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**COMPUTING, COMMUNICATION, AND SUSTAINABLE ENERGY
TECHNOLOGIES-*Sustainable Electronics and Emerging Energy Technologies*
VOLUME 2**

Edited by

Ram Lal Yadava, Anil Kumar Sethi and Amanpreet Singh Saini



COMPUTING, COMMUNICATION, AND SUSTAINABLE ENERGY TECHNOLOGIES

Sustainable Electronics and Emerging Energy Technologies

This book is an outcome of the **Conference on Computing, Communication, and Sustainable Energy Technologies**, focusing on **Sustainable Electronics and Emerging Energy Technologies**. It brings together recent research and innovative ideas that integrate computing, intelligent communication, and energy-efficient electronic technologies to support sustainable development.

The volume highlights advancements in sustainable electronic design, renewable energy integration, smart computing approaches, and intelligent communication frameworks. Emphasis is placed on low-power electronics, energy harvesting, IoT-based energy solutions, smart grids, and AI-driven energy management systems that enable environmentally responsible technologies.

Key features of this book include:

- An overview of current research trends in sustainable electronics, emerging energy technologies, and intelligent computing and communication systems.
- Practical models, designs, and architectures showcasing real-world applications of energy-efficient and smart electronic systems.
- Discussions on applications in renewable energy systems, smart grids, IoT, electric vehicles, and power-aware intelligent devices.
- Insights into challenges, opportunities, and future research directions in sustainable and energy-aware technologies.

This book is intended for research scholars, academicians, undergraduate and postgraduate students, Ph.D. candidates, industry professionals, engineers, technologists, and researchers who seek to advance their knowledge of sustainable electronics, emerging energy technologies, and intelligent systems for a greener and more energy-efficient future.

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PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON COMPUTING, COMMUNICATION,
AND SUSTAINABLE ENERGY TECHNOLOGIES-*Sustainable Electronics and Emerging Energy
Technologies (13CSET-2025)*, GREATER NOIDA, U.P., INDIA, 28TH– 29TH NOVEMBER, 2025

**COMPUTING, COMMUNICATION, AND SUSTAINABLE
ENERGY TECHNOLOGIES**-*Sustainable Electronics and Emerging
Energy Technologies*

VOLUME 2

Edited by

Ram Lal Yadava, Anil Kumar Sethi, and Amanpreet Singh Saini

Galgotias College of Engineering and Technology,
Knowledge Park II, Greater Noida, Uttar Pradesh, India



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Preface

On behalf of the Organizing Committee, I am delighted to extend a warm welcome to all participants of the International Conference on **Computing, Communication, and Sustainable Energy Technologies** (I3CSET-2025). I3CSET-2025 is a non-profit international forum designed to bring together engineers, academicians, researchers, and industry professionals to exchange ideas on recent advancements and future directions in computing, communication techniques, intelligent systems, and sustainable energy technologies. The conference fosters knowledge sharing and interdisciplinary collaboration among experts from diverse domains. The conference proceedings, titled *Computing, Communication, and Sustainable Energy Technologies – Sustainable Electronics and Emerging Energy Technologies*, are technically associated with CRC Press, Taylor & Francis, and are intended for indexing in Scopus. The event featured multiple technical tracks covering core areas of computer engineering, intelligent computing, communication systems, and sustainable energy technologies.

I3CSET-2025 was a two-day international conference held at Galgotias College of Engineering & Technology (GCET), Greater Noida, on 28th and 29th November 2025. The inauguration ceremony took place on 28th November 2025 at D-Block, GCET, and was graced by **Dr. Mohammad Rihan**, Director General, National Institute of Solar Energy (NISE), Government of India, as the Chief Guest. **Prof. Vikram Bali**, Director, GCET, welcomed the dignitaries and participants with his inaugural address. The Conference Chair, **Dr. Ram Lal Yadava**, highlighted that the conference received over 750 paper submissions from more than ten countries, out of which more than 190 high-quality papers were accepted after a rigorous double-blind peer-review process.

The Chief Guest, Guests of Honour, and other distinguished experts delivered insightful talks on emerging themes in artificial intelligence, intelligent computing, communication systems, and sustainable energy technologies, inspiring participants toward research excellence and innovation. The inaugural session concluded with a vote of thanks by **Dr. Shilpee Patil**, Department of ECE, GCET. Over the two days, more than 190 research papers were presented across 24 technical sessions, enabling vibrant discussions and meaningful knowledge exchange.

