Machine Learning Techniques in Predictive Maintenance

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Abstract: Recent advances in manufacturing have been driven by the so-called Industry 4.0 paradigm and a model of production centred around the concept of circular economy. These two driving forces, altogether, have fostered the integration between physical and digital environments and people. As a result, large amounts of data containing information about the underlying processes, such as physical variables, states, and alarms, just to name out a few, are collected in a distributed way and shared among different players and devices.

Once data are available, relevant information about systems' status can be extracted by applying data-driven approaches, namely, Machine Learning (ML) techniques.

Given their inherent features, ML-based methodologies have been widely considered in condition-based maintenance (CBM) problems, aiming to guarantee and improve the availability of manufacturing systems and targeted throughputs, while reducing maintenance costs and promoting sustainability.

Knowing the health condition status of a set of components of a given system is invaluable to support optimal scheduling of Predictive Maintenance (PdM) tasks. This Track intends to bring together researchers, engineers, and practitioner communities, to present and discuss the latest advances and challenges on ML-based PdM, with focus on data gathering, data processing and decision-making, including but not restricted to:

- Architectures for PdM
- Algorithms for PdM
- Sensing and cyber physical systems in PdM
- Condition monitoring
- Fault detection, prognosis, and Remaining Useful Life (RUL) estimation
- Maintenance as a service and reliable manufacturing
- Industry applications and case studies

Keywords: Machine Learning, Manufacturing, Predictive Maintenance, Fault detection, Prognosis and RUL.