Individual Lab Report 2

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Team B: (still nameless)
Teammates: Trevor Decker, Ian Hartwig, Ian Rosado
ILR02
February 12th, 2015

Individual Progress

Mock-Up Design

This week, I went through multiple iterations of gripper geometry and the proposed design, shown below, is the one I plan on prototyping with laser-cut acrylic this week.
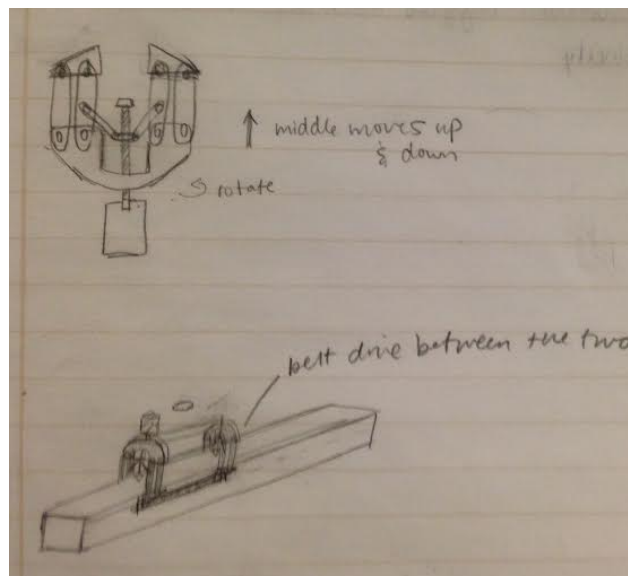

Figure 1. Proposed design for gripper

The gripper has a threaded shaft that allows the rotational motion of the motor to be translated into a linear motion of a threaded disk. The disk has two linkages that control the motion of the claws, allowing it to release and retract from the frame so that the it will not interfere with the frame when we want it to unclasp. For the final robot, this design will consist of two gripping units. Only one motor will be needed if a belt drive can be attached to the rotating disk, allowing the two sides to close and open in a synchronized manner. The bar between the two grippers give us more contact area with the frame. The separation between the two gripping units not only allows for stability under large moments but also provides space for attachments with the pivoting unit.

I also looked into resources that would help us with our design and discovered that there is a talk on Friday regarding linear actuators and relayed this information to my teammates. I also emailed students working on gecko adhesives in Professor Sitti's lab to see if they could provide us with sample materials that we can integrate into our system.

Motor Lab

I helped wire the sensors to the Arduino and helped my teammates with any other electronic modifications.

Website

       I could not make progress on the website this week due to time constraints but I will make sure to continue to add to it for the next checkpoint.

Challenges

       For the new gripper design, I had to take many constraints into consideration. Since there is less than one inch of space between the plexiglass and the top of the frame, I needed to figure out how to increase surface area while minimizing weight. At the beginning, I also had trouble coming up with a way to increase grip strength without increasing the number of motors. I am glad I was able to overcome these challenges this week.

       For the motor lab, I felt as if I was unable to contribute heavily due to my lack of experience in motor control. My group members could complete tasks much more quickly and I could not justify spending too much time on the lab when there were other issues that needed to be tackled regarding our design. However, I will learn the whole circuit and read the code in my own time to make sure I can improve for next time.

Cross-Referencing with Other Team Members

       For the motor lab, by being present and helping Trevor with smaller tasks, he was able to focus on writing coding and figuring out any malfunctions that were occurring. My decision on a gripper design allows Ian H. to focus his parameters for motor selection. Also, Ian R. and I can now work on a complete CAD model. While Trevor and Ian H. are always willing to teach me new ECE principles, Ian R. is a good person to run through part design with. My group members have contributed many hours to the project and I continue to be impressed by their dedication and performance.

Future Work

       I am planning on completing the CAD model for the gripper and creating a prototype for it by the end of the weekend as well. I also want to solidify the connection between the gripper, the pivoting unit and the sliding rail by the next checkpoint so we can prototype as soon as possible.