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Special Session on

Advanced condition monitoring and system reliability for industrial applications

Organized and co-chaired by:

Prof. Abdenour Soualhi, Université Jean Monnet, France

Prof. Hubert Razik, Université Claude Bernard Lyon 1, France

Prof. Moncef Soualhi, Université Franche-Comté, France

abdenour.soualhi@univ-st-etienne.fr

hubert.razik@univ-lyon1.fr

moncef.soualhi@univ-fcomte.fr

Call for Papers

Technical Outline of the Session and Topics:

Rotating machines are critical in sectors such as railway, energy and robotics, and present critical components susceptible to fail. In reality, these systems operate in complex environments, requiring the implementation of advanced monitoring techniques, particularly for fault detection and diagnosis, to maintain their operational functionality. This session highlights the need to develop robust, generic algorithms able to analyse data from a wide range of sources and environmental conditions. By focusing on this objective, we aim to meet the challenges of real-world applications, highlighting the need for sustainable monitoring solutions to improve system performance and energy efficiency.

Topics of the Session include, but are not limited to:

- Advanced signal processing for comprehensive machine health analysis.
- Advanced methodologies for quantifying uncertainty in diagnostic processes.
- Fusion of heterogeneous data sources to enhance accuracy in health monitoring.
- Innovative strategies for generating health indicators using mixed data type.
- Automated construction of health indicators from heterogeneous data.
- Fault detection and diagnostics of multiple failures.
- Development of robust algorithms under varied operating conditions.
- Explainable AI algorithms for machine health monitoring.

Data Sets Proposal for the Session: (authors are welcome to exploit their own data sets)

This special session includes access to three open-access data sets. Each data set covers distinct scenarios with rotating machines in the energy, railway, and robotics sectors, with various data sourced and collected under different operational conditions. These data sets include:

1. Electrical and mechanical faults in railway machinery (AMPERE data sets).
2. Gearbox faults in wind turbine generators (LASPI data sets).
3. Multi-axis robot faults in machining operations (METALLICADOUR data set).

A comprehensive description of these data sets, including experimental and acquisition details, is already available online in the published paper, accessible via the DOI link <https://doi.org/10.36001/ijphm.2023.v14i2.3497>. Also, each data set is provided with a code for loading and structuring the data for training and testing models, and can be found in the GitHub link <https://github.com/khaledbenag/machinery>. Both documentation and codes enable researchers to easily integrate and analyze the data in their studies. It streamlines the initial stages of research, ensuring that contributors can focus more on developing innovative PHM solutions.

Author's schedule:

Deadline for submission of special session papers	April 15, 2024
Notification of acceptance	June 10, 2024
Deadline for submission of final manuscript	July 01, 2024

Early submission is highly encouraged for early decision notifications!

All the instructions for paper submission are included in the conference website:

www.iecon-2024.org

