



UEMGREEN 2025 CONFERENCE PROCEEDINGS

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MESSAGE FROM THE DESK OF CHANCELLOR, UEM KOLKATA

PROF. BANANI CHAKRABARTI



University of Engineering & Management, Kolkata, University of IEM Group has taken an ambitious programme to organize an International Conference on Green computing from 25th to 26th April 2025 in the University Campus. In addition to numerous achievements of the University this is yet another milestone in our academic pursuit. A mix of plenary talks and paper presentations will also be there in the Conference.

I hope three days deliberations and interactions amongst experts and participants will be immensely helpful for the entire fraternity and will emerge many meaningful outcomes. On this occasion I convey my good wishes to the entire team for the relentless endeavor in making the Conference a true success.

MESSAGE FROM THE DESK OF VICE CHANCELLOR, UEM KOLKATA
PROF. (DR.) SAJAL DASGUPTA

It is my great pleasure to know that an International Conference on UEMGREEN 2025 will be organized at the University of Engineering and Management, Kolkata on 25th to 26th April 2025. The Conference aims at bringing the advancement in the field of Green Computing, Cloud Computing, Bioinformatics and Quantum Computing. It lays a special emphasis at educating and informing researchers and industry professionals on the latest development of technology.



The unique nature of the Conference is to bring advancement in the field of utilization of Natural Resources. This will invite all participants across the globe to attend and share their insights and convey recent development and disseminate the knowhow in the field of Green Energy and Bio diversity Conservation Ecosystem Management.

I wish this Conference a grand success.

MESSAGE FROM THE DESK OF PRO VICE CHANCELLOR, UEM KOLKATA PROF. (DR.) SATYAJIT CHAKRABARTI

The Concept of Energy Management is becoming an enormous issue in modern society. So, special emphasis shall be taken for educating the people in Green Computing and its allied research and also industry professionals at the latest knowledge of technology. I am extremely glad as because the Conference theme is of the same. I thank you, the participants, for enriching the Conference by your presence. I hope you will enjoy the content, renew old friendships, make new friends, get new ideas and above all have a good time.



I warmly welcome you to the 6th International Conference on Green Computing - UEMGREEN2025 and wish it to be a grand success.

MESSAGE FROM THE DESK OF CONVENER, UEM KOLKATA
PROF. (DR.) ABIR CHATTOPADHYAY

(DEAN RESEARCH)



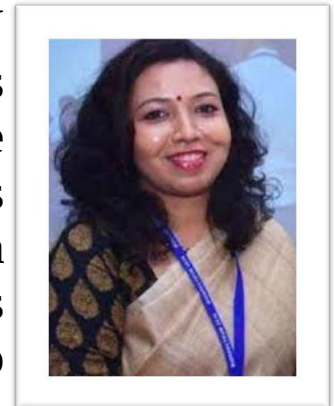
I welcome all the participants of UEMGREEN 2025. The main goal of organizing this Conference is to share and enhance the knowledge of each and every individual in this environment world. We have given a good opportunity for those who have a thirst in knowing the present technological developments and also share their ideas. Furthermore, this Conference will also facilitate the participants to express and share various novel ideas.

The Conference aims to bridge the Research Works in academic and other professional trainings, research presentations and other professional trainings, research presentations and keynote address in current technological trade. It reflects the growing importance of Energy Management for Green Computing. It is the study and practice of using computing resources efficiently by designing.

I thank the Conference Committee for extending their valuable time in organizing the program and to all the authors, reviewers and other contributors.

MESSAGE FROM THE DESK OF DEPUTY DEAN, UEM KOLKATA
PROF. RAJASHREE PAUL

I welcome all the participants of UEMGREEN 2025. The main goal of organizing this Conference is to share and enhance the knowledge of each and every individual in this environment Energy Management for Green Environment world. Furthermore, this Conference will also facilitate the participants to express and share various novel ideas.



I convey my good wishes to the Conference Committee members and their belief in the excellence of UEMGREEN 2025.

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BIOGRAPHY OF THE SPEAKERS
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THE CHIEF GUESTS

Prof. Dr. Deepak Garg (SR UNIVERSITY)

Vice Chancellor - SR University, Director - leadingindia.ai (Leading the Change in Institutions for Excellence)



Prof. Deepak Garg is PhD in Computer Science with specialization in Efficient Algorithm Design. With 25 years of experience he has worked as Professor and Dean, School of Computer Science at Thapar Institute of Engineering and Technology, Patiala and Bennett University, Greater Noida. He is Distinguished Professor in Artificial Intelligence and known as one of the top voices in the country on AI.

