The 14th International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering (QR2MSE2024)

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Special Session on:

Intelligent Diagnostics and Prognostics with Sensor Configuration design for Industrial Systems

Industrial systems experience inherent health degradation, impacting both its performance and structural integrity. Prompt identification and assessment of degradation symptoms are crucial for informed decision-making in predictive maintenance, ensuring industrial safety and maximizing productivity. In industrial machinery, exposure to fluctuating operational parameters is a recurrent occurrence., such as the impact of wind shear on the gearbox of wind turbines and the operation of traction gearboxes in trains passing through high-curvature areas. The variable operating conditions may accelerate the degradation process of the machinery, making it challenging to accurately and reliably diagnose and prognose the condition of the machinery from the information presented by the condition monitoring data. In the past decade, data-driven fault diagnostic and prognostic modelling based on general machine learning has accelerated the intelligentization of prognostics and health management framework.

However, lacking domain expertise or physical knowledge results in the data-driven diagnostic and prognostic models facing challenges to fully trust due to a lack of interpretability. Besides, Unreliable diagnosis and prognosis information lead to unreasonable operational and maintenance (O&M) decisions, consequently resulting in higher (O&M) costs, which constitutes a potential risk to the operational safety of industrial systems.

Therefore, this special Session aims to present original research on the application of interpretable and reliable artificial intelligence for diagnostics and prognostics together with its sensor configuration design of in industrial systems, including, but are not limited to, mechanical systems, offshore equipment, and electrical devices, offering innovative insights for academia and showcasing the latest compelling applications for the industry.

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