Artificial Intelligence applied to Robotics

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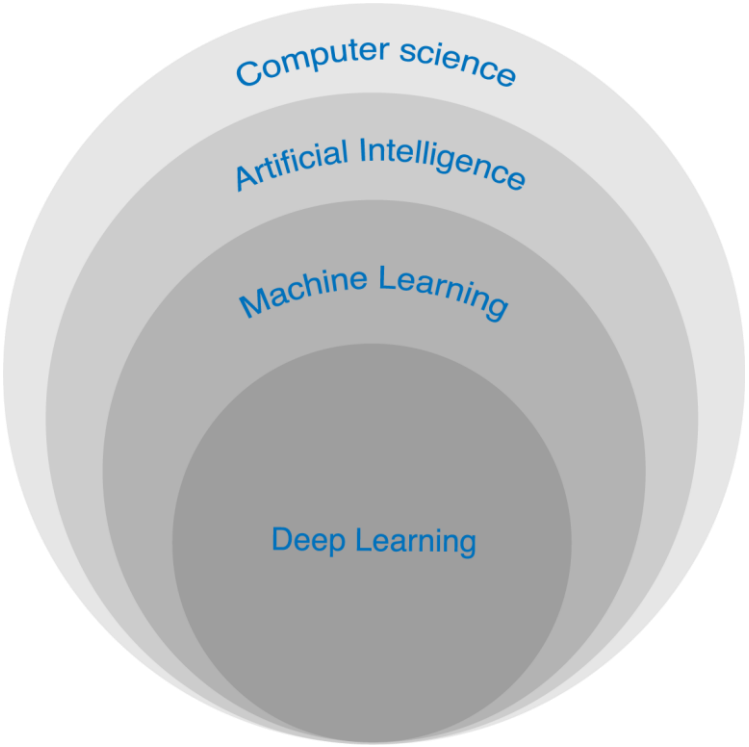
ARTIFICIAL INTELLIGENCE

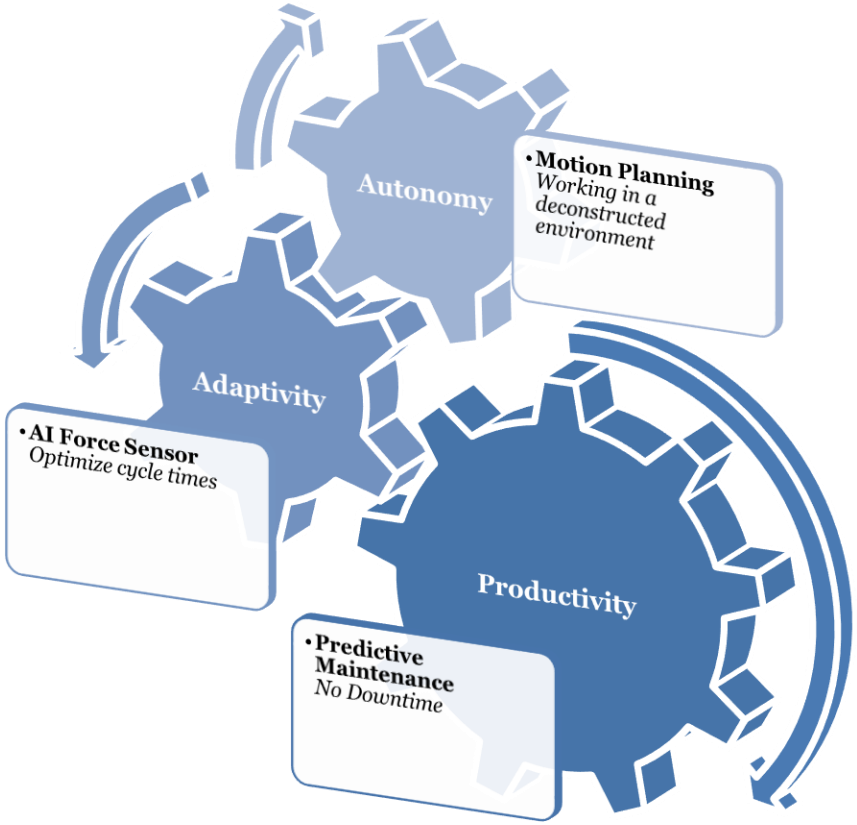


ARTIFICIAL INTELLIGENCE

«Artificial Intelligence is the branch of computer science that studies the development of hardware and software systems with typical human capabilities and capable of autonomously pursuing a defined purpose by making decisions that, until then, were usually entrusted to humans. The typical abilities of the human being specifically concern the understanding and processing of natural language and images, learning, reasoning and planning and interaction skills with people, machines and the environment.»

