

THE 8TH IEEE CONFERENCE ON ENERGY INTERNET AND ENERGY SYSTEM INTEGRATION

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Special Session 11

Artificial Intelligence-Based Optimal Control and Resilient Operation in Cyber-Physical Power Systems

INTRODUCTION AND TOPICS

By leveraging information and communication technologies, smart grids can implement two-way communication between various distributed energy sources to optimize the generation, distribution, and consumption of electricity. In recent years, as the rapid advance of communication networks and computing/control systems, especially in smart grids, such interdependency and coupling between physical and cyber spaces have attracted both academic and industrial attentions. Therefore, the concept of cyber-physical power system (CPPS) has been emerged for bridging the gap between physical and cyber layers, aiming to achieve a seamless collaboration in both worlds. While the CPPS framework offers enhanced flexibility, economy, and reliability, it also presents significant challenges in maintaining optimal control and resilient operation, particularly in systems with high penetration of renewable energy sources and inherent uncertainties and dynamic behaviors. In CPPS, the reliance on cyber networks for control and communication introduces risks such as time delays, cyberattacks, and data integrity issues, which can compromise control performance or even destabilize the system. To address these challenges, Artificial Intelligence (AI) has emerged as a powerful tool for enhancing the control and resilience of CPPS by learning from historical data and interacting with the dynamic system environment.

This special issue aims to provide a platform for academic and industry experts to share the latest advancements in AI-based optimal control techniques and resilient operation strategies for CPPS. We welcome papers that address a broad range of topics related to these areas.

Topics of interests (including but not limited to):

- Data-driven control strategies in cyber-physical power systems and microgrid systems
- Machine learning for optimal control and operation in power systems and microgrids
- AI-based cyber resilient control and operation solutions in CPPS
- Data-driven fault detection and diagnosis in CPPS
- Machine-learning approaches for real-time voltage and frequency control in smart grids
- Interpretable machine learning for control and operation solutions in CPPS
- Distributed and federated machine learning in CPPS

SPECIAL SESSION CHAIRS



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PUBLICATION & SUBMISSION

Submissions will be reviewed by the conference technical committees, and accepted papers will be published in IEEE EI² 2024 International Conference Proceedings, which will be submitted for inclusion in the **IEEE Xplore Digital Library**, and submitted for indexing by **EI compendex** and **Scopus**.



Scan the QR code on the left or open the submission link to submit your paper.

• Submission link: <https://easychair.org/conferences/?conf=ei22024>

Submission Deadline: 15 October, 2024

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For any questions, please contact the conference secretary, Ms. Joyce Zhong, via EI2_2024@outlook.com.