

Summary

Ages: 15 and up must turn 15 by 12.31.2016

Skill Level: Beginner - Advanced

Ratio Guarantee: 6 students per instructor

Prerequisite: None - willing to learn and actively participate

Hardware: Raspberry Pi3, Grove Sensors, BrickPI, Mindstorm EV3, Adruino

Software: Python

Course Description:

Robotics will become an important part of the 21st century's life and infrastructure. There is a need to educate the next generation of scientists so they may understand the challenges and opportunities related to robotics. We will be exploring in this summer school how to program robots to interact with the environment through sensors and then to act upon that sensory information. We will be exploring if such information can be used to build a simple autonomous robot that performs tasks in its environment. Based on students' background we will be designing a number of robots with varying degrees of complexity. The robots may leverage a variety of sensors such as temperature, atmospheric pressure, GPS signals, magnetic fields, buttons, distance, human brain activity, and others. We will then use these sensors to try to evaluate how we can solve real world problems such as developing an entry system to a door protected by fingerprints, or through a camera while detecting faces, or control a robot on wheels by human brain activity. Advanced students can perform some of the analysis required on supercomputers. Students can contribute their ideas to shape the projects conducted.

Disclaimer: Image on the front page copied and modified from: <http://www.pcworld.com/article/2069020/from-android-to-automations-rubins-robots-are-googles-next-moonshot.html>

Contact

Instructors

The summer school on Thinking Robots will be lead by Dr. Gregor von Laszewski, Dr. Badi' Abdul-Wahid, and Dr. Martin Swany

Please contact Gregor von Laszewski at

gvonlasz@indiana.edu

for more details or if you have questions.

Location

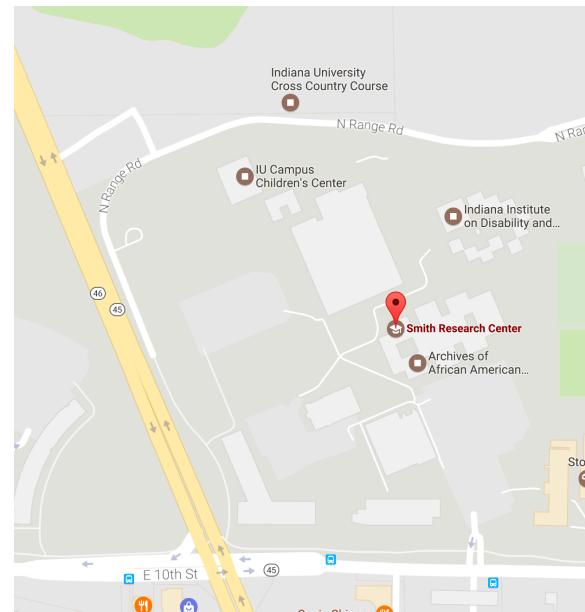
The summer school will be hosted on the Indiana University campus in the Smith Research Center.

2805 E 10th St, Bloomington, IN 47408

In case the address is changing we will inform registered students and parents.