Source: Osservatorio Artificial Intelligence –Politecnico di Milano

A.I. APPLIED TO ROBOTICS

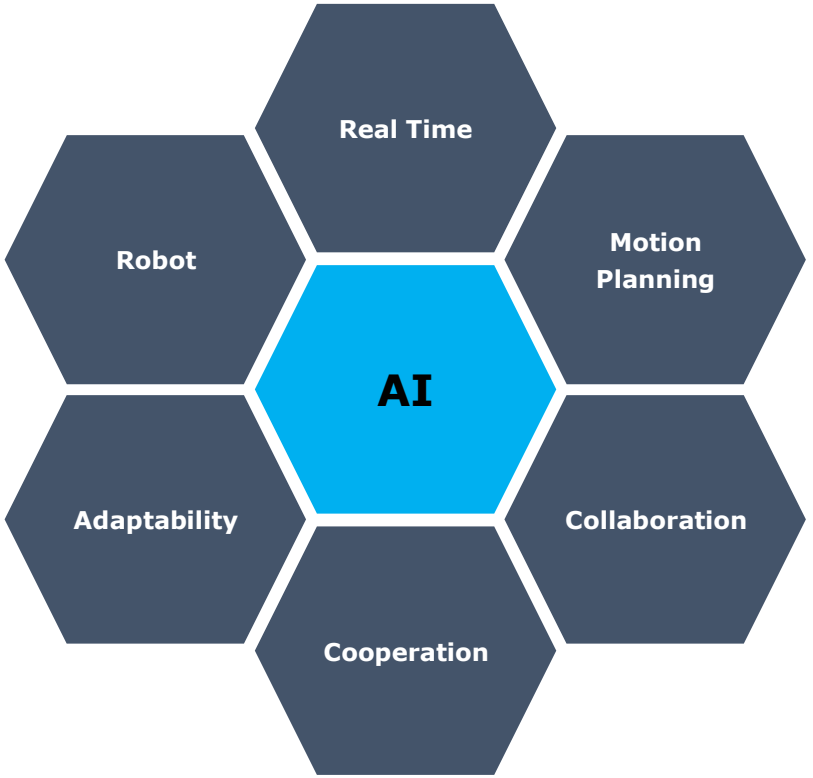


AUTONOMY
MOTION PLANNING

Robot Motion Planning interprets the concept of **artificial intelligence** and represents a solution capable of calculating and determining in **real time** the optimal path to reach the desired position, avoiding any obstacle along the path.

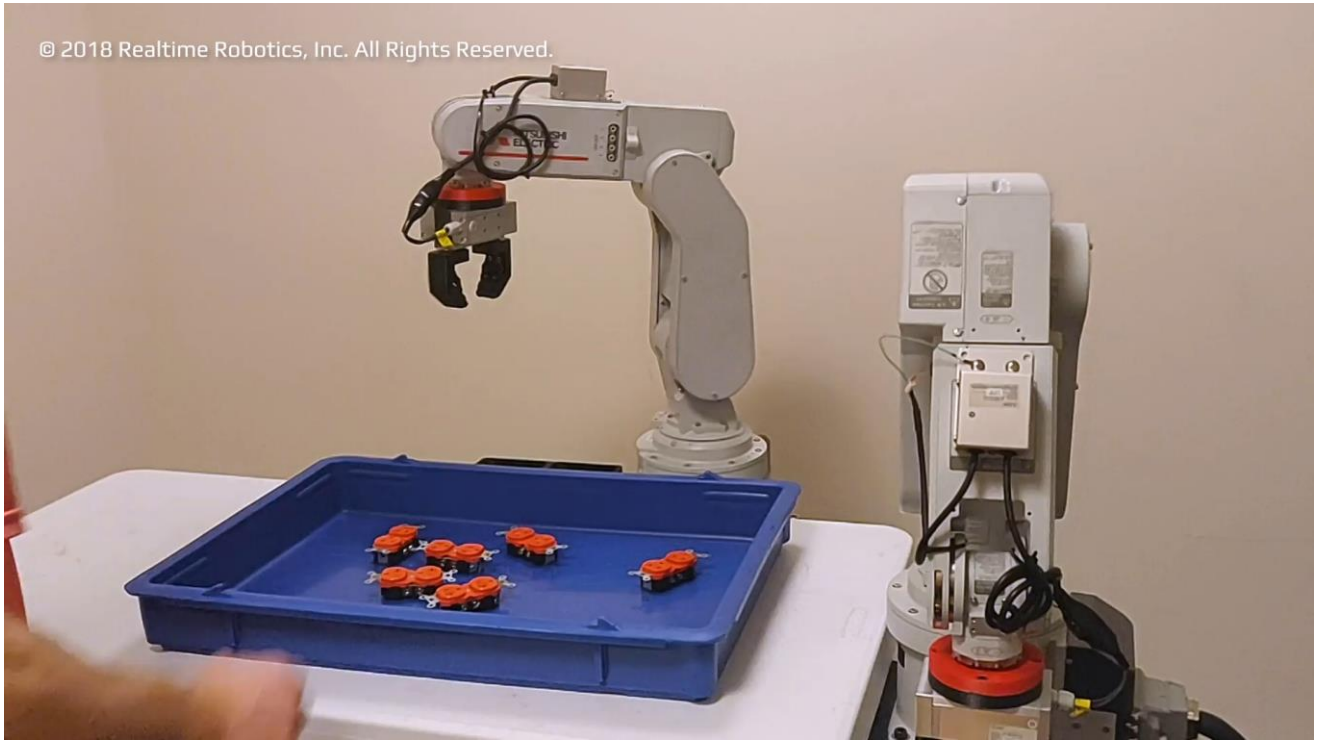
AI algorithms guarantee:

