Robotics Interest Group

2016

Objectives

- Understand what a robot is
- Review the history of robotics
- Catch up with what people around the world are doing in this field
- Discuss ethics and concerns
- Understand the components making up a robot
- Make robots with goals

These slides are largely based on work by:

- Mataric Maja : The Robotics Primer (https://g.co/kgs/ajl3Wv)
- NXT Lego robots (NXT programs)
- Robotics Interest group

Projects

- TODO: but we could
- build something with NXT…only one brick works
- Use ROS and the Drones…still having problems configuring ROS
- …

What is robotics?

- The word robot originated from a Czech word *Robota*, meaning- "obligatory work" and *Robotnic* meaning "serf"
- **Robotics** is the science or study of the technology associated with the design, fabrication, theory, and application of robots
- An **autonomous robot** (e.g. C-3PO from Star Wars) is an autonomous system which exists in the physical world, can see its environment and can act on its own to achieve some goals

- **Autonomous system** - This means it can act on its own, without being controlled (not teleoperated)
- **Exists in the physical world** - It should be subjected to the physical world challenges such as gravity
- **Can see its environment** – It should be able to perceive the environment through sensors in order to take decisions
- **Can act on its own** – With the information from the sensors and the physical components making it up, it can act on its own to **achieve some goals**

Other types include:

- **Remote controlled robots** – Those which are controlled using remote controls e.g. remote controlled drones
- **Mobile robots** - to move they use wheels or "legs"(usually for rough terrains)
- **Stationary robots** - they usually work in factories assembling products
- **Virtual robots** – These are software programs type of robots (e.g. Web crawlers)

Why robotics is needed

- They can work in hazardous or dangerous environments (e.g. cleaning up radioactive waste, exploring other planets)
- For their speed and accuracy (Da Vinci Surgical System)
- They can do repetitive tasks

The first robot:

- The first robot was a mechanical bird made in 350 B.C. by Archytas of Tarentum. It was called "The Pigeon" and was powered by steam.
- He constructed his bird out of wood and used steam to power the movements of the robot. This bird was then suspended from a pivot bar.

Interesting videos to check out…

- Sophia robot Humanoids | Latest Artificial Intelligence
- 5 New Technology 2016 | Military Robots | Awesome Robots
- LS3 military robot
- Amazon Prime Air
- TU Delft - Ambulance Drone
- Drone Technology and Future Aviation on This Week @NASA

Next session:

- Ethics and concerns regarding matters such as privacy and safety
- Rules and regulations for robots
- Artificial intelligence
- Components of robots
- Simulators, firmware and other supporting software