Project dates: September – December 2024	

Title: Development of a Human-Machine Interface for remote interaction – Application to Predictive Maintenance

Project activity areas: Industrial Engineering, Prognostics & Health Management, Predictive Maintenance	**Keywords:** Human-Machine Interface, Predictive Maintenance, Industry 4.0, Prognostics and Health Management, Fault Diagnostics, Fault Prognostics
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Project technical background:

Prognostics and Health Management (PHM) is a critical field in systems life cycle management. Its major tasks include detecting abnormalities, identifying root causes, predicting remaining useful life, and providing predictive maintenance solutions and operation strategies. PHM optimizes system's performance, minimizes downtime, and reduce costs.

In this project, you will explore PHM concepts and their application in predictive maintenance using the PHM platform available at the Production Engineering Laboratory (LGP) of the University of Technology Tarbes Occitanie Pyrénées (UTTOP). The platform collects multimodal sensor data, providing insights into system health and operating conditions. The main objective is to develop a Human-Machine Interface (HMI) for remote access to the PHM platform data, enabling easy visualization, interpretation, and decision-making. You will define the HMI's technical specifications and requirements to meet industry user and platform needs.

Throughout the project, you will gain hands-on experience in data processing, HMI development in a workflow that efficiently transforms raw data into actionable insights. You will showcase your work through a demo highlighting your HMI's key features and benefits. By completing this project, you will gain a general overview of PHM and develop skills in data analysis, AI and cloud IoT service development, and user interface design, preparing you for a successful career in the fast-growing and talent-scarce field of equipment life-cycle management.

Human-Machine Interface solutions

1. Hardware solution for machine monitoring

2. Artificial intelligence-supported software solutions for diagnostic and prognostic

3. Cloud and IoT solutions for predictive maintenance

Studied topics:
- Understanding the basic concepts of PHM and Predictive Maintenance.
- Proposition of a human-machine interface architecture that integrates data acquisition, data processing and data presentation and visualization.
- Implementation of the human-machine interface.
- Setting up a demo that highlights the potential of your work on the PHM platform.