He is leading the largest Development, Skilling and Research initiative in AI in India with more than 1000 institutional collaborators. He is a chief consultant for algorithmguru.in. He has done his Ph.D. in efficient algorithm design in 2006. He served as chair of IEEE Computer Society, India IEEE Education Society (2013-15).

PROF. DR. N RAMAKRISHNAN

(MONASH UNIVERSITY)



Narayanan Ramakrishnan is currently a Professor in the Electrical and Robotics Engineering, School of Engineering, MonashUniversity Malaysia. He is also leading Micro and Nano Devices Research Lab. His current research interest includes acoustic wave sensors and 2D materials for detecting gases, VOCs, and other environmental conditions. His interest also includes developing prototypes of microfabrication tools and handheld sensor systems. He has filed six patents from Monash on semiconductor fabrication tools/ Sensors and some licensed /commercialized jointly with industries. He has received more than 15 external grants from Government of Malaysia and Industry as Principle Investigator. Over the last 13 years of his academic career at Monash, he has graduated 10 PhD students and supervising 5 PhD students as main supervisor. He is also the chair for innovation and industry engagement for School of Engineering creating translation research culture among his peers.

PROF. K SEKAR (IISc, BANGALORE)

Prof. Kanagaraj Sekar is a leader of Laboratory for Structural Biology and Bio-computing and professor of Department of Computational and Data Sciences in Indian Institute of Science, Bangalore.

ACADEMIC QUALIFICATIONS

2016 - Professor (Structural Biology and Bio-computing), Computational and Data Sciences from Indian Institute of Science, Bangalore, India

2010 - Associate Professor (Structural Biology and Bio-computing), Computational and Data Sciences from Indian Institute of Science, Bangalore, India



2004 - Principal Research Scientist (Structural Biology and Bio-computing), Bioinformatics Centre from Indian Institute of Science, Bangalore, India

1998 - Senior Scientific Officer (Structural Biology and Bio-computing), Bioinformatics Centre from Indian Institute of Science, Bangalore, India

1995 - Senior Research Associate (Protein Crystallography), Departments of Chemistry, Biochemistry and Biotechnology from The Ohio State University, Columbus, USA

1992 - Research Associate (Protein Crystallography), Molecular Biophysics Unit from Indian Institute of Science, Bangalore, India

1984 - Ph.D. (Biophysics) from University of Madras, Chennai, India

1982 - M.Sc. (Biophysics & Crystallography) from University of Madras, Chennai, India

PROFESSIONAL

Member of the National Academy of Sciences; Member in American Crystallographic Association; Member, CODATA National Committee

Life member in Indian Crystallographic Association; Life member in Indian Biophysical Society; Life member in Society of Biological Chemists.

DR.TRIDIBESH NAG

(SECRETARY ,IEEE KOLKATA CHAPTER)



He has pursued Ph.D in the year 2017, From Jadavpur University. He has completed Post Graduate in the year 2004 from Jadavpur University.

PROF.DR.TAPATI CHAKRABORTI

(KANYASHREE, VICE CHANCELLOR)



Prof. Dr. Tapati Chakraborti took charge as the first permanent Vice-Chancellor of Kanyashree University today, marking a significant milestone for the institution. Dr. Chakraborti, formerly the Director of the Directorate of Open and Distance Learning (DODL) and a professor of Biochemistry at Kalyani University.

PROF. DR. ANIRBAN MUKHOPADHYAY

Director (IQAC), Kalyani University



Dr. Anirban Mukhopadhyay is currently a Professor of the Department of Computer Science and Engineering, University of Kalyani, Kalyani, West Bengal. He did his B.E. from National Institute of Technology, Durgapur, India, in 2002 and M.E. from Jadavpur University, Kolkata, India, in 2004, respectively, both in Computer Science and Engineering. He obtained his Ph.D. in Computer Science from Jadavpur University in 2009. Dr. Mukhopadhyay is the recipient of the University Gold Medal and AmitavaDey Memorial Gold Medal from Jadavpur University in 2004 for ranking first class first in M.E. He

