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# ICCECE 2025

## INTERNATIONAL CONFERENCE ON COMPUTER, ELECTRICAL & COMMUNICATION ENGINEERING

# Preface

Techno India University, West Bengal, continues to be a leader in academic excellence, setting new standards for education and innovation. With a distinguished faculty, state-of-the-art infrastructure, and holistic student development initiatives, the university remains at the forefront of higher education. The IEEE International Conference on Computer, Electrical, and Communication Engineering, hosted by TIU, has earned global recognition for its commitment to cutting-edge interdisciplinary research. The conference has seen an overwhelming response from scholars worldwide, with a highly selective 23% acceptance rate, ensuring the highest standards of research. Esteemed speakers from top institutions such as IITs, ISI, Google, TCS, and ISRO have elevated the event's stature. As ICCECE 2025 approaches, set for 7th and 8th February, it promises to further push the boundaries of education and research, marking yet another remarkable achievement for Techno India University.

**Message from the Chancellor,**
**Techno India University, West Bengal**

"Techno India University, West Bengal, remains steadfast in its pursuit of academic excellence, supported by a world-class faculty and cutting-edge infrastructure. The continued success of ICCECE, the International Conference on Computer, Electrical, and Communication Engineering, stands as a proud reflection of our commitment to advancing educational standards. I am deeply grateful for the unwavering support of our dedicated faculty, students, and staff, whose contributions make this institution what it is today.

I firmly believe in transforming ideas into practical solutions, understanding that true mastery in any field requires more than theoretical knowledge—it demands real-world execution. My vision is to cultivate a nation in harmony with its environment, focused on alleviating the challenges that affect humanity as a whole. With heartfelt congratulations, I celebrate the collective accomplishments of our students, esteemed faculty, and the entire Techno India University community, looking forward to the continued success and growth of this remarkable institution."

Prof. Gautam Roy Chowdhury

Chairman, Techno India Group
Chancellor, Techno India University, West Bengal

**Message from the Vice Chancellor,**
**Techno India University, West Bengal**

"I commend the ongoing research initiatives at Techno India University, West Bengal, which are a true reflection of our commitment to academic excellence. The university's dedication to fostering technology-driven research remains its core mission, encouraging active student participation and raising the bar for research quality. The exceptional caliber of these papers, consistently meeting rigorous standards, ensures their recognition and acceptance at prestigious journals and conferences.

I extend my heartfelt best wishes for the continued success of the IEEE International Conference 2025, confident that this event will remain a beacon of scholarly achievement and technological advancement for the entire Techno India University community."

Prof. Samiran Chattopadhyay

Vice-Chancellor,
Techno India University, West Bengal

**Message from the Registrar,**
**Techno India University, West Bengal**

"Techno India University, West Bengal, continues to lead with its commitment to research as the cornerstone of academic growth. Through collaborative efforts on prominent government-funded projects, including those supported by DRDO, ISRO, DBT, and DST, the university exemplifies its dedication to excellence. The introduction of interdisciplinary research, guided by our esteemed faculty, actively engages students, nurturing their passions and fostering excellence in their chosen fields.

I extend my deepest gratitude to both national and international reviewers and participants whose contributions ensure the success of ICCECE 2025. My best wishes to everyone involved as they embark on this enriching academic journey."

Prof. Mohit Chattopadhyay

Registrar,
Techno India University, West Bengal

## ACKNOWLEDGEMENT

The unparalleled success of ICCECE stands as a testament to the collaborative efforts of numerous distinguished individuals. Each contribution has played a vital role within its respective domain, collectively contributing to the seamless execution of this event. Our sincere appreciation extends to the management, faculty members, and technical and administrative staff for their unwavering cooperation and coordination in orchestrating the conference.

A profound expression of gratitude is extended to the eminent participants worldwide, whose involvement and keen interest have been instrumental. We remain grateful to both national and international professors, whose trust in us serves as a constant source of motivation for our students. These combined efforts have effectively forged a global platform, paving the way for fresh possibilities in the realm of education.

## WALL OF ACCOLADES

"ICCECE '25 has been an incredible platform for intellectual exchange, where academia and industry converge to shape the future of engineering and technology. Engaging with distinguished scholars and industry leaders has provided invaluable perspectives on bridging theoretical knowledge with real-world applications. This conference continues to be a catalyst for innovation, inspiring aspiring researchers to push the boundaries of possibility. I eagerly look forward to future editions of this transformative experience."

**Professor Debmalya Panigrahi**

*Department of Computer Science*
*Duke University*

"ICCECE '25 has been a powerhouse of ideas, pushing the frontiers of science, engineering, and technology. From pioneering breakthroughs to ingenious adaptations of existing concepts, the conference has been a feast for the mind—one that will keep us energized long after it concludes. Hats off to Techno India University for orchestrating such a dynamic and inspiring event, setting a high bar for innovation and collaboration."

**Professor Shankar Prakriya**

*Department of Electrical Engineering*
*IIT, Delhi*

"Techno India University, West Bengal, continues to set new benchmarks in technical innovation and research, as evident in the successful hosting of ICCECE 2025. This prestigious international conference brings together research, industry, and education on a unified platform, fostering collaboration among leading scientists, academicians, and experts from around the world. Such synergy not only drives technological progress but also inspires the next generation of innovators. My heartfelt appreciation goes to the dedicated conference team for their relentless efforts. I am confident that the coming days will spark insightful discussions and meaningful discoveries for all participants."

**Professor Sridharan Devarajan**

*Department of Computer Science and Automation*
*IISc, Bangalore*

"What an incredible experience! ICCECE 2025 has been a vibrant hub of groundbreaking ideas with the potential to shape the future. The intellectual energy here is truly inspiring, sparking conversations that bridge innovation and impact. A heartfelt thanks to the Organizing Committee for curating a conference that will leave a lasting mark on all who participated."

**Professor Kanungo Barada Mohanty**

*Department of Electrical Engineering*
*NIT, Rourkela*

"ICCECE 2025 continues to be a transformative force in shaping the future of research and innovation in India's science and technology landscape. By encouraging bold, unconventional thinking among students and emerging researchers, it stands out as a rare and invaluable platform. This conference is not just redefining education—it is bridging the gap between academia and industry, paving the way for meaningful, real-world impact. I look forward to seeing its influence grow in the years to come."

**Professor T. V. Vijay Kumar**

*School of Computer and Systems Sciences*
*Jawaharlal Nehru University*

"The synergy between industry and academia is a driving force behind technological progress and innovation. These partnerships fuel groundbreaking research, cultivate a highly skilled workforce, and facilitate the seamless exchange of knowledge—creating a win-win dynamic for all stakeholders. While industries gain fresh perspectives and competitive advantages, academia thrives on intellectual enrichment and economic growth, ultimately strengthening the nation's innovation landscape. Techno India University's remarkable efforts have not only set academic benchmarks but have also inspired students to forge successful careers. This conference stands as a testament to the power of collaboration, and I extend my heartfelt best wishes to the Techno India Group for their dedication in orchestrating such a transformative event."

**Professor Nikhil R. Pal**

*Electronics and Communication Sciences*
*Indian Statistical Institute*

"Techno India University, West Bengal, served as the perfect host for ICCECE 2025, bringing together innovative ideas and forward-thinking solutions to tackle both current and future challenges. It's a true privilege to be part of such a distinguished event. With contributions from renowned researchers, passionate students, insightful presenters, and leading industry professionals, the conference has reached new heights. Thrilled by its overwhelming success, I look forward to the next edition of this remarkable conference and wish it continued success."

**Professor Samiran Chattopadhyay**

*Vice-Chancellor*
*Techno India University, West Bengal*

"Techno India University continues to push the boundaries of technological innovation and research excellence, and I extend my sincere gratitude to all the participants of ICCECE 2025. The conference has flourished with an exceptional interdisciplinary approach, thanks to the involvement of distinguished scholars and academicians. Greatness is not merely a dream—it requires dedicated execution, and I commend the organizing committee of ICCECE 2025 for striking that perfect balance, providing an invaluable platform for deserving individuals. My heartfelt appreciation goes to all those whose efforts made my participation in this conference both enjoyable and rewarding."

**Professor Gautam Majumdar**

*Pro-Vice Chancellor*
*Techno India University, West Bengal*

# International Conference on Computer, Electrical & CommunicationEngineering (ICCECE 2025)

## Committee Members

### Chief Patron:

1. Gautam Roy Chowdhury, Chancellor, Techno India University, West Bengal

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2. Meghdut Roy Chowdhury, Executive Director, Techno India Group
3. Pauline Laravoire, Sustainability Director, Techno India Group

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3. Prof. Samiran Chattopadhyay, Vice-Chancellor, Techno India University, West Bengal, India, Ex-Professor, Jadavpur University, Kolkata
4. Prof. Gautam Majumdar, Pro Vice-Chancellor, Techno India University, West Bengal, India, Ex-Professor, Jadavpur University
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1. Prof. S. Bhatnagar, Indian Institute of Science, Bangalore, India
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## Organizing Chairs:

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2. Dr. Tanaya Datta Das, Techno India University, West Bengal
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## Publication Chairs:

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5. Dr. Utsab Banerjee, Techno India University, West Bengal
6. Dr.Debasmita Das, Techno India University, West Bengal

## Best Paper Awards Chairs:

1. Dr. Pujayita Saha, Techno India University, West Bengal
2. Dr. Puja Chowdhury, Techno India University, West Bengal
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4. Dr. Joydeep Datta, Techno India University, West Bengal
5. Dr. Jayoti Roy, Techno India University, West Bengal

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35. Mr. Koushik Ghosh, Techno India University, West Bengal

36. Mr. Rudranshu Sengupta, Techno India University, West Bengal
37. Ms. Shweta Ghosh, Techno India University, West Bengal
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48. Mr. Sumit Mallik, Techno India University, West Bengal
49. Mr. Manas Halder, Techno India University, West Bengal
50. Ms. Shweta Ghosh, Techno India University, West Bengal

**Contact Chairs:**

1. Dr. Ankush Pal, Techno India University, West Bengal
3. Dr. Arup Ratan Biswas, Techno India University, West Bengal
4. Dr. Sucheta Adhikari, Techno India University, West Bengal

# Event Details

**6th February, 2025**

| DAY 1, SESSION I: INAUGURAL SESSION & TUTORIAL LECTURES | |
|---|---|
| **Time** | **Event Particulars** |
| **10:00 AM – 11:00 AM** | **Desk Open for Registration** |
| **11:00 AM – 11:15 AM**<br><br>**11:15 AM – 11:30 AM** | **Inauguration:**<br>**Lamp Lighting and Welcome Address**<br><br>**Prof. Samiran Chattopadhyay**<br>Vice-Chancellor, Techno India University, West Bengal<br>(Former Professor of Jadavpur University, West Bengal)<br><br>**Prof. Gautam Majumdar**<br>Pro Vice-Chancellor, Techno India University, West Bengal<br>(Former Professor of Jadavpur University, West Bengal) |
| **11:30 AM – 11:35 AM** | **Reception of Honorable Speakers by:**<br><br>**Dr. Pritam Som**<br>Professor, Dept. of ECE, Techno India University, West Bengal |
| Tea Break | |
| **12:00 PM - 01:00 PM** | **Mr. Avikal Goel**<br>Software Engineer, **Microsoft** |
| **01:00 PM - 02:00 PM** | **Mr. Sarthak Gupta**<br>Software Development Engineer, **Google** |
| **Vote of Thanks** | |

**7th February, 2025**

| DAY 2, SESSION I: KEYNOTE SESSIONS | |
|---|---|
| **Time** | Event Particulars |
| **9:00 AM – 11:00 AM** | Desk Open for Registration |
| **10:30 AM – 10:35 AM** | **Inauguration:**<br>**Welcome Address**<br><br>**Prof. Samiran Chattopadhyay**<br>Vice-Chancellor, Techno India University, West Bengal<br>(Former Professor of Jadavpur University, West Bengal) |
| **10:35 AM – 10:40 AM**<br><br>**10:40 AM – 10:45 AM**<br><br><br><br>**10:45 AM – 10:50 AM**<br><br><br><br>**10:50 AM - 10:55 AM**<br><br>**10:55 AM – 11.00 AM** | **Reception of Honorable Speakers by:**<br><br>Dr. R. Paladhi<br>Director, Techno India University, West Bengal<br><br>Prof. Bidyut Baran Chaudhuri<br>FNA, FNAE, FNASc, FIAPR, FTWAS, LF-IEEE<br>Pro-Vice Chancellor, Techno India University, West Bengal<br>(Former Professor of Indian Statistical Institute, Kolkata)<br><br>Prof. Gautam Majumdar<br>Pro Vice-Chancellor, Techno India University, West Bengal<br>(Former Professor of Jadavpur University, West Bengal)<br><br>Prof. Mohit Chatterjee<br>Registrar, Techno India University, West Bengal<br><br>Prof. Amarnath Mullick<br>Dean of Research, Techno India University, West Bengal<br>(Former Professor of NIT Durgapur, West Bengal) |
| TEA BREAK | |
| **11:15 AM - 11:55 PM** | Keynote Address<br><br>Prof. Debmalya Panigrahi<br>Duke University, North Carolina, USA |
| **12:00 PM - 12:40 PM** | Keynote Address<br><br>Prof. Shankar Prakriya<br>Indian Institute of Technology (IIT), Delhi |

| | |
|---|---|
| **12:45 PM-01:25 PM** | Keynote Address<br><br>Prof. Kanungo Barada Mohanty<br>Senior Member IEEE, FIE(I), FIETE<br>National Institute of Technology (NIT), Rourkela |
| **01:30 PM-02:10 PM** | Keynote Address<br><br>Prof. Sridharan Debaranjan<br>Indian Institute of Science (IISc), Bangalore |
| LUNCH | |
| **Session – II (Technical Session, Oral Presentation, each presentation duration: 10+5 mins)** | |
| **02:45 PM - 4:00 PM** | **OS 1 / OS 2 / OS 3 / OS 4** |
| CHANCELLOR' S CONCLAVE | |
| **4.45 PM-5.30 PM** | **Musical Program by**<br>**Shri Rupankar Bagchi** |
| **5.30 PM-5.45 PM** | **Address by**<br><br>**Prof. Manoshi Roy Chowdhury, Prof. Meghdhut Roy Chowdhury and Prof. Pauline Laravoire** |
| **5.45 PM-6:00 PM** | **Felicitation of the Guests**<br><br>**1. Prof. Debmalya Panigrahi**<br>**2. Prof. Shankar Prakriya**<br>**3. Prof. Kanungo Barada Mohanty**<br>**4. Prof. Sridharan Debaranjan**<br>**5. Prof. T. V. Vijay Kumar**<br>**6. Sri. Arun kumar Dasgupta**<br>**7. Prof Dr. Indranil Biswas** |
| HIGH TEA | |

