INDUSTRIAL AND COLLABORATIVE ROBOTICS

Digital Automation Engineering

Course and Goals

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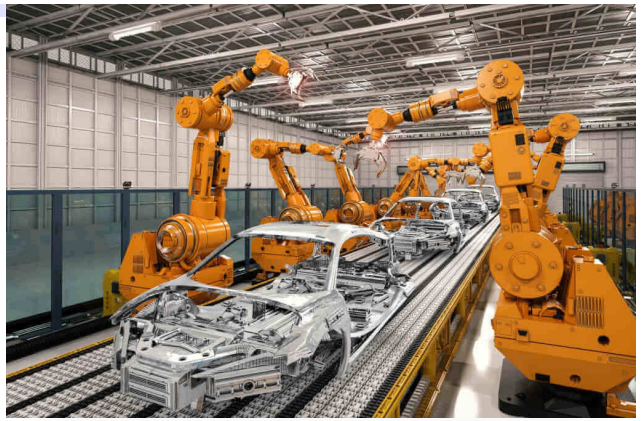
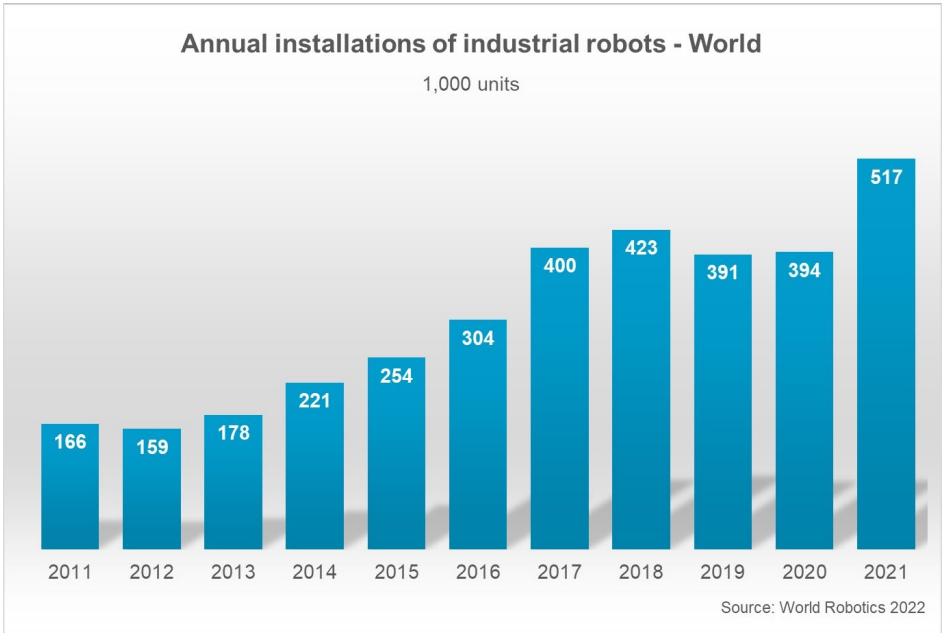
Robotics

- A **robot** is
  - A mechatronic system for interacting with the environment
  - An actuation system for the motion
  - A sensing system for acquiring and processing information on itself and on the environment
  - A control/AI system for programming and controlling its behavior

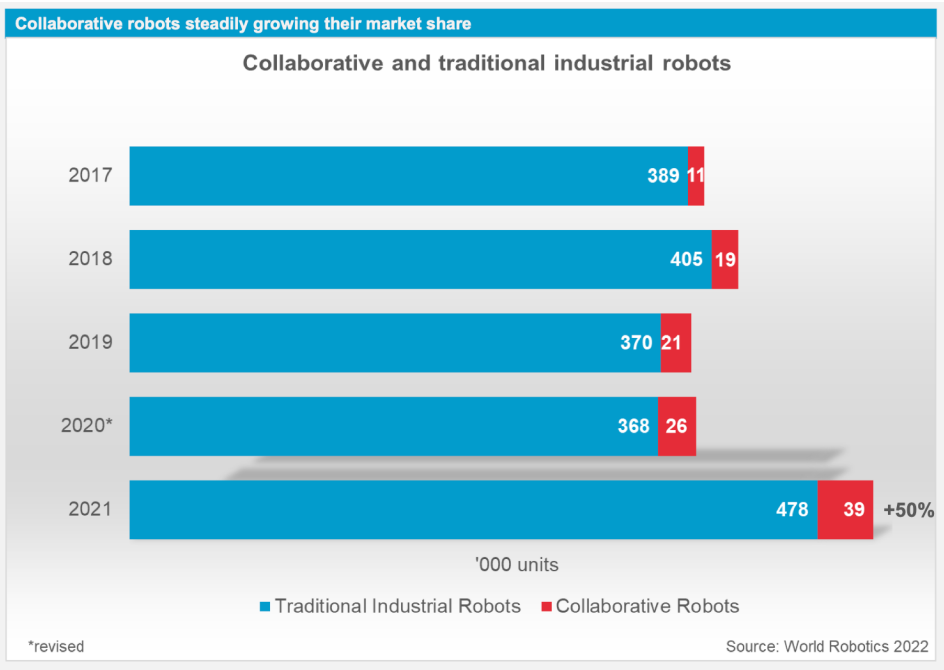
- A robot is a **complex system** embedding many technologies





A fast growing technology

Human-robot collaboration is the new trend for solving complex tasks



Goal of the Course

- Give a solid understanding of robotics and of its applications, with a special emphasis on industrial and collaborative robotics
- Provide a solid background on kinematic and dynamic modeling of robotic systems, including the role of the actuation architecture.
- Illustrate the main strategies for planning and controlling the motion of robotic arms and of mobile robots
- Provide the main tools for controlling the interaction of the robot with the human and with the environment
- Illustrate the regulations and the risk assessment strategies for setting up a collaborative robotic system

Exams

- The exam consists of an oral part and of the presentation of a report relative to a project.
  - The project (30% of the final grade) is about a control application of a robot. The project is assigned during the course. It is necessary to write a short report describing the choices made for solving the problem.
  - The oral part (70% of the final grade) consists of questions on the course program
  - The overall exam will last about 25 minutes.
- During the teaching break, there will be an intermediate exam on the topics addressed in the first part of the course.
  - The intermediate exam will last around 20 minutes.

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