- **Adaptability:** the robot adapts itself to changes in the surrounding environment, allowing the operator to work in a deconstructed environment.
- **Cooperation:** allows multiple robots to work simultaneously, avoiding potential collisions.
- **Collaboration:** allows the robot to work at maximum speed in the absence of obstacles, preserving the productivity of the line.



AUTONOMY

MOTION PLANNING



PRODUCTIVITY

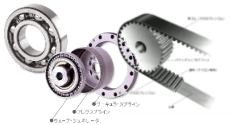
PREDICTIVE MAINTENANCE

Machine Learning: *"The art of extracting knowledge from data"*

The model is based on the data relating to the **real absortion** of the motors, taking into account parameters such as: *speed, accelleration and load status*.

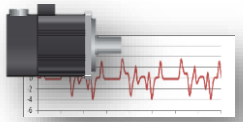
PRODUCTIVITY

PREDICTIVE MAINTENANCE



Parts lifetime model

Dynamic model digital twin



Drive Data

Consumption Degree

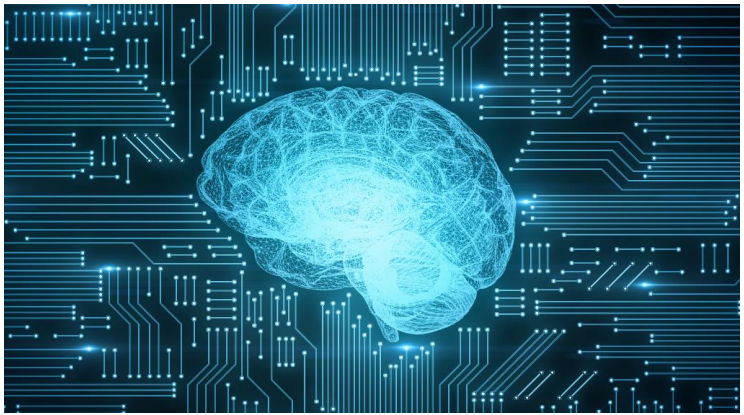
Maintenance Simulation

Abnormality detection

ADAPTIVITY

A.I. FORCE SENSOR

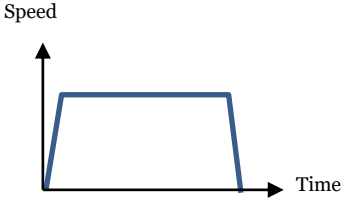
The new functions of **A.I.** make the **force sensor** an *intelligent* tool, able to **adapt** in real time to the different conditions of the application, improving the efficiency of operations.