also received Erasmus Mundus fellowship in 2009 to carry out post-doctoral research at University of Heidelberg and German Cancer Research Center (DKFZ), Heidelberg, Germany during 2009-10. Dr. Mukhopadhyay also visited I3S laboratory, University of Nice Sophia-Antipolis, Nice, France in 2011 as a Visiting Professor, University of Goettingen, Germany, as a Visiting Scientist with DAAD scholarship in 2013, and Colorado State University, Fort Collins, USA as a Visiting Researcher with Fulbright-Nehru Academic and Professional Excellence fellowship during November 2017 - February 2018. He has received Institution of Engineers, India (IEI) Young Engineers Award 2013-14 in Computer Engineering Discipline, and Indian National Academy of Engineering (INAE) Young Engineer Award 2014. He has coauthored one book and over 100 research papers in various International Journals and Conferences.

PROF. DR. PRAJIT NANDI

IIT, KHARAGPUR



Dr. Prajit Nandi, Chief Technical Advisor at Aantaric, is a business and technology enthusiast renowned for his extensive domain knowledge and hands-on experience in product development and building highly skilled engineering teams. His multifaceted expertise and leadership have been instrumental in driving technological advancements and fostering innovation within the organizations he has been part of.

Dr. Nandi's academic journey began at the Indian Institute of Technology (IIT) Kharagpur, where he earned his B.Tech. degree in Electrical Engineering in 2003. He furthered his academic pursuits by obtaining a Ph.D. from the same esteemed institute. His scholarly contributions include authoring and co-authoring eight peer-reviewed journal articles and conference publications, along with holding 8 granted U.S. patents, showcasing his significant contributions to the field of electrical engineering.

KEYNOTE SPEECH

A data mining study: Sequence motif and its three-dimensional structure

K. Sekar

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Internal sequence repeats found in protein sequences, which are derived from three-dimensional protein structures, are incredibly important in helping us to understand the relationship between the amino acid sequence and its three-dimensional structure. Sequence repeats in proteins play a crucial role in protein-protein interactions, as well as in binding to other ligands such as DNA and RNA. These repeated sequence motifs have been widely used to understand genome function and predict protein structure. Therefore, it's essential to track sequence repeats at both the sequential and structural levels to better understand their evolutionary and functional role. Studying internal sequence repeats and their three-dimensional structure could be immensely helpful to scientists working in the fields of structural biology, genomics, and proteomics.

Quantum Computing and its Application in biochemistry & life science

Prof. Shiho Kim

School of Integrated Technology, Yonsei University
Yonsei Institute of Convergence Technology

Abstract

Quantum computing is emerging as a transformative paradigm, offering new computational capabilities that go beyond the limits of classical computing. This talk will begin with an accessible introduction to the fundamentals of quantum computing, including quantum bits, superposition, and entanglement. We will then discuss the potential advantages of quantum computation, particularly in solving classically intractable problems.

The core of the presentation will focus on applications of quantum computing in biochemistry and life sciences, such as the quantum simulation of molecular interactions, drug discovery, and protein folding. We will also explore cutting-edge developments in quantum machine learning and quantum optimization techniques, which hold promise for handling complex biological data and modeling. Despite these advancements, quantum computing still faces significant challenges. We will address the limitations of current hardware, especially the constraints of Noisy Intermediate-Scale Quantum (NISQ) devices, and key algorithmic bottlenecks such as barren plateaus in variational quantum algorithms. The presentation will conclude with a summary and open discussion, inviting reflections on the future role of quantum computing in advancing biochemical and life science research.

ABSTRACT OF ACCEPTED PAPERS

Potato Leaf Disease Detection using Deep Learning : A Review

Prasun Bera, Anirban Jana, Bishal Dey, Rahul Pal, Tahamina Khatun, Maumita Das
University of Engineering and Management, Kolkata

Abstract:

Potato harvests are of vital significance worldwide but are also extremely susceptible to a range of diseases that can have a significant impact on yield and quality. Conventional detection of disease, including visual examination and laboratory tests, tends to be time-consuming, expensive, and dependent on specialist knowledge. The deployment of deep learning algorithms in agriculture has shown potential as a method for automating and increasing the accuracy of disease detection. Convolutional Neural Networks (CNNs), in fact, have been found to perform outstandingly well in detecting potato leaf diseases. This review offers an exhaustive examination of existing deep learning methods for the detection of potato leaf diseases, with respect to their accuracy, efficiency, and practical applicability. Comparative analysis reveals the merits and demerits of different models, along with resolving major challenges such as dataset availability, model generalization, and the applicability of real-time use. The review ends with recommendations for future research to enhance the interpretability, robustness, and scalability of deep learning models in agriculture.

