EAS 561TUT Robotics Project

Student Name: Venkata Harikrishna Talapala

Project Guidance: Dr. Prof. Vojislav Kalanovic

Mobile Manipulation Robot using Neural Networks Perception and RRT*

UBID: 50441870

Problem Statement

Mobile Manipulation Robot using Neural Networks Perception and RRT*

The primary objective of this project is to facilitate the efficient transfer of objects from one location to another through the process of mobile manipulation by robots. As depicted below, the robot is required to navigate from the initial starting position to the designated goal position (G). Along this path, there exists an object location (L1) where an object is positioned, necessitating the robot's intervention to pick it up.

In order to successfully accomplish this task, the robot must possess the ability to identify and approach the object location, employing appropriate manipulation techniques to securely grasp and lift the object. Subsequently, the robot should navigate to the desired destination, ensuring the object remains stable and intact throughout the transportation process. The project necessitates the implementation of advanced perception algorithms for accurate object detection and localization. Additionally, sophisticated planning and control strategies must be devised to enable the robot to navigate the environment seamlessly, avoiding obstacles and adhering to safety protocols.

By addressing these challenges and developing robust mobile manipulation capabilities, this project aims to enhance the overall efficiency and effectiveness of object transfer tasks, offering valuable contributions to the field of robotics and automation.

To conclude, the main aim of this project is to Implement Object Detection using Neural Network and Grasp the Object from Object Location(L1)* and Move to Another Location Avoiding Obstacles using Motion Planning Algorithm (RRT*) and Place the Object in the Goal Position(G)*