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A Robot for all tastes.mp3

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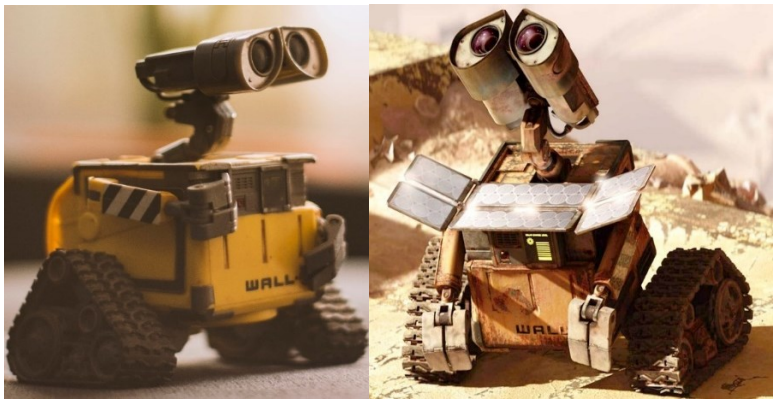
A Robot for All Tastes

Passion Led Us Here. Photo by Ian Schneider

Did you know that robotics can help you discover your passion? Robots are used in an enormous range of applications. No matter what your interests are, it is highly likely that there is an application of robotics that falls within your interests. There are applications of robotics in medicine, biology, production, space exploration, and many more areas than one could imagine. In this blog, we will discover that robotics requires a great number of skills which can allow you to learn about different areas of science and engineering.

What is a robot?

A robot is a machine that can perform multiple tasks (Hitt, 2009). The difference between robots and other machines is that a robot can be instructed to solve new problems (Social Underground, n.d.). In essence, a robot can do things for which one would need many machines by changing its set of instructions. This process of giving instructions to the robot is called programming. Have you watched Disney's Wall-E? Wall-E is a robot; it can perform a great number of tasks. If you are wondering where Wall-E gets its energy, its from the sun.


(Image) Miniature Wall-E toy (left) and Wall-E receiving solar energy (right)

What can be learned through robotics: Real-world applications of science and engineering

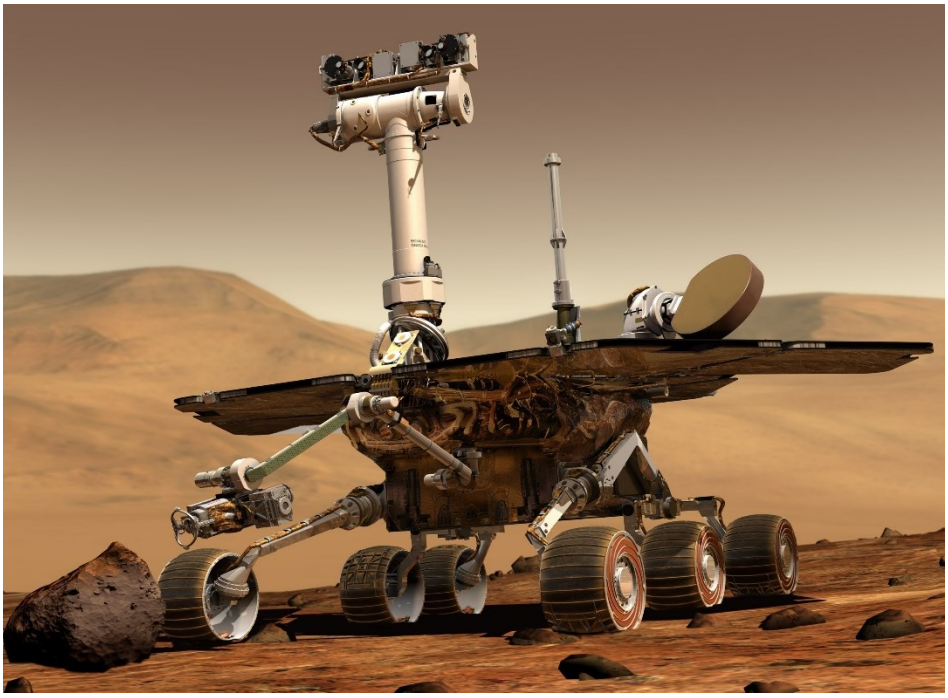
Robotics is a very broad field that requires a great variety of skills; therefore, everyone can find inspiration through robotics. The University of Campinas and the University of Sao Paulo found that the use of robotics in education stimulates learning in various disciplines (Alves et a., 2011, p. 9). This comes directly from the definition of robots. There are many tasks to get done and so there are many robots. As a result, people can use robotics to discover career paths or hobbies that may appeal to their interests or increase their passion. The technical university of Germany found out that robotics competitions can be highly successful in motivating mechatronic students (Stier, Zechel, & Beitelschmidt, 2011, p. 11). Therefore, even if students already have a career path associated with robotics, they can still find inspiration through robotics.

