

phme22

TURIN (Italy) - 6/8 July 2022

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CALL FOR ABSTRACTS

Special Session

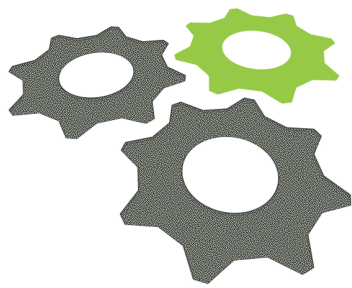
ADEPT: from algorithms to deployment of data-driven predictive maintenance: how to overcome real-world challenges and ensure successful deployment

Description

Predictive Maintenance takes advantage of sensor information to precisely follow up the exact condition of the equipment, understanding its history as well as forecasting its future usage and wear trends – in order to identify the optimum maintenance time. As unexpected downtimes and failures are becoming more costly, accurate predictions of imminent issues turn out to be crucial for highly efficient operations. Predictive Maintenance aims not only at the early detection of faults but also to identify degraded performance and trends in product quality, providing suggestions on the best actions to remedy the problems. Recent academic developments exploit various Machine Learning and Artificial Intelligence methods for fully- and semi-automated data-driven pattern recognition and knowledge creation. At the same time, successful implementation and deployment of various advanced solutions in practice, across different industries, remain challenging. The complexities of the real world often put into question the findings from idealised, simplified research settings. In this session, we are equally interested in *both* the novel algorithmic advancements as well as the practical solutions to key issues faced by the commercial actors during implementation.

Motivation

Predictive Maintenance aims to significantly improve upon the alternatives by creating techniques for “understanding” the individual health status of every single piece of equipment. By considering how different usage profiles influence the health management, due to global aspects (e.g. climate, education levels, and maintenance culture) or the particulars of the assignment (e.g. digging rocks or gravel, driving on the highway or in the city, etc.), it promises to deliver much more efficient operation. Current technical developments like IoT, digitisation, big data, more efficient computing devices with cheap memory, and, most importantly, new machine learning tools that exploit very large data sets, have led to the possibility of making such specific predictions with very high accuracy. Most analysts agree that the predictive maintenance market will skyrocket in the near future. The industry is quickly moving away from hand-crafted diagnostic functions designed and tested by teams of domain expert engineers. Embracing the new developments in AI/ML, however, comes with its own challenges. This special session is a prime opportunity for practitioners and the scientific community to meet and understand each other’s perspectives.



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Objective

Data-driven Predictive Maintenance problems fit perfectly into the “aware systems” research, i.e., the research on systems that construct knowledge (semi-)automatically from observing real-world data. In most domains, the “normal” operation of a system is difficult to characterise precisely before deployment, and what is “normal” will vary throughout the lifetime of the equipment. Similarly, possible faults are often unknown or hard to describe precisely. Finally, due to the cost and design reasons, it is never possible to measure everything of interest; the condition of the equipment needs to be evaluated based on data that is available because it is convenient to capture – not necessarily the ideal data. All these challenges combine to make practical implementations of Predictive Maintenance a very interesting testbed for modern AI/ML research. This special session will be interesting both for practitioners working in the area of AI/ML (who will get a chance to better understand the challenges related to the deployment of these methods in practice), researchers with a background in other areas of PHM (who may bring cross-fertilisation from disciplines where some of the challenges has been solved in various ways), as well as for industry practitioners (who can share their experiences and challenges faced in the complex real-world settings). Topics of interest include (but are not limited to) representation learning, semi-supervised learning, active learning, fleet-based PHM, domain adaptation, deployment pipelines, tiny ML, AutoML and MLOps.

Please submit your abstract by January 28, 2022,

<https://phm-europe.org/registration>

Please submit your abstract through the conference website. Also, please send a copy of the abstract by email to the special session organisers.

Organizers

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