Sundance Weekly Progress Report

Week 5

20.11.2022

1. Previous Week's Overview

Last week, our main objective was to prepare a proposal report. We determined the scope, the objectives, and the requirements of our project. We prepared a solution procedure for our problem, and made a detailed Gantt chart using that procedure. Then we shared the initial tasks among the team members. Lastly, we made lighting simulations to simulate some of the structures.

2. This Week's Progress

Mechanical Design

This week, we focused on the main decision for our project, which is the manipulator design. The bottleneck is the topology, where a solid design is required to lead the project. The latter systems are deeply dependent on this step. Thus, a great level of attention is required. The two preliminary designs are inspected. This week a couple more are experimented with where the design is slightly more unconventional. Another aspect of the project such as modularity, is again more predominant in these new designs. Some new designs might require another type of actuation rather than linear, some rotary designs are investigated. Another design capturing series manipulator, such as a robotic arm, is also investigated, and further simulation work is moving along. After finishing preliminary simulations, we will all gather and vote for the most suitable topology.

Choosing Preliminary Components

This week's seminar was important for mechanical design and we suggested working with the available components rather than creating a design from scratch, therefore we searched for linear actuators off the shelf. We found a variety of actuators but there were problems with the specifications where the forces are quite higher than our needs and the price range is more expectedly. Other than the actuators, we will need these products as well as basic electrical circuit elements:

- Filament for 3D printer
- USB camera for coverage and sun sensing

General Research

Superficial research for every part of the system (including materials, mechanical parts and motion, sun position sensing systems, control algorithms, etc.) is conducted. However, this week our team could not spend enough time on subsystem research, simulation, and design. It will be compensated by working harder next week.

3. Next Week’s Plan

As explained above, detailed design decisions for each subsystem should be made as we further research the subsystems. We will complete the tasks that were assigned last week to the team members. After this research, we will start to implement the basic features of these subsystems.