Another consequence of the broadness of this field is that there are too many applications to fit in any medium. We will discuss some of the most popular applications in selected fields, but the list is not extensive. All readers are encouraged to research for robotics in their area of interest.

- **Medicine**: It is not necessary to choose between engineering and saving lives. Imagine performing surgery. Surgeons must be very precise. They need to have incredibly steady hands, a very clear vision, and good stamina. Otherwise, there could be fatal mistakes. Luckily, robotic systems have been created to help surgeons in delicate procedures (Adept Technology, 2010; Crawford, 2016). This increases safety by providing a great degree of precision and relieves stress from the surgeon which results in even more safety.

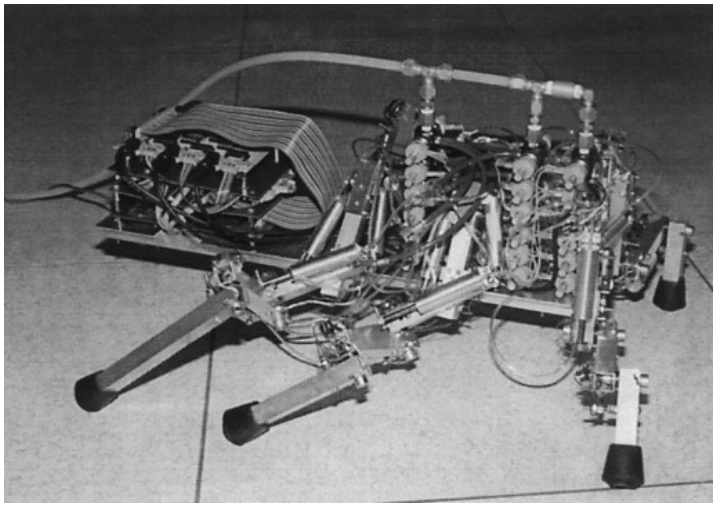
(Image) US Army: Robotic Surgical Assistant

- **Space Exploration**: If the stars are for you, space programs like NASA rely on robots for exploration in places where it is not practical to send humans. For example, NASA sent the Curiosity Rover to explore Mars and send images and measurements to earth (Hitt, 2009). The Curiosity Rover has spent years doing its job, a similar mission with humans would be very dangerous, impractical, and expensive.



(Image) NASA's Curiosity Rover

- **Biology**: Biologists can understand the structure and properties of some animals by replicating their behavior through robots. This can lead to increasing the knowledge of human and animal biology. For instance, a group from the University of Illinois developed a robot to study one type of American cockroach to understand its biological structure (Delcomyn & Nelson, 2000, pp. 1, 9-10). Therefore, biology and robotics are quite interconnected.



(Image) Hexapod Robot: The American Cockroach

- **Production**: Industrial robots increase the safety of production lines and its workers by handling materials that can be heavy or hazardous (Calderone, 2016). This means that robots not only make the work easier and more efficient but also safer. As a result, the use of industrial robots has grown rapidly. It has been forecasted that the industrial robotics market will grow 11.8% every year until 2025 (Murphy, 2017). A bigger market translates into more opportunities, whether you are looking for learning, passion, entertainment, or employment.

