
High-power
hydraulic
upper
body
High-mobility
tracked "leg"
base
Dynamic
Balance
Behavior
on all
lower
joints

Capek and his Robots

The term "Robot" can be traced back to Karel Capek's play "R.U.R. Rossum's universal robots" (in 1921)
that comes from the Czech word for "corvee".

A brief History of Robots

Robotics are based on two *enabling technologies*: Telemanipulators and the ability of numerical control of machines.

Telemanipulators are remotely controlled machines which usually consist of an arm and a gripper. The movements of arm and gripper follow the instructions the human gives through his control device. First telemanipulators have been used to deal with radio-active material.

Numeric control allows to control machines very precisely in relation to a given coordinate system. It was first used in 1952 at the MIT and lead to the first programming language for machines (called APT: Automatic Programmed Tools).

The combination of both of these techniques lead to the first programmable telemanipulator. The first industrial robot using these principle was installed in 1961. These are the robots one knows from industrial facilities like car construction plants.

The development of *mobile robots* was driven by the desire to automate transportation in production processes and autonomous transport systems. The former lead to driver-less transport systems used on factory floors to move objects to different points in the production process in the late seventies. New forms of mobile robots have been constructed lately like insectoid robots with many legs modeled after examples nature gave us or autonomous robots for underwater usage.
Since a few years wheel-driven robots are commercially marketed and used for services like "Get and Bring" (for example in hospitals).

Definition: What is a Robot?

Robots are physical agents that perform tasks by manipulating the physical world. They are equipped

with
sensors to perceive their environment and effectors to assert physical forces on it (covered in more detail
in next section). As mentioned before Robots can be put into three main categories: manipulators, mobile
robots and humanoid robots.

Robotics and AI

Artificial intelligence is a theory. The base object is the *agent* who is the "actor". It is realized in
software.
Robots are manufactured as hardware. The connection between those two is that the control of the robot is
a software agent that reads data from the sensors, decides what to do next and then directs the effectors to
act in the physical world.