**8TH February, 2025**

| DAY 3, SESSION I: KEYNOTE SESSIONS | |
|---|---|
| **Time** | **Event Particulars** |
| **11.00 AM – 11.40 AM** | Keynote Address<br><br>Prof. T. V. Vijay Kumar<br>Jawaharlal Nehru University (JNU), New Delhi |
| **11:45 AM -12:25 PM** | Keynote Address<br><br>Prof. Nikhil R. Pal<br>Indian Statistical Institute, Kolkata |
| **12:30 PM – 01:10 PM** | Keynote Address<br><br>**Prof. Samiran Chattopadhyay**<br>Vice-Chancellor, Techno India University, West Bengal<br>(Former Professor of Jadavpur University, West Bengal) |
| **TEA BREAK** | |
| **Session – II (Technical Session, Oral Presentation, each presentation duration: 10 +5 mins)** | |
| **01:15 PM – 02:15 PM** | **OS 05/ OS 06/ OS 07/ OS 08/ OS 09**<br>**OS 10/ OS 11/ OS 12/ OS 13/ OS 14** |
| **LUNCH** | |
| **03:00 PM – 3:15 PM** | Performance by the students of Techno India University, West Bengal |
| **3:20 PM- 3:45 PM** | Prize and Certificate Distribution |
| **3:45 PM – 4:00 PM** | Valedictory Session and Vote of Thanks<br>Participant's Feedback |
| **Closing Ceremony** | |

# TECHNICAL SESSION

## ORAL SESSIONS

**PAPER ID: 31**

**Lowering the Peak to Average Power Ratio by using the PTS method for high-speed application systems**

Pushpendu Kanjilal[1], Arun Kumar[2], Aziz Nanthaamornphong[3*] and Soumitra Bhowmick[4]
[1,4]*Department of Electronics and Communication Engineering Techno India University Kolkata, India*
[2]*Department of Electronics and Communication Engineering, New Horizon college of Engineering, Bengaluru, INDIA,*
[3*]*College of Computing, Prince of Songkla University, Phuket, Thailand*
[*]*Contact: aziz.n@phuket.psu.ac.th*

**PAPER ID: 61**

**Face Recognition Using Iiot**

Yash Grover[1*], Pulkit Sharma[2] and Nishtha Kansal[3]
[1, 2, 3]*Vivekanand Institute of Professional Studies, New Delhi, India.*
**Contact: groveryash1234@gmail.com*

**PAPER ID: 70**

**Sleep Disorder Detection Using Deep Learning**

K.Rakesh Kumar Reddy[1], G.L.V.Sathya Sai Ram[2] and K. Abinaya[3*]
[1,2]*BE CSE IoT Sathyabama Institute of Science and Technology Semmancheri, Chennai, Tamil Nadu, India- 600119;*
[3]*Assistant Professor, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology Semmancheri, Chennai, Tamil Nadu, India- 600119*
**Contact: abinaya.k.cse@sathyabama.ac.in*

**PAPER ID: 71**

**An Advanced Diagnostic Framework for Thyroid Disease Prediction using Enhanced Deep Neural Networks**

Srinjoy Chanda[1*], Deepayan Das[2], Tania Dutta[3] and Shiladitya Ghosh[4]
[1,3,4]*Brainware University, Kolkata, West Bengal*
[2]*Govt. College Of Engineering & Ceramic Technology Kolkata*
**Contact: chandasrinjoy9@gmail.com*

**PAPER ID: 72**

**An Efficient Nodule Characterization Framework using Gabor Filter and Shape Features**

Amitava Halder
*Computer Science & Engineering Department*
*Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex Kolkata, India-700074*
**Contact: amitava.halder@dsec.ac.in*

**PAPER ID: 81**

**Digital Twins for Sophisticated Laboratory Automation for Energy Management and Security**

Parameshwar Eswar, Nischitha Bureti, Sutaria Jay Rajeshkumar and P Mangalraj[*]
*Dept of CSE GITAM-Bengaluru India*
**Contact: mangal86@gmail.com*

**PAPER ID: 83**

**Fraud Detection in Bank Transactions Using Machine Learning: A Comparative Analysis of Classification Algorithms**

Sameeruddin Shaik
*Fivesky, India*
*Contact: sameershaiks786@gmail.com*

**PAPER ID: 100**

**Mitigating Transformer Inrush Currents Using Passive Magnetic Fault Current Limiter**

Asit Kumar Mondal[1*], Tapan Santra[2*] and Tirtha Sankar Daphadar[3*]
[1]*Department of Electrical Engineering, Haldia Institute of Technology, Haldia, WB, India*
[2]*Department of Electrical Engineering, Kalyani Government Engineering College, Kalyani, Nadia, WB, India*
[3]*Department of Electrical Engineering, College of Engineering & Management, Kolaghat, WB, India*
**Contact: asitmondal969@gmail.com*

**PAPER ID: 103**

**Robotic Automation Dynamic Hybrid NeuroFuzzy and Deep Learning Framework with GRU-BiLSTM, Capsule Networks, Type-2 Fuzzy Logic and CNN-TCN for Accurate IoMT-Based Chronic Kidney Disease Detection**

Naga Sushma Allur[1*], Koteswararao Dondapati[2],Himabindu Chetlapalli[3],Sharadha Kodadi[4],Durga Praveen Deevi[5]and Purandhar N[6]
[1]*Astute Solutions LLC California,USA*
[2]*Everest Technologies,Ohio, USA*
[3]*9455868 Canada Inc,Ontario, Canada*
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[6]*Department of CSE(Artificial Intelligence),School of Computers, Madanapalle Institute of Technology and Science, Madanapalle College code - 69 Andhra Pradesh - 517325, India*
**Contact: sushmaallur@ieee.org*

**PAPER ID: 111**

**Advanced Waste Detection Leveraging YOLO for High-Precision Classification**

Ripan Roy[1], Tauquir Ahmed[1] and Abhishek Majumdar[2*]
[1]*Department of CSBS, Techno India University, West Bengal, India*
[2]*Department of CSE-AI, Techno India University, West Bengal, India*
**Contact: ripanroy111@gmail.com*

**PAPER ID: 113**

**Solar Energy Based Cogeneration System for Improved Solar Energy Utilization**

Ritika Arora* and Sushma Kakkar
*Electrical Electronics and Communication Engineering, Sharda University, Uttar Pradesh, India*
**Contact: ritika@dr.sharda.ac.in*

**PAPER ID: 114**

**Information Superhighway for Neurological Disorders: Security Vulnerabilities and their mitigation strategies**

Prashant K Gupta*, Bireshar Dass Mazumdar and Divolika Bajpai
*School of Computer Science & Engineering Technology, Bennett University, Uttar Pradesh, India*
**Contact: guptaprashant1986@gmail.com*

**PAPER ID: 115**

**Advanced Optimization Techniques for Electric Vehicle integrated Solar- Hydro-Thermal Systems**

Sunanda Hazra[1]*, Debasis Maji[1], Dilip Dey[1], Palash Pal[1] and Provas Kumar Roy[2] *1Department of Electrical Engineering,Haldia Institute of Technology, India*
*[2]1Department of Electrical Engineering,Kalyani Government Engineering College, India*
**Contact: sun.hazraee50@gmail.com*

**PAPER ID: 116**

**Biometric System Attacks-A Case Study**

Menakadevi Balasundaram* and Sathish Kumar D
[1]*Research Scholar, Department of ECE, Pollachi Institute of Engineering and Technology, Pollachi, India*
[2]*Associate Professor, Department of ECE, Sri Eshwar College of Engineering, Kinathukadavu, India*
**Contact: menakamails@gmail.com*

**PAPER ID: 118**

**Comparative Study of Asymmetric Key Cryptographic Algorithms in Image Encryption**

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**Fabrication Of Mos2-BSA-Zno Nano-Bio Composite Flexible Electronic Sensor For Ultra-Low Level Of Atrazine Detection**

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**Rarh Rainfall Analytics: Machine Learning Insights from NASA Data**

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**Tracking Food Supply Chain in Local Market using Blockchain**

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**A Hybrid CNN-LSTM Approach For Detecting Intracerebral Hemorrhage In CT Images**

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**MCRec: A Co-Attention Based Meta-Path Contextualized Recommender System for Heterogeneous Information Networks**

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**Indian Fake News Detection System using Deep Learning Model and Adaptive Learning**

Yash Nautiyal[*], Sudhanshu Gupta, Kabir Yadav, Shrey Goel, Palash Dey and Kuldeep Chaurasia

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**Framework for classifying gait disorders and fall prevention**

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**Trajectory Tracking and Obstacle Avoidance for Mobile Robot using Laguerre based Model Predictive Control**

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**Dynamic Street Lighting based on Adaptive Learning**

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**Optimal Power Dispatch in Combined Heat and Power Systems with Solar and Wind Integration**

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**RAFM: On designing a robustness assessment framework to evaluate the hardness of malware detectors against adversarial attack**

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**Vision Transformers for Retinal Disease Classification using Optical Coherence Tomography Images**

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**TubiLearn: Predictive Analysis of Tuberculosis Using Machine Learning Algorithms**

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**A Comprehensive Review on LiDAR Based 3D Deep Learning Object Detection Algorithms**

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**Real-Time 3D LiDAR Point Cloud Data Acquisition & Generation on Jetson**

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**Navigating Obstacles with Monocular Image Inputs: A Comparative Analysis of Path Planning Algorithms**

Ram Vaishnav, Shivendra Singh and Pooja Goswami*
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**Evaluating Area Coverage Efficiency in Swarm Robotics: A Comparative Study of Different Approaches**

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**Advanced Robot Assistance System Using Depth Camera and AI**

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**Predicting UPI Transaction Efficiency and Impact on Microbusinesses in Digital India**

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**TinyML for Edge Networks: Challenges and Future Directions**

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**Exploring Geospatial Mapping through Speech Commands**

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**Design, Fabrication, and Characterization of Paper-Based Flexible Sensor for Wearable Applications**

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**CAE-CNN Hybrid Model for Efficient Classification of Freshwater Fish Diseases**

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Ayanta Dey, Subhram Das and Papri Ghosh
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**GLIDESMART: PREDICTIVE TOUR GUIDANCE**

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**Impact of Atmospheric Turbidity on Terahertz Communication in Tropical Sub-Continent**

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**Quantum-Powered Autonomous Deep-Sea Explorer Using AI, Microbiofuels, and Advanced Sensors for Oceanic Discovery**

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**DLIoMT: Deep Learning Approaches for IoMT-Overview, Challenges and the Future**

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Subrata Chowdhury[4] and Sudhansu Shekhar Patra[5]
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**BUBBLE: A Scalable and Efficient Bellwether Discovery Method for Large-Scale Software Engineering Datasets**

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**Optimization of Cluster Head Selection Using Bacterial Foraging Algorithm for Energy-Efficient Routing in Wireless Body Area Networks**

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R. Madhan Mohan, Pabbathi Geethesh, Bhumi Reddy Bhanu Teja,
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**Enhancing Remote Sensing Image Quality with Advanced ADMM-Based Stripe Noise Removal**

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**Innovative Lung Cancer Diagnosis Using the AlReM-Net Hybrid Approach**

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**Real-Time Scheduling Algorithms for Improved Mobile Device Energy Efficiency**

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**Cryptography Innovations for Securing Data in the Quantum Computing Era: Integrating Machine Learning for Enhanced Security**

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**GRU Based Multiview Summarisation to Obtain Fast Effective Key-Frame**

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**Modularity-Driven Influence: An Enhanced LPA Framework for Community Detection and Maximization in Social Networks**

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Akash Reddy and Ankita Shukla*
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**Performance Evaluation of Sentiment Analysis on Reddit Comments: Insights and Improvement Opportunities for Naive Bayes, SVM, and BERT Models**

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**Smart Battery Management System For Electric Vehicles**

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**An Enhanced Algorithm for Medical Image Fusion Utilizing Artifificial Rabbit Optimization**

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**Dynamic Fog Federation Scheme Using Vertex Cover Problem and Shapley Value-Based Approach**

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**A Smart Agrisense IoT System with ML Integration**

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**Sentiment Mining in ChatGPT Dataset: Leveraging Rule-Based and Transformer-Based Models**

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**IALS:Innovative Approach for Lung Segmentation Applying Artificial Intelligence and Deep Learning**

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**Clustering Technique for Setting Group Based Protection in Multi-Microgrids System**

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**Improved Control Method for Combining a Multi-Level Based Inverter with Neutral-Point-Clamped Configuration Using PV and Battery Storage**

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**Variational Mode Decomposition for Classification of EEG motor Imagery Signals: A Comprehensive Study and Evaluation of Entropy based Measures**

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**Design and Development of Low-Cost Ventilator for Medical Emergency**

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**PAPER ID: 301**

**A Multi-Agent Garage Service Search and Recommendation with Hybrid MLs and LLMs**

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**Real-Time Voice: A Comprehensive Survey of Automatic Speech Recognition and Transcription**

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**A Proposed Utility Assisting Agricultural Pump Controller for Agricultural Grid-tied Photovoltaic (PV) Systems**

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**Cardiac Diagnosis System For Heart Diseases Classification Based On Deep Learning And Optimization Strategies Using ECG Signals**

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**Heart Disease Prediction Using Logistic Regression**

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**PAPER ID: 315**

**Hardware Design Of Smart Landmine Detection Robot**

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**Understanding the Roles of Geometric Forms and Proportions in CNN-Based Image Classification**

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**Enhanced Prediction of Fuel Consumption and Carbon Emissions in Light-Duty Vehicles using Convolutional Recurrent Imputation Network**

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**PAPER ID: 331**

**An Efficient Gradient-SVM Fusion Model for Early Lung Cancer Diagnosis using Feature Engineering and SMOTE**

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**Efficient Smart Public Transit System Using RFID and IoT Integration with MERN Web Applications**

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**Development Of A Portable Emergency Ham Radio Communication System For Disaster Response**

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**Design of Autonomous Robotic Vehicle Integrated with Obstacle Avoidance Facility and Wireless Connectivity**

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**Fake News Detection Using Natural Language Processing**

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**PAPER ID: 350**

**Analyzing Customer Feedback on Amazon to Reveal Sentiment Trends using Machine Learning**

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**Fine- Tuning Pre-trained Models for Aspect-Based Sentiment Analysis of Amazon Food Reviews**

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# Lowering the Peak to Average Power Ratio by using the PTS method for high-speed application systems

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## *Abstract*

Orthogonal Time-Frequency Space is a promising modulation waveform for beyond-5G or 6G communication systems: superior robustness in high mobility and multipaths is achieved from the delay Doppler domain; however, one severe challenge of this OTFS was its high peakto-average ratio of power, constraining the linearity of efficient power amplifiers at the transmitter which degrades further the overall performance of the entire system. This paper presents a new application of the Partial Transmit Sequence (PTS) method in reducing the PAPR for OTFS systems, which will ensure compatibility with future wireless networks that have stringent requirements. The PTS is a distortion less technique that divides the input signal into sub-blocks and applies optimized phase factors to reduce the peak power of the signal. It will help to eliminate computational complexity existing with traditional PTS and incorporates enhanced optimization techniques like heuristics algorithm, reduced space searching, hence ensuring a dramatic PAPR reduction with complexity that is minimized. Simulation analysis proved the ability of this proposed work for achieving efficient results in lowering the PAPR with relatively little effect on the bit error rate performances. The results demonstrate the feasibility of PTSbased PAPR reduction to further improve the energy efficiency, spectral efficiency, and reliability of OTFS systems, thereby making it an attractive solution for beyond 5G communication scenarios. The numerical results reveals that the proposed PTS obtain an energy saving of 25% and reduce the PAPR by 3.9 dB to 5.8 dB.

