Team Name: sdmay21-40
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Project Title: Dancing Swarm of Robots
Report Period: Sept. 14 - Sept 27
Advisors: Dr. Akhilesh Tyagi, Dr. Diane Rover, Dr. Phillip Jones

Summary of Progress in this Period

During this period, our group finalized our project plans and took our first steps toward prototyping. Normal weekly advisor and team member meetings were held with project plans being made. The group finalized the subtask breakdown and project schedule, both parts of our Project Plan Lightning Talk. Work began on the first two chapters of our Design Document, with these chapters to be completed in the first portion of the next period.
For extra guidance with the Webots platform, a portion of our group met with Group 10 from the Spring-Fall 2020 Senior Design session. We got an overview of setting up projects, adding robot nodes, and creating, modifying, assigning, and compiling node controllers. From this meeting, we were able to begin our first basic Webots model with the baseline iRobot Create platform.
Lastly, we began a simulated software model to experiment with our algorithm outside of Webots. This model is a simplified 2-D visualization of the three swarm participants and their movement directions. Currently, follower robots are able to maintain their position correctly as long as the leader moves in a straight line.

Pending Issues

The LiDAR sensor that we plan to use isn't built natively into Webots, so we will have to find a way to either adapt an existing sensor to behave similarly to ours or model it from scratch. Additionally, we don't have the data to properly model the dimensions of the acrylic plates, circuitry, and servo motor that are mounted to the CyBots we plan to use. We are currently working to get the design schematics for these mountings from ETG.

Plans for Upcoming Reporting Period

For the next period, we will initially be finishing V1 of the Design Document. Modelling of platform motion and the LiDAR sensor in Webots will begin prior to initial simulated integration. Once we receive the design data of the CyBot mounts, modelling of the full platform will begin. This will require added geometry nodes for each mount component, as well as the servo model.
Additionally, our simplified algorithm model will be developed further. We will be attempting to incorporate some basic turn maneuvers to the leader's programmed path. Once our integrated simulation model is complete, this algorithm will be incorporated into the follower robots' controllers. This will make them follow the leader at the correct separation distance and angle.