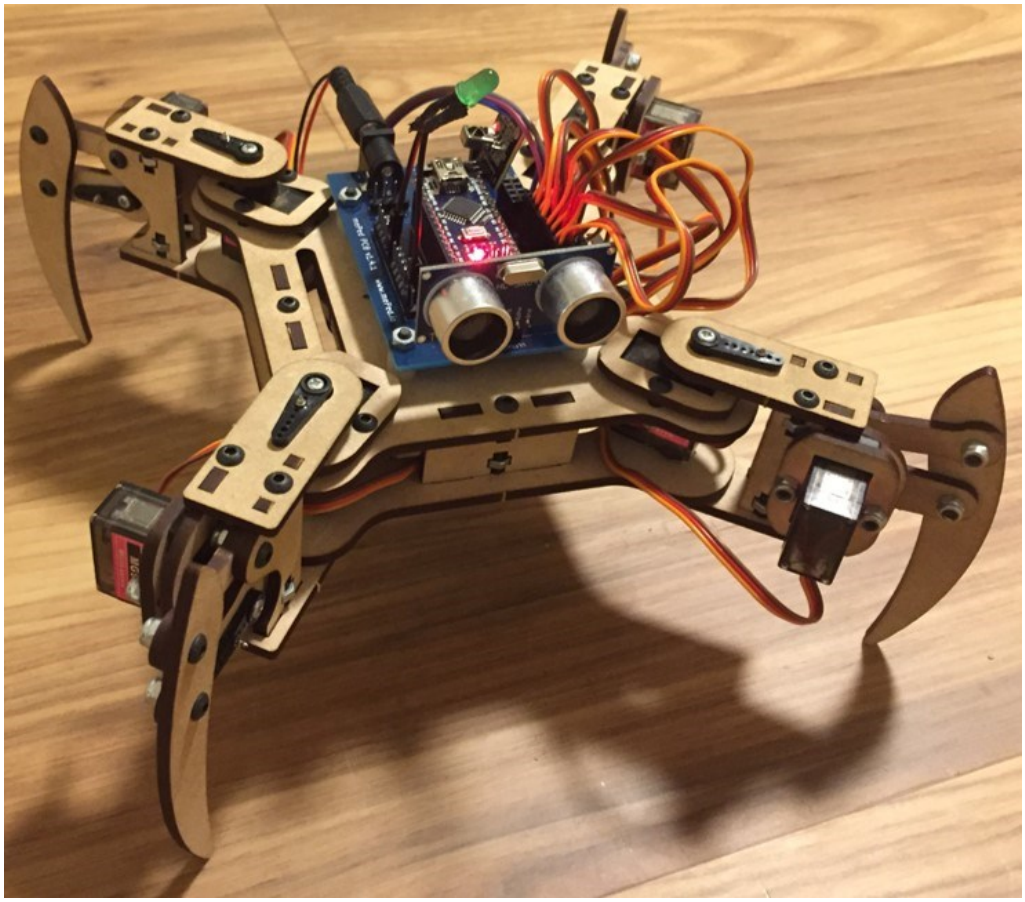
(Image) Industrial Robotic Arms

My experience

Two years ago, I took an introduction to electronics class. At the time, I knew I wanted to study electrical engineering, but I did not know in which area to focus. In this class, we learned to program small robots. We could choose our projects, and so we had the liberty to choose projects that were interesting for us. During this class I learned to

measure physical quantities with sensors, to write code, and to make a robot do what I wanted. These skills can be used in a variety of fields, which allowed me to explore my options. This is how I knew that I wanted to focus on an area called embedded systems.

My final project was named PARS, which is Latin for party. PARS is a four-legged robot that can dance, walk, sit down, wave, and bow. The brains of PARS is a very popular device called Arduino. The Arduino can be programmed from a computer and then connected to the robot which runs on energy from four AA batteries (found in many toys, TV controls and can be bought in any supermarket). PARS is controlled via a remote control that uses Infrared light, a type of light that we cannot perceive. The robot has a sensor to capture this light and decide what to do according to its programming.



(Image) PARS: Quadruped Walking and Dancing Robot

Whether you are looking for a career or a hobby, there is at least one application of robotics that will fit within your goals and interests. I learned the basics of robotics because I needed to take a class, but I ended up discovering my passion and making an important career choice. Robotics is such a big field that anyone can discover what they like after a few projects. Even if you don't end up programming, you will start taking on projects that will let you know what your interests are. Many of the students in the class had similar experiences. One of my friends figured that they enjoyed designing mechanics rather than electronics:

“I joined the class wanting to be an electrical engineer. Now, I figured I enjoy building the mechanical parts.” A student from Introduction to Electronics.

You can find your new career or hobby too. I recommend doing at least two of the following:

- Find out if there is any robotics class at your local community college.
- Look at the official Arduino tutorials at https://www.arduino.cc/en/Tutorial/HomePage?from=Main.Tutorials
- Check out this free electronic book for an introduction to robotics https://link.springer.com/chapter/10.1007%2F978-3-319-62533-1_1

Please leave a comment below if you would like to learn more, share your experience, or make a suggestion. This blog appreciates all the feedback necessary to provide you with the best possible experience.

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