***Keywords*:**Waveforms, OTFS 5G, PAPR, BER

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# Face Recognition Using Iiot

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## *Abstract*

Face detection using AI and IoT has gained significant attention in recent years due to its wide range of applications in various fields, including surveillance, security, and human-computer interaction. This innovative technology utilizes artificial intelligence algorithms to analyze and identify human faces in images or video streams, while IoT devices such as cameras and sensors capture and transmit the data in real-time. By combining AI and IoT, researchers and engineers have been able to develop sophisticated facial recognition systems that can accurately detect and track faces even in crowded and complex environments. The ability of these systems to recognize faces with high precision and speed has revolutionized the way we interact with technology, enabling advancements in areas such as personalized advertising, access control, and law enforcement. Despite the many benefits of face detection using AI and IoT, there are also ethical and privacy concerns that need to be addressed. As these systems become more widespread and powerful, there is a growing need to establish regulations and guidelines to ensure the responsible use of this technology and to protect individuals' rights to privacy and data security. Further research and discussions are required to strike a balance between the advantages and challenges posed by face detection using AI and IoT.

***Keywords*:** AI, IOT, Security, Complex environment, Law Enforcement

**PAPER ID: 70**

# Sleep Disorder Detection Using Deep Learning

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## *Abstract*

Since sleep disorders can have a major impact on general well-being, classifying them is crucial to enhancing human health. Experts have historically categorized the stages of sleep, but this is a challenging and error-prone process. By more efficiently assessing, tracking, and diagnosing sleep disturbances, accurate machine learning algorithms (MLAs) can be beneficial. This study uses the publicly accessible Sleep Health and Lifestyle Dataset to evaluate deep learning algorithms and traditional MLAs for the categorization of sleep disorders. Thirteen characteristics pertaining to sleep and everyday activities are included in the 400- row dataset. A genetic algorithm was employed to adjust the parameters of the machine learning models in order to maximize their performance. The Artificial Neural Network (ANN) method was evaluated in the study. Significant performance differences were found in the results, with the ANN obtaining the best classification accuracy of 92.92%. In addition, it outperformed the other algorithms tested with high precision (92.01%), recall (93.80%), and F1-score (91.93%).

***Keywords*:** Sleep Disorder, Artificial Neural Networks (ANN), Polysomnography (PSG), obstructive sleep apnea (OSA)

**PAPER ID: 71**

# An Advanced Diagnostic Framework for Thyroid Disease Prediction using Enhanced Deep Neural Networks

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## *Abstract*

Machine learning models have recently become valuable tools for diagnosing thyroid conditions. It offers potential improvements in diagnostic accuracy; this study examines the effectiveness of Artificial Neural Networks for thyroid disease classification and imposes several dimensionality reduction and feature selection techniques, which include Linear Discriminant Analysis, Fisher kernel Discriminant, and Principal component analysis. Random Forest assesses feature importance and establishes an input feature set to clarify model performance further. The result indicates that integrated ANN with these preprocessing techniques significantly increases classification accuracy. This suggests a methodology for the clinical diagnosis of thyroid diseases. The research underscores the effectiveness of ANN and Data Preprocessing in improving diagnostic precision for thyroid related conditions.

***Keywords*:**Thyroid, Artificial Neural Networks, Linear Discriminant Analysis, Fisher Kernel Discriminant, Principal Component Analysis, Random Forest

**PAPER ID: 72**

# An Efficient Nodule Characterization Framework using Gabor Filter and Shape Features

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## *Abstract*

Lung cancer is one of the most prevalent and deadly types of cancer worldwide, accounting for a significant portion of cancer-related deaths annually. Early detection and characterization of lung cancer involves identifying the disease at an early stage when it is more treatable and the chances of successful treatment are higher. Therefore, in this work a new fully automated machine learning (ML) framework has been developed by introducing Gabor filter-based textural features combined with shape features for lung nodule characterization. The proposed framework obtained highest performance indices of 90.48% sensitivity, 100.00% specificity and 95.00% accuracy on publicly available LIDC-IDRI dataset for lung nodule characterization.

***Keywords*:**Lung cancer, Lung nodule, Machine learning, CADx, Nodule characterization

**PAPER ID: 81**

# Digital Twins for Sophisticated Laboratory Automation for Energy Management and Security

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## *Abstract*

The recent advancements in Digital Twin technologies and their transformative applications across various sectors bring in a new dimension to the Human Computer Interface Domain. Due to the immersive and interactive nature of the Digital Twin applications, we are emphasizing to utilize the advancement for laboratory automation and rehabilitation. The democratization of virtual reality, enabled by cost-effective headgear and the integration of Unity AR technology with the Internet of Things (IoT), has revolutionized the control of home appliances, making it an intuitive and immersive experience. We are proposing a model to control sophisticated laboratories' power supplies using digital twin technologies integrated with IoT. The Model encompasses a 2D system-based interaction, a Mixed Reality-based interaction, and a Hand Gesture-based interaction, all developed using the Unity Engine and the Leap Motion-SDK. The integration of IoT devices is achieved through NODEMCU, which toggles the status (ON/OFF) of the appliances upon receiving an HTTP request. This comprehensive exploration of the latest VR and AR technologies and their applications provides valuable insights for future research and development in the field. We have evaluated our proposed work quantitatively and qualitatively (through user experiences) and modernized.

***Keywords*:** Digital Twin, Sophisticated Laboratories, Virtual Reality, Internet of Things, Energy Consumption

**PAPER ID: 83**

# Fraud Detection in Bank Transactions Using Machine Learning: A Comparative Analysis of Classification Algorithms

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## *Abstract*

Fraud detection in financial transactions is a critical priority for banks due to the increasing threat posed by fraudulent activities. This project investigates various machine learning models to detect fraudulent transactions in bank payments. The dataset used contains over 59,000 records of both fraudulent and nonfraudulent transactions. The study applies several classification algorithms, including Logistic Regression, K-Nearest Neighbors (KNN), Decision Tree, and Random Forest, to identify the most effective method for fraud detection. The models are evaluated based on accuracy, with Random Forest achieving the highest accuracy of 96.64%. Techniques such as undersampling are employed to address class imbalances in the dataset. The results demonstrate the potential of machine learning in automating fraud detection and highlight future improvements through more extensive datasets and advanced algorithms.

***Keywords*:** Cyber security, security, Fraud Detection, Bank Transactions, Machine Learning, Classification Algorithms, Logistic Regression, K-Nearest Neighbors (KNN), Decision Tree, Random Forest, Data Imbalance, Undersampling, Financial Fraud, Fraudulent Transactions, Predictive Modeling, Accuracy Evaluation, Algorithm Comparison, Transaction Analysis, Data Mining, Artificial Intelligence in Banking, Automated Fraud Detection, Financial Security.

**PAPER ID: 100**

# Mitigating Transformer Inrush Currents Using Passive Magnetic Fault Current Limiter

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## *Abstract*

Transformer inrush current, a transient phenomenon characterized by high peaks and harmonic content that happens during energization, can have a big effect on how the power system works. It can result in core saturation, protective relay malfunctioning issues, and excessive stresses on transformer windings. Because transformer inrush current has a major effect on protection systems, it has been the focus of much research. To minimize this problem, a novel Passive Magnetic Fault Current Limiters, or PMFCLs, offer a viable remedy. To reduce transient currents, the PMFCL adds dynamic impedance in series with the transformer using the magnetic saturation principle. This paper examines the effects of passive MFCLs on power system performance and examines how well they restrict transformer inrush current, thereby improving the performance and reliability of transformer protection systems. First the PMFCL's construction and operation are examined and the ANSYS Maxwell software and finite-element analysis(FEA) was used for the PMFCL design .Then MATLAB/Simulink is used to do comprehensive simulations for the transformer's inrush current mitigation with and without proposed PMFCL unit.

***Keywords*:**Transformer Inrush Current, Passive Magnetic Fault Current Limiter, Power System Protection, Harmonic Mitigation, Magnetic Saturation

**PAPER ID: 103**

# Robotic Automation Dynamic Hybrid NeuroFuzzy and Deep Learning Framework with GRU-BiLSTM, Capsule Networks, Type-2 Fuzzy Logic and CNN-TCN for Accurate IoMT-Based Chronic Kidney Disease Detection

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## *Abstract*

Chronic kidney disease (CKD) is a world health concern that requires an early detection and careful observation over time. The IoMT is offering continuously streaming data for prognostication; however, the traditional approaches fail in capturing temporal interdependencies, spatial representation of attributes, and uncertainty in data. Objectives: The objective is the engineering of a Dynamic Hybrid Neuro-Fuzzy and Deep Learning Architecture by combining GRU-BiLSTM, Capsule Networks, Type-2 Fuzzy Logic, and CNN-TCN for accurate identification of CKD, ensuring scalability, precision, and minimal latency.The proposed framework uses GRU-BiLSTM for temporal pattern analysis, Capsule Networks for spatial representation, Type-2 Fuzzy Logic for managing uncertainty, and CNN-TCN for extraction of spatial-temporal features. Data preprocessing and robust feature extraction enhance the prediction pipeline using IoMT.The architecture outperforms the state-of-the-art methods, with 96.5% accuracy, 95.7% precision, and 94.9% recall, while being scalable (50 GB) and having minimal latency of 98.5 ms, making it suitable for real-time IoMT applications. This framework provides a strong, extensible, and adaptive solution for CKD prediction, overcoming the challenges of IoMT and improving patient care. Future work will extend this framework to other chronic diseases and secure deployments through distributed learning.

***Keywords:*** IoMT, Chronic Kidney Disease Detection, GRU-BiLSTM

**PAPER ID: 111**

# Advanced Waste Detection Leveraging YOLO for High-Precision Classification

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## *Abstract*

This study aims to investigate the impact of improper waste disposal, addressing a critical gap in the existing literature and providing a sustainable waste management solution incorporating Artificial Intelligence. The research seeks new insights into advanced garbage detection systems. An open source pre-existing annotated dataset consisting of 3501 training set of images, 348 validation set of images and 228 test set images of a single class from roboflow was used to train all the models on 12 different versions of YOLO (You only look once) and 2 different versions of Gelan Series. All models were trained on an NVIDIA A10g 24GB GPU for 50 epochs, applying data augmentation techniques like rotation, cropping, and blurring. Among all models, YOLOV9-c and YOLOV8m achieved the best performance. Additionally, a full-stack application was developed as a Proof Of Concept using Flutter for the front end and Django for the back end.

***Keywords:*** YOLO, Waste Detection,Artificial Intelligence

**PAPER ID: 113**

# Solar Energy Based Cogeneration System for Improved Solar Energy Utilization

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## *Abstract*

This paper presents the design and analysis of a solar energy based cogeneration system. The integration of photovoltaic (PV) cell units with thermal energy recovery units is analysed for improved energy harnessing schemes. In addition to the electrical energy produced by solar panels, solar heat energy can also be utilized by employing such types of hybrid systems. This effectively increases the total solar energy utilization prospect by the system. The solar cogeneration system is developed in MATLAB simulation. environment. The comprehensive analysis of energy utilization and performance improvement is presented in the paper. The simulation data utilises a full day 24 hour duration for the analysis. The system ratings, efficiencies for each type of energy harnessing method are related to the overall system performance by their fundamental relations. The major methods of heat energy tapping including active and passive heat exchangers are combined along with electrical energy by PV cells and thermoelectric generators in the system. The simulation results indicate that by combining the thermal energy harnessing model, total energy utilization can be increased by more than 100% as compared to the solar PV system only. This increases the overall efficiency of the system and helps in promoting solar energy units as a better renewable energy source for green energy generation and household applications.

***Keywords*:**Cogeneration System, Solar energy, Thermal model, MATLAB simulation, Heat energy tapping, Active and passive

**PAPER ID: 114**

# Information Superhighway for Neurological Disorders: Security Vulnerabilities and their mitigation strategies

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## *Abstract*

Artificial Intelligence (AI) is making great strides in the healthcare sector. Its prowess is being increasingly utilized to develop powerful detection \& classification models for neurological disorders. Cost efficient AI models are the answer to the otherwise costly approaches of disorder detection through brain scans, behavioral analysis, etc. For an end user to realize the potential of these AI models end to end the architecture of an Information Superhighway in the form of AI pipeline was presented. The AI pipeline enabled capturing the multimodal data (image, video, etc.) of a neurologically affected subject from a smartphone of a laptop webcam, and send this through a secure information channel to a cloud, where it was managed using various Big Data technologies. Further, the DL models were used for generating different types of recommendations, which were sent through a different secure communication channel back to the mobile or laptop. The research work through which AI pipeline was proposed was quite novel. However, we feel that in healthcare systems, data security is a major concern. Hence, in this paper, we discuss security vulnerabilities of the AI pipeline, highlighting different types of security attacks that are possible at different points in the AI pipeline. We also discuss why we feel the particular attack is possible and ways to mitigate the effects of such attacks.

***Keywords:***Artificial Intelligence, Data Security, Deep Learning, Neurological Disorders

**PAPER ID: 115**

# Advanced Optimization Techniques for Electric Vehicle integrated Solar- Hydro-Thermal Systems

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## *Abstract*

In order to address the environmental concerns, renewable energy has always been quite beneficial in lowering emissions and cutting generation costs. However, renewable sources are unpredictable, erratic and volatile. So, its large proportional integration poses risks to the secure and reliable operation of power networks. On the other hand, one of the main sources of extreme pollution is fossil fuels. To overcome all drawbacks, EV is considered and virtual power plant (VPP) concept of EV have been integrated with SHT (Solar, Hydro, Thermal) System. The objective is to reduce generation cost by fulfilling transmission losses and load demand while satisfying all constraints. In this study, advanced moth flame optimization technique (OMFO) has been applied to Electric Vehicle (EV) integrated SHT Systems for cost minimization.

***Keywords*:**Electric-Vehicle, Solar-Hydro-Thermal, Oppositional Moth Flame Optimization

**PAPER ID: 116**

# Biometric System Attacks-A Case Study

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## *Abstract*

It is incontrovertible that biometric identification devices are vulnerable to a variety of software-based or template attacks. It is feasible to launch attacks on several weak spots inside the biometric authentication system. But these attacks are not without their shortcomings. There are two possible outcomes: either researchers or biometric stakeholders are not aware of some of these dangers, or they may have forgotten or disregarded the repercussions of these attacks. Meanwhile, such attacks may cause biometric systems to get compromised if they don't have enough protection. Being undermined. It is certain that sensitive personal data will be compromised and lost as a result; this data is irreplaceable and cannot be recovered. The consequences that these dangers represent for researchers and biometrics should be taken into account. Diverse strategies have been put up by stakeholders to lessen some of the attacks during the past 20 years. A significant portion of the current attacks are not monitored, and many of them are not monitored. We therefore felt that it was imperative to address this matter. The scientific community is taking note. This article focuses on the repercussions of these attacks. Utilize the threat method in accordance with the attacker's expertise, then merge them into a single, comprehensive, and potent attack. The thorough evaluation includes recently proposed state-of-the-art defense methods. Lessen the effects of these dangers. These defense mechanisms' comparative performance study is also carried out. It is stated that potential defenses against the attacks are provided. This survey is anticipated to be successful. An alert was conveyed out to the community of researchers studying biometric template security.Glove to glove. On the other hand, informing stakeholders in biometrics and common users about the risks associated with biometrics.