Keywords: Potato Leaf Disease, Deep Learning, CNN, Disease Detection, Traditional Disease Detection

Advanced Gas Sensing Technology using MQ Gas Sensor Array

Jeet Naskar, Subhajit Ghosh, Rohit Dey , Sayed Rahaman , Dhiraj Mahato, Shreya Nag,
Maumita Das

University of Engineering and Management, Kolkata

Abstract: Air pollution is a huge challenge that affects our environment and our health. This study introduces a real-time Air Quality Monitoring (AQM) system that uses a 4-channel sensor array network to track important hazardous gases like NH₃, H₂S, CO₂, and Natural gases (propane, butane, etc.). With the help of a Wi-Fi-enabled MCU (ESP32), the system transfers the sensor data to a cloud platform for wireless data access and graphical interface. To boost usability and automation, a modified air pump and solenoid valve have been integrated with the setup. The system was tested by injecting target gases into the chamber, and sensors were selected based on their sensitivity and selectivity.

ARTIFICIAL INTELLIGENCE (AI) BASED MEDICAL RECOMMENDATION SYSTEM USING SEVERAL CLASSIFIER MODELS

Subhajit Saha, Debanjana Ghosh
University of Engineering & Management, Kolkata

Abstract

In this work AI driven medical recommendation system is supported by an automated recommendation algorithm which can help in patient diagnosis without the help of any primary consultation of doctors and suggest best possible treatment method faster than conventional techniques. The system provides disease detection along with personalized recommendations for medical needs. Patients or users need to enter their symptoms in the system and the system can predict the disease and recommend medicines. Using various machine learning algorithms like decision trees, support vector classifier (SVC), k-nearest neighbors (KNN); the system executes the prescribing process. This research article explores rapid advancements in healthcare technology including smart systems that predicts diseases and suggests medicines diets, workouts, and precautions.

Web-Controlled Smart Car with Real-Time Tracking and Safety Features

Saptarshi Mukherjee, Debanjana Das, Ankita Saha, Arpita Das, Rimi Sengupta

University of Engineering & Management, Kolkata

Abstract

This paper involves the design and development of an intelligent, web-controlled automobile. Unmatched convenience is made possible by the use of smart automotive technology, which allows users to control the vehicle's movements remotely via an intuitive online interface that can be accessed from any internet connected device. In addition, the system is strengthened with advanced safety features including collision detection to proactively handle possible hazards while in use. To further improve user safety, a panic button for emergencies is included in addition to these capabilities. Users may also track the whereabouts of the vehicle with the device, which adds even more protection and peace of mind. By providing an interactive demonstration of the viability and effectiveness of web-based control systems for smart cars, this study highlights how important it is to support user accessibility and security in contemporary transportation frameworks.

Analysing CO₂ Emission from Vehicles: A Machine Learning Approach for Climate Action (SDG 13)

Shanu Kumar Manglam, Rohit Dey, Dhiraj Mahato , Sayed Rahaman , Snehasee Dey , Maumita Das
University of Engineering & Management, Kolkata

Abstract

The majority of CO₂ emissions caused by vehicles are the major agents of climate change, which, however, requires innovative solutions for reduction and mitigation. This work proposes an analytical framework combining machine learning algorithms for vehicle CO₂ emissions prediction. The analysis focuses on main emission factors including fuel consumption, engine size and vehicalcydinders, and uses real-world datasets downloaded from Kaggle. As well as linear regression, random forest, and gradient boosting machine learning models are used to improve prediction accuracy. The results indicates that Random Forest yield the highest accuracy and electric and hybrid vehicles substantially reduce emission. Additionally, policy recommendations are made in the form of carbon taxation and incentives for electric vehicles that will fulfill obligations for the Sustainable Development Goal 13 (SDG 13). Their findings will help advance sustainability automotive practices and policy, working towards low carbon transport solutions.

