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ROBOTICS

Robotics is the engineering science and technology of robots, and their design, manufacture, application, and structural disposition. Robotics is related to electronics, mechanics, and software. The word "robot" was introduced to the public by Czech writer Karel Čapek in his play R.U.R. (Rossum's Universal Robots), published in 1920. The word "robot" comes from the word "robota", meaning, in Czech, "forced labour, drudgery". The term "robotics" was coined by Isaac Asimov in his 1941 science fiction short-story "Liar!" Stories of artificial helpers and companions and attempts to create them have a long history.

In 1927, the Maschinenmensch (“machine-human”), a gynoid humanoid robot, also called "Parody", "Futura", "Robotrix", or the "Maria impersonator" (played by German actress Brigitte Helm), the first and perhaps the most memorable depiction of a robot ever to appear on film, was depicted in Fritz Lang's film Metropolis.

In 1942, Isaac Asimov formulated the Three Laws of Robotics, and in the process of doing so, coined the word "robotics".

In 1948, Norbert Weiner formulated the principles of cybernetics, the basis of practical robotics.

Fully autonomous robots only appeared in the second half of the 20th century. The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal from a die casting machine and stack them. Today, commercial and industrial robots are in widespread use performing jobs more cheaply or more accurately and reliably than humans. They are also employed in jobs which are too dirty, dangerous, or dull to be suitable for humans. Robots are widely used in manufacturing, assembly, and packing; transport; earth and space exploration; surgery; weaponry; laboratory research; safety; and mass production of consumer and industrial goods.

The structure of a robot is usually mostly mechanical and can be called a kinematic chain (its functionality being similar to the skeleton of the human body). The chain is formed of links (its bones), actuators (its muscles), and joints which can allow one or more degrees of freedom. Most contemporary robots use open serial chains in which each link connects the one before to the one after it. These robots are called serial robots and often resemble the human arm. Some robots, such as the Stewart platform, use a closed parallel kinematical chain. Other structures, such as those that mimic the mechanical structure of humans, various animals, and insects, are comparatively rare. However, the development and use of such structures in robots is an active area of research (e.g. biomechanics). Robots used as manipulators have an end effector mounted on the last link. This end effector can be anything from a welding device to a mechanical hand used to manipulate the environment.