

Individual Lab Report 03

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16-681 MRSD Project

Team B: Space Robot

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Individual Progress

During this week, I together with Nate discussed our mechanical part of inchworm robot with Dimi. During this meeting, we figured out the basic rough frame of our robot. And for this week, I mainly worked on creating 3D model for the robot. Because HS servo motor is not so convenient for assembly, I made a new bottom with the same positions of holes and connected to the original servo motor to form a new one (see figure 1).

Our inchworm robot basically will have 5 parts (see figure 2), 1 and 5 are left and right bottom parts those each will have two feet. And 2 and 4 are middle parts those connect top main body and bottom part. These two middle parts will have the linear motion function so that the body of our robot can extend and shorten like an inchworm (see figure 3). 3 is the main body of the robot that contains a joint in the middle can have rotation function. Also 3 is the main place for holding arduino due, power supply and other devices.

Challenges/Issues

One of the challenges is that we now only have the 3D modeling design of whole robot system. We haven't figure out the whether is possible for the dynamic problem. So for this part we still need math calculation to estimate more correctly so that will help us to choose devices like servo motors, dc motors and so on.

For the gecko material, we have casting roughly by using the bottom of plastic cup as the mold. The result was not so perfect. It could only show that material has the adhesion function. However, because the mold was not so flat so that made the surface of the product that we made was also not so flat. So in this situation, it mostly like point touch not surface touch any more. So in order to solve this problem, we will need to find a better mold.

Also our team has a confusion about choosing the correct components for our power distribution board before and we just research online and asked TAs for help.

Cross-reference/Teamwork

During this week, Brian has changed our GUI according to match our new design of robot system. Also he has started combining ROS with GUI.

Dipta was mainly focusing on casting our gecko material. Dipta and Nate also worked on our power distribution board schematic that matching our new design.

Nate involved the brainstorm about the mechanical design of inchworm robot. He also used arduino due to test HS servo motors.

I finished 3D modeling of our whole robot system. And I was the person who gave the presentation this time.

Plans/Future Work

For the next coming week, I will focus on doing a second pass over our 3D model, and hopefully we can begin fabricating as soon as possible. And before that, I need to do math calculation about our torques, weight distributions in our robot system so we can choose different kinds of motors. And also I need to consider the main platform for the distribution of all the electrical devices.

For the gecko material part, I will together with Dipta to find a better mold to cast the product we want.

