MEng Design Project Announcement – 2019-20 AY

Project title: Vision Robot Image Analysis

Brief Description of Design Project Goals:

Overview:
The overall goal is to create a robot with one or more video cameras that can analyze the visual surroundings and navigate in real time. This project concerns the vision component of the robot. The robot will be constructed on an iRobot Create 2 base with the addition of an external Raspberry Pi controller and external cameras. The system will alternate between internal, Create 2, control, and override control, using Raspberry Pi control. There are 2 MEng project teams associated with this project:

- Robot Navigation: One team will develop robot systems to alternate between the two control modes of the system for desired Robot operation and integrate Create 2 sensors into the control system.
- Robot Image Analysis: Another team develop systems to use advanced robotic vison to obtain information about the environment and use this information to inform path planning for the robotic system.

This project description outlines the tasks for the Robot Image Analysis Project.

Specific MEng Contribution:
The tasks for this project are:

- Image acquisition using camera systems and associated Raspberry Pi
- Preprocessing at RPi using Google coral accelerators
- Mapping image acquisition into path decisions for robot motion
- Communication with base station.
- System development for mounting, power, network communication, and data storage and transmission on an iRobot create2 platform.
- Integration of available Create 2 sensor set to be used for robot control.
- Coordination with the Robot Navigation team to insure smooth system integration.

The students will begin by evaluating different video camera options. This project will coordinate with the "vision Robot Navigation" project to integrate vision and navigation.

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Project Web Sites: www.via.cornell.edu/students/

Create2 Information: https://www.adafruit.com/product/2388

Number of MEng Students Needed: 2

Required Skills:

Experience in computer vision and computer vision programming tools for Linux, C, and python. It is required to take ECE 5470 Computer Vision and ECE 5725 Design with Embedded Operating Systems in the Fall semester to gain these skills if the student has not already taken these courses.

Estimated Project Time Frame:

2019-20 Academic Year, Two (2) Semesters