

Ian Rosado

Team B: Monkey Bots

Teammates:

Stephanie Chen, Trevor Decker, Ian Hartwig

ILR06

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Individual Progress

In the past week I have worked to refine the gripper design in order to make it reach the requirements we have established. By machining the baseplate of the gripper down, I was able to create a more uniform gripping area on the 80-20, which created a stronger hold. I also helped the rest of the team with manufacture of the extending arm and the rotating wrists when issues arose. One realization that we as a team had this week was that some of the reaction forces due to the large moment arm of the robot when only one side is gripped might actually help us adhere to the window frame. Figure 1 depicts some of the forces in a drawing.

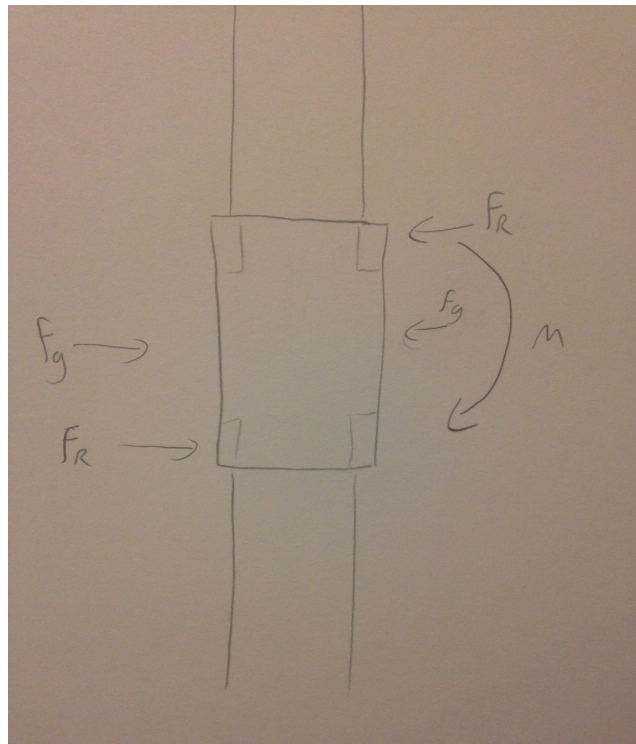


Figure 1: A drawing of some of the forces experienced by the gripping unit. F_g is the force exerted on by the motor in the gripping unit, M is the moment due to the weight of the robot hanging off to the side, and F_R is the reaction force due to M .

From figure 1, we can see that if the gripper is able to supply enough closing force to withstand F_R , that reaction force will actually increase the normal force on the window frame, and increase our gripping strength.

Challenges/Issues

A large issue remains with finding a suitable material to use as gripping pads for the aluminum frame on the gripper. The neoprene has worked moderately well, and we do have thinner neoprene pads that will not shear as much under large forces, so the next step will be to use the thinner neoprene pads and see if those provide more reliable results.

As far as actual manufacturing goes, the hours of the MechE machine shop have proven limiting, but luckily we have been able to use machines in other places on campus such as Robo club or elsewhere when we have needed to, though those machines are less precise.

Teamwork

Stephanie has spent many hours in the machine shop milling parts for the extension arm and the other parts that we made this week, as well as using the CNC mill for more complex parts. Ian has worked to make all of the plastic parts that we need to assemble the subsystems we are making right now, either by laser cutting or 3D printing, and then assembling those after the fact. Trevor has worked on the design of the cleaning unit, which has proven to be difficult because the design needs to change as we find issues and make changes to any part of the robot.

Future Plans

We as a team will continue to make parts and assemble the robot as we are able to. The next steps after we assemble the extension arm and the rotation wrists is to build the cleaning unit and test some of the functionality behind that. My next immediate step is to test the thinner neoprene pads, as well as run a test on the gripping unit that includes forces in multiple directions to try and replicate the large moment that we will be experiencing in the final robot, to see if that does indeed give us more friction force on the window frame. After tests are run, depending on the results, it will be time to either make the second gripper or begin making a new gripper of a different design.