The valedictory session was presided over by Conference Co-Chair **Mr. Amanpreet Saini**, who expressed heartfelt gratitude to **Mr. Suneel Galgotia**, Chancellor; **Dr. Dhruv Galgotia**, CEO; Prof. Vikram Bali, Director, GCET; faculty members of the ECE Department; and all student volunteers for their invaluable support and cooperation.

Finally, I extend my sincere thanks to all authors, participants, reviewers, and organizing committee members for their significant contributions to the success of I3CSET-2025. I am confident that this conference has provided a stimulating platform and will contribute meaningfully to future research and technological advancements.

On behalf of the Editors

Dr. Ram Lal Yadava

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Acknowledgements

It is with great pleasure that I acknowledge **Galgotias College of Engineering and Technology (GCET)**, Greater Noida, India, for successfully organizing the International Conference on Computing, Communication, and Sustainable Energy Technologies (I3CSET-2025) on 28th and 29th November 2025.

On behalf of the Organizing Committee, I extend my sincere gratitude to our Chief Patron, Hon'ble **Shri Suneel Galgotia, Chancellor, Galgotias University, and Hon'ble Dr. Dhruv Galgotia, CEO, Galgotias University**, for their constant encouragement and for providing the essential support and facilities that greatly contributed to the success of I3CSET-2025.

I also convey my heartfelt thanks to Professor Vikram Bali, Director, GCET, and Prof. (Dr.) Brijesh Singh, Dean Academics, GCET, for their valuable guidance, motivation, and unwavering support throughout the planning and execution of the conference.

I am sincerely thankful to all the distinguished keynote speakers, guests, session chairs, and authors for their insightful contributions and active participation. I also appreciate the dedicated efforts of the reviewers, whose expertise helped maintain the high quality of the conference proceedings.

I express my deep appreciation to the organizing committee members, faculty, and student volunteers for their commitment and teamwork, which played a crucial role in making I3CSET-2025 a resounding success.

Thank You.

Prof.(Dr.) RAM LAL YADAVA

Organizing Chair I3CSET-2025,

Galgotias College of Engineering and Technology (GCET)

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Editors Biographies

R.L.Yadava, Ph.D., is a Professor in the Department of Electronics and Communication Engineering, Galgotias College of Engineering and Technology (GCET), Gr. Noida, U.P, INDIA. He received his doctorate in Electronics Engineering from the IIT-BHU University. He joined VIT University, Vellore, in 2001 and served as Head of the Microwave Division, Coordinator (R&D), and Coordinator (UG)

of Electrical Sciences. During his service at VIT University, he was deputed as visiting faculty to Kigali Institute of Science and Technology (KIST), Kigali, Rwanda, Central Africa. He has served as coordinator of M.Tech, HOD, and Head Exams at GCET. Dr. Yadava has organized several guest lectures, short-term training programs, and conferences sponsored by DST and AICTE, Govt. of India, in the field of microwave antennas and wireless & optical communications. His research areas include: microwave antennas and communications. He is an associate editor of the Journal of Information,

Intelligence and Knowledge, USA, and also a member of IEEE, EAI, ISTE, and SEMCE (I). He has guided five Ph.D. scholars, 30 M.Tech students, and several B. Tech projects, and he has 150 publications to his credit in IEEE, International/ National Journals, Conferences, and Symposia. He is the reviewer of the International Journal of Electronics, Springer Nature, IEEE Access, and Journal of Electromagnetic Waves and Applications.

Dr. Anil Kumar Sethi is a Professor in the Department of Mechanical Engineering at Galgotias College of Engineering & Technology, Greater Noida, with over 25 years of teaching and academic experience. He holds a Ph.D. in Mechanical Engineering and an M.E. in Welding Engineering from IIT Roorkee. His academic and research interests include thermal engineering, renewable energy, advanced materials, artificial intelligence applications in engineering, and manufacturing processes. Dr. Sethi has published extensively in reputed international journals and IEEE conferences and is a German patent holder. He is a Life Member of ISTE and has actively participated in numerous FDPs, workshops, and international conferences. His career reflects strong contributions to teaching, research, and academic leadership.

Mr. Amanpreet Singh Saini

Mr. Amanpreet Singh Saini is an academic professional and researcher with interests in intelligent systems, computing technologies, and applied communication solutions. He has actively contributed to research, technical training, and academic coordination. His involvement in conference organization, editorial support, and scholarly activities reflects his commitment to promoting quality research and innovation in emerging technological domains.

