IEEE Transactions on Industrial Cyber-Physical Systems

CALL FOR PAPERS

for Special Collection on

Machine Learning for Prognostics and Health Management of Industrial Cyber-physical Systems

Theme: In today's intricate ecosystem of Industrial Cyber-Physical Systems (ICPS), the confluence of machine learning (ML) with prognostics and health management (PHM) is pioneering transformative pathways for enhanced operational intelligence and resilience. This synergy promises transformative advancements in monitoring, diagnosing, and maintaining the health and functionality of industrial systems, ensuring their reliability, efficiency, and operational longevity. However, while the benefits are manifold, integrating ML with PHM is not devoid of challenges. Central among these is the heavy reliance of ML-driven prognostics on historical data, which often grapples with the complexities of representing the multifaceted and unpredictable realms of industrial operations. The assumptions that often underpin these models, particularly regarding data distributions and operational consistencies, sometimes falter in the face of real-world volatilities, leading to potential inaccuracies and operational vulnerabilities. Moreover, the often "black-box" nature of ML algorithms necessitates a concerted focus on fostering enhanced levels of trust, transparency, and interpretability. This becomes especially critical within industrial contexts where decision-making hinges on the accuracy and reliability of predictive insights and system health diagnostics. Ensuring that ML-driven prognostics tools and systems are adept at navigating the complexities and unpredictabilities of industrial environments is essential to mitigate risks and enhance operational confidence. In light of these considerations, this special collection, titled "Machine Learning for Prognostics and Health Management of Industrial Cyber-Physical Systems," aims to foster a rich dialogue and exploration of cutting-edge advancements, challenges, and future trajectories in this transformative domain. We invite a diversity of contributions, including original research articles, insightful reviews, and impactful case studies that delve into the evolving landscapes of ML in ICPS prognostics and health management.

This special collection will focus on (but not limited to) the following topics:

- Solutions for data security and privacy in ML-driven ICPS PHM.
- Trustworthy and interpretable ML for Enhanced ICPS PHM.
- Robust ML algorithms for diverse ICPS environments.
- Enhanced user experience in ML-integrated ICPS through intelligent interface interpretability, feedback, and interaction.
- Efficient data management strategies in ML-driven ICPS.
- Advanced sensor fusion techniques in ML-augmented ICPS PHM.
- Case studies of integrating ML into ICPS PHM across various industries, including energy, manufacturing, telecommunications, and industrial monitoring.

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Timetable:

Deadline for manuscript submissions May 30, 2024

Expected publication date (tentative) December, 2024