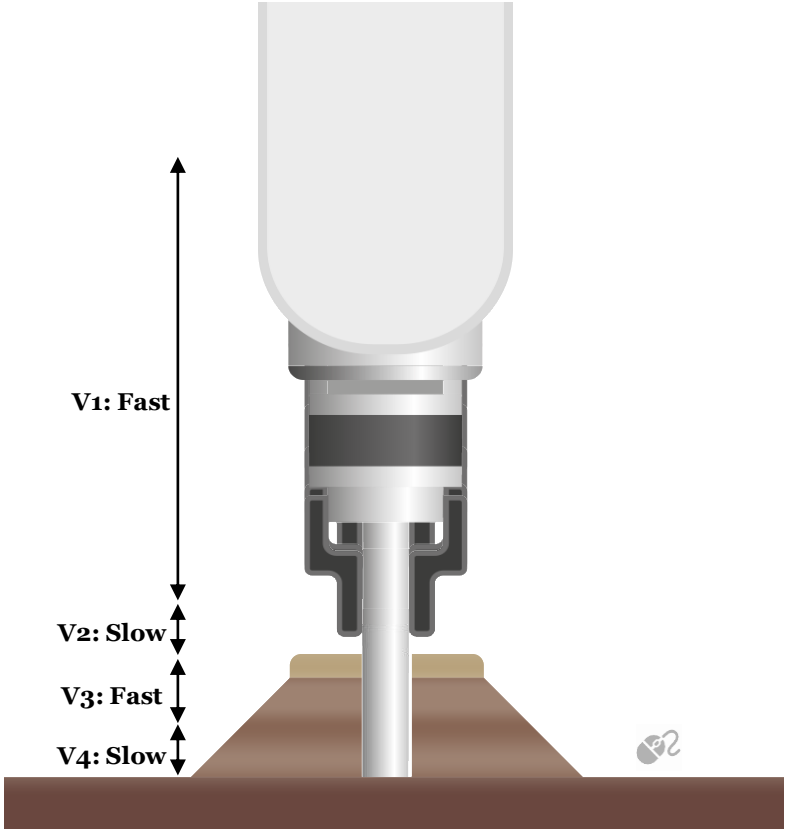


ADAPTIVITY

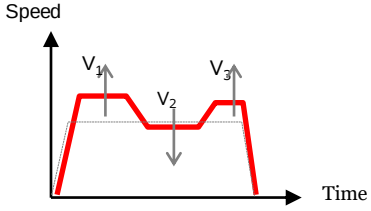
A.I. FORCE SENSOR

Conventional Speed Control





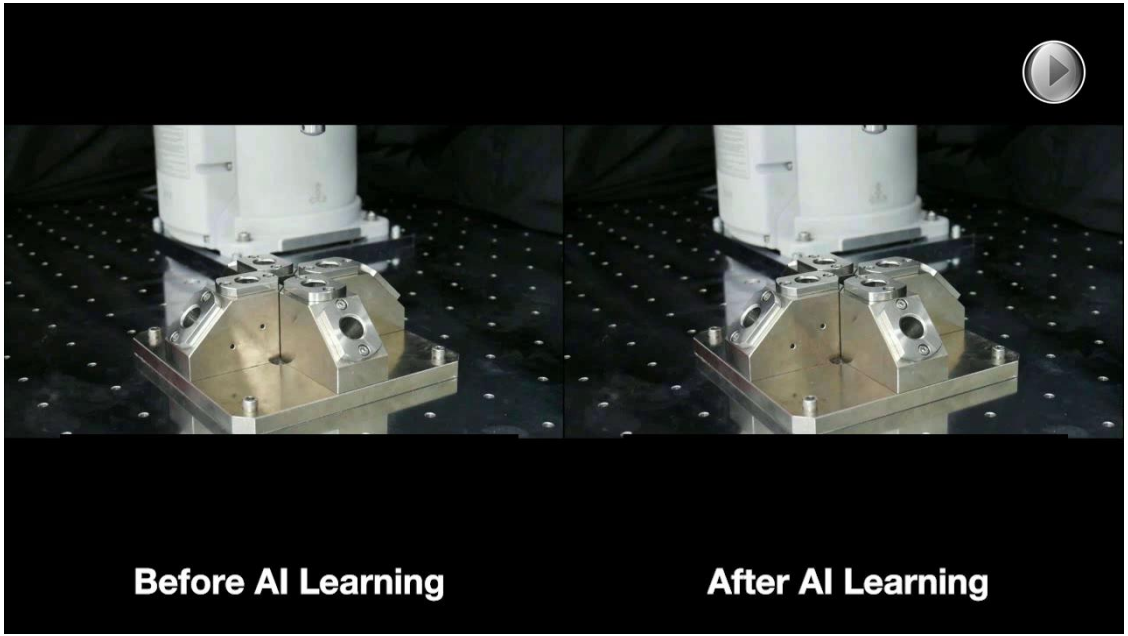
Optimized Speed Control



ADAPTIVITY

A.I. FORCE SENSOR

Deep Learning performs an "end-to-end learning", in which a network automatically learns how to process data and perform an operation, improving the performance of the entire process.



Thanks for attention