EE209AS (Winter 2016)

Robotics: Design, Manufacture, and Control

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Lab assignment 2
Lab report due 2pm Tuesday Feb. 2, 2016

1 Lab Overview

1.1 Objectives

The goal of this lab is to get started with electromechanical hacking. You will build an internet-enabled "jam band" consisting of two independent Intel Edison controllers each driving an electromechanical "musical" instrument. They will be commanded through an internet-based web interface.

You will be working in your project teams. You will be responsible as a team for dividing the various tasks of this project between all members. Your grade will be based both on team and individual performance.

1.2 Deliverables

There will be two deliverables for this project — one team and one individual.

As a team, you will create a webpage documenting and demonstrating your band. This should contain everything necessary to recreate your system. Be sure to include your code, wiring schematics, and a bill of materials, as well as pictures, videos, and text descriptions of the construction and operation. N.B.: Putting your project in a version control system is a great way to share your code and designs amongst your team and to the world.

As an individual, you will write up your individual contributions to the project in the format of an academic report / white paper. This paper should contain at minimum an introduction, methods, results, and conclusions sections. You may want to include background as well. Indicate on your report who you worked with, and for each person including yourself estimate an aggregate percentage of the total work done. Submit a .pdf of your report via email by 2pm Tuesday Feb. 2, 2016. Use the subject heading "EE209AS Lab 2 report: " + your name. Include in the email a link to the team webpage.

Submissions that are up to 24 hours late will be accepted for a 10 percentage point reduction in final grade. No submissions will be accepted more than 24 hours late.

2 Lab specification

2.1 Getting Started with the Intel Edison

As a team you will be given 2 Intel Edison boards. A set of tutorials for using these boards can be found at the Google Drive folder shared here:

`http://tinyurl.com/EdisonTutorials`

Follow the instructions in tutorials 1-5 to learn how to program the board and interface to it using an internet based webpage. Additional Arduino sample code can be found in the Arduino example library — the Servo examples in particular may be of use.

2.2 Making music

You will be given two servos to use as actuators; these will probably need to be augmented with some mechanical devices to create the desired sounds. You may also choose to use other actuators if you'd like. Be creative! Each Edison will need to contribute to the band's music; it is up to you to determine how.

2.3 User interface

Your band will be controlled through a web-based user interface. The interface may be hosted on an Edison, or on a server with links to command the Edison. You are free to decide what options to provide the user. It can involve simple commands such as start and stop, more detailed options such as select song and set tempo, or full control involving programming the music.

2.4 Demonstrations

Be sure to record a live performance and include it on your webpage!

3 Resources

3.1 Hardware

You will be provided two Intel Edison boards and two servos. If you need additional servos or motors, you can check with me to see if I have extras. I may also have limited additional components such as breadboards, jumper wires, and LEDs. You are free to use any additional actuators or mechanical components, found or purchased, as you wish.

3.2 Computing infrastructure

Feel free to use any web services you'd like. If you'd rather not use such resources and would prefer locally served space to host your website, videos, or code repository, come talk to me.