

AI-PROFICIENT

Artificial intelligence
for improved production efficiency,
quality and maintenance

Press Release#1

AI-PROFICIENT: Using advanced AI technologies to improve manufacturing

AI-PROFICIENT project, is a new funded project by the European Commission, under Horizon 2020, aspiring to integrate advanced AI technologies with manufacturing ones, in order to improve production planning and execution, and facilitate the collaboration between humans and machines.

AI-PROFICIENT intends to identify the effective means for human-machine interaction and increase the positive impact of AI technology on the manufacturing process as a whole. In fact, the project plans to enable event identification and prediction, operation scenarios simulation, transparent decision and optimal control, along with personalized shop-floor assistance, while respecting the safety and security requirements and following the ethical principles in accordance with High-Level Expert Group (HLEG) guidelines.

AI-PROFICIENT will combine human knowledge and AI capabilities to develop proactive control strategies in 3 key manufacturing aspects: **production efficiency, quality and maintenance**. In specific, the manufacturing process will be transformed into a self-learning AI system, capable of incorporating the human feedback to reinforce suitable control strategies and decisions. For such an agile manufacturing process, AI-PROFICIENT will embed predictive and prescriptive AI analytics into the production systems, creating a computationally distributed AI environment.

The project will also deliver a multi-objective generative optimization for **improved production execution and scheduling**, leveraging in this way both digital-twins and empirical data to identify multiple sets of control parameters, as evaluated against predefined objectives (e.g. production efficiency, resource consumption, etc.). Interaction with plant operators will leverage the human knowledge and feedback, such as for the reinforcement learning mechanisms to be applied for permanent adaptation of predictive AI models (**human-in-the-loop**). In addition to this, humans will be consulted for selection of the desired set of control parameters evaluated against the related production metrics (**human-in-command**), while giving them an executive role in addition to the supervisory one (**human-on-the-loop**).

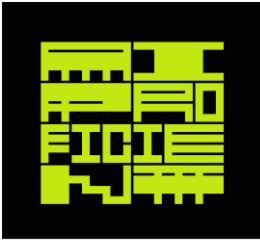
The project will be validated and demonstrated in **three different operation environments** (i.e. plant facilities) provided by two manufacturing enterprises, CONTINENTAL and INEOS. In collaboration with their plant operators, AI-PROFICIENT will ensure the **end-user engagement** throughout the project lifetime, considering requirements specification, deployment and validation, as well as development of recommendations for ethical principles for trustworthy AI in manufacturing domain.

Overall, the project will facilitate the human-machine collaboration within the European manufacturing and process industry as an evolvement from hierarchical and reactive decision making for plant automation, by:

- Integrating self-learning and self-prognostic AI services with production processes with the manufacturing systems and processes in an IIoT environment.
- Embedding the deep learning techniques and complex event processing capabilities for the early detection of process anomalies and provision of fault diagnostics.
- Providing AI-based decision support for proactive maintenance at component and system level
- Delivering a joint human-machine approach to improved production planning and execution.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957391.



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The AI-PROFICIENT project is a collaboration between 10 partners in 7 countries:

[Université de Lorraine](#) (France) that is coordinating the project, [Continental France SNC](#) (France), [Fundación Tekniker](#) (Spain), [INEOS Group](#) (UK), [TenForce](#) (Belgium), [VTT Technical Research Centre of Finland](#) (Finland), [Inos Hellas S.A.](#) (Greece), [Ibermática S.A.](#) (Spain), [Institute Mihajlo Pupin](#) (Serbia), and [Athens Technology Centre S.A](#) (Greece).



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