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SMARTHANDLE: Resilient manufacturing lines based on smart handling systems

A groundbreaking European research project, SMARTHANDLE, has been recently approved to address the pressing challenges faced by the manufacturing sector in the European Union. With the aim of enhancing productivity, flexibility, and sustainability in handling operations, SMARTHANDLE will pioneer the development of intelligent, reconfigurable agents, AI-based reasoning enablers, and advanced planning systems.

The manufacturing sector in the European Union plays a vital role, contributing to 2 million enterprises, 33 million jobs, and 60% of productivity growth. However, the sector has encountered significant challenges in recent years due to global occurrences such as economic crises and an unprecedented pandemic. As market demands shift towards products with shorter lifecycles, manufacturing businesses must adapt to remain sustainable by effectively balancing cost, quality, and productivity.

Under the new reality, production lines, both manual and automated, must evolve to "produce more and diverse with less." *SMARTHANDLE recognizes the shortcomings that need to be addressed, including the high number of product variants requiring reconfigurable and flexible handling tools, the lack of advanced perception systems for efficient product and environment monitoring, the absence of adaptable control and planning schemes for handling a variety of workpieces and materials, and the immaturity of planning systems to keep up with market needs and custom orders.*

The SMARTHANDLE research project aims to tackle these challenges head-on and provide vital support to the European manufacturing industry. The project will focus on the following key areas of research:

Intelligent, Reconfigurable Agents: SMARTHANDLE will develop intelligent handling agents capable of adapting to a range of handling applications. These agents will possess dexterity and flexibility, allowing them to efficiently handle different types of workpieces and materials.

AI-Based Reasoning Enablers: Leveraging the power of artificial intelligence, the project will explore advanced reasoning capabilities to optimize the flexibility potential of the intelligent handling agents. By incorporating AI-based decision-making processes, SMARTHANDLE aims to enhance the adaptability and efficiency of handling operations.

Higher-Level Planning and Coordination Mechanism: SMARTHANDLE will design and implement higher-level planning and coordination mechanisms to ensure the successful and scalable deployment of the developed solutions in real-life use cases. These mechanisms will enable seamless integration of the intelligent handling agents into existing production systems, allowing for enhanced productivity and customization.

SMARTHANDLE is set to make a significant impact on the European manufacturing landscape, providing crucial solutions to the challenges faced by businesses. By reimagining handling operations, the project aims to unlock new levels of efficiency, agility, and adaptability, ensuring that European manufacturers remain competitive in a rapidly evolving market.

The SMARTHANDLE technological solutions will be applied in **3 industrial pilots** derived from a variety of sectors, namely:

Metal production – end user ALUMIL

Consumer goods production – end user MENICON

Battery disassembly – end user ABEE

The consortium of –SMARTHANDLE consists of **14 partners from 6 countries** (Greece, Spain, Germany, Netherlands, Luxemburg, and Belgium) who will join forces to develop, deploy, validate, and promote smart and versatile manufacturing solutions within the 3 years duration of the Project.