**ROBOTICS**

**Robotics** is an [interdisciplinary](https://en.wikipedia.org/wiki/Interdisciplinarity) field that integrates [computer science](https://en.wikipedia.org/wiki/Computer_science) and [engineering](https://en.wikipedia.org/wiki/Engineering).[[1]](https://en.wikipedia.org/wiki/Robotics#cite_note-1) Robotics involves design, construction, operation, and use of [robots](https://en.wikipedia.org/wiki/Robot). The goal of robotics is to design machines that can help and assist humans. Robotics integrates fields of [mechanical engineering](https://en.wikipedia.org/wiki/Mechanical_engineering), [electrical engineering](https://en.wikipedia.org/wiki/Electrical_engineering), [information engineering](https://en.wikipedia.org/wiki/Information_engineering_(field)), [mechatronics](https://en.wikipedia.org/wiki/Mechatronics" \o "Mechatronics), [electronics](https://en.wikipedia.org/wiki/Electronics), [bioengineering](https://en.wikipedia.org/wiki/Bioengineering), [computer engineering](https://en.wikipedia.org/wiki/Computer_engineering), [control engineering](https://en.wikipedia.org/wiki/Control_engineering), [software engineering](https://en.wikipedia.org/wiki/Software_engineering), mathematics, among others.

Robotics develops machines that can substitute for humans and replicate human actions. Robots can be used in many situations for many purposes, but today many are used in dangerous environments (including inspection of radioactive materials, [bomb detection](https://en.wikipedia.org/wiki/Bomb_detection) and [deactivation](https://en.wikipedia.org/wiki/Bomb_disposal)), manufacturing processes, or where humans cannot survive (e.g. in space, underwater, in high heat, and clean up and containment of hazardous materials and radiation). Robots can take on any form, but some are made to resemble humans in appearance. This is claimed to help in the acceptance of robots in certain replicative behaviors which are usually performed by people. Such robots attempt to replicate walking, lifting, speech, cognition, or any other human activity. Many of today's robots are inspired by nature, contributing to the field of [bio-inspired robotics](https://en.wikipedia.org/wiki/Bio-inspired_robotics).

Certain robots require user input to operate while other robots function autonomously. The concept of creating robots that can operate [autonomously](https://en.wikipedia.org/wiki/Autonomous_robot) dates back to [classical times](https://en.wikipedia.org/wiki/Classical_times), but research into the functionality and potential uses of robots did not grow substantially until the 20th century. Throughout history, it has been frequently assumed by various scholars, inventors, engineers, and technicians that robots will one day be able to mimic human behavior and manage tasks in a human-like fashion. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes, whether [domestically](https://en.wikipedia.org/wiki/Domestic_robot), [commercially](https://en.wikipedia.org/wiki/Industrial_robot), or [militarily](https://en.wikipedia.org/wiki/Military_robot). 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. Robotics is also used in [STEM](https://en.wikipedia.org/wiki/Science,_technology,_engineering,_and_mathematics) (science, [technology](https://en.wikipedia.org/wiki/Technology), [engineering](https://en.wikipedia.org/wiki/Engineering), and [mathematics](https://en.wikipedia.org/wiki/Mathematics)) as a teaching aid.

**Robotics in daily life:-**

The word “robot” conjures up images of famous Hollywood humanoid characters, but robots are mostly undramatic mechanical devices programmed to perform specific repetitive functions. They are used routinely to carry out many tasks that people don’t want to do because such jobs are boring, dirty or dangerous. Robots can also be programmed to carry out some tasks that are too complex for humans. They are broadly classified as industrial and have multiple uses from robots that weld parts on auto assembly lines to robots that interact with humans in the service industry. Though you may not feel like you are dealing with a robot, using the self checkout lane at the grocery store or purchasing tickets from a kiosk at the movies involves interacting with service robots. Robots most obviously impact everyday life in the service capacity.

## Education

Children are a major market for service robots. An early childhood education center in San Diego, California employs a robot as a teacher's assistant. The robot teaches the kids to sing and can help them to sound out words. Robotic toys are readily available for children of all ages and can help kids start to think about how things work from an early age.

## Protection

Another robot, called Spykee, is Wi-Fi friendly. Controlled through the Internet, it can be made to watch, hear, monitor and speak on demand. It takes pictures, records videos, makes phone calls and protects the family home through video surveillance.

## Around the home

Called the vacuum cleaner with a brain, Dyson’s Robotic Cleaner memorizes the complete layout of a house and covers every area of every room, making up to 10 decisions per second. Meanwhile, in the yard, another robot is simultaneously cutting and mulching the grass, while a third is cleaning the pool, checking the chemical mix of the water and calculating the life left in the filters.

