Kumar Saha (Research Scholar), Nitai Pal (Professor)  
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**Abstract-** EV Charging system topologies and their control are vital in electric cars. This paper presents a Simulation and Analysis of controlled charging (Constant Current Constant Voltage, CC/CV) of an On-board unidirectional full-bridge series resonant charger (Level 2) along with Load flow analysis of Uncoordinated Charging at different penetration levels of EVs. The EV charger control strategies & analysis of Load flow in the IEEE-15 Bus Radial Distribution network have been performed in MATLAB-SIMULINK R2017 (a). Uncoordinated loading of vehicles on the local grid can cause various severe distribution problems. The optimal or Coordinated Charging scheme of EVs is based on the maximization of the load factor and the minimization of power losses of the grid.

**Keywords:** CCCV Control, Battery charging strategies, charging topology, DSM-PI Control, coordinated charging scheme, Load flow.

Paper ID: 67

**Language Learning Models (LLMs) in AI: Beyond Text Generation to Contextual Mastery**Ayisha Tabbassum, Jitender Jain, Shaik Abdul Kareem  
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**Abstract-** Language Learning Models (LLMs) have transformed artificial intelligence, evolving from simple text generation to achieving a deep, nuanced mastery of context. This paper examines the key advancements in LLMs, focusing on their ability to comprehend, generate, and manipulate natural language with increased precision. By transitioning from syntactic processing, where models only understood language structure, to semantic processing, LLMs are now capable of understanding the meaning behind text, enabling more sophisticated applications like question answering and complex text summarization.

The study highlights how transformer-based models such as GPT and BERT have been pivotal in this evolution, leveraging self-attention mechanisms to process entire sentences and paragraphs at once. Future trends in LLM development, such as multimodal learning and adaptive models, are also explored. Through the review of experimental results, supported by tables, diagrams, and flowcharts, this paper demonstrates the growing capability of LLMs in advancing context-aware systems, while identifying existing challenges and future directions for improvement.

**Keywords:** Language Learning Models, AI, Text Generation, Contextual Understanding, NLP, Deep Learning, GPT, BERT.

Paper ID: 68

**Insights on Cooling System for Floating Solar Technology**

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**Abstract-** Emerging trend of solar energy power generation has seen wide varieties of classification based on placement area, scale of module used and many more. The cooling system is a crucial part of any solar Photovoltaic (PV) system as the efficiency is directly proportional to the heat. Heat management is a continuous process which must be implied to the system for longer lifespan and higher power delivery of solar PV. In order to cooldown the system, a Floating Solar PV (FSPV) is adopted, which can use the specific heat capacity of water to benefit the solar panel cooling. Despite natural cooling, the efficiency can yet be enhanced economically by the addition of passive cooling system. Cooling system is broadly categorized as air based cooling, liquid based cooling, radiator based cooling and hybrid cooling. Liquid based cooling systems and radiator based are theoretically reviewed intensively. Liquid cooling uses water flow, liquid submerging, Nano fluid circulation and refrigerant cooling techniques. Radiator based cooling uses the concept of heat dissipation to the surrounding by increasing the surface area. All the techniques are unique and meritorious in absolute level, but the perfect technique for FSPV system is selected based on several environmental and availability factor. This paper gives a brief insights of the modern techniques of cooling and their compatibility with FSPV system. Water jet impingement cooling technique is found most effective and low cost system.

**Keywords:** Cooling system, FSPV, liquid cooling, water jet impingement, Floating Solar.

Paper ID: 70

## **Review on DC-to-DC Boost Converter Control Topologies of Renewable Energy Applications**

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**Abstract-** This paper reviews the various control strategies used for Dc-Dc boost converter applied with renewable energy systems, like photovoltaic array module and wind energy system. Boost converters are in prime position for lifting up the lower voltage level collected from renewable energy sources (RES), such as fuel cells and solar panel, to cope up the required level of the grid voltage. Useful control techniques are required for assuring circuit efficiency, stability and reliability under different condition. This paper classifies control methods into conventional method and advanced methods. Each method's benefits, drawbacks and suitability for dynamic and unbalanced renewable energy supply. Distinct concentration is provided for real-time adaptability, fast response and minimized power losses vital for improving renewable energy system applications.