Time

TBD



Summer School

Thinking Robots

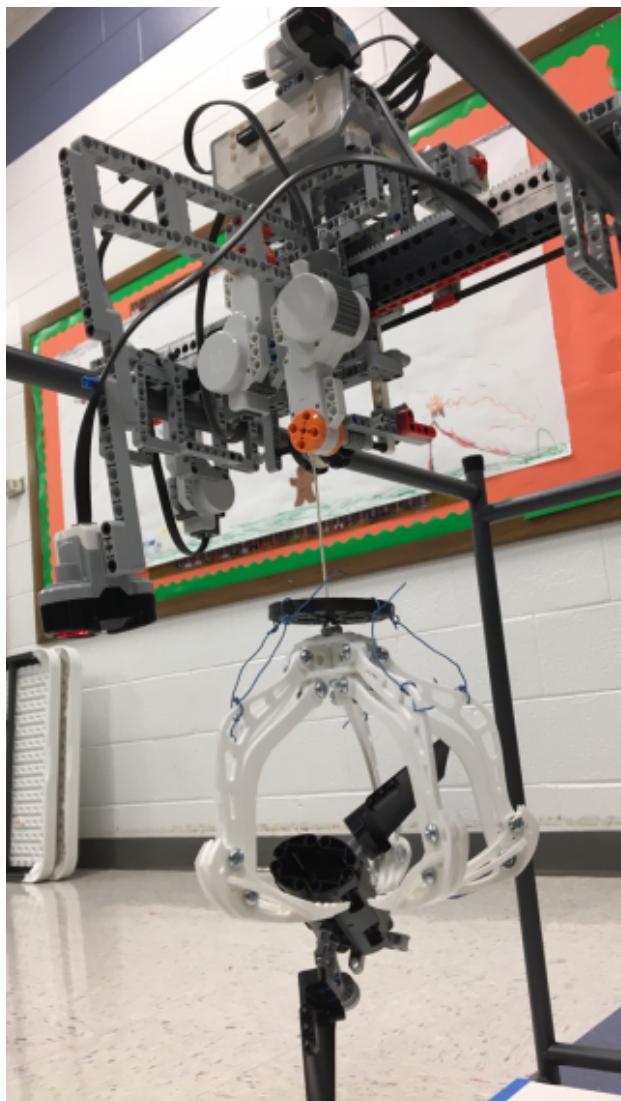
Indiana University

Don't think inside the box - Make the robot think



Example Projects

We list here some sample projects. Projects may be adjusted based on interest and experience of the students



Make it sense

A robot will need to be aware of its environment. You will be learning how to use sensors to interact with the environment.

Make it think

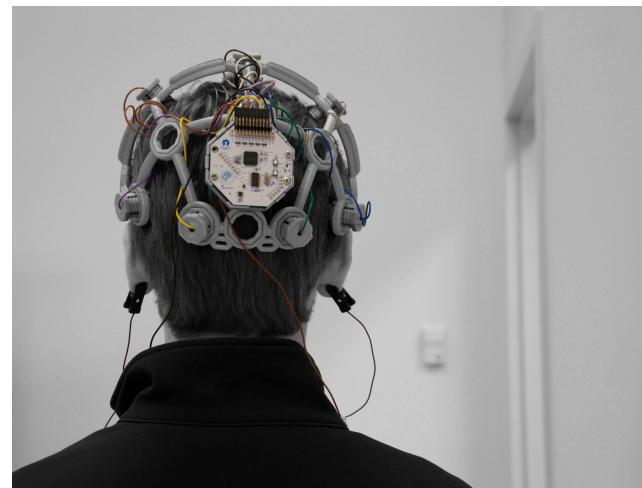
You will need to analyze the environmental inputs and will develop programs that take the input and provide reactions and plan on what to do with this data.

Make it act

Now that you have sensed your environment and created a plan of what to do, its time to act and conduct tasks that you have identified.

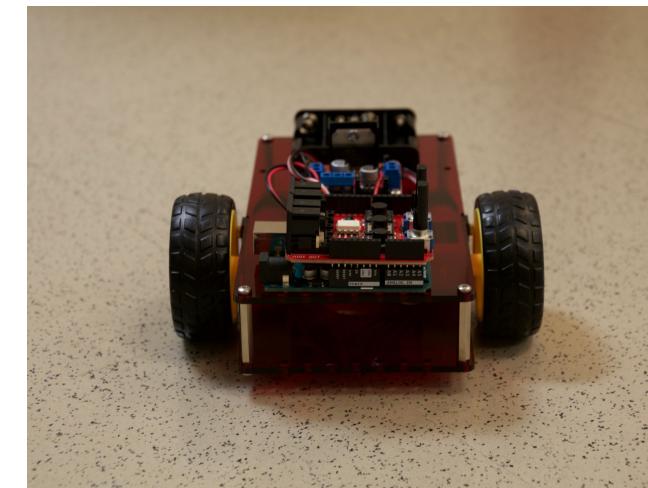
Have fun learning

Most importantly, this is a team activity with other students. We want you to have fun and actively participate while integrating your own thoughts



Brain Computer Interface

In this project you will be using a sensor that can be placed on your head and measures brain activities. The computer will interpret specific brain waves in order to control an intelligent system remotely. This may include a drivable robot. You will be contrasting contemplative and meditative states and assign specific actions to them that are then executed on an Arduino based drivable robot. The communication between the brain wave sensor and the robot is conducted through Bluetooth. Such an interface could have significant impact to design intelligent systems to control prosthetics



World Wide Road Kill

A team of 5th and 6th graders had the idea to remove roadkill from roads with autonomous drones that get notified via cell phone from cars passing by. We will explore this idea further and create a drone simulator that includes a number of advanced sensors to simulate a flight into the vicinity of the roadkill, locate it, identify it through neural nets that interface with a camera. Then we will simulate the drone landing and picking up the roadkill. Naturally, if we can pick up roadkill, we could pick up other things, such as packages or pizza, or deploy them in areas that are hazardous to humans. We could use supercomputers to control many drones.