

A15: Autonomous Robots

The main aim of robotics is to build intelligent machines that are able to perceive and even model the state of the dynamic environment in which they operate and act with reference to that information. This is how we define the basic control loop that raises a number of challenges to disciplines such as Electronics, Mechanics, Applied Mathematics and, especially, Computer Science, in particular, Artificial Intelligence. In the module, we will study and apply several methods of control, coordination and communication of autonomous mobile robots that use specific tools as a base together with techniques of Artificial Intelligence. These can be summarised as methods based on artificial neural networks, evolutionary techniques and genetic algorithms, fuzzy logic, reinforcement learning, and paradigms of coordination models that use multi-agent systems. As a final aim, we study and provide solutions for mobile robots with wheels, articulated, modular, aerial, and also for multi-robot systems consisting of teams of robots with the previously listed characteristics.