**Keywords:** boost converter, renewable energy, control techniques, photovoltaic array.

Paper ID: 71

## **Implementing and Analyzing Machine Learning Models for Early Diabetes Detection: A Methodological Approach using Survey-based Data**

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**Abstract-** Diabetes is a growing global health concern, and early detection plays a critical role in its management and prevention. Machine learning techniques have shown great promise in medical diagnostics, offering potential to enhance prediction accuracy and support timely interventions. This research paper outlines a comprehensive methodology for implementing and analyzing machine learning models in the detection of diabetes. Utilizing a dataset compiled from surveys, public interactions, and responses collected via Google Forms, stored in the 'Health.csv' file, the study pursues several key objectives: (1) preparing the dataset by addressing missing values, encrypting sensitive variables, and removing irrelevant data to ensure readiness for model training, (2) splitting the dataset into training and testing subsets to facilitate robust model evaluation, (3) training multiple machine learning models on pre-processed data and evaluating their performance using accuracy and other relevant metrics, and (4) comparing model performance to identify the most effective model for diabetes prediction and its potential applications in healthcare. The findings of this study contribute to the field of healthcare informatics by demonstrating the practical application of machine learning techniques in early diabetes diagnosis and management, offering a valuable foundation for future research and real-world healthcare applications.

**Keywords:** machine learning, diabetes detection, data preprocessing, model evaluation, healthcare informatics, early diagnosis.

Paper ID: 73

## **Machine Learning Model Implementation for Predicting Essential Transmission Line Outage via Reliability Index**

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**Abstract-** Currently, electric power transmission systems are operating at maximum loading capacities, frequently operating near their stability thresholds with minimal security margins. In such scenarios, monitoring of important line for a particular loading level has become a crucial factor in ensuring the efficient operation of contemporary power systems. Thus, precisely assessing reliability for different line outage condition is an important task for a power engineer. Through the reliability assessment, the designers can identify the component which is the least reliable and take necessary measure in order to increase the consistency of the system as a whole. This paper concentrates on presenting the most recent ML techniques like GB, LR, KNN utilized to determine the reliability index for different outage condition. Out of the 3 ML techniques GB performance best in terms of R2Score, MAE, MSE, RMSE.

**Keywords:** Power System Reliability, Line outage, Machine Learning, Gradient Boosting.

Paper ID: 75

## **A Review on Energy Evaluation of Floating Solar PV-Based Grid Connected System for Rainwater Preservation and Sustainable Electricity Production In Different Climatic Conditions**

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**Abstract-** In areas with strong levels of solar radiation, solar photovoltaics have become a viable and affordable renewable energy source. Nevertheless, the lack of land frequently causes disruptions in the installation of different utility-scale PV installations. Because they get more solar radiation, sparsely populated regions with hot, dry climates can lessen the conflict of land use and energy generation. Due to dust accumulation on PV modules and decreased energy conversion efficiency at higher temperatures, PV systems in arid regions experience larger losses. The cost of washing the modules is exorbitant due to the water scarcity. These issues are resolved by floating solar photovoltaic (FSPV) systems because of their smaller land footprint, increased efficiency, and decreased evaporative water loss. The energy production of different MW FSPV-based microgrid in a hot, semi-arid metropolitan environment is estimated in this study. The FSPV system meets certain area's energy demand by producing several GWh of electricity yearly using a fraction of the waterbody. The catchment area of hydro electricity power station can be used for additional power generation from floating solar PV as well as normal hydro-electric power generation is remaining there. In near future, this concept will give minimum 100 times more power generation from existing hydroelectric power plant. If the area of reservoir is 10% to 12% are covered by floating solar PV, out of total catchment area. The thermal power station's reservoir area of water requirement for boiler, demineralization plant and cooling tower can be utilized for both floating solar PV as well as normal thermal power generation is remaining there. This idea will enable the current thermal power plant to generate at least same amount or more electricity in the near future. 20% to 30% percent of the reservoir's area is covered with floating photovoltaic cells. The system's power output is higher than that of the land-based PV system.

**Keywords:** Controllable Block Chain, Cloud Computing, Authentication, Authorization, Security.

Paper ID: 76

## **Harnessing Retrieval-Augmented Generation (RAG) For Intelligent Information Retrieval in AI Systems**

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**Abstract-** The quick development of AI systems has drastically changed how information is retrieved improving accuracy and speed. However effectively managing big datasets is frequently a challenge for traditional retrieval-based approaches. By fusing retrieval-based methods with generative models Retrieval-Augmented Generation (RAG) offers a more sophisticated and scalable method of information retrieval. The architecture and use of RAG in AI systems are examined in this paper with an emphasis on how well it works in fields that demand the retrieval of high-quality context-aware information. We explain the workings of RAG contrast it with conventional approaches and offer empirical assessments based on performance metrics and case studies. We also go over the possible developments and difficulties in incorporating RAG into AI systems of the future.