**Robotics in industries**

**The** vast majority of robots in use today perform labor tasks for humans. The first robots created were used to produce ashtrays, according to the Tech Museum of Innovation. NASA’s Rover Ranch website mentions that robots that perform industrial tasks often do jobs that are either too dangerous or too hard for humans to do.

Automotive factories use robots to cut and assemble parts. With space exploration, scientists send robots to explore the surfaces of the moon or planets like Mars, while other robots go into space to repair space equipment. In the medical field, a robot might be used to perform surgery that is too delicate for a surgeon’s hands to perform or as an aid in regular surgeries such as coronary artery bypasses.

* **Health Care**

Advances in robotics have the potential to change a wide variety of health care practices, such as surgery, rehabilitation, therapy, patient companionship, and everyday activities. Robotic instruments used in health care are not designed to take over the duties of health care professionals, but rather to make their work easier.

The da Vinci Surgical System, for example, utilizes the hand movements of the operating surgeon to control tiny, precise instruments inside the patient’s body. This allows for minimally invasive procedures in surgeries such as cardiac, colorectal, gynecologic, head and neck, thoracic, and urologic.

For patients who have suffered strokes or spinal cord injuries, or who are paralyzed, robotic devices such as exoskeletons have the ability to assist and guide them during rehabilitation. In addition, robotic lifting machines can help nurses lift patients who are elderly or immobile. Companion and therapeutic robots such as Paro can also comfort patients with mental health issues with a system of sensors, microphones, and cameras.

* **Agriculture**

To help increase productivity while lowering overall costs, the agriculture industry has been actively working to adopt different forms of robotic technology. Farmers have already been using tractors and harvesters that are self-guided by GPS. Recently, there has been a rise in the experimental use of autonomous systems that automate operations like pruning, thinning, mowing, spraying, and weed removal. Sensor technology is also being utilized to manage pests and diseases that affect crops.

* **Manufacturing**

Robotics are being used in many aspects of manufacturing to help increase productivity and efficiency while lowering production costs. Similar to the health care industry, many robots in manufacturing collaborate with workers to perform repetitive, monotonous, or intricate tasks under the worker’s guidance and control. With these machines, precision is valued more than speed, as is the ability to be reprogrammed for specific tasks of different sizes and complexities. Robotic manufacturing technology is also becoming safer to operate. Cameras, sensors, and automatic shut-off capabilities enable robots to sense and stay clear of humans in the workplace.

**References**

1. W. D. Smart, “Is a common middleware for robotics possible?” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop on Measures and Procedures for the Evaluation of Robot Architectures and Middleware (IROS '07)*, E. Prassler, K. Nilsson, and A. Shakhimardanov, Eds., 2007.View at: [Google Scholar](https://scholar.google.com/scholar_lookup?title=Is%20a%20common%20middleware%20for%20robotics%20possible?&author=W.%20D.%20Smart)
2. J. Kramer and M. Scheutz, “Development environments for autonomous mobile robots: a survey,” *Autonomous Robots*, vol. 22, no. 2, pp. 101–132, 2007.View at: [Publisher Site](https://doi.org/10.1007/s10514-006-9013-8) | [Google Scholar](https://scholar.google.com/scholar_lookup?title=Development%20environments%20for%20autonomous%20mobile%20robots:%20a%20survey&author=J.%20Kramer%20&author=M.%20Scheutz&publication_year=2007)
3. N. Mohamed, J. Al-Jaroodi, and I. Jawhar, “Middleware for robotics: a survey,” in *Proceedings of the IEEE International Conference on Robotics, Automation and Mechatronics (RAM '08)*, pp. 736–742, September 2008.View at: [Publisher Site](https://doi.org/10.1109/RAMECH.2008.4681485) | [Google Scholar](https://scholar.google.com/scholar_lookup?title=Middleware%20for%20robotics:%20a%20survey&author=N.%20Mohamed&author=J.%20Al-Jaroodi&author=&author=I.%20Jawhar)
4. N. Mohamed, J. Al-Jaroodi, and I. Jawhar, “A review of middleware for networked robots,” *International Journal of Computer Science and Network Security*, vol. 9, no. 5, pp. 139–148, 2009.View at: [Google Scholar](https://scholar.google.com/scholar_lookup?title=A%20review%20of%20middleware%20for%20networked%20robots&author=N.%20Mohamed&author=J.%20Al-Jaroodi&author=&author=I.%20Jawhar&publication_year=2009)