***Keywords:***Biometrics, Fingerprint, Attacks, Generic Threats, SystemTemplate, Template Protection Techniques

**PAPER ID: 118**

# Comparative Study of Asymmetric Key Cryptographic Algorithms in Image Encryption

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## *Abstract*

In the realm of information security, ensuring the confidentiality and integrity of image communication has become a critical concern, especially in the context of modern technological advancements. This paper presents an in-depth analytical study of image encryption using asymmetric key cryptography algorithms such as RSA, ElGamal, Elliptic Curve Cryptography (ECC), and LUC. The study explores the encryption and decryption mechanisms of these algorithms, assesses their computational efficiency, and evaluates their strengths and weaknesses in the context of secure image transmission. The paper concludes with a detailed comparison of these algorithms, identifying the most suitable ones for practical application in secure communication systems. Finally, the study highlights the need for algorithms that are not only secure but also capable of efficiently handling the growing challenges, ensuring minimal computation overhead and no compromise in encryption and decryption speeds.

***Keywords:***

Encryption, Decryption, Rivest–Shamir–Adleman (RSA), Elliptic Curve Cryptography (ECC), ElGamal, LUC.

**PAPER ID: 122**

# Fabrication Of Mos2-BSA-Zno Nano-Bio Composite Flexible Electronic Sensor For Ultra-Low Level Of Atrazine Detection

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## *Abstract*

Flexible electrode materials, particularly polyethylene terephthalate (PET), coated with ITO (indium tin oxide) have attracted many of researchers due to a wide variety of applications. However, the effects of electrode flexibility during electrochemical processes have received minimal attention. In this article, we have fabricated an electronic sensor device for ultra-low level of atrazine (ATZ) detection using nano-bio-composite MBZ (MoS2-BSA-ZnO) on ITO/PET substrate. The MBZ was characterized with UV-Vis spectroscopy, TEM prior to sensor device fabrication. A highly attentive ATZ detection scheme was created by a simple drop casting process. The working principle of the device is based on the variation of current/conductance of MBZ with ATZ concentration. Thus, the MBZ flexible electronic sensor device shows a great potential for ultra-low-level of ATZ detection with a detection limit of 0.1nM.

***Keywords*:** MBZ, ITO, PET, flexible, atrazine detection

**PAPER ID: 127**

# Rarh Rainfall Analytics: Machine Learning Insights from NASA Data

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## *Abstract*

Predicting rainfall is an essential part of meteorology and is crucial for solving problems in agriculture, water resource management, and disaster relief. In regions with significant climatic variability, such as the Rarh region of India, accurate rainfall forecasting is essential to support sustainable development and ensure agricultural productivity. This research focuses on predicting rainfall over the Rarh region of India, an area known for its diverse climatic conditions and agricultural reliance. By leveraging NASA's comprehensive satellite datasets, this study employs advanced ML techniques to increase the accuracy of rainfall forecasting in this region. Integrating various meteorological variables into the dataset enables the discovery of intricate patterns and relationships that traditional methods might not detect. This research adopts a systematic machine learning pipeline involving feature selection, correlation matrix analysis to understand relationships among features, 10 CV, hyperparameter passing, and three splitting ratios for training and validation. Five ML classifiers are employed to analyze performance among which Naïve Bayes gave the best accuracy score of 0.99.

***Keywords*:** Rarh Region, NASA dataset, meteorological parameters, correlation matrix,machine learning (ML), Accuracy (Acc)

**PAPER ID: 128**

# Tracking Food Supply Chain in Local Market using Blockchain

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## *Abstract*

Generally, health depends on nutrition level. Nutritious food is very necessary for physical and mental growth. Supply chains need to transfer the food products in a secured manner so as to retain the nutrition level that may otherwise deteriorate during transfer. The prime purpose of the supply chains is to assure the arrival and flow of food products without affecting the nutrition level. This research is focused on how blockchain technology can be leveraged to increase the fineness, traceability and safety of the food supply chain, in general and local food supply chain, in particular. Using effective and efficient supply chain management, the quality, safety of food in food business can be ensured and the blockchain can further enable the transparent transfer of food products from source to destination location. Due to distributed and decentralized nature of blockchain, the transaction record is shared between all. Using this, rural farmer can sell the food directly to the consumers or vendors removing third parties in the system and earn more profits. This paper introduces the blockchain in supply chain management for food business to enhance the security of food during transfer and facilitate farmers sell their products in Small Grocery Shops and Local Market with more profits.

***Keywords*:**Supply-chain Management, Blockchain Technology, Local Food Supply Chain, Distributed Ledger Technology, Cryptocurrency, Smart Contract, Usability

**PAPER ID: 132**

# A Hybrid CNN-LSTM Approach For Detecting Intracerebral Hemorrhage In CT Images

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## *Abstract*

Stroke is a life risk condition caused due to lack in blood flow to the part of brain. Accurate diagnosis using computed tomographic (CT) scans is crucial for immediate care in emergency department. Multidisciplinary approach is essential to manage this health challenge. Medical imaging using computed tomography (CT) and MRI data from stroke patients plays a crucial role in supporting clinical decision-making. Locating lesions in image is a challenging and time-consuming task for radiologists, hence automated techniques powered by Artificial Intelligence (AI) is vital for detecting and quantifying Intracerebral Hemorrhage (ICH). In this study, we proposed deep learning approach based on CNN along with long short-term memory (CNN-LSTM) for accurate prediction of ICH on CT scans. Non-contrast whole-head CT scan images were collected from 72 hemorrhagic stroke patients at KIMS, Bhubaneswar. A total of 2,394 head CT images was used to train the models with both CNN and CNN-LSTM architectures with a split of 80:20. The performance of the two models was then compared to evaluate their effectiveness. The CNN alone achieved an accuracy of 0.95, a recall of 0.89, and an F1-score of 0.94, whereas the hybrid CNN-LSTM model outperformed it with an accuracy of 0.97, a recall of 0.97, and an F1-score of 0.97. The findings indicate that the hybrid CNN-LSTM model performs better in detecting ICH lesions in CT images. Further research is essential to enhance the detection of hemorrhagic stroke in clinical settings for effective management of stroke.

***Keywords*:**Stroke, Intracerebral hemorrhage detection, CT scan image, Deep learning, CNN, LSTM

**PAPER ID: 134**

# MCRec: A Co-Attention Based Meta-Path Contextualized Recommender System for Heterogeneous Information Networks

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## *Abstract*

Recommendation systems play a crucial role in personalized content delivery across various domains, yet the challenge of modeling complex interactions in heterogeneous information networks (HINs) remains underexplored. In this paper, we propose MCRec, a novel recommendation framework designed to address this challenge by leveraging a co-attention mechanism to integrate multi-faceted context from users, items, and meta-paths. MCRec refines the representation of these entities and their relationships, improving recommendation accuracy and providing interpretability. Through a priority based sampling strategy, we ensure that the most informative meta-paths are utilized for training. Extensive experiments on real-world datasets, including MovieLens and Yelp, show that MCRec outperforms state-of-the-art recommendation algorithms in terms of both precision and interpretability. We also highlight the framework's strengths in cold-start scenarios and its ability to provide meaningful insights into user-item interactions. Finally, we discuss the limitations of MCRec, including its reliance on manual meta-path selection and scalability challenges, and suggest directions for future work, including automated meta path discovery, scalability improvements, and temporal modeling.

***Keywords*:** MCRec, heterogeneous information networks. Meta-Path Contextualized system

**PAPER ID: 139**

# Indian Fake News Detection System using Deep Learning Model and Adaptive Learning

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## *Abstract*

The proliferation of fake news poses significant challenges to societal well-being and the integrity of information. This paper presents a scalable and robust modular system for fake news detection, leveraging advanced deep learning models integrated with Named Entity Recognition (NER), claim extraction, and adaptive learning. By utilizing a fine-tuned DistilBERT model, the system achieves a state-of-the-art accuracy of 98%, surpassing existing methods. Key contributions include structured insights through NER and claim extraction for im-proved transparency and interpretability, alongside an adaptive learning mechanism that ensures scalability across domains and adaptability to evolving misinformation patterns. The proposed system's efficiency and domain robustness make it a practical solution for combating fake news, particularly in diverse and data-intensive contexts such as India. Future work includes exploring hybrid generative-discriminative model synergies to further enhance system performance.

***Keywords*:** Fake news detection, NER, Deep Learning, Transformers, Adaptive Learning

**PAPER ID: 142**

# Framework for classifying gait disorders and fall prevention

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## *Abstract*

One of the vital technique that evaluates human movement is called gait analysis. It helps diagnose neurological and musculoskeletal conditions. It also tracks the effectiveness of rehabilitation. Conventional techniques for analyzing gait frequently depend on costly items and methods like fixed lab apparatus, force plates as well as motion capture devices. But new developments in wearable sensor technology and machine learning provide new methods. It is more affordable, portable, and easily accessible way to continuously track gait in real-world settings. In this work, the use of wearable sensors for gait analysis which includes devices like magnetometers, gyroscopes, and accelerometers, is examined. They are integrated into gadgets like smart phones, insoles, and smart watches and offer real-time kinematic data that machine learning algorithms can analyze. Some of the important gait parameters which are extracted from sensor data are stride length, cadence, and gait symmetry. Machine learning is used to process these data and use it for categorization and gait analysis. The suggested method improves patient monitoring outside of clinical settings. It supports individualized rehabilitation plans and also identifies early indicators of gait abnormalities. The use of the wearable sensor-based gait analysis may emerge as a game-changing medical tool. It offers constant, discrete monitoring and prompts intervention in gait-related disorders. It is demonstrated in this work. This report offers insights for upcoming researchers in the field by surveying the state of the art in wearable sensor-based gait analysis.

***Keywords*:** Gait analysis, wearable sensor, SVM, ML techniques medical applications

**PAPER ID: 143**

# Trajectory Tracking and Obstacle Avoidance for Mobile Robot using Laguerre based Model Predictive Control

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## *Abstract*

Trajectory tracking for a differential drive robot is accomplished using Laguerre-based model predictive control. This paper emphasizes obstacle avoidance for the same robot using model predictive control. Simulation results highlight the success of the Laguerre-based approach in both obstacle avoidance and trajectory tracking. Constraints are incorporated within the model predictive control to define the region for obstacle avoidance. The proposed controller's performance for the differential drive robot is validated through MATLAB simulations.

*Keywords*: Differential Wheel Robot, Circular Trajectory, Constraints

**PAPER ID: 144**

# Dynamic Street Lighting based on Adaptive Learning

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## *Abstract*

Smart street light solution utilizing Long Range Wide Area Network (LoRaWAN) is one of the highly interesting topics in the field of Internet of Things (IoT) automation engineering. It is seen that many prototypes and modelling were served with IoT based sensors in this existing research idea globally and in fact Narrow Band IoT is used in some cases for data sharing along with secure communication channels. But some factors other than sensory technology associated with it will become more crucial to consider as those are emerging now like street light controlling as per traffic loads, adjustment of illumination power dynamically, and some changes of road condition if possible to distribute the data under a fault-tolerant architecture. In this paper, there is proposed an adaptive algorithm for street light control with decision-making logic based on Reinforcement Learning in some of the road cases as discernment. And with it traffic pattern observation to feed the dataset further using a deep learning technique. Also, simulate a Deep Q-learning algorithm that is necessary to be shown here and the most enthusiastic thing of implementation is to observe the road patterns and vehicular movements and note them clearly.

***Keywords*:** Dynamic Street Lighting, Adaptive Learning, Brightness Adjusting

**PAPER ID: 149**

# Optimal Power Dispatch in Combined Heat and Power Systems with Solar and Wind Integration

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## *Abstract*

Cogeneration, or combined heat and power (CHP) generation system delivers electrical energy and recovers dissipated heat, reducing costs, emissions, and enhancing renewable energy integration by smoothing intermittency. CHP economic dispatch problem (CHPED) is necessary for handling load dynamics and addressing the uncertainty of nonconventional energy sources. The primary focus of this proposed work is to minimize overall operational expenses while adhering to generator constraints and giving priority to solar, wind power output. For solving this CHPED problem, an arithmetic optimization algorithm (AOA) is utilized to obtain an optimal solution. In this study, a 10-unit framework is tested to establish the effectiveness of CHPED both including and excluding solar and wind power. Obtained results shows significant decrease of 18% in operational costs by incorporating considered renewable energy sources. This approach can enhance the integration of wind and solar source energy generated power as distributed sustainable energy into the CHPED process.

***Keywords*:**cogeneration, Arithmetic Optimization Algorithm, solar energy, wind energy, battery integration

**PAPER ID: 153**

# RAFM: On designing a robustness assessment framework to evaluate the hardness of malware detectors against adversarial attack

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## *Abstract*

Artificial intelligence (AI)-driven intrusion detection systems (IDS) are crucial in modern technological environments such as virtual domains for identifying complex attack patterns. Although these machine learning (ML) based security models are highly effective, they remain vulnerable to adversarial attacks that target the ML model and exploit its sensitivity by carrying out small perturbations in the input sample. The proposed framework, RAFM, is designed to evaluate the robustness of deep learning-based and gradient-boosting decision tree-based IDS models. It generates adversarial samples through functionality-preserving byte-level manipulations, such as DOS header modifications and shifting techniques, designed to evade detection while maintaining malware functionality. The framework highlights vulnerabilities in these systems by testing against diverse malware families. It offers valuable insights for developing a more resilient AI-based intrusion detection solution for securing virtual machines (VMs) from adversarial attacks.

***Keywords*:**Virtual Machine , Evasive Attack, Windows , Adversarial Attack, PE Manipualtions.

**PAPER ID: 156**

# Vision Transformers for Retinal Disease Classification using Optical Coherence Tomography Images

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## *Abstract*

Optical coherence tomography is an imaging method used in medical ophthalmology for retinal disease diagnosis and treatment. With the advancements in deep learning techniquies, ccategorization of Optical coherence tomography pictures can be done with higher accuracies. Recently vision transformers have evolved as more powerful networks than Convolutional Neural Networks in computer vision tasks since transformers exhibit long range relationships using self-attention strategy. This work explores popular vision transformfers namely ViT and BEiT for optical coherence tomography picture categorization of retinal diseases into 7 labels. ViT and BeiT has classification accuracy of 91.94 and 90.86 respectively. Furthermore in this work vision transformers are compared to traditional convolutional neural networks in classifying retinal diseases using optical coherence tomography pictures.

***Keywords*:** Deep learning, OCT, image classification, Vision Transformer

**PAPER ID: 164**

# TubiLearn: Predictive Analysis of Tuberculosis Using Machine Learning Algorithms

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## *Abstract*

Tuberculosis(TB) remains a critical global health challenge, particularly in resource-limited regions where access to timely and accurate diagnostic tools is constrained. This study introduces TubiLearn, a machine learning-based diagnostic framework designed to predict TB presence using synthetic clinical data. By leveraging advanced algorithms such as Random Forest, K Nearest Neighbours (KNN), and Extreme Gradient Boosting (XGBoost), TubiLearn aims to enhance diagnostic accuracy and support clinical decision-making. A synthetic dataset of 10,000 samples was generated, incorporating key clinical features including age, gender, X-ray intensity scores, and symptoms such as cough duration, fever, and weight loss. To address class imbalance, preprocessing techniques like standardization, SMOTE, and downsampling were applied. The performance of the classifiers was evaluated using accuracy, precision, recall, F1 score, and the area under the receiver operating characteristic curve (AUC). Feature importance analysis identified the most influential predictors of TB. XGBoost demonstrated superior performance, achieving an accuracy of 89.6TubiLearn presents a scalable and cost-effective framework with significant potential for deployment in low-resource settings. By integrating synthetic data and state-of-the-art machine learning techniques, this framework provides a supplementary diagnostic tool that can assist clinicians in early detection and management of TB. Future work will focus on validating the framework with real-world datasets and exploring its integration into web-based diagnostic systems to further enhance its clinical utility.

