Special Issue

AI- and Digital Twin-Driven Intelligent Diagnostics and Predictive Maintenance for Transportation Systems

Message from the Guest Editors

We invite contributions that develop foundational theory, algorithmic innovation, and rigorous applications across vehicles (railway, automotive, aviation, maritime) and infrastructures (tracks, bridges, tunnels, roadways, depots, communications). **Topics of interest, include but are not limited to, the following:**

- Hybrid AI–DT architectures for diagnostics, prognostics, and predictive maintenance.
- Real-time synchronization between physical assets and DTs; streaming analytics and online learning.
- Multi-modal data fusion (vibration, acoustic, image/video, operational logs, environmental and network data).
- Edge and federated learning for privacy-preserving, low-latency deployment at scale.
- RUL prediction, health indicators, and risk-aware/uncertainty-aware decision-making (UQ).
- Trustworthy/Explainable AI (XAI), robustness to domain shift, and safety assurance.
- Digital Twin modeling, calibration, fidelity assessment, V&V, and co-simulation.
- Condition-based maintenance (CBM), maintenance optimization, and scheduling under constraints.
- Benchmarking datasets, evaluation protocols, and reproducible baselines.
- Lifecycle management and sustainability assessment of maintenance strategies.

Guest Editors

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Deadline for manuscript submissions

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal *Applied Sciences* has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

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