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Track 2: Signal, Image & Multimedia Processing

1. Universal text-to-speech converter

Shubham, Mekhala, Kamini Tanwar & Mamta Narwaria

Track 3: Embedded Systems, IoT & Cyber-Physical Networks

2. Man-in-the-middle & spamming in IOT networks

Arpit Mittal, Manas Aswal, Arman Raza, Priyanshi Bhatt, Rahul Shivhare & Swati Sharma

3. Food quality monitoring system for remote monitoring

Anusha & Ayush Garg

4. Brain-machine interaction via an embedded EEG-IoT system

Vikash Kumar Jha, Vasu Pandey, Priyal Uppal & Ram Lal Yadava

5. Green BinX

Kanchan Dipu, Nimitt Srivastava, Tanisha Bhardwaj, Tanishka Gahlot & Ujjawal Singh

Track 4: Antennas, Propagation & Microwave Technologies

6. Polymer based FSS for IOT assisted 6G THz-WBAN applications

S. Sharma, M. Khan & A. K. Sharma

7. Smart agriculture: tomato leaf disease monitoring system

P.M.S.S. Chandu, R Elankavi, J Monika, V Pavani, Y Lakshmi Priya & K Mounish

Track 5: Cybersecurity, Blockchain & Information Technologies

8. A review on automatic detection of API security in decentralized web3 application

Rizwan Pattan, Anand Raj, Sonali Dass

9. Cryptocurrency in emerging economies: adoption factors, challenges, and policy considerations

Saurabh Pratap Singh Rathore, Sundaram Arun, Nagendar Yamsani, Babitha Lincy R, Deep Biswas & Ishit Jain

10. The transformative impact of blockchain: revolutionizing security transparency and decentralization

Ramanjeet Singh, Amandeep Kaur, Priyanshu Choudhary, Pritpal Singh, Sugandha Sharma & Inderpreet

Kaur

11. Comparative analysis of iOS and android file structures for DJI drones forensics

N. Trake, M. Singh, S. Kaur & D. Bansal

12. Detection and prevention of shill bidding in online auctions

Suruchi Pandey, Reeyaj Raj bhandari and Saphal Acharya & R K Yadav

13. The classical and quantum inaccuracy based cybersecurity: the identification techniques for integrated classical and quantum systems

Ramanan Sathiaseelan & K.Manikandan

14. Employing AI to strengthen online authentication for customers: a blockchain-based technique to electronic identity management via cybersecurity

Antony Helena Antony Alwyn, Antony Alwyn Michael Adrian & R. L. Yadava

15. Creating dynamic cybersecurity in edge computing: application of smart contracts and blockchain technology

Antony Helena Antony Alwyn, Antony Alwyn Michael Adrian & R. L. Yadava

16. Application of the internet of things and machine learning for predictive disaster response and real-time environmental monitoring

Ganesamoorthy Pandian & Karthikeyan Kesavan

17. Strengthening data security in decentralized cloud computing: how to use blockchain technology to schedule and allocate resources efficiently

Ganesamoorthy Pandian & Karthikeyan Kesavan

18. Strengthening cybersecurity in autonomous systems: adaptive risk management and real-time threat detection using AI

Karthikeyan Gurunathan, Sandhya Murali Parthasarathy & Om Vikash

19. Integrating blockchain & AI to improve distributed storage systems: enhancing cybersecurity and data integrity in cloud environments

Perumalsamy Devaraj & Om Prakash

20. Blockchain-enabled homomorphic lightweight validation and encryption mechanism for secure data aggregation in edge computing cybersecurity

Prashanth Kura, Teja Pusarla & Rajashekhar Chitimalla

21. Quantum cryptography and AI integration: quantum-resistant defenses for future communication systems against emerging cyber threats

Suguna Balusamy, RajaKumar Rengasamy & Aravind J

22. Lightweight cybersecurity protocols for securing resource-constrained IoT devices in smart cities and critical infrastructure

