



Thesis project available

Prognostics and Health Management (PHM)

(duration: 10-12 months)

❖ Title of the research:

Development and implementation of prognostics and health management methods based on image processing

❖ Context of the research

The third millennium has started with a technological revolution that, under the name of Industry 4.0, is driving extensive digitalization and interconnection of manufacturing processes and products. The technical enablers of this are recent disruptive technologies, such as Internet of Things (IoT), mobile and cloud computing, advanced big data analysis algorithms and Cyber-Physical System (CPS). These technologies are changing the way we design and manufacture to offer new services and products to customers, with efficiency, standards of quality and reliability higher than before, which allow expanding the value chain by generating new business models that create value for customers and revenues for manufacturing companies. Particularly, the increased availability of information from industrial monitored components and systems and the grown ability of treating the acquired information by intelligent algorithms has opened wide the doors for the development of advanced maintenance approaches. Their application is supported by Prognostics and Health Management (PHM) methods, which aim at exploiting the monitoring data for identifying the onset of equipment degradation, diagnosing and the causes of its degradation and the degradation states, and predicting its Remaining Useful Life (RUL), i.e. the time left before the equipment will no longer perform its intended function. The thesis project aims at developing and implementing artificial intelligence methods such as artificial neural networks, deep learning methods and convolutionary neural networks for defect detection and diagnostics from images.

The thesis will be developed in collaboration with INFINEON within the European Project IREL4.0

❖ Objective of the research

Methodology investigation, development and pilot case examination, with software implementation of the method explored.

❖ Work Phases

- Analysis of the information available for the development of the method (NDT tests, images, measured signals, physical models of the degradation processes,...);
- Analysis of the possible solution methods for the machinery defect detection;
- Selection of the most promising solution method;
- Development of the selected solution method;
- Analysis of the obtained results.

❖ Required skills

- Good knowledge of computer vision and images processing technologies and techniques;
- Interest in developing innovative algorithms to tackle real applications;
- Good knowledge of Matlab and Python programming.

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