***Keywords*:** TB Diagnosis, Machine Learning, XGBoost, SMOTE, KNN, Random Forest

**PAPER ID: 166**

# A Comprehensive Review on LiDAR Based 3D Deep Learning Object Detection Algorithms

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## *Abstract*

Recent advancements in autonomous vehicles and robotics have underscored the importance of robust 3D object detection(3DOD) systems. Among various sensor modalities, 3D LiDAR stands out for its ability to provide dense and accurate point cloud data(cloud of points signifying the reflected rays from the surface of objects present in the environment of the sensor), crucial for detecting and localizing objects in 3D space. This paper surveys the state-of-the-art (SOTA) deep learning models specifically tailored for 3D object detection for 3D LiDAR data. We classify these models based on their foundational architectural principles and methodologies,including voxel-based, pointbased, and range-image-based techniques.Popular Key datasets,evaluation metrics and considerations for real-time application are discussed, highlighting advancements and ongoing challenges in the field. Finally,this review seeks to guide future research towards enhancing the accuracy, speed and robustness of 3D object detection systems utilizing 3D LiDAR technology.

***Keywords*:**3D Object Detection, LiDAR, Pointcloud, Deep Learning

**PAPER ID: 167**

# Real-Time 3D LiDAR Point Cloud Data Acquisition & Generation on Jetson

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## *Abstract*

This paper presents a novel algorithm for real-time data acquisition, processing, and visualization of 3D point cloud data generated by the VLP-32C LiDAR sensor. The proposed method efficiently captures raw UDP packets transmitted by the LiDAR, decodes the data to generate a comprehensive 360-degree point cloud representation, and visualizes it in real-time on NVIDIA Jetson boards. Leveraging the computational capabilities of the Jetson platform, the algorithm ensures low-latency performance, making it suitable for applications in autonomous systems, robotics, and real-time mapping.

***Keywords*:**3D LiDAR, Point Cloud, UDP Communication, NVIDIA Jetson, Open3D

**PAPER ID: 168**

# Navigating Obstacles with Monocular Image Inputs: A Comparative Analysis of Path Planning Algorithms

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## *Abstract*

Effective path planning in obstacle-filled environments is essential for the deployment of autonomous mobile robots. This paper provides an extensive comparative analysis of different path planning algorithms that utilize monocular image inputs for navigating obstacles. We evaluate the performance of popular graph based algorithms such as BFS, DFS, Dijkstra, A*. examining their efficiency and effectiveness in complex and dynamic settings. Using a standardized dataset, we rigorously test each algorithm's ability to interpret monocular image data, determine viable paths, and avoid obstacles. Key metrics such as computational efficiency, accuracy of obstacle avoidance, and resilience to environmental variations are analyzed to identify the strengths and limitations of each method. Our findings underscore the trade-offs between traditional algorithms and deep learning approaches, providing valuable insights for selecting the most suitable path planning techniques for applications in robotics and autonomous vehicles. This study aims to bridge the gap between theoretical research and practical application, enhancing the development of more adaptive and dependable autonomous navigation systems. Through rigorous experimentation and statistical analysis, this research identifies the strengths and weaknesses of each algorithm in handling different environmental complexities. Results demonstrates that A* path planning method performs better than the other methods.

***Keywords*:**Path Planning, Monocular Image, Obstacle, Performance Metrics

**PAPER ID: 169**

# Evaluating Area Coverage Efficiency in Swarm Robotics: A Comparative Study of Different Approaches

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## *Abstract*

Swarm robotics is an emerging field inspired by natural systems like insect colonies, focusing on decentralized, scalable, and robust multi-robot coordination. This paper presents a comparative study of four key area traversal algorithms used in swarm robotics: Random Walk, Flocking, Behavior-Based, and Spiral Search. These algorithms are evaluated on several quantitative parameters, including best position, coverage area, final velocity magnitude, trajectory efficiency, and convergence speed. Random Walk offers high coverage but suffers from inefficiency due to its unpredictable nature. Flocking provides cohesive group movement but is slower to converge. Behavior-Based algorithms balance avoidance and exploration but require fine-tuning for optimal performance. Spiral Search enables systematic exploration with moderate coverage and convergence. The results show that no single algorithm excels in all areas, emphasizing the need for task-specific algorithm selection. Future research should explore hybrid approaches, scalability, and real-world testing to enhance algorithm robustness and adaptability in dynamic environments.

***Keywords:*** Swarm robotics, area traversal algorithms, random walk, flocking, behavior-based algorithm, spiral search, decentralized control, coverage efficiency, trajectory efficiency, multirobot coordination, scalability, robustness

**PAPER ID: 170**

# Advanced Robot Assistance System Using Depth Camera and AI

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## *Abstract*

This paper presents a novel system combining realtime collision warning, pedestrian warning, cyclist warning and slope detection using Intel Real Sense D455 and Object detection module. The system detects the inclination angle with respect to ground of an Unmanned Ground Vehicle(UGV), alerts the UGV of potential collisions within a specified range and provides warnings if a pedestrian and cyclist is detected. The proposed approach integrates multiple sensing modalities and machine learning to enhance the safety and awareness of UGV, particularly in environments with complex terrain and condition.

***Keywords*:** Depth Camera, Object Detection, Artificial Intelligence, Autonomous Bots Navigation

**PAPER ID: 172**

# Predicting UPI Transaction Efficiency and Impact on Microbusinesses in Digital India

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## *Abstract*

The Unified Payments Interface (UPI) has revolutionized India's digital payment ecosystem, offering significant benefits to micro-businesses by enhancing financial inclusion, operational efficiency, and transparency. However, adoption is hindered by barriers such as digital illiteracy, infrastructural challenges, and cybersecurity concerns. This paper aims to analyze UPI's impact on micro-businesses, identifying the factors driving and obstructing its adoption, and evaluating its role in improving financial systems. Employing a mixed-methods approach, including the Random Forest algorithm, empirical research, case studies, and secondary data analysis, the study examines transaction volumes, user growth, and sectoral adoption trends. Results indicate that UPI has improved cash flow, expanded market reach, and connected micro-businesses to formal financial systems. To maximize UPI's potential in fostering inclusive economic growth, the study recommends enhancing digital literacy, improving infrastructure, and strengthening cybersecurity, ensuring its transformative impact on India's micro-businesses.

***Keywords*:**Unified Payment Interface (UPI), Digital India, Micro-businesses, Digital Payment Systems, Cyber-security, Financial Inclusion

**PAPER ID: 174**

# TinyML for Edge Networks: Challenges and Future Directions

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## *Abstract*

The performance of Convolutional Neural Networks (CNNs) in image classification is affected by factors such as: number of training datasets used, geometric forms of features present, and scaling for capturing geometric proportions. To the authors' best knowledge, there is still a lack of clarity as to how these factors affect accuracy in scenarios where there is a limited amount of data available. To address this, two custom datasets were designed: one that contains cars, trucks and roses to test the variation of features, and a second case study consisting of the images of lionesses and kittens to assess the impact of scaling. For image pre-processing, the images were resized and CNNs were trained using fixed hyper parameters. The best results implied a training accuracy of 94.07% and a testing accuracy of 75% for scaled lionesses and kittens, which are higher than those of the unscaled results. These findings emphasize the need for data "pre-processing", and specificities of a dataset for improving CNN performance.

***Keywords*:**Convolutional Neural Networks, Image Classification, Dataset Size, Feature Diversity, Image Scaling, Pre-processing, Deep Learning

**PAPER ID: 178**

# Exploring Geospatial Mapping through Speech Commands

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## *Abstract*

The integration of voice assistant technology into geospatial data visualization and processing platforms enhances accessibility and user interactivity. Traditional GIS tools often present challenges for non-technical users due to complex interfaces and terminologies. This study addresses these limitations by developing a voice-enabled web-based application capable of understanding domain-specific commands for seamless geospatial data interaction. The proposed system processes voice inputs for tasks such as navigating to specific coordinates, toggling WMS layers, and overlaying geospatial data. A custom Natural Language Processing (NLP) model was designed to interpret geospatial terminologies like "LULC" and "AWiFS", using curated datasets sourced from platforms such as Bhuvan, Bhoonidhi, and open-access WMS services. The prototype was built using open-source technologies, including Flask for backend processing, OpenLayers for map visualization, and the Web Speech API for voice recognition. Testing on real-world queries achieved 93% accuracy in converting voice commands into actionable outputs like layer management and map navigation. The results demonstrate the system's ability to reduce cognitive load while enabling natural interaction with geospatial data. This research provides a scalable solution for enhancing GIS usability, paving the way for more intuitive, accessible, and interactive geospatial tools.

***Keywords*:**Geographic Information System (GIS), Natural Language Processing (NLP), Voice user interface, Web Map Services (WMS) Layer Management, Semantic and fuzzy matching, OpenLayers Integration.

**PAPER ID: 187**

# Design, Fabrication, and Characterization of Paper-Based Flexible Sensor for Wearable Applications

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## *Abstract*

This study presents the design, fabrication, and evaluation of a cost-effective paper-based flexible sensor for wearable applications, specifically motion detection. Lever-aging filter paper as a substrate, the sensor is coated with graphite for conductivity and enhanced with sodium chloride (NaCl) to boost ionic dissociation and sensitivity. The fabrication process employs low-cost and sustainable materials and methods, yielding a sensor with high responsiveness, repeatability, and durability. Comparative analysis with commercial silicon-based sensors demonstrates the paper sensor's superior sensitivity to small angular changes, albeit with slightly lower stability. Optimal dimensions of 6 × 1 cm were identified, balancing sensitivity and mechanical stability. Integration with a microcontroller facilitates real-time data acquisition, showcasing the potential of assistive devices, gesture recognition, and healthcare monitoring. This work highlights the feasibility of sustainable, paper-based sensors as accessible alternatives to conventional silicon-based technologies, aligning with goals of environmental sustainability, and cost-effectiveness.

***Keywords*:**Paper-based, Flex Sensor, Graphite-Coated Sensors, Sustainable Sensor, Wearable Technology.

**PAPER ID: 195**

# CAE-CNN Hybrid Model for Efficient Classification of Freshwater Fish Diseases

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## *Abstract*

Detecting fish infections and monitoring their health via manual visual examination is a difficult undertaking. To avoid disease transmission, diseased fish must be identified as soon as possible. As a result, tackling this problem requires a rapid, dependable, and highly automated solution. This work presents a novel hybrid deep-learning architecture for the classification of freshwater fish diseases. The proposed model leverages the strengths of both Convolutional Autoencoders (CAEs) and Convolutional Neural Networks (CNNs) to achieve improved accuracy and efficiency in disease identification. First, a CAE is used to reduce dimensionality and capture complex illness patterns by extracting significant characteristics from fish images. After that, a CNN is fed the encoded features, and it completes the last classification task. This hybrid method makes use of CNN's expertise in picture classification and the CAE's capacity to learn discriminative representations. Experimental findings show that the suggested design outperforms conventional CNN-only models, indicating its potential for precise and prompt identification of diseases affecting freshwater fish. This technique has the potential to greatly improve aquaculture health management by facilitating timely treatment and reducing possible financial losses.

***Keywords:*** CNN, Convolutional Autoencoders, fish disease classification, ResNet50

**PAPER ID: 196**

# GLIDESMART: PREDICTIVE TOUR GUIDANCE

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## *Abstract*

As the trendy need for customized, experiential tourism, and the fact that the modern traveler does not want dry, outdated data, but rather dynamic, location-specific advice. The tour guide offerings of today are largely stale, factory produced information that does not take into account the interests, the exact location at any given moment, or the interactive method of delivery of each individual tourist. To compensate for these disadvantages, we introduce the AI Tour Guide that will offer a more vibrant, live, personal tour. Featuring the latest in AI technologies such as geolocation awareness, dense information retrieval, and multimodal interaction (text / speech / image), along with top-of-the-line text-to-speech synthesis. In the AI Tour Guide, tourists can type in any question in normal everyday language, ask about different monuments, and get back detailed responses that include a description typed out, pictures related to the question, and audio explanation. This answer is to completely revamp the way travelers see the world by making this exploration process as fluid and interactive as possible, also to improve the storytelling aspects of tours through the use of some intelligent, responsive content delivery.

***Keywords:***Customized travel, smart tour guide, geolocation, multimodal, text-to-speech, NLP, image-to-text, OCR

**PAPER ID: 200**

# Impact of Atmospheric Turbidity on Terahertz Communication in Tropical Sub-Continent

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## *Abstract*

Research works on Terahertz spectrum have been emerged as one of the most fascinating areas of cutting-edge communication researches, where ultra-fast data-rate and ever-increasing 'G' constraint play a very important role. Although Terahertz Spectrum is wide enough (0.1THz-10THz), it is highly susceptible to atmospheric hydro-meteors. Depending on the weather constraints, the fog/cloud based liquid water droplets can absorb the incoming Terahertz signal drastically. Besides, the presence of atmospheric humidity, on the other hand, may lead to several adverse effects in free-space propagation of Terahertz signal. India, located in the South-East Asia is categorized in the Tropical Climatic Region. The mean temperature under this climatic belt lies around 650F and the drop-dimension of atmospheric aerosols lies around 5mm. Through an indigenously developed and experimentally verified non-linear self-consistent simulator, the author's group has thoroughly analyzed the Terahertz attenuation spectra in atmospheric turbidity under tropical weather scenario and the outcomes of simulation have also been presented here. To the best of author's knowledge this is the first report on the impact of atmospheric turbulence on entire Terahertz Spectra in tropical weather scenario.

***Keywords:*** Terahertz Communication, Atmospheric Attenuation, Scintillation, Scattering And Absorption

**PAPER ID: 201**

# Quantum-Powered Autonomous Deep-Sea Explorer Using AI, Microbiofuels, and Advanced Sensors for Oceanic Discovery

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## *Abstract*

The ocean's depths are among the most enigmatic regions on Earth, with geographical features, temperatures, and marine life remaining widely unexplored. The traditional forms of exploration confront water pressure, cold-temperature conditions, and a lack of energy resources. This research suggests a novel apparatus, that integrates quantum technology, artificial intelligence (AI), and cutting-edge sensors to address these issues and enhance ocean floor mapping, gas detection and element analysis. The energy apparatus of the device is central to ensuring its functionality for a prolonged period. It employs thermoelectric generators exploiting the temperature difference between the cold waters located at depth and warmer surface layers and the microbial fuel cells (MFCs) that convert organic materials in ocean sediments into electricity. This hybrid energy combined cycle therefore sustainable operation without external power supplies. Sophisticated sensors such as quantum-enhanced spectroscopy and mass spectrometers will be used for the detection and analysis of gases, trace elements and organic compounds. The balanced engineering systems integrated into the automated equipment, with the power distribution control and information processing in the real-time mode performed by the quantum neural networks (QNN), will be used. The system's adaptability, this accuracy and that such a system may function unattended for fairly long periods of time, this system presents an unprecedented device which should change the course of deep-sea studies as it will provide access to previously unreachable areas.

