(30th – 31st March 2026)

DINS-2026 Special Session on

"AI and ML for Energy Security: Applications in Electric Vehicles and Renewable Systems"

Aims and scope of the session:

The aim of this special session is to examine the transformative role of Artificial Intelligence (AI) and Machine Learning (ML) in enhancing energy security through intelligent and data-driven applications in electric vehicles (EVs) and renewable energy systems. As nations increasingly transition toward clean, decentralized, and digitally managed energy infrastructures, AI-enabled solutions have become essential for ensuring reliability, efficiency, resilience, and sustainability of energy systems.

This session provides a multidisciplinary platform for researchers, industry practitioners, and policymakers to present and discuss recent advancements in AI and ML techniques applied to energy generation, storage, distribution, and consumption. The scope of the session encompasses predictive analytics for renewable energy forecasting, intelligent EV energy management, battery health monitoring and lifecycle prediction, smart charging infrastructure, grid and microgrid optimization, demand response, fault detection, and cyber-physical security of energy systems.

By integrating advanced AI methodologies with real-world energy challenges, the session aims to foster innovative solutions that support sustainable mobility, large-scale renewable integration, and national energy resilience, thereby contributing to long-term energy security objectives.

Topics of interest:

The special session track will cover the following topics but not limited to:

1. AI and machine learning for energy security and system resilience
2. Renewable energy forecasting using data-driven and deep learning models
3. Intelligent energy management systems for electric vehicles
4. Battery health estimation, diagnostics, and lifecycle prediction
5. Smart EV charging infrastructure and load optimization

6. AI-based integration of renewable energy into power grids
7. Demand response and energy load forecasting using ML
8. Reinforcement learning for energy storage and dispatch control
9. Predictive maintenance and fault detection in energy systems
10. Cybersecurity and anomaly detection in AI-enabled power networks
11. Smart grids and microgrid optimization using AI techniques
12. Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) intelligence
13. Edge AI and IoT-enabled monitoring of energy systems
14. Explainable and trustworthy AI for energy applications
15. Policy, regulatory, and ethical aspects of AI-driven energy security

Special session organizers:

- **Dr. Sasmita Padhy**, NIST University, Berhampur, India
  Email: sasmita_padhy@nist.edu
- **Dr. Preeti Ranjan Sahu**, NIST University, Berhampur, India
  Email: preetiranjan.sahu@nist.edu
- **Dr. Brojo Kishore Mishra**, NIST University, Berhampur, India
  Email: bkmishra@nist.edu

Organizer(s):

Name: Dr. Sasmita Padhy

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Dr. Sasmita Padhy is a dedicated academician with over 20 years of teaching experience in Electrical Engineering currently serving as the Head of the department. Dr. Padhy has consistently demonstrated a strong commitment to nurturing student potential through innovative pedagogy and interdisciplinary learning approaches. A seasoned researcher in power system stability, control, microgrids. Dr. Padhy has published in reputed SCI journals, presented at international conferences and contributed to book chapters in this field. Her work often integrates soft computing techniques to address real world energy	

challenges Dr. Padhy is also an active promoter of innovation and sustainable technology. She is currently guiding projects aimed at campus microgrid formation, Energy Auditing, and the revival of renewable energy systems like solar PV, Wind and biogas at the university. As a mentor and Ph.D supervisor she inspires the students to bridge theoretical knowledge with practical applications to drive impactful solutions in the energy transition landscape.	

Name: Dr. Preeti Ranjan Sahu

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Dr. Sahu received the B.Tech. degree from BPUT, Rourkela, Odisha, India, in 2008, and the M.Tech. and Ph.D. degrees from the Veer Surendra Sai University of Technology (VSSUT), Burla, Odisha, in 2011 and 2020, respectively. He is currently working as an Associate Professor in the Department of Electrical and Electronics Engineering, NIST University, Brahmapur, Odisha. His research interests include hybrid power systems, power system stability, and optimization techniques. He serves as a Reviewer for several prestigious international journals. Dr. Sahu published 20 SCI-indexed journal papers, 3 patents, and 10 international conferences.	

Dr. Brojo Kishore Mishra is a distinguished academician, researcher, and Professor in the Department of Computer Science & Engineering at NIST University, Berhampur, India. He holds a Ph.D. in Computer Science (2012) from Berhampur University, along with Master's degrees in Computer Applications (2005) and Mathematics (2004).

With over 20 years of experience in teaching, research, and academic administration, Dr. Mishra has held key leadership positions such as Associate Dean (International Affairs), Institutional IQAC Coordinator, Principal, Prof. i/c (Examinations), and Head of Department. He has served as adjunct and visiting faculty at reputed institutions including Lincoln University College (Malaysia), SIMATS Chennai, and IISER Berhampur.

Dr. Mishra has authored 3 books, edited 26, and published over 200 research articles in journals, conferences, and book chapters. His work has led to multiple patents, copyrights, and a trademark. His research interests include Artificial Intelligence, Data Mining, and IoT. He has successfully supervised 5 Ph.D. scholars, contributing to research in supply chain recommendation systems, sentiment analysis, and multilingual speech data processing.

Beyond research, Dr. Mishra is deeply engaged in curriculum development, academic quality assurance, and industry-academia collaboration, shaping the next generation of computing professionals.

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