IEEE Transactions on Industrial Cyber-Physical Systems

CALL FOR PAPERS

for Special Collection on

"Learning based Cross-Layer Design Approaches for Fusion, Control, and Optimization for Securing Industrial Cyber-Physical Systems"

Theme: Information and communication technologies (ICT) has been increasingly utilized to support the exchange of measurements, control signals, and system-level management commands in industrial cyber-physical systems (ICPSs). While the communication infrastructure significantly facilitates the transmission of vast amounts of data over wide geographical areas, it makes ICPSs vulnerable to cyberattacks. To secure ICPSs in terms of their crucial functions such as fusion, control, and optimization, it indispensably involves timely acquiring and processing tremendous amount of data. Conventional model-based methods themselves may have difficulty in meeting these data-heavy involved demands. Machine learning (ML) and its emerging algorithms offer the potential of dealing with large-scale data analysis and decision-making for the monitoring and control of ICPSs. In turn, these ML based applications in securing fusion, control, and optimization of ICPSs can also promote the development of ML, such as approximation theory, physics-informed learning, deep learning algorithms, and optimization approaches. This special collection solicits state-of-art research work related to the latest challenges, technologies, solutions, methods, and fundamentals in the field of learning-based cross-layer approaches for fusion, control, and optimization for ICPSs while taking cyberattacks into considerations.

Topics Include, but are not limited to, the following topics and technologies:

- Data-driven modeling for ICPSs with cyberattacks
- Data and model hybrid driven approaches for ICPSs with cyberattacks
- Learning based stability analysis, estimation for ICPSs with cyberattacks
- Learning based resilient control and enhancement technology for ICPSs
- Game theories for optimal decision making for securing ICPSs
- Data privacy and transparency in ICPSs
- Vulnerabilities of machine learning models in ICPSs
- Physics-informed learning for control, and optimization of ICPSs
- Applications in smart grids, intelligent transportation systems, smart factories, Industrial 4.0, robotics, etc.

Tentative timeline: Deadline for the first submission of papers: Feb 28, 2024
Expected publication date: August 31, 2024

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