

Michael O'Connor

Team G: Bobs the Builders

Teammates: Christian Heaney-Secord, Eric Newhall,
Guillermo Cirde

ILR 1 – Sensors Lab

February 5, 2015

Individual Progress

Mock-up:

For our teams mock-up we created the frame that we intend to use in our final deliverable and created the subsystems out of cardboard. I had made the original CAD model for our system and used that model to place an order for the necessary Aluminum 80-20, t-nuts, and acrylic needed to make the frame. When that material arrived, Christian, Eric, and I measured and cut the 80-20 down to the correct size and as a team we assembled the frame. I also made cardboard parts for the mockup of the wire cutter and flux extruder sub-assembly and added them to the frame. I undertook the role of presenter for our presentation of our mock-up to the professor and TAs.

Sensors Lab:

For the sensor lab I took responsibility over the potentiometer sensor. I determined the appropriate value resistor to integrate into the circuit and wired the potentiometer and resistor into our breadboard and Arduino. I then manually recorded the voltage readings measured by the Arduino at several angles and plotted these to show the non-linear relationship between the rotation angle and voltage.

Website:

Although I did not take part in the building of our websites structure, I have made sure to update sections of the website as I have worked on different parts of the project.

Challenges and Issues

One issue that we faced was that our McMaster order of Aluminum 80-20 and other parts did not arrive until Sunday and the MechE machine shop did not open until Monday. This meant that although we could create some of our subsystems beforehand, we would not be able to assemble our device until the day of the presentation. In order to handle this, myself and two other team members arrived at the MechE machine shop at 7:30am Monday morning to cut our pieces, ensuring that we had enough time to put the whole assembly together before the presentation.

Another issue that we experienced was entirely my fault. I was in charge of measuring out the 80-20 to be cut and I naively did not follow the golden rule of 'measure twice, cut once', resulting in us cutting two pieces of 80-20 two inches too short. In order to correct this, we trimmed two other pieces down two inches so that we could build our frame. As a result of this mistake, our frame is now two inches short in one of the horizontal axis than originally intended.

Cross-Referencing with Teammates

Our team all worked together during the building of the mockup. Together we divided the work between different subsystems and components that needed to be modeled out of cardboard and then each built and integrated a subsystem.

For the sensors lab I relied on Eric and Guillermo to integrate my code for the potentiometer sensor into one, all-encompassing program and to implement a low pass filter.

Eric has been the lead on the website development and I have inputted any results or documents that I have into the structure he created.

Figures

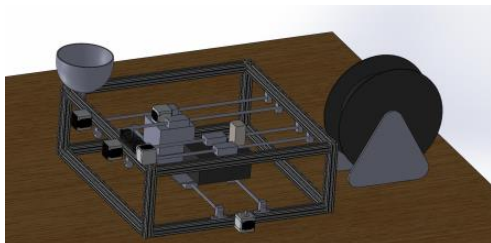
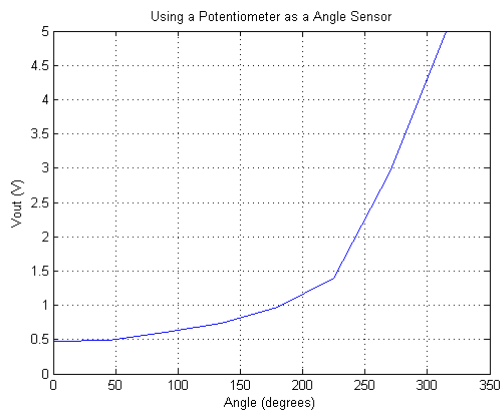


Figure 1: Top left is a graph showing signal voltage as a function of potentiometer angle. Bottom left is the CAD model showing our overall system design. Right is a photo of the mockup created out of aluminum 80-20 and cardboard.

Plans for Following Week

Our plan for next week is to test several different 3D printed hopper designs to try to determine the best geometry for sorting the pieces. We also plan on actuating one of the three rail systems as a proof of concept so that we can be confident in ordering the supplies to actuate the remaining two rail systems. We also intend to create one linear actuator based on a stepper motor, which can be used for flux extrusion and can be used for preliminary testing of the part placer or wire cutting assemblies.