**Keywords:** RAG, Intelligence, Information, Retrieval, AI, System

Paper ID: 77

## **A Review on Voltage supported High Gain DC to DC converter with a modified Cuk configuration for the Evaluation of Sustainable Renewable Energy Production**

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**Abstract-** DC to DC converters are employed in a wide range of sectors and applications, including electrical trains, renewable energy sources, electric vehicle charging stations, and continuous power supply. Because non-traditional energy sources like fuel cells and photovoltaics typically have low DC output voltages, large voltage gain DC-DC converters are needed to connect them to the grid. Most of the time constant output current is needed from the converter in order to get maximum power fetched from PV panels. The primary determinants of a converter's applicability for renewable energy applications are its high voltage gain and constant input current.

This research presents review on recent high gain DC-DC converters that incorporates an extra DC voltage injection. In comparison to previous traditional converters, the injected voltage controls the maximum voltage gain and aids in achieving a high voltage gain. Based on a modified Cuk converter, the suggested solutions offer the same benefit of continuous input/output current as the original. Furthermore, the approach achieves a high boost factor, overcoming the Cuk converter's shortcoming. Without substantially altering the continuous input current, the extra injected voltage is obtained from the same input voltage via an isolated path. A thorough comparison analysis in different conduction modes is provided, along with the working principle, steady state analysis, and the impact of parasitic losses.



Paper ID: 79

## Support Vector Machines in Practice: Optimizing AI for Real-Time Decision Making

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**Abstract-** Support Vector Machines (SVMs) are robust machine learning models widely applied in Support Vector Machines (SVMs) are powerful machine learning models that excel in tasks such as classification and regression. However, their application in real-time decision-making environments presents challenges due to their computational demands. This paper explores various optimizations techniques to improve the speed and accuracy of SVMs, which is critical in real-time settings where decision latency must be minimized. We review recent advancements in kernel approximation, feature scaling, and parallel processing, which are essential for enhancing SVMs in high-speed decision scenarios. These methods are tested through case studies and experiments in fields such as autonomous systems, finance, and healthcare, demonstrating that SVMs can be effectively tuned for real-time applications without sacrificing performance.

In addition to established optimization strategies, this paper introduces two novel techniques to further enhance SVMs for real-time use. The first is hybrid kernel combination, which accelerates decision-making by merging multiple kernels to balance speed and accuracy. The second is dynamic support vector pruning, which reduces the model's complexity by removing unnecessary support vectors during runtime, leading to faster computations. By integrating these approaches, SVMs can be optimized for environments that require rapid, accurate decision-making, paving the way for their broader adoption in fields like autonomous driving, stock prediction, and medical diagnostics.

**Keywords:** Optimization, Real-Time, Decision Making, Artificial intelligence, Support Vector Machine

Paper ID: 80

## Blockchain Method for Authentication and Authorization in Cloud Computing

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**Abstract-** Cloud services have experienced a decline in efficiency due to security vulnerabilities and frequent data breaches. To address these issues, service providers now focus on implementing cryptographic methods, advanced authentication strategies, and virtualization to ensure stronger security measures and privacy protections. However, in the process, providers may lose control over managing user identities when hosting data and online applications. Encryption methods are often recommended in cloud computing for secure certification and authentication. In this research, we introduce a blockchain-based solution for handling authentication and authorization within cloud environments. The proposed approach is divided into two phases: an initial phase and a system operation phase. The authentication and authorization process follows five key steps, utilizing the HMAC algorithm for hashing. This model has been developed using Python, and its performance is evaluated in terms of vulnerability to attacks, processing time, and space efficiency.

**Keywords:** Controllable Block Chain, Cloud Computing, Authentication, Authorization, Security.

Paper ID: 81

## **Early Detection of Parkinson's Disease using Machine Learning and Deep Learning Techniques: A Multimodal Analysis of Voice and Spiral Image Data**

