Roomba Swarm

Team: sdmay22-02

Unit Testing

Most of our unit testing will be done by testing the functionality of individual components of the roombas.

- LiDAR
  - Manual setup of an object at a specific distance and checking if the LiDAR results match the actual measurement
- Movement
  - Programming a movement routine testing and manually checking if the roomba does the expected routine. The routine will be moving forward and driving in a figure 8. It won't test reverse because the project requirements don’t require reverse driving
- Direction decisions
  - We will program a movement routine and manually check if the roomba does the expected routine.
- Receiving controls
  - We will send a movement routine over the air and manually check if the roomba does the expected routine.
- Following a leader.
  - We will program a movement routine for the leader and manual check in the follower follows.

Interface Testing

- Manual leader control
- Leader tracking with LIDAR
- Obstacle detection
  - All sensor types
- Obstacle avoidance
  - Either follower or leader

Integration Testing

- Integrating LIDAR with the rest of the robot
- LIDARs connection to movement direction (followers)
- Movement connection to controls received (leader)
- Obstacle detections connection to movement

System Testing

- Leader system testing
  - LIDAR detects obstacles
  - Robot follows desired path
  - Robot avoids obstacles
- follower system testing
  - LIDAR detects leader
  - LIDAR detects obstacles
  - Robot follows leader at the expected distance
  - Left and right robot follow the leader at the correct angle from the leader and each other
  - Robot avoids obstacles

Regression Testing

- Checking basic movement after new code is added
- Developing tests early and running them after any major changes
- Develop a routine for the roombas to follow which tests every subsystem after each test

Acceptance Testing

- Build tests to show simple desired flock movement
- Roombas follow the given movement routine
- Build advanced tests showing the flock avoiding obstacles
  - Video tests to show client, as well as analyze position, angle, etc.

Results

- Results will be in the form of visual verification by the team
- Results of tests will be recorded on video or documented with a written report
- Analyze video for robot meeting positional functional requirements