Sundance Weekly Progress Report

Week 3 (Spring)

28.03.2023

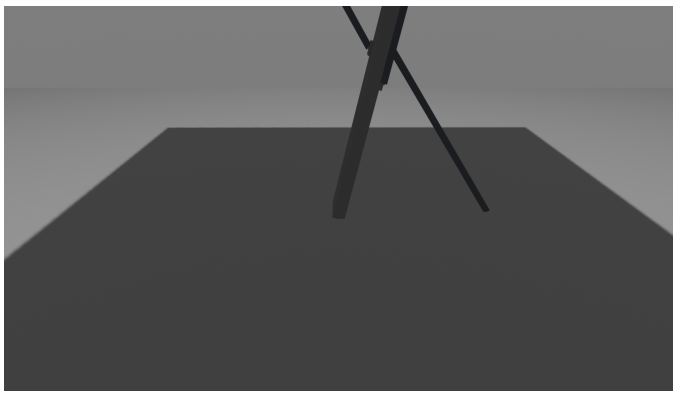
1. Previous Week's Overview

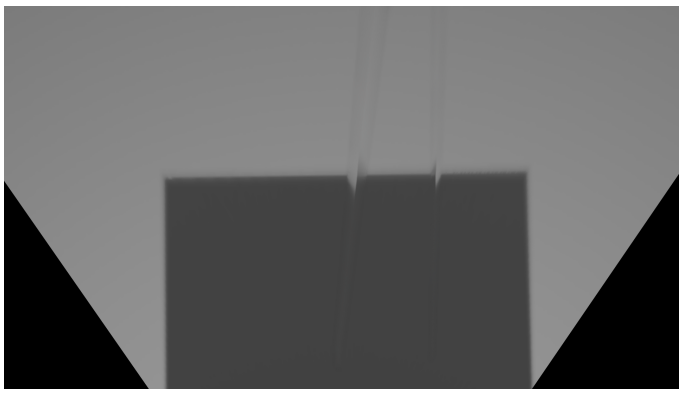
Previous week, we worked on image processing and manufacturing processes. For the image processing part we worked on eliminating the noises. Also, we have researched and tried different processing methods to remove the effect of poles and camera perspective on the canopy shadow. For the mechanical part, we made adjustments on the arrived components such as fortifying the cabling of the motors. We continued the mechanical manufacturing process. Finally, we also made research on how to configure communication between the different elements of the system.

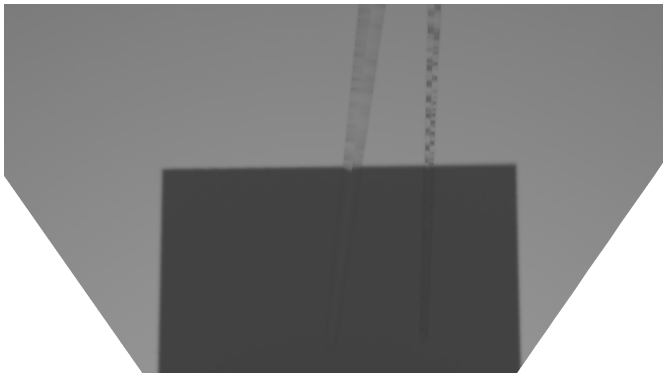
2. This Week's Progress

Image Processing

This week, we obtained some images from the simulator to develop and test the image processing algorithm. Using these images for different camera positionings, we tried out combinations of inpainting and perspective correction algorithms. We concluded that using inpainting before perspective correction gives better results if using inpainting poses a necessity. Moreover, we tried out template matching as an object detection method, and we did archive research on "haar-like features for rapid object detection" algorithms for pole detection in case it becomes a requirement.





Communication
We programmed STM32F103C8T6 for UART communication. We can easily adjust the communication parameters and use our own modified protocols for data transfer. However, there are still problems on the code and some debugging is required.

3. Next Week's Plan

Next week, in image processing we will try out different background algorithms and implement those algorithms into our main code. Then, we will start to implement different methods to determine the required movements in the x, y and z-axis for base matching. We will also test our algorithm with new images to analyze its vulnerabilities.

The manufacturing process for the mechanical parts and actuators will be continued in the next week.

Debugging will be completed and the communication between the Raspberry Pi and the ST microcontroller will be tested and UART communication with multiple microcontrollers will be implemented.

Finally, the CDRR will be discussed and planned among the team members, and the workload of the report will be shared between the team.