Special Issue

Digital Twins and Intelligent Systems for Condition-Based Industrial Maintenance

Message from the Guest Editors

Recent Industry 4.0 advances have enabled digital twins and intelligent systems to revolutionize machine monitoring, maintenance, and optimization throughout their lifecycle. By integrating real-time sensor data, AI-driven diagnostics, and virtual replicas of physical assets, this Special Issue highlights cutting-edge solutions for condition-based maintenance (CBM) aimed at enhancing reliability, efficiency, and cost-effectiveness in industrial environments. We invite original research and comprehensive reviews on topics including digital twin framework design for real-time monitoring, AI-powered fault detection and prognostics, IoT and cloud integration within CBM, case studies of digital twin applications in maintenance, and optimization strategies linking virtual and physical systems for intelligent decision-making. Contributions may cover theoretical models, data-driven methods, hybrid simulations, or real-world implementations across manufacturing, energy, and automated industries. This Special Issue fosters cross-disciplinary dialogue to advance next-generation smart maintenance strategies leveraging digital twins and intelligent CBM systems.

Guest Editors

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Message from the Editor-in-Chief

Machines is an international, peer reviewed journal on machinery and engineering. It publishes research articles, reviews and communications.
Our aim is to encourage scientists to publish their experimental and theoretical results in as much detail as possible. There is no restriction on the length of the papers. Full experimental and/or methodical details must be provided.
There are, in addition, unique features of this journal: Manuscripts regarding research proposals and research ideas will be particularly welcomed; Electronic files or software regarding the full details of the calculation and experimental procedure - if unable to be published in a normal way can be deposited as supplementary material.

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