***Keywords:*** Quantum Technology, Autonomous Exploration, Microbial Fuel Cells (MFCs), Deep-Sea Sensors, AI-Driven Systems

**PAPER ID: 205**

# DLIoMT: Deep Learning Approaches for IoMT-Overview, Challenges and the Future

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## *Abstract*

An artificial intelligence (AI) system works by combining a computer program and algorithms to make a device more efficient and intelligent for tasks that are typically performed by humans. Deep learning, machine learning, conven- tional neural networks, recognition, and fuzzy logic are a few of the subsets of AI with unique capabilities and functions that can enhance modern medical science. Such innovations simplify human interference in clinical diagnostic procedures, decision making, and medical imaging. To improve human health, con- nected biomedical network devices and software applications are interconnected to form the Internet of Medical Things (IoMT), the next generation of bioanalytical tools. This review paper provides in-depth analysis of the IoMT encasing its definition, technologies, applications, challenges, and future prospects.

***Keywords:*** Internet of Medical Things (IoMT), Neural Network, Artificial Intelligence (AI), Smart Health, Machine Learning (ML), Deep Learning

**PAPER ID: 215**

# BUBBLE: A Scalable and Efficient Bellwether Discovery Method for Large-Scale Software Engineering Datasets

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## *Abstract*

Bellwether analysis is a widely-used technique in software engineering for identifying representative projects that can be used to predict outcomes in other projects. However, existing methods, such as the one proposed by Krishna et al., require extensive comparisons, making them inefficient for large datasets. In this paper, I present a novel approach called BUBBLE, a hierarchical bellwether discovery method designed to scale with large datasets. BUBBLE clusters projects into hierarchical levels, reducing the number of comparisons by a factor of mmm, where mmm is the number of clusters at the leaf level. This method not only improves performance but also maintains prediction quality. Experimental results on a defect prediction dataset of 697 projects show that BUBBLE reduces bellwether discovery time from hours to mere minutes while yielding high recall, precision, and defect prediction metrics. I also discuss threats to validity and demonstrate that BUBBLE is both statistically and empirically effective for large-scale bellwether analysis in software engineering.

***Keywords:*** Software Engineering, Data Science, Computer Science

**PAPER ID: 218**

# Optimization of Cluster Head Selection Using Bacterial Foraging Algorithm for Energy-Efficient Routing in Wireless Body Area Networks

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## *Abstract*

Optimizing cluster head (CH) selection in Wireless Body Area Networks (WBANs) using the Bacterial Foraging Optimization (BFO) algorithm. The approach aims to enhance network performance by minimizing energy consumption, balancing node load, and ensuring reliable communication. The process begins with the initialization of bacteria, representing potential CH candidates, which are randomly distributed within the network. A multi-objective fitness function evaluates each bacterium based on residual energy, proximity to the sink, and data load distribution. The BFO algorithm employs chemotaxis for exploring the solution space, guided by both directed and random movements. The reproduction phase ensures that the most efficient bacteria propagate their traits to subsequent generations, while the elimination-dispersal phase prevents stagnation by introducing diversity in the solution space. The iterative process continues until a stopping criterion, such as convergence or maximum iterations, is met. The optimal CHs are selected based on the fitness evaluation, ensuring energy efficiency and balanced operation within the WBAN.

***Keywords:***Iterations, Communication, Cluster Head, Energy, WBAN, BFO, Bacteria

**PAPER ID: 219**

# Dynamic AP-UE Association and Power Allocation in Sparse LSFD for Energy-Constrained Networks

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## *Abstract*

The rise of 5G and beyond has intensified the need for energy-efficient, high-capacity wireless networks, especially in IoT, smart cities, and dense urban settings. Sparse Large-Scale Fading Decoding (S-LSFD) addresses this challenge by dynamically associating User Equipment (UE) with a selective subset of Access Points (APs) offering the strongest channel gains. This selective association reduces interference, improves spectral efficiency, and minimizes energy consumption while maintaining Quality of Service (QoS).S-LSFD incorporates optimized power allocation to focus energy on high-quality AP connections, maximizing transmission efficiency. Its adaptability is governed by the control parameter λ, which balances reliability and energy savings by adjusting the number of APs each UE connects to. This flexibility makes S-LSFD ideal for energy-constrained scenarios like IoT ecosystems and densely populated areas.This study explores dynamic AP-UE association and power allocation mechanisms in S-LSFD using mathematical modeling and real-world scenarios. The proposed framework ensures scalability, energy efficiency, and high data rates, providing a sustainable solution for next-generation wireless networks.

***Keywords:***5G networks, Sparse LSFD, energy efficiency, spectral efficiency, AP-UE association, power allocation, IoT ecosystems, next-generation wireless networks, control parameter λ, scalable solutions.

**PAPER ID: 221**

# Enhancing Remote Sensing Image Quality with Advanced ADMM-Based Stripe Noise Removal

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## *Abstract*

This study presents an efficient methodology for stripe noise removal in remote sensing images using the Alternating Direction Method of Multipliers (ADMM). The process begins with dataset preparation, where the image matrix is normalized and key characteristics, such as dimensions and peak intensity, are identified. Stripe noise is simulated by introducing vertical streaks with defined intensity ranges, creating a noisy image for testing. The ADMM framework is then employed with carefully initialized parameters, including regularization coefficients and iteration limits, to iteratively separate noise components and reconstruct the underlying image. The algorithm effectively suppresses noise while preserving essential image features, as validated by performance metrics such as Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index (SSIM), and mean absolute error (D). Visual comparisons of clean, noisy, and destriped images highlight the success of the noise removal process. With an execution time of 1.59 seconds, this robust approach enhances remote sensing image quality, enabling more reliable data analysis and supporting applications in environmental monitoring, urban planning, and land classification.

***Keywords:***Stripe noise removal, Remote sensing images, Alternating Direction Method of Multipliers (ADMM), Image destriping, Noise suppression, Image reconstruction, Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index (SSIM), Mean Absolute Error (D).

**PAPER ID: 222**

# Innovative Lung Cancer Diagnosis Using the AlReM-Net Hybrid Approach

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## *Abstract*

As one of the primary causes of cancer-related death globally, lung cancer requires precise and effective diagnostic instruments for early identification and categorization. This paper presents AlReM-Net, a hybrid framework that combines Multi-Class Support Vector Machines (SVM) for classification, Reservoir Computing (RC) for dynamic pattern analysis, and AlexNet for feature extraction. The suggested methodology's clinical relevance and computational efficiency are highlighted by its 98.7% sensitivity, 100% specificity, and 98.5% accuracy. AlReM-Net's detection module successfully overcomes the drawbacks of current diagnostic systems by preprocessing CT scans, segmenting lung nodules, and extracting essential information for precise cancer identification. Using both spatial and dynamic information for dependable classification, the combination of AlexNet, RC, and SVM guarantees accurate and robust results. With continued attempts to improve the system by incorporating a thorough classification module for real-time clinical applications, these developments offer a computationally effective and clinically appropriate approach for lung cancer diagnosis.

***Keywords:***Lung Cancer Detection, AlReM-Net, Deep Learning, AlexNet, Reservoir Computing (RC), Echo State Network (ESN), Multi-Class Support Vector Machine (SVM), Computer-Aided Diagnosis (CAD), CT Imaging, Classification, Early Diagnosis, Medical Image Processing.

**PAPER ID: 227**

# Real-Time Scheduling Algorithms for Improved Mobile Device Energy Efficiency

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## *Abstract*

In the era of real-time applications dominating mobile devices, balancing enhanced performance with prolonged battery life has become a significant challenge. This paper explores the complexities of real-time scheduling algorithms, focusing on Earliest Deadline First (EDF) and Rate Monotonic (RM) algorithms, and their impact on energy consumption. Additionally, variations of these algorithms are introduced in the context of Dynamic Voltage Scaling (DVS), a technique crucial for achieving optimal performance with improved battery efficiency. Through an in-depth analysis of various conditions, including task numbers and worst-case processor utilization, the study demonstrates the effectiveness of these algorithms, making them indispensable in scenarios where energy efficiency is paramount.

***Keywords:***Algorithm, Mobile Devices, Computing Algorithm, Intelligent Computing

**PAPER ID: 237**

# Cryptography Innovations for Securing Data in the Quantum Computing Era: Integrating Machine Learning for Enhanced Security

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## *Abstract*

The rise of quantum computing introduces substantial risks to traditional cryptographic protocols, which are vulnerable to quantum decryption methods such as Shor's algorithm. To address these emerging threats, this paper proposes an innovative cryptographic framework that integrates machine learning (ML) techniques to enhance data security in the quantum computing era. Our approach leverages ML-driven anomaly detection, adaptive key management, and predictive analytics to create a flexible and resilient cryptographic defense. The system's anomaly detection module utilizes neural networks to identify potential quantum-based decryption attempts, while reinforcement learning optimizes key generation and distribution in response to detected threats. Experimental results demonstrate that the proposed ML-augmented framework significantly improves anomaly detection accuracy and reduces vulnerability to quantum decryption attempts by dynamically adjusting cryptographic parameters. These findings underscore the potential of machine learning to strengthen cryptographic systems, making them adaptable to the advanced threats posed by quantum

***Keywords:***Quantum Cryptography, Machine Learning, Quantum Security, Post-Quantum Cryptography, Anomaly Detection, Adaptive Key Management, Predictive Analytics

**PAPER ID: 240**

# GRU Based Multiview Summarisation to Obtain Fast Effective Key-Frame

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## *Abstract*

This paper proposes a novel approach to video summarisation by introducing a feature variance model that enhances video frame extraction. In typical video record aggregation systems, a variety of image processing tasks, such as acquisition, preprocessing, segmentation, and feature extraction, should be carried out with high precision to guarantee seamless system performance. Among these, feature extraction is essential since it breaks down large amounts of visual data into more manageable, informative vectors, and the success of the system is directly impacted by how effectively this process functions. Widely Recurrent Neural Networks (RNNs) are used in supervised video summarisation processes to obtain a model for the temporal dependencies between video frames. RNN's ability to learn long-range memory in the video is limited, and CNN often focusses on local information while losing long-term knowledge when the input sequence is lengthy. Therefore, a Gated Recurrent Unit based Neural Network (GRU-NN) for video summarisation is proposed, to classify them into keyframes and non-keyframes. Keyframes are selected for summarisation, while non keyframes are discarded or reduced. We explore various keyframe extraction techniques, analyse the performance of the proposed summarisation model, and discuss the results. Finally, we offer insights into the model's potential improvements and its broader applications in video summarisation tasks.

***Keywords:*** Video Summarisation Computer Vision, Deep Learning, Artificial Intelligence, Video Analytics

**PAPER ID: 241**

# Modularity-Driven Influence: An Enhanced LPA Framework for Community Detection and Maximization in Social Networks

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## *Abstract*

It is quite an uphill task to identify social network communities as well as to diffuse impact because of their complex architecture as well as evolving nature of their relationships. In this paper, we present an advanced version of the Modularity-Driven Label Propagation Algorithm (ELPA) which has provided solutions to these issues through the adoption of modularity optimization and the local influence effectiveness measure. The modularity component ensures accurate and coherent community discovery, while the LIE metric optimises effective node selection and network impact propagation. The productivity and the impact distribution of the method have surpassed the results of the Louvain method which is often used on large databases of networks. The findings suggest that this new LPA is of a linearly increasing runtime with better impact diffusion making it appropriate for the use in viral marketing, public health activities and the dissemination of specific information. By integrating computational scale with analytical precision, the methodology advanced in this study offers a robust and efficient strategy for the current evolution of social networks research.

***Keywords:***Community Detection, Label Propagation Algorithm, Social Network Analysis, Influence Spread, Lie Value, Graph Visualization, Seed Size, Community Structure

**PAPER ID: 250**

# Performance Evaluation of Sentiment Analysis on Reddit Comments: Insights and Improvement Opportunities for Naive Bayes, SVM, and BERT Models

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## *Abstract*

Sentiment analysis plays a key role in Natural Language Processing (NLP). It aims to pull out sentiments, opinions, and emotions from text. Social platforms like Reddit show how important this is. People express many different emotions there. This makes sentiment analysis useful for market analysis, consumer feedback, and social behavior research. This study tackles problems in emotion classification. These include not having enough emotion databases, making things too simple with binary classification, and the high computing costs of processing big datasets like GoEmotions. We use the GoEmotions dataset to test machine learning and transformer-based models. This dataset has 58,000 comments labeled with 27 emotions. We look at Support Vector Machines (SVM), Naive Bayes, and BERT. Our findings show that BERT does better than the others. It's more accurate and captures small differences in sentiment well. BERT's strong performance shows it's a good fit for complex sentiment analysis tasks. This paper stresses the need for accuracy and efficient computing. It sets a standard to help push fine-grained sentiment analysis research forward.

***Keywords:***Sentiment Analysis, Emotion Classification, Support Vector Machines, BERT

**PAPER ID: 266**

# Smart Battery Management System For Electric Vehicles

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## *Abstract*

Due to the demand for eco-friendly transportation, electric vehicles, or EVs, are growing in popularity. EVs' restricted range, which is based on battery capacity, is their largest drawback. Monitoring the battery is required to maintain the dependability and efficiency of electric vehicles. Consequently, the battery's condition can be tracked using an Internet of Things-based battery monitoring device. A microprocessor, a wireless communication module, a cloud server, and battery sensors make up the suggested Internet of Things-based battery monitoring system for electric cars. The microprocessor receives data from the battery sensors, which measure the battery's voltage, current, and temperature. The microcontroller processes data before it is sent to the cloud server via the wireless connection module. Data is kept on the cloud server and examined to offer guidance on the condition of the battery. A battery tracking system based on the Internet of Things continuously monitors the voltage, current, and temperature of the battery. You can use this information to increase the battery's lifespan and performance. The driver may be able to more effectively plan their trip by using the system's data to predict how much range the EV will have left. Due to their ability to reduce pollution, electric vehicles are becoming more and more common for transportation in the modern world, replacing conventional automobiles. A range of battery types, such as solid- state, lead-acid, nickel-metal, and lithium batteries, are utilized in electric cars. The battery made with lithium is the most popular of these battery types. Because it has a lot of energy per unit mass and is more efficient than conventional batteries. It can also be recycled. This article suggests a system for tracking batteries built around the Internet of Things. Since this study proposes a proposal that uses IoT to examine the car's display, testing ought to be clear. Implementing a battery monitoring system with IoT functionality. Monitoring requires keeping a watch on critical operational characteristics when charging and discharging, such as voltage, smoke, and temperature. This When temperature, voltage, and smoke levels are at the proper levels, a hardware-timed sensor system tracks and publishes the data on the Internet of Things.

***Keywords:***Smart Manufacturing, Data Analytics, Sustainability

**PAPER ID: 270**

# An Enhanced Algorithm for Medical Image Fusion Utilizing Artifificial Rabbit Optimization

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## *Abstract*

Here we present a novel technique for fusing a set of multimodal medical images utilizing the Artificial Rabbits Optimization (ARO) algorithm. The used medical images are acquired from multi-sensor integrated instruments and are mutually coregistered in the image space. Five popular fusion techniques are randomly chosen at runtime for medical image fusion (MIF) using ARO algorithm. Instantaneously, one technique is selected for fusing two multimodal images. Mutual Information (MI) of the fused image is measured and considered to be satisfactory parameter. Higher MI is the indication of more fit cost-function value. Several quantitative measures are used to judge wellness of the planned scheme. Evaluation of the suggested scheme's effificacy in merging multimodal medical images is done by comparing it to the existing MIF approaches.

