

Robots and manipulators

We live in a world of natural, technological, social and other hazards, which often threaten our health and life. Every day newspapers, radio and television tell us about the latest accidents, catastrophes or disasters because of which people are killed or injured.[5]

The existence of different environments, potentially dangerous to human beings, identified the need to develop vehicles suitable for remote handling and controlled by a human operator, located in a secure environment.[1]

The concept of creating machines that can operate autonomously dates back to classical times but research into functionality and potential uses of robots did not grow substantially until the 20th century. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes, whether domestically, commercially, or militarily. Many robots are built to do jobs that are hazardous to people such as defusing bombs, finding survivors in unstable ruins, and exploring mines and shipwrecks.

In robotics a manipulator is a device used to manipulate materials without direct contact.

The applications were originally for dealing with radioactive and hazardous materials, using robotic arms, or they were used in inaccessible places. In more recent developments they have been used in applications such as robotically-assisted surgery and in space. It is an arm-like mechanism that consists of a series of segments, usually sliding or jointed, which grasp and move objects with a number of degrees of freedom. It is an arm-like mechanism that consists of a series of segments, usually sliding or jointed, which grasp and move objects with a number of degrees of freedom.[3]

In industrial ergonomics a manipulator is a lift assist device used to help workers to lift, to maneuver and to place articles in process that are too heavy, too hot, too large or otherwise too difficult for a single worker to manually handle. As opposed to simply vertical lift assists (cranes, hoists, etc.) manipulators have the ability to reach in to tight spaces and remove workpieces. A good example would be removing large stamped parts from a press and placing them in a rack or similar dunnage.

Additionally, manipulator tooling gives the lift assist the ability to pitch, roll, or spin the part for appropriate placement. An example would be removing a part from a press in the horizontal and then pitching it up for vertical placement in a rack or rolling a part over for exposing the back of the part.

Remotely controlled manipulators are classified according to the type of management systems: command control, copier control, with semi-automatic control.

Command control is characterized by the fact that a human operates by pressing different buttons or activates different triggers starting up drives of manipulator according to different degrees of its mobility, thus achieving the desired final position by switching on each drive by turns of all the manipulation mechanism.

Copying control is characterized in that a human operator is working with a pushing device kinematically completely similar to manipulators. Wherein each hinge of the pushing device is connected on the principle of the tracking system with the appropriate joint working manipulator.

The copying system monitoring can be carried out either directly visually or at a distance with the help of television system.

A robot is a mechanical or virtual artificial agent, usually an electro-mechanical machine that is guided by a computer program or electronic circuitry.[2]

There are three different types of robotic programs: remote control, artificial intelligence and hybrid.

A robot with remote control programming has a preexisting set of commands that it will only perform if and when it receives a signal from a control source.

Robots that use artificial intelligence interact with their environment on their own without a control source.

Hybrid is a form of programming that incorporates both AI and RC functions.[1]

Robots have replaced humans in performing repetitive and dangerous tasks which humans prefer not to do, or are unable to do because of size limitations, or which take place in extreme environments such as outer space or the bottom of the sea.

There are concerns about the increasing use of robots and their role in society. Robots are blamed for rising unemployment as they replace workers in increasing numbers of functions. The use of robots in military combat raises ethical concerns.



Robot Tmsuk T-52 Enryu “was born” in 2004, its name is translated from Japanese as "dragon-saver." It is worth noting that this metaphor quite accurately reflects the characteristics of the machine: the large size and purpose

to participate in rescue missions. The robot can lift and remove the debris of buildings and thus help to find people under the rubble.



A robotic hose Anna Konda is used to help firefighters. Robot's length is 3 meters, and weight - 70 kg. It is connected to the traditional fire hose and can "crawl" with it on the tail to reach areas difficult of access in a burning building, enter through cracks or floor decks, wherever fire fighters do not get.



EMILY Robot (EMergency Integrated Lifesaving lanYard), developed by employees of the company Hydronix, is an autonomous swimming device that can independently detect a drowning man, and quickly rush to the rescue. For this purpose it is provided with sonar and acoustic sensors. It is also important that the robot is equipped with

a camera, speakers and microphone. This allows the coastal rescue service to be in contact with the person who needs help.[5]



The Shuttle Remote Manipulator System (SRMS), is a series of robotic arms that were used on the Space Shuttle orbiters to deploy, maneuver and capture payloads.

Robotics is still developing. And we will be able to observe its results in future.

References

1. Article Robotics (<https://en.wikipedia.org/wiki/Robotics>)
2. Article Robot (<https://en.wikipedia.org/wiki/Robot>)
3. Article Manipulator (<https://en.wikipedia.org/wiki/Manipulator>)
4. Lecture Remotely controlled robots and manipulators

5. Article Rescuers Robots to help people (<http://robotics.com.ua/>)
6. Article Shuttle Remote Manipulator System (SRMS)
(<https://en.wikipedia.org/wiki/Canadarm>)