EECS 4421 Robotics
Final Project Mobile Robot

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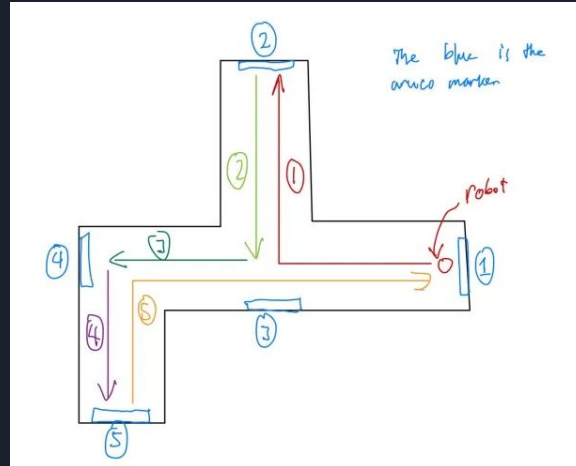Tom Vo, 218799171
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What is our project?

- Simulate an autonomous mobile robot in a virtual lab environment using Gazebo and ROS2

- Our robot navigated between stations represented by Aruco targets

- The robot would be able to deliver coffee, be a mobile printer, or garbage can.

- Stops in front of obstacles and tells the object to move out of the way in the terminal

- Demonstrates autonomous navigation, localization, and path-following in a controlled environment

What we did so the robot can navigate through the map?

- We combined the LIDAR and camera
- We decided that the robot would navigate through the map through a defined path
- We added aruco targets in the map so that the robot would be able to follow and go towards the target, so that it doesn't stray off it's given path

Demo

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Challenges

- Having the robot recognize the aruco target and driving towards it

- Integrating obstacle avoidance with aruco target based navigation

- Ensuring the robot follows path points smoothly without straying off from its original targets

Some Changes We Made From the Proposal:

Original Proposal

- Robot navigates to computer stations in LAS 1004 map

- Command-line destination selection

- Focus on lab room map environment simulation

- Originally wanted to use nav2 for the robot to navigate

Actual Implementation

- Robot navigates through a enclosed map and searches for Aruco markers

- Added aruco targets with predefined path to navigate through the map

- Robot navigates to all of the stations within one command.

- Map is more simplified to make simulations easier

Future Work

- Allow the robot to move around large obstacles instead of stopping

- Detect when a path is fully blocked and automatically skip to the next task

- Improve navigation so the robot can find alternative routes when needed

Any Questions?