***Keywords:***MIF, Artificial Rabbits Optimization, Mutual Information, Quality Fused Medical Image

**PAPER ID: 274**

# Dynamic Fog Federation Scheme Using Vertex Cover Problem and Shapley Value-Based Approach

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## *Abstract*

The Internet of Vehicles (IoV) has advanced significantly, leading to a increased reliance on low-latency and high-bandwidth applications. In response to the increasing computational demands, fog computing has emerged as a critical paradigm for offloading tasks from centralized cloud infrastructures. However, conventional fog resource allocation strategies face significant challenges in dynamic environments characterized by vehicle mobility and fog node heterogeneity. This study introduces a novel Dynamic Fog Federation Scheme (DFFS) tailored for IoV environments, integrating the Vertex Cover problem and a Shapley value-based resource allocation framework. The Vertex Cover approach is utilized to optimize resource allocation between vehicles and fog nodes, while the Shapley value employs cooperative game theory principles to ensure equitable resource distribution. The proposed scheme is evaluated for its efficiency, fairness, and computational complexity, demonstrating notable improvements in load balancing and resource utilization within dynamic IoV ecosystems.

***Keywords:***Internet of Vehicles (IoV), Fog Computing, Dynamic Fog Federation Scheme (DFFS), Vertex Cover Problem, Shapley Value

**PAPER ID: 275**

# A Smart Agrisense IoT System with ML Integration

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## *Abstract*

This paper presents an advanced agricultural monitoring system utilizing Internet of Things (IoT) technology to provide precise soil and nutrient analysis. The core of the system is the ESP32 microcontroller, which processes data from various sensors to facilitate seamless operation. The focus is on improving crop yield and soil health by continuously monitoring nitrogen, phosphorus, and potassium (NPK) levels. The system explores recent advancements, including machine learning algorithms for accurate crop recommendations and edge computing for real time data processing.challenges faced in implementing such systems—such as sensor calibration, maintaining data consistency, and integrating predictive models—are addressed. Despite these obstacles, field tests demonstrate the system's reliability in analyzing soil fertility and offering tailored crop suggestions. The system consistently provides actionable insights to identify suitable crops, ensuring efficient resource use. This proposed agricultural monitoring system is designed to overcome these challenges and significantly advance precision farming. It is innovative, affordable, and easy to operate, making it a valuable tool for modern agriculture.

***Keywords:***Soil Nutrient Monitoring, Precision Agriculture, Real-time Soil Analysis, Crop Recommendation System, NPK Sensor, Internet of Things (IoT) Technology, Soil Fertility Assessment, Smart Farming, MachineLearning in Agriculture, Sustainable Farming Practices, Edge Computing, Agricultural Innovation, Resource Optimization, Data- driven Farming.

**PAPER ID: 284**

# Sentiment Mining in ChatGPT Dataset: Leveraging Rule-Based and Transformer-Based Models

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## *Abstract*

The rapid popularity of ChatGPT and conversational AI systems has sparked considerable interest in comprehending opinions expressed on social media platforms. This research analyzes sentiment analysis in datasets associated with ChatGPT, utilizing both rule-based models and sophisticated transformer-based architectures. A comparative analysis employs VADER, a lexicon-based method, and advanced transformer models including BERT, DistilBERT, and RoBERTa, in conjunction with RNN architectures such as LSTM and Bi-LSTM. \\ The findings indicate that transformer-based models surpass conventional and RNN-based approaches, with RoBERTa attaining the highest accuracy of 98.76% owing to its capacity to comprehend contextual subtleties. VADER demonstrates proficiency in rapid, rule-based sentiment analysis but exhibits deficiencies in accuracy inside intricate contexts. Exploratory Data Analysis (EDA) yields valueable insights into sentiment distribution by categorizing sentiments as positive, neutral, or negative, and also generates word clouds for each category of tweets, thereby illustrating user involvement with ChatGPT. This research not only illustrates the effectiveness of advanced models in sentiment analysis but also establishes a framework for future investigations to enhance sentiment mining techniques for conversational AI datasets, with potential applications in opinion monitoring, user feedback analysis, and real-time trend identification.

***Keywords:***Sentiment Analysis, ChatGPT Tweets, VADER, RoBERTa, Transformer Models

**PAPER ID: 287**

# IALS:Innovative Approach for Lung Segmentation Applying Artificial Intelligence and Deep Learning

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## *Abstract*

The automated segmentation of lung tissue in chest CT scans is emergent for various clinical applications, including illness diagnosis and treatment planning. This paper presents a new and innovative deep incremental learning (DIL) system designed to tackle the difficulties usually faced during segmentation of lung tissue. To gain exceptional results in segmentation, the framework uses a neural network structure that uses masked RCNN+UNet for segmentation on tissue and GAN + VARMA for classification. We know that the lung tissue structure is complicated as its shape is irregular and its structure is complicated. So it is very difficult to get accurate segmentation. By applying masked RCNN+UNet the irregularity of shape can be controlled and gain better accuracy in segmentation on lung tissue. We have incorporated DIL in order to retain the enhanced features from the segmented images. The employed framework helps us to gain better performance which is measured by employing the evaluation metrics namely-Dice similarity coefficient (DSC), mean absolute error (MAE) and Jaccard index (JI). The experimental results demonstrate that the proposed framework outperforms existing state-of-the-art methodologies for lung tissue segmentation. The DSC score of 0.96, JI score of 0.93, and MAE less than 0.01 show that the framework has high precision and efficacy in detecting lung tissues. The enhanced feature extraction technique would be beneficial for improving medical image analysis in healthcare.

***Keywords:***Lung Tissue Segmentation, Chest CT Scan, GAN, RCNN, VARMA, Deep Learning

**PAPER ID: 290**

# Clustering Technique for Setting Group Based Protection in Multi-Microgrids System

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## *Abstract*

Multi-Microgrids (MMGs) are developing as one of the feasible options for utilizing locally accessible, cost-effective, and environment friendly electricity provided by distributed energy resources (DERs). One of the most significant aspects in MMG is to ensure adequate coordination among protection devices. The topology of MMGs may alter in a number of ways, including islanded mode, connecting to another autonomous microgrids (MGs) or grid linked mode, etc. Depending on the short circuit current level, the protection devices may have various setting groups for each MMG topology. As a result, using separate relay settings for each topology is not a realistic strategy. Therefore, it requires techniques that cluster similar topologies and form groups to provide adequate protection capable of operating in different groups. This paper proposes a possible configuration of the topological changes for MMG and categorizes them into four and eight groups using the k-means clustering technique. The proposed clustering scheme has been validated on a benchmark MMGs test system. The effectiveness of the clustering techniques has been evaluated based on the topological configuration of microgrids.

***Keywords:***Multi-Microgrids, Fault Current Vector, Clustering Techniques, k-means, Setting Groups, Silhouette plot

**PAPER ID: 291**

# Improved Control Method for Combining a Multi-Level Based Inverter with Neutral-Point-Clamped Configuration Using PV and Battery Storage

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## *Abstract*

In this work, a multi-level based neutral-point-clamped (NPC) inverter is recommended for grid-connected solar photovoltaic (PV) system and battery storage. For a three-phase, three-level inverter, a new and streamlined space vector pulse-width modulation (PWM) method is suggested. Compared to two-level inverters, three-level inverters have more switching states. A three-level space vector PWM inverter is directly applied in the suggested manner. This control approach incorporates maximum power point tracking (MPPT) technology and controls the flow of power in between the grid and the solar PV system. By using a vector modulation technique, the control architecture can produce precise AC voltage in situations when the DC voltage is imbalanced. Additionally, it controls the battery storage system's charging and discharging under various solar irradiation levels. A MATLAB platform is used to simulate and check the effectiveness of space vector modulated three-phase, multi-level inverter.

***Keywords:***NPC inverter, MPPT, multilevel inverter, MPWM, space vector diagram

**PAPER ID: 293**

# Variational Mode Decomposition for Classification of EEG motor Imagery Signals: A Comprehensive Study and Evaluation of Entropy based Measures

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## *Abstract*

Nowadays, research on human movement related to Brain-Computer Interface (BCI) technology is increasing significantly. The objective of this research is primarily on improving neurological rehabilitation. The complexity and nonlinearity of electroencephalogram (EEG) data present challenges for conventional signal processing techniques. The present study addresses these challenges by analyzing the dynamic nature of EEG signals. The Variational Mode Decomposition (VMD) method is used non-recursively to decompose the EEG signals into four different band-limited intrinsic mode functions (IMFs), specifically IMFs 8, 9, 10, and 11. To reduce computational load and enhance system performance, 16 motor-cortex-based channels are chosen from a total of 118 channels. Approximate entropy and sample entropy are computed from the IMFs to form a feature vector. This generated feature vector is then fed into different classification algorithms such as LDA, SVM, Decision Tree, and Naive Bayes for classification. The highest average accuracy achieved across all classifiers using approximate entropy is 100%, while the sample entropy feature yields classification performances of 98.75%, 99.38%, 100%, and 100%, respectively. VMD allows for more accurate decomposition of the signal for precise analysis. Both ApEn and SampEn yield state-ofthe- art results when applied to the decomposed signals. This study demonstrates exceptionally well in feature extraction and classification compare to the recent study and making more efficient for real-time application.

***Keywords:*** EEG, VMD, Feature Extraction, Approximate Entropy, Sample Entropy

**PAPER ID: 298**

# Design and Development of Low-Cost Ventilator for Medical Emergency

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## *Abstract*

The worldwide scarcity of respiratory support equipment has made the development of affordable ventilators for medical emergencies even more important. The design and development of a low-cost ventilator, which attempts to offer accessible and reasonably priced respiratory therapy, is presented in this work. The ventilator has a straightforward design, uses easily obtained parts and reduces production costs. To guarantee the safety and effectiveness of the gadget, extensive testing and assessment were carried out. The outcomes show that, in comparison to ventilators that are sold commercially, the designed ventilator significantly lowers costs while still meeting the fundamental performance requirements for respiratory assistance. In especially in areas with little resources, this research helps to solve the global healthcare concerns related to ventilator availability.

***Keywords:***Mechanical Ventilator, Respiratory Support, Volume-Controlled Ventilation, Tidal Volume, Flow Rate, Portable, Low-Cost, IoT-based, Oxygen Sensor, Pressure Sensor, Home Ventilation, Cost-Effective Design

**PAPER ID: 301**

# A Multi-Agent Garage Service Search and Recommendation with Hybrid MLs and LLMs

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## *Abstract*

The automobile service industry's explosive growth highlights the need for creative approaches to boost operational effectiveness and user experience. This study introduces a Hybrid Garage Assistance System, integrating Classical Machine Learning (ML) techniques with Generative AI to optimize garage service discovery and analysis. The system employs sophisticated data processing methods, including Term Frequency-Inverse Document Frequency (TF-IDF) vectorization and regex-based service detection, to extract actionable insights from unstructured garage data.Central to the system are machine learning models Random Forest (RF) and XGBoost (XGB) which achieve high precision and recall in classifying garage services. A hybrid search mechanism, combining cosine similarity with ML-driven predictions, ensures the delivery of highly personalized search results. To further refine decision-making, the system incorporates Generative AI models such as Perplexity for web-based research, Gemini for location-specific analysis, Mistral for email sending and GPT-4 for detailed service recommendations and dall-e for creating user specific parts images. These advanced tools provide users with comprehensive information that enables them to make well-informed decisions about garage services.Performance evaluation of the system is conducted using robust metrics, including precision, recall, F1-score, and system latency. Experimental results reveal a precision of 85%, recall of 70.8%, and an F1-score of 77.2%, demonstrating the efficacy of integrating classical ML with generative AI. The system's average latency of 5.9 seconds ensures a seamless and responsive user experience.This hybrid framework highlights the potential of blending classical ML and Large Language Models (LLMs) to enhance search and recommendation functionalities, offering a scalable and robust blueprint for future advancements in the automotive service sector. The system’s Propose a Multi-Agent System With high accuracy, scalability, and reliability position it as a cutting-edge solution for users navigating the complexities of garage service selection.

***Keywords:***Garage, LLMs, MLs, MultiAgent

**PAPER ID: 303**

# Real-Time Voice: A Comprehensive Survey of Automatic Speech Recognition and Transcription

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## *Abstract*

Human-computer interaction has been transformed by Automatic Speech Recognition (ASR), opening the door to uses including voice-activated devices, assistive technology, and real-time transcription. But it's still difficult to get reliable results when dealing with different accents, loud surroundings, and domain-specific jargon. In this research, a high-performance ASR system utilizing a WaveNet-based architecture and sophisticated preprocessing methods such as SubSpectral Normalization and Mel-Frequency Cepstral Coefficients is presented. The suggested approach combines linguistic decoders with causal and dilated convolutions to improve contextual comprehension. Time-stretching and noise addition are two data augmentation techniques that guarantee resilience to real-world fluctuations. Results from experiments show notable gains in generalization, scalability, and transcription accuracy. By providing useful answers for a range of applications, including accessibility tools and virtual assistants, this work advances ASR technologies.

***Keywords:***MFCC, Speech-to-Text, Automatic Speech Recognition (ASR), WaveNet Architecture

**PAPER ID: 307**

# A Proposed Utility Assisting Agricultural Pump Controller for Agricultural Grid-tied Photovoltaic (PV) Systems

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## *Abstract*

In context in Indian scenario, about 17% of the total electrical energy consumption is utilized in the agricultural sector of which the majority is used for driving the irrigation pump. Traditionally diesel-based pumps were extremely popular for running the irrigation pumps which were not only less efficient but also have environmental impacts as well. Therefore, the government is encouraging the use of electric motors so as to overcome the limitations. Government of India (GoI) is also targeting the utilization of solar energy for running these agricultural pumps and deliver the surplus energy to the grid. Due to the unpredictable nature of the renewable energy sources, demand response (DR) is a useful tool to take care of this problem. While investigating the behavior of a 3-Φ induction motor (I.M.) fed by a power electronic device, it was observed that the power output of the motor can be controlled by controlling the power electronic converter. Based on this observation, a methodology is proposed for controlling such motors by controlling power electronic converter. This can be useful to meet the requirements of demand response weakly in the grid-interacted PV fed agricultural sector.

***Keywords:***Irrigation Pump, Demand Response (DR), Grid-Connected Photovoltaic (PV) Systems, Microcontroller, Power Electronic Converter

**PAPER ID: 312**

# Cardiac Diagnosis System For Heart Diseases Classification Based On Deep Learning And Optimization Strategies Using ECG Signals

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## *Abstract*

Heart Disease is among the leading causes of death worldwide. Significant factors include other cardiovascular disorders, such as aortic disease, coronary artery disease, and arrhythmia. The increase in death tolls has underlined the urgent necessity for precise and timely diagnosis to help initiate proper treatment. A mistake in diagnosis can result in very dire consequences. It is essential to be accurate when determining heart conditions. Lives are saved by early detection. Heart conditions are typically diagnosed using techniques that include electrocardiograms and computed tomography. Here, of the two methods, ECG is essentially the basis of diagnosing heart conditions. However, their interpretation in manual mode involves much time consumption. Traditional diagnosis through signal processing techniques includes feature extraction, selection, and classification that often lacks selection of proper features for better diagnosis accuracy.

