

IT - Technologies Robotics

What does it do?

Robotic technologies also known as mechatronics is the combination of Artificial Intelligence and mechanics to create autonomous machines that can fulfill a role or specific sub-function. A robot is defined as being an intelligent, physically embodied machine capable of performing tasks autonomously to some degree while also being able to sense and manipulate its environment. (Simon, 2020)

Our use of robots in society has become widespread amongst many facets of industry, manufacturing, agriculture, commercial enterprise, in the home, and even in space exploration. (Dimock, 2020) (NASA, 2022) (Rawat, 2022) For example modern car manufacturing production lines(Simon, 2020) utilize robotic arms for lifting, drilling cutting, welding as well as assembly. In addition to this CNC machines have allow for the mass production of components greatly improving the speed at which manufacturing takes place.

The automotive industry has also made advancements in vehicle safety with the use of robotics. It has achieved this by utilizing systems such as ABS (Anti-Lock Braking Systems) which detects when the wheels are turning faster and adjusts the rate of braking along with other systems such as lane assist and collision detection and airbags. Future technology is also moving towards self-driving cars, which take away the human error with the goal of making roads safer and less congested. (Dimock, 2020)

In the home robotic technologies have been developed to assist with everyday domestic tasks such as Roombas, baby monitors, smart wiring and Intelligent washing machines which can detect how much water is needed for a given load and then send you a SMS alert when it's time to change the load. As well as host of other recreational devices. (Dimock, 2020)

Many advancements in robotics have been made in the field of space exploration since its inception in 1958, (whyweexplore) one of which is NASA's (North Atlantic Space Association) Curiosity A Rover which is capable of autonomous movement, operation as it collects samples and data and analyses the raw material as data to send back to earth for scientists for further analyses.

Robots such as the humanoid-like Sophia, have also been developed, that can learn from and adapt from interactions with people. (Dimock, 2020) Sophia is capable of operating similar to how a human would function, with her ability to control a working mouth and limbs by sending power to various motors in her body mimicking a human nervous system. The robotics company SynTouch (Simon, 2020) has also made major developments in the field by creating robotic fingers for prosthetics and robots similar to Sophia. These fingers are capable of detecting a range of sensations from temperature to coarseness. This development adds a new dimension to how robots can interact with the wider world and improves the quality of life for those using robotic prosthetics. These prosthetics have also undergone developments to utilize sensors attached to muscles in the arm to allow the wearer of the prosthetic to be able to move the fingers like a second hand improving the quality of life for those with prosthetics. (Dimock, April 2020)

One amazing development being made in the robotics domain is the introduction of the Consis Robotic Cabinet (Rus, 2022), an automated shelf in pharmacies that can stock and dispense products. Robots like this can automate the shelf stocking of supermarkets down the line and fully automate the shopping experience.

Future and near future advancements in robotics technology will allow for hardware to be miniaturized, improving affordability and accessibility to a broader market. Modularization would allow for engineers to create self-contained components compatible with a standard framework, allowing customization to meet the specific needs of the owner. Autonomous Devices describe robots that can examine their environment and making changes on the fly to be able to adapt and regulate themselves to maintain peak performance. (ECPI University, 2022)

To summarize, robotics has been utilized to advance most aspects of society. It has potential to improve the automation, efficiency and safety in most sectors. Robots are also designed with human senses in mind. Robotic technology is the automation of previously impossible, dangerous or mundane tasks, with the goal to create a more efficient and practical society. The technology used also helps to raise the quality of life in households by making mundane tasks more efficient, and also speed the production and expansion of industries. The technology also enables scientific fields to spread beyond the scope of what is currently possible.

What is the likely impact?

The primary impact of advancements in the field of robotics is efficiency through automation. Robotics can allow society to do more things with far less effort and time.

Robots have the potential to increase efficiency in building sites and manufacturing facilities. Replacing labor intensive projects with automated systems using robotics, increasing output and reducing risk. This improves safety for workers by reducing manual handling and risks associated with accessing dangerous environments. On the whole, replacing humans with robots and robotics in high risk scenarios will significantly improve safety outcomes in these industries.

(DJ Wardynski, 2020)

The impacts of robotics on the field of science and discovery, allows scientists to explore previously inaccessible locations such as the deep ocean and outer-space where environmental conditions prevent traditional methods of exploration. (Peter, 2013)

Robotics, in general, can also meaningfully improve day-to-day life, with a broad range of tasks being completed by devices designed specifically for the application. These tasks may be highly complex, with self-driving cars an example of a complex and dynamic. These advancements can drastically improve the general quality of life for society by reducing the time spent on menial tasks, allowing for greater productivity and additional recreation time.

However there is a major moral dilemma associated with robotics and the automation of our future. There is a potential for a robot to make decisions based on its programming that can lead to highly unethical or even potentially fatal decisions. This development is doubly problematic when it's considered that the logic is often cold and not influenced by other more human factors such as empathy and human emotion. The risk of this issue is compounded when using robotics in warfare, specifically robotics coupled with artificial intelligence. In the battlespace decisions need to be made quickly, with rapid acquisition of new information there is a potential for cold logic to make catastrophic choices given that it is unable to take context or nuance into consideration this could lead to the mass loss of human life. (DJ Wardynski, 2020) (Kenna Castleberry, 2021)

Another major moral dilemma concerns the usage of robots in low-skill jobs. Such as manufacturing plants and mines. These fields are in demand and also dangerous for people to work in. The reduction of these jobs in these fields increases the necessity for higher education. For members of society to find adequately paying jobs in an era where the cost of living is being raised, where education, on the whole, is gatekept by opportunity and/or monetary cost to the potential student. The impact of the automation and loss of jobs such as these could lead to a greater amount of people living in poverty. (DJ Wardynski, 2020) (Kenna Castleberry, 2021)

In conclusion, the advancements in robotics will lead to a safer and possibly more efficient society, one where we would also need to take on a greater range of challenges associated with the social and moral implications of the rapid integration of robotic technologies in our daily lives.

How will this affect you? In your daily life, how will this affect you? What will be different for you?

How might this affect members of your family or your friends?

Personally the field of robotics would add to my general quality of life in both major and minor ways. I can use developments in robotics to remove more tedious chores in my life like mowing the lawns and vacuuming.

This can allow me to use my free time for more rest and relaxation. Career wise, the expansion of robotics will not directly influence my current career path in a meaningful timeframe. The skill required to fulfil specific functions in hospitality is unachievable by robots at the current moment. Robotics are currently incapable of creating barista level coffees at this moment and still require a human element to operate.

Self-driving cars will cause my commute to be affected because I will no longer have to drive, being able to turn on "self-drive mode" while driving will allow for more rest and relaxation on daily my commute.

With self-driving cars becoming feasible this may affect the laws regarding who can drive, this development can affect families in a way that much younger or much older people and disabled can now "drive" a self-driving car now this will have the effect of allowing better transportation for those age groups.

My friends will be affected in such a way that I can now contact them while there “driving” their self-driving car and vice versa, this will allow for better communication.

With the advancement of robotics I could potentially have a lot more variety with what I consume at home because I may no longer have to spend time preparing meals this can allow me to consume more healthy food which in the long run allow for a more healthy life style.

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