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EU project makes headway in zero-defect manufacturing

EU funded project OPTIMAI introduces new Artificial Intelligence (AI) methods for improved quality in manufacturing with an intelligent approach to zero-defect manufacturing through its breakthrough AI powered toolkit. 16 partner organizations join forces to optimise production processes through a mix of AI, augmented reality, virtualisation, and smart sensors.

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Manufacturing industries are constantly looking for new ways to improve quality control for both manufactured products and manufacturing processes. Through the OPTIMAI project we are spearheading innovation in this area. Introducing new technologies designed to reduce scrap, eliminate defects, maximise productivity and improve quality of shop floor processes, the project is set to make a tangible impact on European industry and environmental sustainability. On the attempt to create a new industry ecosystem, we are optimizing production processes through a unique mix of Smart Instrumentation, Metrology, Artificial Intelligence, virtualization, and Augmented Reality.

Thanks to the three-year project, funded by the European Commission's Horizon 2020 research and innovation programme, we are shaping the factories of the future thanks to its unique set of smart technology designed for the manufacturing arena. OPTIMAI was launched in January 2021 and has just entered its second year.

The manufacturing industry has spent the last few decades in a continuous state of technological revolution with the progressive introduction of ICT, robotics, and automation

technologies and most recently the introduction of digitalization technologies on the shop floor. From OPTIMAI, we are now revolutionizing current industry practices further by bringing together and advancing several enabling technologies that strengthen the collaboration between humans and machines.

The team led by Dr. dimitrou we designed the OPTIMAI toolkit, which will initially be tested and validated in factories focusing on the manufacturing of lifts and antennas and on the assembly of microelectronics in Greece, Spain and the UK respectively. The highly adaptable solutions will then be applied in a wide range of industrial settings and brought to market across Europe. We seek to have a significant impact on industrial competitiveness through an optimal balance between fast, cheap, and reliable production processes.

Core parts of the toolkit we developed by contributing organisations (including the Institute of Law and Technology, housed in the Faculty of Law of the Autonomous University of Barcelona) include a decision support system that detects and issues early notifications of defects, a continuous production, monitoring and quality inspection system powered by smart sensors, an intelligent marketplace for recycling of scrap, digital twins for simulation and forecasting of industrial processes, and, of course, a comprehensive ethics and regulatory framework surrounding the technologies. From the UAB, we are playing a leading role in the design of the ethical and legal strategy for the project, as well as in the monitoring of the research activities to ensure compliance with the European standards.

Feeding into the current transformative phase in the Industrial Revolution known as Industry 4.0., the project's innovations go beyond the state of the art and pave the way for a smarter, digitalized European manufacturing domain.

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References

Project "Optimizing Manufacturing Processes through Artificial Intelligence and Virtualization" OPTIMAI. Grant Agreement No. 958264.

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