

Michael O'Connor

Team G: Bobs the Builders

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

ILR 2 – Motors Lab

February 12, 2015

Individual Progress

Mock-up:

For our team's mock-up we added the linear rail guides with the rails and liner ball bearings for all three subassemblies to the 80/20 frame(Figure 1). I created a model for a linear actuator based on a rack and pinion and laser cut the rack and pinion out of 3/8" acrylic. The spur gear was attached to the D-shaft of the gearmotor provided to us and will be the primary actuator in the part placer subsystem(Figure 2). I designed several CAD models for potential part hoppers and Christian and I learned how to operate the 3D-printers in the IDeATe lab(Figure 3).

Motors Lab:

For the motor lab my team utilized the potentiometer that I originally worked with on the sensors lab in order to control the gearmotor. Based on recommendations from last week, I soldered an additional wire to the middle potentiometer connection instead of utilizing a resistor, allowing for a linear relationship between the orientation of the potentiometer and the output 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

My team faced several challenges with the motors lab this week. We initially struggled to get readings off the encoder that was mounted to the gearmotor. This issue was resolved by Eric adding pull up resistors while after a visit to office hours. We also struggled to eliminate the noise from our sensors translating to motion of our motors, causing some of our motors to rotate back and forth while not being manipulated.

Christian and I also ran into issues with the 3D-printers in the IDeATE lab. We intended to print several hopper designs to test this week, however, it took us several attempts to successfully print a model and we severely underestimated the print time required to print our models. Because of these two factors as well as the late hour of night we were working on this, we did not get to print out a full hopper prototype.

Cross-Referencing with Teammates

Christian and I worked together to generate ideas and CAD models for hopper designs and attempted to 3D-print these designs together. We also completed the design for the subassembly actuators along the rails system.

For the motors lab I relied on Eric and Guillermo to integrate my code for the potentiometer sensor into one, all-encompassing program and to connect the gearmotor's actuation to the output value of the potentiometer. Guillermo handled creating the GUI and adding slide bars to control the motors.

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: Frame assembly with rail and linear bearings attached.

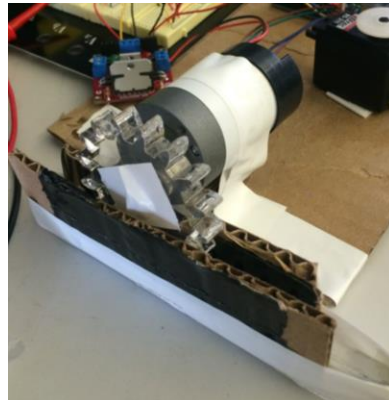


Figure 2: Acrylic rack and pinion mounted to gearmotor.

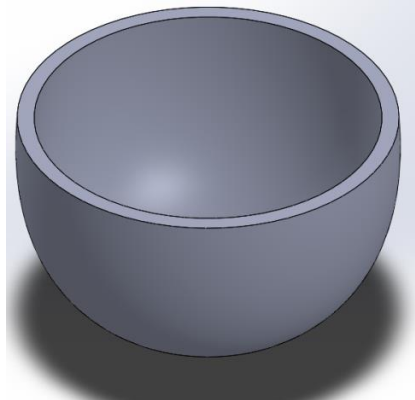


Figure 3: Isometric view of conical shaped hopper design to 3D-printed.

Plans for Following Week

My plan for next week is to test several different 3D-printed hopper designs with Christian to try to determine the best geometry for sorting the pieces. I 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. Our team also intends 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.