AI·PROFICIENT

Artificial **i**ntelligence
for improved *pro*duction ef*fici*ency,
quality and mai*nt*enance

Overview

AI-PROFICIENT aims to improve manufacturing processes in terms of production efficiency, quality and maintenance, by combining human knowledge with AI capabilities (human-machine interaction). The overall goal is to increase the positive impact of AI technology on the manufacturing process as a whole, while humans assume supervisory (human-on-the-loop) and executive (human-in-command) roles.

Project Objectives

AI-PROFICIENT will develop a technical and business ecosystem to showcase the potential that advanced AI technologies bring in production plants, alongside with human interaction. In this regard, AI-PROFICIENT proposes an evolution from hierarchical and reactive decision making for plant automation, towards self-learning and proactive control strategies. This will be achieved by:

- creating the AI-PROFICIENT platform for digitalized production plants, that will integrate existing and emerging AI technologies and local intelligence of smart components at system edge, to enable agile production processes and improved operation planning and execution, while increasing the Overall Production Efficiency.
- piloting the AI-PROFICIENT solution in 3 production plants of different manufacturing domains, under alternative use case scenarios. Pilots will involve AI-enabled predictive fault detection, diagnostics and proactive maintenance features, demonstrating AI's potential to improve the quality of products and processes.
- identifying the effective means for human-machine collaboration, while respecting privacy, safety and security requirements and respective ethical principles. The goal is to enable the AI decision-making explainability and transparency, as well as the reinforcement mechanisms based on the human knowledge and feedback, to improve the trustworthiness of AI in manufacturing domain.

Use Cases

The 3 different operation environments that will run the pilots are provided by 2 manufacturing enterprises, CONTINENTAL and INEOS. With their collaboration, AI-PROFICIENT will ensure the end-user engagement throughout the project lifetime, considering requirements specification, deployment and validation, as well as development of recommendations for ethical principles for trustworthy AI in manufacturing domain.

Enabling technologies and concepts of AI-PROFICIENT solution

- Smart components for embedded AI at system edge
- IoT for smart component integration and interoperability
- AI prognostics for system degradation and health state assessment
- AI enabled decision-making for quality assurance
- Semantic lifting and model agnostic techniques for XAI

- Hybrid digital twins and process modelling
- Generative optimisation of production processes (human in the loop)
- Role-specific visualization for transparent AI decision support
- "Ethics by design" approach

Expected Impact

- Products and services usable in a wide range of manufacturing processes, leading to agile production processes and improved quality of products and processes
- Humans working together with AI systems in optimal complementarity

The Team

The project is a collaboration of 10 partners in 7 countries

Contact Us

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