M. Yerin & O.Chorny, Students
Y. Murevych, language advisor
Berdychiv College of Industry, Economics and Law

ROBOTICS ENGINEERING

The development of science has its roots in ancient times. People researched and explored everything around them. Modern science is quite well-developed and one of the main directions of its development is the study of IT sphere, in particular robots and robotics.

Robots are used in various applications. There are many jobs which humans would rather leave to robots. The job may be boring, such as domestic cleaning, or dangerous, such as exploring inside a volcano.

Today's robots assist in high precision surgeries such as brain and heart surgery. They are also used to test quality control in pharmaceuticals.

A lot of people consider robots to be dangerous. The best example of what may happen if robots become uncontrollable is the movie "Terminator". But other people consider them to be very useful and safe. The main supporter of this idea is Isaac Asimov. He is a science fiction writer who is considered to be one of the fathers of robotics. In one of his most famous series, made of 38 short stories and 5 novels, Asimov built a universe and unified history promoting the themes of the interaction of humans, robots, and morality. Starting with "I, Robot" in 1950, the series would see the birth of two important concepts: positronic robots and robotics. Indeed, the Oxford English Dictionary credits Asimov for inventing both these words. While the Robot word originated from the Karel Čapek's play "R.U.R" in 1920, the term Robotics only appeared in 1941 in "Liar!" (published in "Astounding Science Fiction"). But not only Asimov coined the term, he also wrote the essential rules of this field of science. They are also known as the Thee Laws or Asimov's Laws. They define the ground principles for modern robotics. While being introduced in his 1942 short story "Runaround", they have been hinted at during various stories:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws

A fourth or more precisely zeroth law was added by Asimov himself later:

A robot may not harm humanity, or, by inaction, allow humanity to come to harm.

Modern definition of robotics and robots gives us Encyclopaedia Britannica: “Robotics as a science is design, construction, and use of machines (robots) to perform tasks done traditionally by human beings. Robots are widely used in such industries as automobile manufacture to perform simple repetitive tasks, and in industries where work must be performed in environments hazardous to humans. Many aspects of robotics involve artificial intelligence; robots may be equipped with the equivalent of human senses such as vision, touch, and the ability to sense temperature. Some are even capable of simple decision making, and current robotics research is geared toward devising robots with a degree of self-sufficiency that will permit mobility and decision-

making in an unstructured environment. Today's industrial robots do not resemble human beings; a robot in human form is called an android."

Today we have a separate branch of engineering, which is called robotics engineering. It is the interdisciplinary branch of engineering and science that includes mechanical engineering, electrical engineering, computer science, and others.

It deals with the design, construction, operation, and use of robots, as well as computer systems for their control, sensory feedback, and information processing.

A robotics engineer is a specialized type of engineer, also known as: automation engineer, robotics and automation engineer, automation robotics engineer.

Most robotics engineers are employed by private robot manufacturers or robot users. Some engineers work in military and space programs.

A robotics engineer is a behind-the-scenes designer, who is responsible for creating robots and robotic systems that are able to perform duties that humans are either unable or prefer not to complete.

So what are the future trends of robotics?

Toyota recently revealed T-HR3, a robot that follows the movements of a human pilot from a "remote maneuvering system."

The SnakeBot, developed at Carnegie Mellon University, may not have any digits, but it moves similarly to an actual snake and is already being used in search and rescue missions.

On the AI side of things, Sophia, built by Hanson Robotics, was given citizenship in Saudi Ariba in October 2017. Sophia is a celebrity in her own right, appearing on shows like *The Tonight Show with Jimmy Fallon.* She was interviewed by *Khaleej Times* and expressed interest in starting a family in the future, even going as far to say she'd name her daughter after herself. Not long after, she announced plans to start a crowdfund for her AI, called SingularityNET.

These advancements have worried more than a few experts, however. Founder of PayPal and CEO of Tesla, Inc., Elon Musk, tweeted his concerns about Atlas in particular, saying "in a few years, that bot will move so fast you'll need a strobe light to see it." He also suggested regulating them, similar to how we regulate food and aircrafts. Fei-Fei Li, chief scientist of AI/ML at Google Cloud, is much more optimistic, tweeting that cooperation between humans and artificial intelligence is the key to the future. She also said that, as of this moment, "we are closer to a wash machine than the Terminator."

She has a point. Ocado, an online food retailer, revealed their latest robot to the public: an oversized arm that specializes in grabbing and placing groceries. By using suction technology and a camera, the bot can identify which product to pick up and which bag to put it in. The advantage of using automaton over a human- they currently both perform at about the same speed- would be efficiency, including the ability to work 24/7 without breaks.

Similar cases of robots replacing repetitive and menial jobs have sparked debates in both the academic and economic communities. For now, though, your bagger at your local grocery store will remain flesh-and-bone. Suction works fantastic for cans and boxes, but fresh produce is easily damaged.

Nevertheless, these advancements in robotics are worth analyzing. We're getting closer to a truly automated world where robots and humans coexist (whether peacefully or not). For now, though, the fear of a robot uprising is still some ways off. It may be more pressing to worry about seeing a robot gymnast at the 2020 Olympics.

REFERENCES

https://www.britannica.com/technology/robotics
https://en.wikipedia.org/wiki/Three_Laws_of_Robotics
https://www.quora.com/What-is-robotics-engineering
https://www.robotshop.com/community/blog/show/fathers-of-robotics-isaac-asimov
http://www.thegreenbook.com/importance-of-robots-in-industries.htm
https://www.tomorrowsworldtoday.com/news/2018/04/04/the-future-of-robotics/