COROMA

Cognitively enhanced robot for flexible manufacturing of metal and composite parts

Various manufacturing tasks that will be enhanced and fields that will be involved in COROMA.

Example for a manufacturing process that involves drilling, polishing and adaptive fixturing.

The lifelong learning module is connected to other modules that support autonomy.
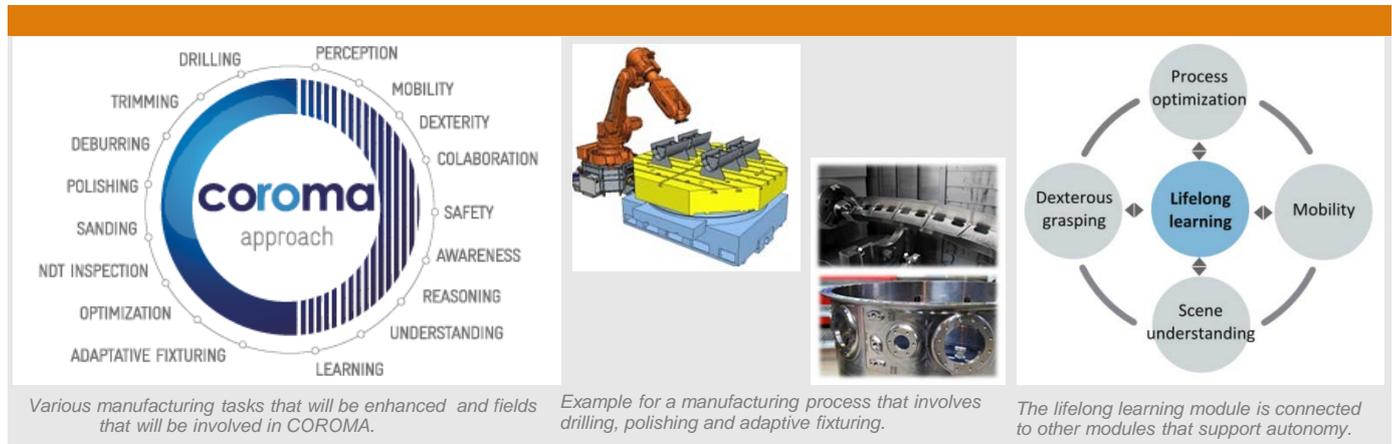
The goal of the COROMA project is to develop a cognitively enhanced robot that can execute multiple tasks for the manufacturing of metal and composite parts. COROMA will therefore provide the flexibility that European metalworking and advanced material manufacturing companies require to compete in the rapidly evolving global market. The main output will be a modular robotic system that performs a multitude of different manufacturing tasks autonomously in dynamic environments. Thereby it will be able to adapt to production requirements, while continuously improving its performance.

More flexible robotic manufacturing systems will be able to perform tasks that cannot be automatized at the moment because of their variability. The robotic system that is developed in COROMA will be capable of performing various operations in application domains where mobility and adaptation to dynamic environments is required. Using a simple interface the robot receives commands that require a minimum programming effort. The robot will autonomously navigate in the workshop, automatically perceive the manufacturing scene, locate the part that must be manufactured, and even handle some of the required tools. By learning from previous experiences during displacement, tool grasping, part localization and the manufacturing process itself, the robot improves its performance. It will be able to interact with other machines in the shop floor and to work on a part even while other manufacturing operations are being performed by these other machines. Safe human-robot and machine-robot collaborations are paramount, so that the robot will react to the presence of both humans

and other machines.

In COROMA, the DFKI Robotics Innovation Center develops a lifelong learning and knowledge sharing system. During the project, imitation learning and lifelong learning methods are implemented to continuously improve the behavior of the manufacturing system. The system will leverage knowledge obtained by systems with different capabilities and morphologies that work on similar tasks. Furthermore, the developed system will be able to generalize its behavior over similar tasks so that the workpieces can vary in size and shape.

Duration: 10/2016 – 9/2019

Partners:

IDEKO S. Coop (Spain), The University of Sheffield (United Kingdom), Université de Nantes (France), Kungliga Tekniska Högskolan (Sweden), Staubli Faverges SCA (France), IT+Robotics SRL (Italy), Convergent Information Technologies GmbH (Austria), BA Systèmes SAS (France), The Shadow Robot Company Ltd (United Kingdom), SORALUCE S. Coop (Spain), Europe Technologies SAS (France), Equipos Nucleares S.A. (Spain), SA SPBI (France), Aciturri Metallic Parts SL (Spain), DIN Deutsches Institut für Normung e.V. (Germany)

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