SAP Individual Report

Team Homo-SAP-iens
Dhruv Pandit
K23118144

I. Reflection

The project aimed at making a robotic museum tour guide that can autonomously navigate museums, talk about the exhibits and answer any questions that a visitor might have. While we were able to accomplish these goals, certain elements of the implementation didn't run properly on the actual robot. While we used our time as effectively as we could given other deadlines and coursework, better planning at the beginning of the project could certainly have helped. The coursework gave me a lot of experience working with ROS, a framework I was not too familiar with before the start of the module.

II. Individual Contribution

I was asked to work on the locomotion and object avoidance node of the project.

The locomotion node is responsible for moving the robot to a set of coordinates. These coordinates could either be obtained from the RGB-D camera or predefined based on the position of the Museum exhibits.

Locomotion is handled by the geometry_msgs package which provides message types for representing geometric concepts and data in robotic systems. It includes message definitions for various geometric entities such as points, vectors, poses, transforms, and other geometric primitives. These messages are designed to facilitate communication between different components of a robotic system, enabling the exchange of geometric data between sensors, actuators, controllers, and other software modules within the ROS framework.

The obstacle avoidance portion of the project used the RGB-D camera and laser sensor on the base of the robot. Data from these sensors is published by the laser and depth camera topics and is used to detect any obstacles in the way. If the obstacle is a person, the robot will wait for the person to move if not it tries to find a new path.

An image of the locomotion implemented in simulation can be seen Fig.1. In the image the robot can be seen navigating towards the wall with the artwork.

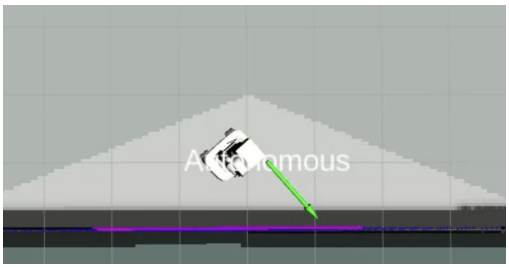

Fig. 1. Locomotion simulation

III. Project Analysis and Conclusion

We were successfully able to implement each task that we set out with at the start of the project either in hardware or in simulation. The robot was able to identify artwork, objects in its environment and people wanting to ask questions. It was also able to navigate to a set of given coordinates.

While the robot is able to identify people in its path and answer questions when someone raises their hand, future work could include detecting the person's facial features to check if they want to ask a question. This information could then be used by the robot to prompt questions thereby making the guide more proactive rather than purely reactive.