SMART HANDLE

| D3.1 | SMARTHANDLE dexterity enablers – First prototypes |

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Number of the Deliverable	D3.1
Related WP Number and Name	WP3: Intelligent agents and mechatronic tools for workpiece handling
Related Task Number and Name	T3.1 Sensorial system and mechatronics for proficient workpiece handling
	T3.2 Control methods for grasping of intractable and sensitive objects
	T3.3 Perception algorithms for operator and object recognition and localization
	T3.4 Behavior libraries for advanced teaching methods of single/dual arm robots
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D3.1 SMARTHANDLE dexterity enablers – First prototypes

Deliverable Submission Date	28/6/2024
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Reviewer(s)	ROBOCEPTION

Keywords

Intelligent agents, mechatronics, dexterous handling, 3D vision system, grasping strategies, tactile sensors, robot motion plans, perception, machine learning, shared working spaces, human perception, hand gestures, behaviour libraries, semantic information, dual arm robot, environment volumetric representation.

Abstract

This document presents the advances achieved during the first half of the SMARTHANDLE project execution time in Work Package 3 (WP3), regarding the first prototypes developed to get the different dexterous enablers, with the goal of handling different workpieces, from tough to very sensitive. The tasks encompass from the sensorized grippers design and manufacturing to the development of different software modules responsible for determining grasping strategies, perceiving and localizing objects and people, representing in a volumetric and semantic way the robot environment, and programming robots easily through a hand guiding system.

Executive summary

The main objective of the WP3-SMARTHANDLE consists of handling with dexterity different workpieces, taking advantage of developing improved sensing, developing grasping strategies, developing motion planners, considering operators working close to robots. Based on that, the purpose of this document is to present the first prototypes for the dexterity enablers, as it was defined in Tasks T3.1 – Sensorial system and mechatronics for proficient workpiece handling, T3.2 - Control methods for grasping of intractable and sensitive objects, T3.3 - Perception algorithms for operator and object recognition and localization, and T3.4 - Behavior libraries for advanced

teaching methods of single/dual arm robots. After a brief introduction, the developed prototypes are described in detail in the four main sections (one per task) of the present document. Finally, a section dedicated to the conclusions summarizes the efforts done by the SMARTHANDLE consortium regarding the dexterity enablers as well as the future work directions.