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**Abstract-** Parkinson's disease is a prevalent brain disorder that affects the neurons that control bodily movement and is predominantly impacted by substances such as dopamine and acetylcholine. Environmental, genetic, brain, speech, age and all of these factors contribute to the progression of Parkinson's disease. Early detection of disease is critical for effective management. This research investigates the latest machine learning (ML) and deep learning (DL) techniques for PD detection. This research focuses on early detection of Parkinson's disease using machine Learning and Deep Learning methodologies. Data preprocessing, feature extraction using Histogram of Oriented Gradients (HOG), and training ML models (XGBoost, CatBoost, LightGBM) on voice and spiral image data are all part of the proposed methodology. Additionally, spiral image data is subjected to DL approaches such as CNN (Convolutional Neural Network) to capture the intricate spatial relationships and patterns found in image data. The proposed work highlights that CatBoost and LightGBM classifiers achieve greater accuracy and speed in identifying Parkinson's disease using voice data. For spiral image data it is proved that the DL models, such as InceptionV3, are the better choice than ML approaches. The methodology depicts the effectiveness of ML model for handling structured data (voice data) through a powerful gradient boosting framework as well as DL models for handling unstructured data (spiral image data) which automatically detects image features using deep neural networks. Using advanced ML and DL algorithms, this study proposes an efficient method for early Parkinson's disease identification..

**Keywords:** Parkinson's disease, Machine Learning, Deep Learning, Early detection, Voice data, Spiral image data, Feature extraction.

## AOI: ACT Object Indexing – A new Paradigm of Unique Identification

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Abstract(extended): indexing of any digital or material object is important for unique identification. There are different organizations that provide unique numbers to digital objects and these are DOI, ISSN, ISBN etc. This article proposes a new indexing technique, AOI( ACT Object Indexing) which is based on single platform and easy to generate and all numbers are link based object identifier.

DOI (Digital Object Indexing) is provided by the organization of [www.doi.org](http://www.doi.org), who organize international consortium for discussing different issues of distributions of DOI numbers. DOI numbers start from '10.' and all files under DOI are kept within the server space of [www.doi.org](http://www.doi.org) or link is managed by them. Rather than DOI, the new scheme of indexing, AOI, will index digital objects also hardware objects keeping track of different version in same place. In AOI, options are available for keeping link with next versions also.

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ISBN(International Standard Book Number) number has different meanings on different digits as: group, publisher, title and Check digit for 10 digit based ISBN number. For latest 13 digit based ISBN, an extra prefix either 978 or 979 is added. This ISBN system has made it a complex numbering system, we are proposing a simple book serial number as AOIB. It is simple and like:

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nnnnPnnnnB : middle 'P' is for print version of the document, last 'B' is to mean it is a book.

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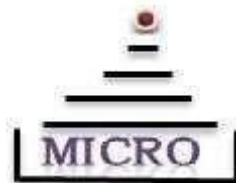
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	<p style="text-align: right;">Keynote Speaker &amp; Guest of Honour</p> <p><b>Dr. Yogesh Vijay Hote</b>                  Professor, Department of Electrical Engineering                  Indian Institute of Technology, Roorkee</p>
	<p style="text-align: right;">Keynote Speaker</p> <p><b>Prof. Pradip Kumar Sadhu</b>                  General Chair, ESDA2024                  Professor, department of Electrical Engineering,                  IIT (ISM), Dhanbad, Jharkhand, India.</p>
	<p style="text-align: right;">Keynote Speaker:</p> <p><b>Dr. Bogddan Miedzinski,</b>                  Professor of Electrical Engineering,                  Wroclaw University of Technology, Faculty of Electrical Engineering and                  Faculty of Geoengineering, Mining and Geology; Institute of Vacuum                  Technology, Warsaw, POLAND.</p>
	<p style="text-align: right;">Keynote Speaker</p> <p><b>Dr. Grzegorz Debita,</b>                  KOMAG Mining Institute, POLAND.</p>
	<p style="text-align: right;">Invited Speaker:</p> <p><b>Dr. Marta Zurek-Mortka</b>                  Senior Researcher, Lukasiewicz Research Network - Institute for                  Sustainable Technologies, Radom, Poland,</p>

	<p style="text-align: right;">Invited speaker:</p> <p><b>Dr. Afzal Sikander,</b> Department of Instrumentation and Control Engineering, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab, India</p>
	<p style="text-align: right;">Invited Speaker:</p> <p><b>Dr. Mohd Faizul Mohd Sabri</b> Professor, Department of Mechanical Engineering, Faculty of Engineering, University of Malaya, Kuala Lumpur, Malaysia.</p>
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	<p style="text-align: right;">Keynote Speaker:</p> <p><b>Dr. Sandip Chanda,</b> General Chair, ESDA2024 Professor, Department of Electrical Engineering, Ganni Khan Chowdhury Institute of Engineering and Technology (GKCIET), Maldah, West Bengal, India</p>
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	<p style="text-align: right;">Invited Speaker:</p> <p><b>Dr. Rajesh Dey</b> Associate Professor, Gopal Narayan Singh University, Bihar, India.</p>
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