Figures

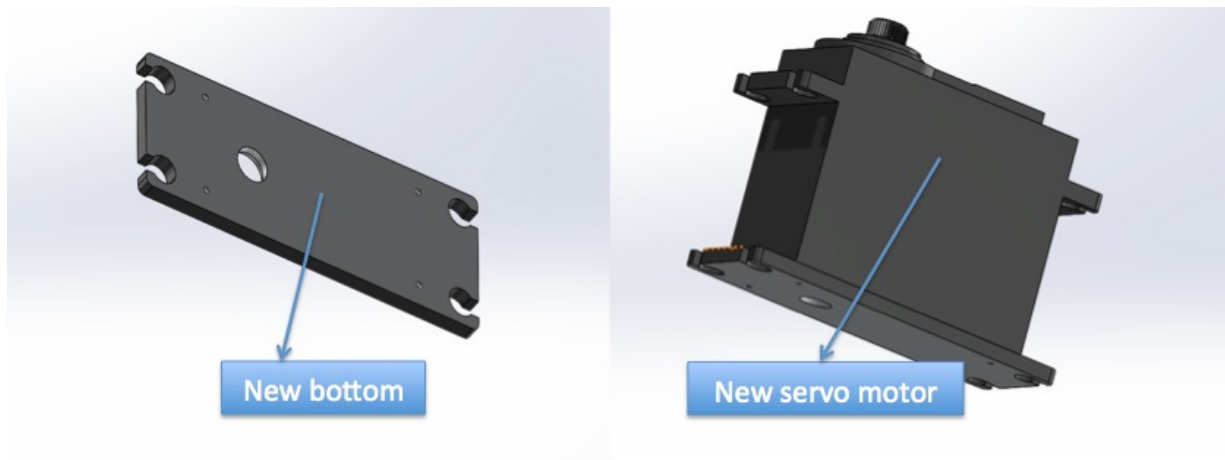


Figure1: new servo motor bottom and new servo motor

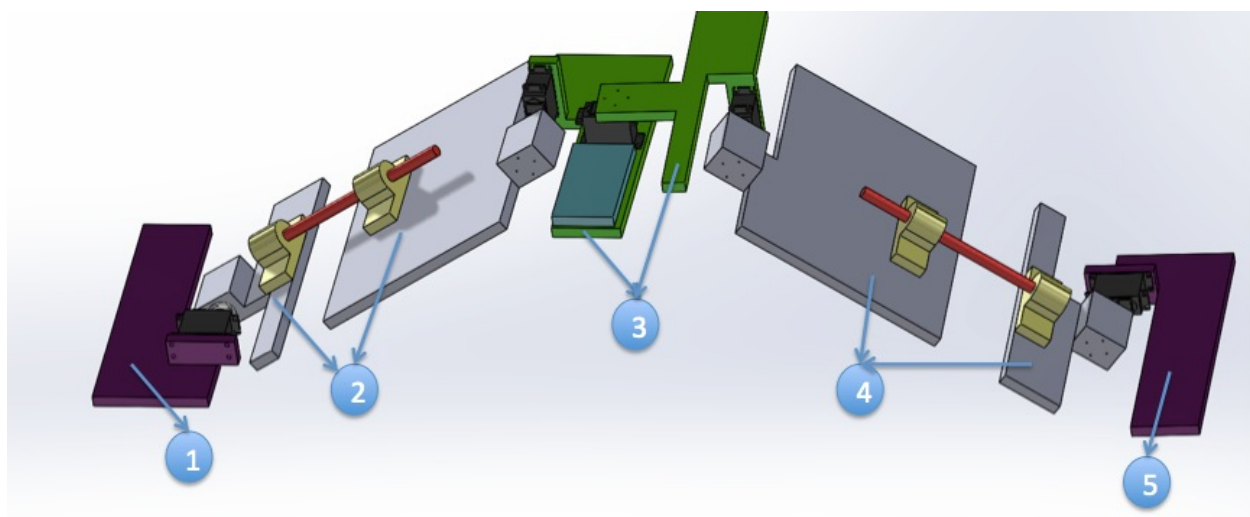


Figure2: 3D model of robot

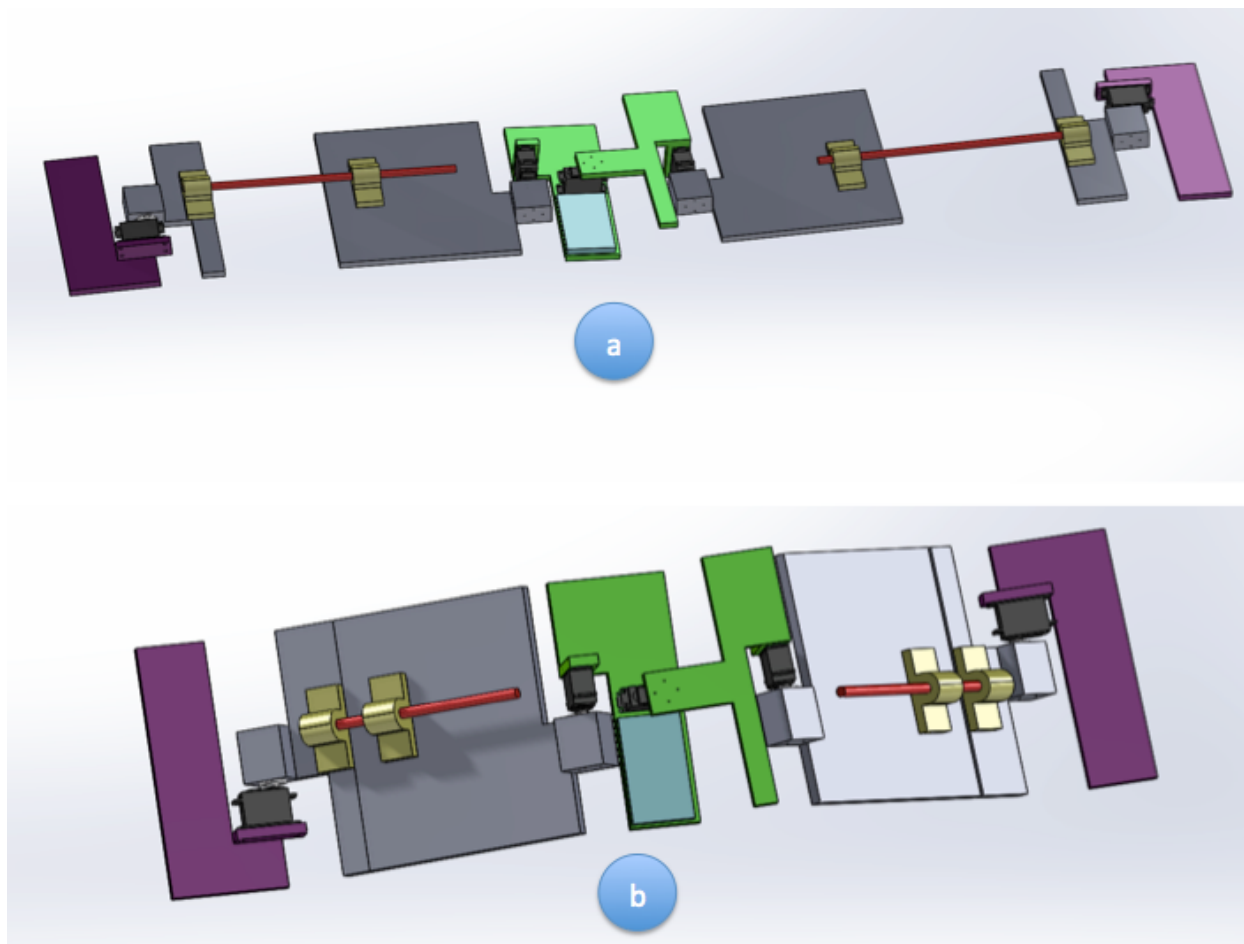


Figure3: different statuses of the linear motion part