

IMPACT: vIision devices and systems for Monitoring the wellbeing of oPerators in a workspAce shared with Cobots in indusTry 4.0

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Research Program

In recent years, it has become essential for manufacturing companies to manage new challenges, such as managing complex products, product deterioration, increased demand for customization, and increased international competition. The attempt to overcome these problems has led to the increasing use of industrial robotic solutions, contributing to a complete revolution in company organization, from design to production. Furthermore, with the advent of the fourth industrial revolution, also known as Industry 4.0, the number of industrial robots in the manufacturing has experienced a further and decisive growth, mainly due to the ability of robots to simplify and considerably speed up industrial operations, and to interact with both human operators and other machines.

However, high levels of automation do not necessarily guarantee high levels of productivity, safety, and/or well-being of the operator. To bridge this gap between manual and fully automated manufacturing, “collaborative robots” or “co-bots” are becoming a matter of increasing concern. The term cobot refers to an innovative robotic device that is designed to manipulate objects and work closely with humans, with no need of using protective barriers or safety fences. It is a safe and intuitive technology for humans, whose key-role is sharing the work areas between robots and operators. They are meant to share a common workspace without any risk, carrying out their respective tasks simultaneously.

The proposed Ph.D. research activity aims at analyzing the cognitive aspect and the well-being of operators working in manufacturing scenarios, following the paradigms dictated by Industry 4.0, thus implementing collaborative robots in production. To this purpose, devices and intelligent systems for monitoring movements and interactions between operators and cobots will be deeply studied. The study of such systems will be aimed at creating comfortable work environments, adaptable to the needs and abilities of individual people, increasing the well-being of the operators in a human-centered factory concept. The research project will also focus on the possibility of monitoring operators suffering from physical and/or cognitive disabilities, whose support of devices suitable for human-machine interactions can be fundamental for easier insertion in collaborative robotics contexts.