Renewable Energy Trends for the Next Decade: Innovations, Challenges, and Global Impact

Shanu Kumar Manglam, Maumita Das
Univeristy of Engineering & Management, Kolkata

Abstract

The world is moving quickly toward renewable energy generation, thanks to advances in technology, changes in legislation and increased investment. Clean energy- solar, wind, hydrogen and so forth replaces fossil fuels, as nations move toward carbon neutrality. This paper explores the trends responsible for propelling renewable energy into the future from increasingly competitive energy storage solutions, smart grid technology, and new financing mechanisms. Highly valuable, despite some significant strides, large-scale adoption is limited by issues like high initial costs, energy variability, archaic grid infrastructure and inconsistency in regulations. However, researchers say the combination of economies of scale, AI-aided energy management, and international trade in energy will ensure renewables generate over half of the world's electricity by 2030. The solution to current challenges will involve stronger legislative frameworks, better funding of grid system modernization, and improved international collaboration around the globe. A clean, reliable and cost effective energy future is possible and almost assured with continued investment and technical progress.

Multi-Layer Based Security-Built E-Voting System with an Unauthorized Access Prevention

Soumyadipta Ghosh , Sritam Das , Subhajit Das , Arpita Das
University of Engineering & Management, Kolkata

Abstract

Ensuring secure and transparent elections is very crucial, accelerating the need for an enhanced Electronic Voting Systems (EVS). This following project introduces a multi-layer-based Security-Built EVS with an unauthorized access prevention. The system built with two IR sensors, and two security buzzers to enhance protection and ensure fair voting. Two IR sensors strengthen and enhance the security: The first IR sensor detects hand placement and starts a timer—if a hand remains beyond the threshold, an alert is triggered through security buzzer indicating possibility of vote tampering. The second IR sensor activates a cooldown timer after a vote is cast; unauthorized movement within this period triggers another security buzzer, preventing multiple voting attempts by an individual. A countdown timer enforces a strict gap between two voters. This is a lucrative, adaptable system enhances electoral integrity by minimizing unauthorized intervention.

Intelligent Diabetes Prediction System: A Machine Learning-Based AI Chatbot

Toheli Misra¹, Ankita Mishra¹, Souptika Ghosh¹, Prakash Banerjee²

¹Narula Institute Of Technology, ²University of Engineering & Management, Kolkata

Abstract

Diabetes is the disorder in which the body either cannot generate insulin or cannot effectively use it, hence raising blood sugar levels. It is a significant global health issue that affects millions and can result in severe health issues such as kidney failure, heart disease, vision impairment and neuropathy. Detecting it early and accurately is essential in reducing these risks. Conventional diagnostic method often requires invasive and costly blood tests. Non-invasive, data-driven detection techniques have been made possible by recent advancements in machine learning and deep learning. A diabetes prediction system that uses deep learning and machine learning for precise diagnosis is presented in this work. To efficiently analyse clinical data, it combines several classification models, such as K-Nearest Neighbors (KNN), Support Vector Machine(SVM), Gaussian Naïve Bayes (GNB) and Deep learning Neural Network (DNN). Additionally, the system utilizes preprocessing techniques like feature scaling and stratified sampling to improve the system's reliability and performance, ensuring accurate and consistent prediction. A Stream lit-based platform enables real-time risk assessment, supported by an AI chatbot.

IoT-ENABLED MINI FRIDGE FOR FOOD SPOILAGE DETECTION

Swastik De , Soumyadipta Mukherjee, Sudipta Ghosh
University of Engineering & Management, Kolkata

Abstract

One of the biggest issues facing households and the food industry is food spoilage. Food quality is decreased by improper storage, which results in waste and health hazards from consuming spoiled food. This project presents a smart refrigerator system that uses sensors to check the quality of the food. The system has a DHT11 sensor to measure the temperature and humidity within the refrigerator and a MQ4 gas sensor to identify spoiled food. A 0.96-inch OLED panel displays the results, showing food as either "edible" or "spoiled." This method encourages more intelligent and sustainable food storage. It is perfect for families and small companies. This concept provides a cost-effective and user-friendly design for homes and small companies in response to the growing demand for improved food storage. The smart fridge reduces food spoilage by monitoring food in time and promptly notify customers when the food is spoiled. Because of its modular design, the system may easily be scaled up for larger applications such as supply chains, restaurants and supermarkets. The initiative supports worldwide energy and environmental conservation goals while addressing food safety concerns with compact, energy-efficient components.