



Title: PRECognition: Intelligent Maintenance Platform for Production Equipment

Duration: 40 months

Total Cost: €397,425.00

Public Funding: €323,395.00

The PRECognition system combines innovative and advanced models for fault prediction and detection, offering a comprehensive solution for monitoring the condition of production equipment for the factory of the future. The project aims to create a predictive maintenance system that will:

- Detects and predicts the risk of equipment failure and effectively manages potential breakdowns.
- Reduces repair times and schedules maintenance at the optimal time based on production needs, while ensuring the smooth operation of the equipment.
- Extends the service life and improves the efficiency of production equipment.

The PRECognition system consists of the following three modules:

Incident Prediction and Detection (IPD)

The Event Prediction and Detection module analyzes equipment degradation that could lead—or has already led—to failures. More specifically, it focuses on identifying correlations between normal and abnormal operation of a machine or component, aiming to predict the likelihood and timing of a potential failure, as well as to diagnose existing or developing failure incidents.

To this end, it interacts with a Big Data Analytics module, while IIoT (Industrial Internet of Things) and big data analytics techniques are applied. The key subsystems of the IPD module are: Fault Detection, Fault Prediction, and Results Fusion.

Online Maintenance Manager (OMM)

The Online Maintenance Manager (OMM) module is the core component of the PRECognition system, as it coordinates and manages the entities and events (breakdowns, damage, maintenance tasks, etc.) that a factory's maintenance department must address during the production process. Essentially, it acts as an "Electronic Maintenance Assistant," supporting and—where necessary—substituting for the factory's Maintenance Manager. The main functional modules of the OMM are as follows:

Ontology, Fault and Event Management, Alarm Management, and Consulting for Operation Management and Optimization.



Notification and Feedback

The role of the Notifications and Feedback module is to generate notifications for the appropriate stakeholders involved in the production process when equipment failure incidents are in progress or are predicted by the IPD module. Furthermore, it dynamically determines who needs to be informed about each event and the volume of information required for each recipient. The module's key subsystems are: Recipient Feedback and Data Package Creation for Notification.

The expected key results of the project include:

- Increase in Total Equipment Yield and Return on Investment (ROI).
- Extension of equipment lifespan through improved reliability, MTBF (Mean Time Between Failures), and MTTR (Mean Time to Repair).
- Reduction of downtime.
- Contribution to the digital transformation of the industry within the framework of the Fourth Industrial Revolution (Industry 4.0).
- Reduction of equipment-related accidents and improvement of working conditions on the production floor.



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