Deep Learning has been very promising in the last few years for tasks of prediction and classification. This work proposes CNNs to classify heart diseases. The system analyzes ECG signals, focusing on parameters like heart rate and RR intervals, to diagnose conditions such as arrhythmia, coronary artery disease, and aortic disease. The Osprey Optimization Algorithm will enhance the accuracy of the model developed in classifying heart disease by means of ECG. For testing and training purposes, it will evaluate performance with various metrics such as accuracy, sensitivity, specificity, MSE, and PSNR. This strategy is used in order to increase diagnostic accuracy and thus allow early detection while reducing death rates.

***Keywords*:**Electrocardiogram (ECG); Convolutional Neural Networks (CNN); Computed Tomography (CT); RR Intervals; Early detection.

**PAPER ID: 313**

# Heart Disease Prediction Using Logistic Regression

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## *Abstract*

Cardiovascular diseases (CVDs) are one of the leading causes of death worldwide, and early identification is crucial to improve the patient's prognosis. Traditional diagnostic methods for heart diseases are highly dependent on clinical expertise and can be time-consuming, making machine learning an attractive alternative for improving accuracy to diagnose and support faster decision making. Previously, research has explored various machine learning algorithms, such as decision trees, support vector machines, and neural networks, to improve prediction accuracy. However, many of these models face challenges related to their interpretability and generalization to unexpected data. This paper presents a logistic regression model to predict CVDs based on a dataset of 303 samples, incorporating key demographic, clinical, and diagnostic features. The model achieved an accuracy of 85. 12% in the training data and 81. 97% in the testing data, demonstrating its effectiveness for binary classification tasks. The study emphasizes the computational efficiency and interpretability of logistic regression, making it appropriate for real-time applications in clinical settings. In conclusion, the results indicate that logistic regression can serve as a reliable tool for early detection of heart disease, and future work can explore dataset expansion, advanced models, and explainable AI techniques to further improve prediction accuracy and model transparency.

***Keywords*:**Heart Disease, Machine Learning, Predictive Modeling, Early Detection, Preventive Measures, Risk Factors.

**PAPER ID: 315**

# Hardware Design Of Smart Landmine Detection Robot

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## *Abstract*

This paper presents a smart landmine detection robot designed to enhance safety and efficiency in demining operations. The robot autonomously detects buried landmines, records their GPS coordinates, and navigates challenging terrains, significantly reducing human exposure to danger. It combines metal detection and ground-penetrating radar technologies with precise navigation and mapping capabilities. Powered by a sustainable energy system, the robot offers a practical and reliable solution for landmine clearance, addressing both technical and humanitarian challenges in postconflict areas.

***Keywords*:**Landmine Detection, Autonomous Robot, Metal Detector, GPS Module, Atmega328, Power Efficiency, Autonomous Navigation

**PAPER ID: 323**

# Understanding the Roles of Geometric Forms and Proportions in CNN-Based Image Classification

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## *Abstract*

The performance of Convolutional Neural Networks (CNNs) in image classification is affected by factors such as: number of training datasets used, geometric forms of features present, and scaling for capturing geometric proportions. To the authors' best knowledge, there is still a lack of clarity as to how these factors affect accuracy in scenarios where there is a limited amount of data available. To address this, two custom datasets were designed: one that contains cars, trucks and roses to test the variation of features, and a second case study consisting of the images of lionesses and kittens to assess the impact of scaling. For image pre-processing, the images were resized and CNNs were trained using fixed hyper parameters. The best results implied a training accuracy of 94.07% and a testing accuracy of 75% for scaled lionesses and kittens, which are higher than those of the unscaled results. These findings emphasize the need for data "pre-processing", and specificities of a dataset for improving CNN performance.

***Keywords*:**Convolutional Neural Networks, Image Classification, Dataset Size, Feature Diversity, Image Scaling, Pre-processing, Deep Learning

**PAPER ID: 327**

# Enhanced Prediction of Fuel Consumption and Carbon Emissions in Light-Duty Vehicles using Convolutional Recurrent Imputation Network

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## *Abstract*

Fuel utilization and emission estimation are essential for assessing the consequence of materials and strict emission control measures due to the startling rate of weather changes. The world's socioeconomic issues are significantly impacted by the growing worldwide average temperature and its effects on climate change. The melting of the polar ice caps, that is a direct result of this rise, leads to a number of other problems, such as the polar animal's death, coastal flooding, and exposure to bacteria and earliest microorganisms that are frozen in the snow and could cause many more global pandemics and invisible illnesses. In this paper, Enhanced Prediction of Fuel Consumption and Carbon Emissions in Light-Duty Vehicles using Dynamic Graph Convolutional Recurrent Imputation Network (EP-FCCE-DGCRIN) are proposed. . The effectiveness of the EP-FCCE-DGCRIN technique is compared to other existing methods. This research offers evidence-based suggestions to lessen the environmental effects of vehicles for both manufacturers and consumers depending upon the outcomes of the Descriptive Statistics analysis.

**Keywords:** Carbon Emissions, Compact Maximum Correntropy Based Error State Kalman Filter, Dynamic Graph Convolutional Recurrent Imputation Network

**PAPER ID: 331**

# An Efficient Gradient-SVM Fusion Model for Early Lung Cancer Diagnosis using Feature Engineering and SMOTE

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## *Abstract*

Cancer is a group of diseases that arise from uncontrolled proliferation of cells. Cancer cells will disrupt the natural cycle by growing excessively and uncontrollably, whereas normal cells in the human body develop, divide, and die in a regular manner. Lung cancer develops when cells in the lungs grow out of control, forming tumors and spreading to other regions of the body, including lymph nodes and surrounding tissues. Lung cancer has a significant influence on patients and their families, causing them to experience difficulties leading regular lives, including coughing, breathing issues, psychological and emotional issues. Furthermore, lung cancer has the highest death rate in the world, and the best patient outcomes and survival rates are obtained when the disease is detected early. However, considering the nature of the disease and certain limitations and inadequacies of the current diagnostic techniques, early detection of lung cancer is extremely difficult. Therefore, the model developed in this research work for the early diagnosis of lung cancer uses feature engineering, also known as feature aggregation, which combines several features from the dataset to provide more representative and informative features to improve algorithm efficiency. The dataset's noisy and unnecessary data is eliminated using the threshold-based outlier approach. The class imbalance in the lung cancer dataset used in the present research is being addressed by the implementation of the SMOTE technique. Then, patients with and without lung cancer are categorized using the Gradient-SVM Fusion model, which combines the advantages of the Support Vector and Gradient Boosting machine learning methods. Using a variety of performance metrics, including Accuracy, Precision, Recall, the output of the proposed model is compared with that of the current models. The results show that the proposed model is the best model, with the greatest accuracy of 98.5%.

***Keywords:***Cancer, Feature Aggregation, Gradient Boosting, Lung Cancer, SMOTE, SVM

**PAPER ID: 332**

# Efficient Smart Public Transit System Using RFID and IoT Integration with MERN Web Applications

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## *Abstract*

This paper develops a Smart Public Transportation System using RFID technology, IoT integration, and a MERN-based web application for increasing the efficiency, accessibility, and user experience of urban transit systems. It addresses problems such as unreliable bus tracking, lack of support for multilingualism, and ineffective communication between operators and passengers. The key hardware components include RFID tags for bus identification, and IoT-enabled bus stations with RFID scanners, speakers, GSM modules for data transmission, and LCD displays. These ensure accurate real-time updates about the bus locations. On the software side, it is supported by a MERN stack, including MongoDB, Express.js, React.js, and Node.js, providing a responsive web interface that's complemented by Leaflet.js for dynamic route visualization and WebSockets for live updates. Multilingual support through i18next makes it inclusive for various user groups. The system is efficient in that it only updates when RFID scanners capture bus tags at certain checkpoints, thereby reducing server load much more than GPS-based systems. Additional features include route tracking, interactive maps, ticket pricing, and anonymous passenger chats. Crowd-sourced feedback mechanisms and an admin panel for bus management ensure the reliability and scalability of the system. This work shows the feasibility of cost-effective, scalable, and user-centric modernization of public transportation systems, paving the way for further enhancements such as integrated payment systems and AI-based route optimization.

***Keywords:***Public Transportation System, IoT, GSM RFID-based System, MERN Stack

**PAPER ID: 333**

# Development Of A Portable Emergency Ham Radio Communication System For Disaster Response

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## *Abstract*

Effective communication during disasters is crucial for coordinating rescue operations and ensuring public safety. Conventional communication networks often fail or become unreliable during emergencies, making portable and resilient alternatives essential. This research paper focuses on the development of a Portable Emergency Ham Radio Communication System designed to address these challenges. The system integrates a compact and rugged transceiver with a user-friendly interface, optimized for use in high-stress and resource-constrained environments. The paper involves designing a versatile hardware setup, including a high-frequency (HF) and very high frequency (VHF) transceiver module, a durable enclosure, and a power supply system capable of functioning on batteries and solar panels. The software component features intuitive controls and preset emergency frequencies, facilitating rapid deployment and ease of operation under pressure. To ensure the system's effectiveness, rigorous testing is conducted in simulated disaster scenarios, evaluating its reliability, portability, and usability. The system aims to provide clear and reliable communication channels in areas where traditional infrastructure is compromised. Expected outcomes include a robust, portable communication tool that enhances emergency response capabilities by enabling seamless and efficient communication among responders and with affected communities. This development is anticipated to significantly improve the coordination and effectiveness of disaster response efforts, contributing to better management of emergencies and ultimately saving lives.

***Keywords:***Portable Communication System, Emergency Ham Radio, Disaster Response, High-Frequency Transceiver, VHF Transceiver, Radio Technology, Rescue Operations

**PAPER ID: 336**

# Design of Autonomous Robotic Vehicle Integrated with Obstacle Avoidance Facility and Wireless Connectivity

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## *Abstract*

This research article presents the architecture and implementation of an autonomous vehicle which is capable of following a particular lane and also avoiding obstacles. By incorporating different types of sensors, including infrared sensors for line detection and an ultrasonic sensor for distance measurement, the vehicle navigates its movement effectively. This mechanism consists of an Arduino based microcontroller which processes sensor inputs to execute movement commands, such as forward, turn left, and turn right. A servo motor is employed to periodically scan the surroundings for obstacles, allowing the vehicle to adapt its path in real-time. The system integrates motor drivers to control the vehicle's motion, ensuring precise maneuverability. Experimental results demonstrate the vehicle's ability to follow a designated path while efficiently avoiding obstacles, showcasing its potential applications in robotics and automation fields. This project emphasizes the importance of sensor integration and control algorithms in developing autonomous vehicle systems.

***Keywords:*** Arduino Controller, Android OS, Mart Phone, Bluetooth, Wi-Fi, PDA

**PAPER ID: 348**

# Fake News Detection Using Natural Language Processing

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## *Abstract*

Fake news is rampart in the society of the current country and has caused the society to distrust the media, fake news is chosen over real news articles. As a result in the current paper, we discuss the application of natural language processing methods in the identification of fake news on the different platforms. Here we present an unobtrusive framework to automatically interpret news articles as real or fake based on supervised learning with the help of feature extraction from natural language processing. This method contains features based on textual elements which include syntactic features, semantic features and features that speaks about the sentiment of the given content in detail. We enhance feature representation by incorporating pre-trained word embeddings and transformer-based models such as BERT which relieves the amount of structural design and hence, results in better classification accuracy. The experiments we want to propose rely on a dataset containing a set of different news sources; to provide a more realistic scenario, when tuning the model, we use a balanced combination of real news and fake ones, using made up stories. To assess the effectiveness of the proposed framework, we employ tools for performance assessment, namely: precision, recall and F1 score to detect fake information. This result also shows the importance of context and shows how NLP techniques can distinguish between two forms of language use that typically define fake news. In addition, we explain how our work relates to prior research on media literacy and the creation of algorithms for journalists and non-journalists alike. Moreover, our research contributes to the stream of studies that aim at applying NLP for enhancing the effectiveness of combating fake news and the emergence of the society that is better equipped to function within the information logistics of the digital world. All in all, the present overall study focuses on whether advanced language processing tools remain a vital weapon in the ongoing fight against fake news in the current news landscape.

***Keywords:***Fake News, Natural Language Processing, Machine Learning, BERT, Text Classification, Sentiment Analysis, Feature Extraction Misinformation

**PAPER ID: 350**

# Analyzing Customer Feedback on Amazon to Reveal Sentiment Trends using Machine Learning

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## *Abstract*

Online reviews on platforms like Amazon provide valuable insights into customer experiences, but manually processing this data is time-consuming and impractical. This paper "Analyzing Customer Feedback on Amazon to Reveal Sentiment Trends using Machine Learning" delves into the providing details of sentiment analysis on Amazon reviews, utilizing machine learning techniques. This paper aims to automate the classification of reviews based on both topic classification (product-based review or service-based review) and sentiment (positive review, negative review, neutral review). This study examines the application of machine learning techniques to analyze customer feedback from Amazon, with a focus on separately classifying product and service reviews, followed by sentiment analysis for each category. The results highlight key trends in customer experiences and demonstrate the effectiveness of machine learning in multi-level sentiment analysis. By the use of Naïve Bayes Classifier, the model achieves the accuracy of range 80% to 90%.

***Keywords:***Sentiment Analysis, Machine Learning, Topic Classification, Product Reviews, Amazon Reviews, Naïve Bayes Classifier

**PAPER ID: 351**

# Fine- Tuning Pre-trained Models for Aspect-Based Sentiment Analysis of Amazon Food Reviews

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## *Abstract*

The process of classifying consumer responses to a particular product review as neutral, negative, or positive is known as sentiment analysis. Product owners can utilize sentiment analysis for assistance in them decide whether to continue producing their product, increase production, or eliminate production altogether. As a result, they will gain a deeper comprehension of how customers feel about their products. The method used to determine the opinions expressed in the review regarding a specific feature or aspect of the product is called Aspect Based Sentiment Analysis, or ABSA. Numerous machine learning and natural language processing models are currently available for ABSA. The inability to precisely identify and categories the views expressed towards particular features is a major drawback of the aspect-based sentiment analysis (ABSA) techniques presently in usage for Amazon food assessment tasks. The Hybrid Contextual Aspect-Based Sentiment Analyzer (HCABSA), a hybridized framework for aspect-based sentiment analysis, is developed in this research to accurately assess the sentiment of Amazon food reviews through a number of processes. This research starts by collecting dataset for Amazon food reviews from Kaggle, preprocessing the data to eliminate noise and irrelevant information, and then using POS tagging to identify the specific aspects and sentiment words related to those aspects, which are nouns and adjectives in the review using the Lexicon based approach. In the following stage, the frequency-based candidate extraction method is utilized to pick the characteristics that are used to determine the product's internal and exterior features. The raw data is then transformed into features that the machine learning models can access using the Bag of Words feature extraction process. The Gradient Boosting Decision Tree technique is then used to categories the sentiment as either positive or negative. Using performance metrics like accuracy, precision, recall, and f1 score, the model's output is compared to existing algorithms and the comparison clearly indicates that the proposed approach provides the maximum accuracy of 98%.

***Keywords:***ABSA, Bag of Words, Frequency Based, GBD, Lexicon Based, Sentiment Analysis

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