Venugopala Reddy Kasu & P. Deepalakshmi

23. Blockchain-driven AI for privacy-preserving healthcare data exchange

Shamshad Ahmed Khan, Faiz Ahmed Khan & Ram Om Sai Chethana

24. IoT-ML for smart city traffic management and dynamic routing

Shamshad Ahmed Khan, Faiz Ahmed Khan & Ram Om Sai Chethana

25. AI-powered tools automate cybersecurity, cut errors, speed response

Venugopala Reddy Kasu & P. Deepalakshmi

26. AI-blockchain for data integrity in cloud storage

Vamsi Krishna Pentela & Prasanth Yalla

27. ML-Driven IoT cybersecurity for personalized smart retail

Suguna Balusamy, RajaKumar Rengasamy & Aravind J

28. ML for cybersecurity predictions in smart infrastructure

Ramanan Sathiaseelan & K. Manikandan

29. Blockchain based electronic health record system

Pavithra Guru, Rashi John, Manmohan Dubey and P. Durga Nagarjuna

30. ML-enhanced intrusion detection & encryption for IoT

Paddabbai Chowdari Karanam & P. Deepalakshmi

31. Blockchain decentralization for cybersecure digital health records

Paddabbai Chowdari Karanam & P. Deepalakshmi

32. Digital twin boosts cybersecurity in smart manufacturing

Dinesh Kumar Arivalagan & Om Prakash

33. AI-blockchain boosts secure cyber threat sharing

Dinesh Kumar Arivalagan & Sathiyandrakumar Srinivasan

Track 6: Artificial Intelligence, Machine Learning & Data Science

34. Artificial intelligence techniques for dual-path complaint resolution: a survey on enhancing online indian hotel reservation system response and increase customer satisfaction

Sandeep Bhatia, Deepak Panda, Neha Goel, R. K. Yadav & R. L. Yadava

35. FITORBIS: AI-powered fitness alarm using skeleton-based action recognition

Arun Kumar Rana, Prince Kumar Yadav, Prabudh kr. Gautam & Nitanshi Kulshrestha

36. The impact of augmented and virtual reality on brand interaction in online shopping

Kumar P & Hari Sainath C

37. Simulation-driven fault detection in power system: Performance analysis using machine learning models

A. Barwal & S. Kaur

38. Design and implementation of a light-weight flashcard generator for STEM education

Anusha & Ayush Garg

39. Supervised learning based deep learning approach for tracking small vehicular ad hoc objects

Md Ezaz Ahmed

40. Smartaccess: a platform for efficient university resource navigation

Anil Khatak, Anju Gupta & Sheenam Naaz

41. Retrieval-augmented generation: revolutionizing personalized and accessible education

Aiyaan Qaiser, Anuj Naruka, Kamini & Inderpreet Kaur

42. HealMe: a personalized therapy assistant

Antriksh Singh Rawat, Mridul Mehta, Tanishka Singh & Nidhi Gupta

43. Dehazify: an AI powered haze removal application

Tanvir Singh, Akshi Dagar, Ayaz & Nidhi Gupta

44. A review on multilingual conversational agents and their applications

Vanshika Gupta, Vaibhav Singh, Vaibhav Singh, Aayush Pratap Singh & Ratan Rajan Srivastava

45. AI-based traffic control using machine learning and computer vision for smart cities

Ashad Ozair, Aditya Saha & Ashish Jain

46. Aspect-based sentiment analysis: evolution of techniques and pathways for future research

Madhav Gupta, Yash Taneja, Nilesh Borse & Radha Krishna Rambola

47. Assessing awareness and accessibility of government welfare schemes among citizens: a policy implementation perspective

Sneha Sinha, Ananya Gupta, Ashish Jain, Jitendra Kumar & Aanchal Vij

48. Fabricinspect: fabric defect detection system using deep learning

Dipal Raskar, Garima Shukla, Isha Shinde, Ankita Punekar, Jeyavel Janardhanan & Shriniwas Singh

49. Green cement: the emerging horizon for india's cement industry

Niranjan Sahoo, A.K. Sethi & Anil Kumar

50. Graph-based multi-label syndrome classification using attention networks

Nirav Patel, Frenisha Digaswala, Meetkumar Patel, Vaibhav C. Gandhi, Mihir Rajyaguru & Jignasha Lakhtaria

51. Personalized learning pathways: a review

Aditi Agnihotri, Aditi Pandey, Ayush Pratap Singh & Samiksha Singh

52. Swasthya Mitra: AI-assisted healthcare companion for rural and underprivileged communities in India

Kambam Sai Charan, Budda Dhanushya Surya Manikanta, Bolla Manoj Sai and Velayudham Sathiya Suntharam

53. From static to dynamic: revolutionizing restaurant pricing strategies

Sparsh Kumar, Yash Kumar Singh, Sandeep Kumar Dubey & Ratan Rajan Srivastava

54. A review of digital technologies in elderly care: focus on web-based applications for health management and social support

Siddhartha Singhal, Tanya Nigam, Asit Kumar Gahalaut & Ratan Rajan Srivastava

55. Low-light enhancement of moon surface images: techniques, challenges, and applications

Aadesh Kumar, Ansh Abrol and Yash Gupta

Shree Harsh Attri

56. Vision based fitness analysis and adaptive health management using deep learning and large language models

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