Individual Lab Report 06

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16-682 MRSD Project 2

Team B: Space Robot

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Individual Progress

During this week, I thought some ideas for the new attachment mechanism design together with whole group. We figured six methods still focus on by using the V10 sticky material and one backup method by using magnetism screw structure. See figure 1, this is one of the ideas. The outer triangle belt will be printed by MakerBot Replicator 2X and contain with the V10 material. The inner structure will be solid part also printed by MakerBot Replicator 2X that will be connected by servo motor. As we can see from the figure 1, the V10 material will detach the surface following the period of 120 degrees rotation.

And I have learned how to use the new 3D printer bought this semester. I found the MakerBot Replicator 2X to be more convenient and better to use.

Since I have finished Computer Vision class last semester, I will try myself best to figure out the localization of our robot in the testing environment. So these days, I was learning about the ROS and also the April Tags. Right now, I just finished the some tutorials and still on the way.

Challenges/Issues

There are two main challenges in the period.

One is still about our sticky feet problem. Even though we have figured out totally seven methods for the designing of this part. None of them seems to be easy and to guarantee the success. And also time for us to design and manufacture this attachment mechanism is already so tight for us. Since the attachment mechanism definitely is our core and most innovational part of our whole robot system, we at least need to complete the basic function in the final spring validation test.

The other one is for myself. I was trying to use the camera input and April tags to get the localization of the robot by using ROS. Even though I have learned the computer vision class last semester, ROS, Linux and April Tags are totally new to me. So it will take me long time to understand how to use these things and to combine them together.

Cross-reference/Teamwork

During this week, our group had two brainstorms. One was to figure out the new attachment mechanism designs. The other one was to clarify spring semester requirements and detail spring validation experiment plan, including preliminary test environment design.

Brian also finished cleaning up code for GUI, Gait Generator and Scheduler. At the same time, he created a new GUI pane for a simplified motion interface that should be understandable by an

amateur with a brief introduction. Brain gave the presentation this time.

Nate mainly successfully established radio communication between operator and robot by using XBee. Dipta have performed trade studies for cameras and also IMU. He also designed PDB for a second iteration.

Brain has already printed one part by using honeycomb structure by MakerBot Replicator 2X and got the weight comparison between this one and the original one. See figure 2, we had the result the new white piece was 11g and the old one was 22g. So it can save nearly 50% of the weight and still have the same or even more strength because of this honeycomb structure inside.

Plans/Future Work

For the future work for next two weeks, I will involve in two things

One is to complete one method of the attachment mechanism design. Our whole group will assign everyone as a small homework to complete one method so we can do at the same time. Mainly I will finish the 3D modeling, printing and the assembly.

The other thing, I will still work on the ROS and April Tags. Since we already ordered our camera, so hopefully I can finish one simple task by using the camera and April Tags to get the localization of the camera.

Figures

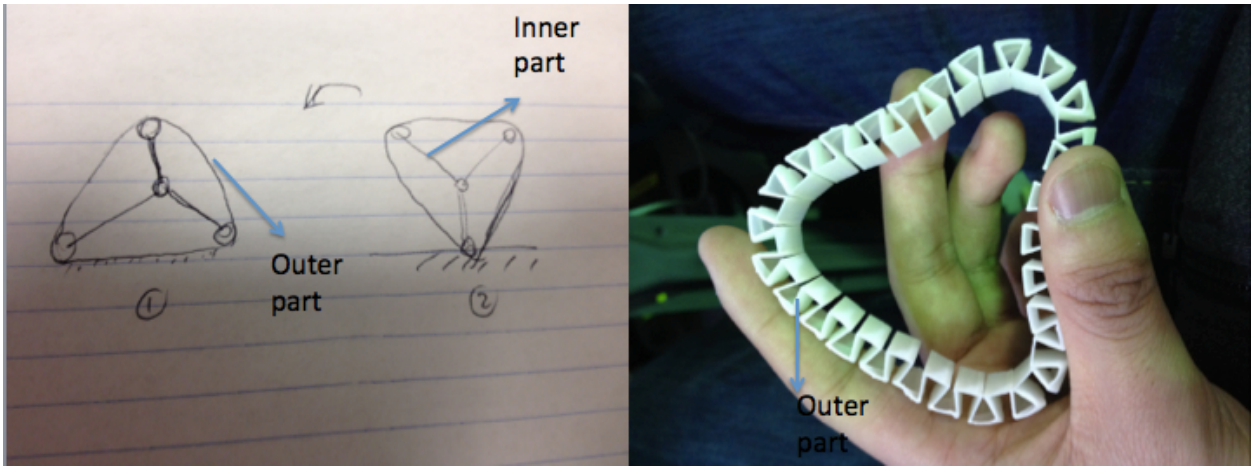

Figure1: one idea of the attachment mechanism design

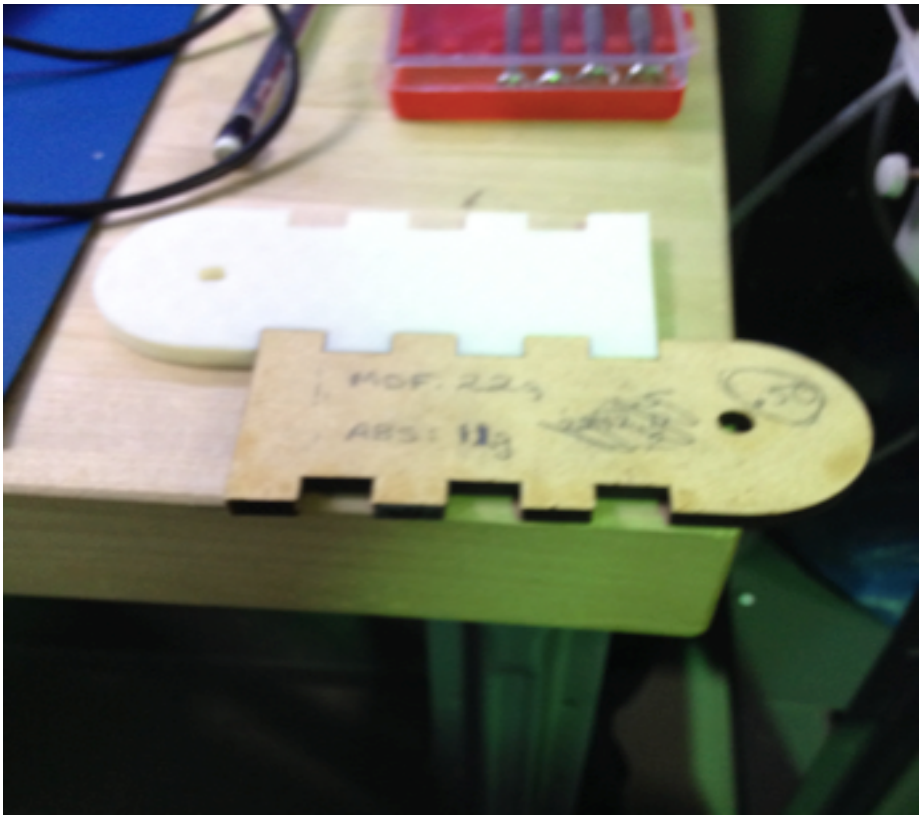

Figure2: the weight comparison between the new one and the old one