

Individual Lab Report 9

Christian Heaney-Secord

Team G-Bobs the Builders

Teammates-Michael O'Connor, Eric Newhall, Guillermo Cidre

ILR09

4/16/15

Individual Progress:

Since the last checkpoint, I spent the majority of my efforts finishing the designing and manufacturing process for the part transporter subassembly and the part flipper subassembly. The part transporter subassembly's job is to transport the part from the part flipper to a point in parallel with the axis of the part placer. The design for the part transporter consists of two sheet metal pieces manipulated into having a U channel shaped base. The U channel serves to position the two different part sizes in the middle of the sheet metal slide. The first sheet metal slide slopes downward so that the parts can travel closer to where the part placer is. The second sheet metal piece is parallel with the ground so that the part placer does not have to pick up the parts at an angle. There is also a small wall at the end of this sheet metal piece so that the parts will stop. The two sheet metal pieces are attached to two acrylic mounts that I designed in Solidworks and manufactured using the laser cutter. You can see the part transporter subassembly in Figure 1. I also worked on creating a better transition between the part orientater subassembly and the part flipper subassembly. Smoothing out this transition required manipulating the geometries of the two subsystems in order to get them to line up. In order to make this transition better I did things such as adding washers to the bolts for the part flipper and cutting off the edge of the part orientater slide. I also used the drill press and lathe to fabricate numerous pieces for our design. I used the countersink drill to create indents in the acrylic for the countersink bolt heads to fit in. Lastly, I played a major part in installing the subassembly. You can see the complete the part orientater, part slipper, and part transporter subassemblies in Figure 2.

Challenges/Issues:

A major issue that we faced this week occurred with our computer vision process. It seems that our camera is very sensitive to any change in light on the object. These changes in light can be caused by something as simple as someone walking past our lab station. This is problematic because we are depending on our camera for the functionality of our design. In order to remedy this problem we are going to try and provide our camera a more controlled environment for it to view the objects. We plan to box in the camera from any outside disturbances by attaching cardboard to the end of our 80/20. We may also play with the amount of lighting that we give our camera in hopes of allowing it to function better.

Another issue that we faced this week occurred when we were working with our part transporter. Originally we planned on using a single piece of sheet metal for the part transporter subassembly. However, this was not possible because the sheet metal could not be manipulated in the way that we originally designed it. This was unexpected and we considered alternatives such as 3-d printing and carving the slide out of wood. However, we realized that constructing the subassembly out of two sheet metal pieces was the simplest and most cost-effective method of achieving the results that we desired.

Cross-Referencing:

This past week I collaborated with Mike in creating a design for the part transporter and the part flipper. We also went into the machine shop to manufacture the various parts used for our subassembly. Mike also worked on getting the part orientater to work more reliably.

While Mike and I did the majority of the work to assemble the part transporter and the part flipper, Guillermo and Eric worked to operate the motor controls for the servo motor on the part flipper and the electromagnet on the part flipper. Eric and Guillermo also worked on integrating all the motor controls within our system so that they work together well. Eric also worked to update the website.

Figures:

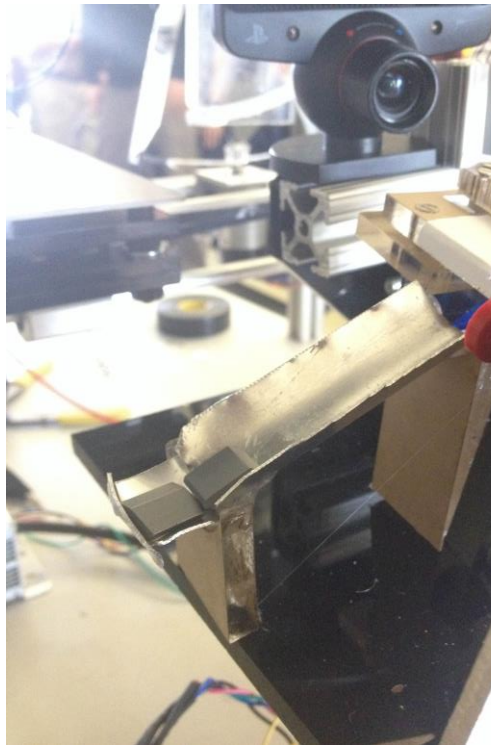


Figure 1: Part Transporter

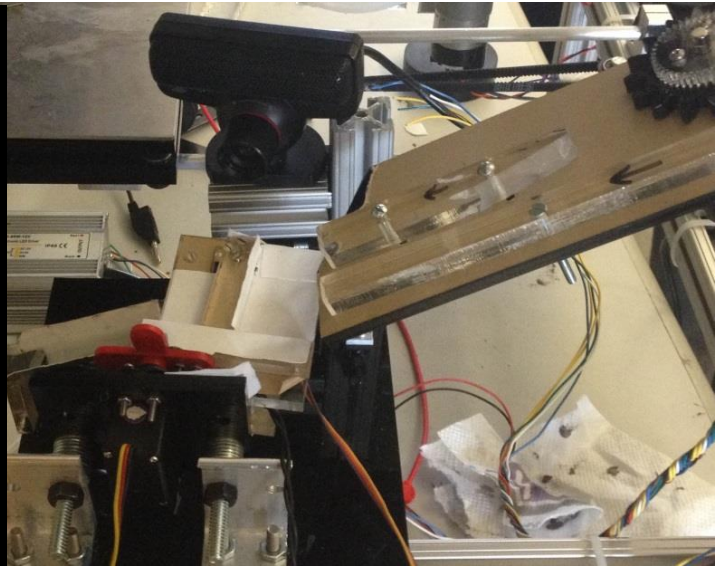


Figure 2: Part Orientater, Flipper, and Transporter

Future plans:

For the upcoming week we want to have our system able to handle all 20 parts of both sizes on its own. In order to do this we need to work on integrating all of our motor controls so with one another so that we can complete this process. We also need to create a code that will be able to lay out all of the parts in a grid. There is also more work that needs to be done in getting our computer vision and wire feeder to work more reliably.

Individually, I will work on creating a more controlled environment for the camera and the wire transporter subassembly. Right now we are having the wire leave our revolver through a tube that leads to a point right in front of the part. There is still a lot of calibration that needs to be done so that the wire comes out of the tube at the right speed in order for the wire to end up resting on top of the part.