Collector Robot - Project Magpie ACME Robotics

Background and Motivation

- Large gatherings of people at public spaces often lead to significant amounts of trash on the floor. However, trash collection done by human beings is very inefficient and labour intensive.
- Robots provide repeatable and scalable trash handling solutions. Thus, we propose the use of Turtlebot 3 for collecting trash. This methodology can significantly reduce cost.

Technical Approach

- Integrate the apriltag ROS 2 package with turtlebot 3 to detect trash blocks.
- Developing a reliable and sophisticated ROS 2 package using C++ for navigating from current pose to the final pose near the detected trash block.
- Create launch files with necessary parameters to provide stable simulation environment in ROS 2 and gazebo.

Objectives

- Detection of trash using apriltags and images captured from robot's on-board camera.
- Implement path planning to help the robot navigate from its initial position to the detected trash.
- Generate scenarios to test the robot's robustness.
- Simulate the turtlebot 3 with block collection using Gazebo and ROS 2.

Deliverables

- GitHub repository of the ROS package containing source code and steps to build and run the simulation.
- Project documentation and UML diagrams.
- Sprint planning and review sheet.