Autonomous Vehicle Sensor Data Processing to Enable Control of Material Handling Equipment

Alvin Antony, Chutimun Glanboot, Nick Teteak
Faculty Mentor: Dr. Hasan Ferdowsi
Client: Eric Richardson from UniCarriers America Corporation
Electrical Engineering, and Mechanical Engineering

Abstract

In this project, a multi-sensor system that will be attached to a robot for navigation. The sensor system will collect and process data to navigate the environment by the robot. The essential features of the project are how the sensor system will interpret the environment data; how it will parse and pull valuable information out of the data streams.

Methods and Materials

ROS: A flexible framework for writing robot softwares.
-RViz (ROS Module): RVIZ is a configurable 3D visualization tool for ROS applications.
Intel RealSense Camera: A device designed to give machines depth perception capabilities and much more.
Toposens 3: This sensor provides similar data as the RealSense camera: 3D depth data.
ABS-Like Photopolymer Resin: Used for creating Sensor Module Housing.
Turtlebot: A testing robot that will carry all the listing components.

Results / Discussion

Toposens 3 Sensor: The data points that were gathered revealed to be flawed. External high frequencies caused false data points to appear within the ultrasound map.
Intel RealSense Camera: internal testing revealed that a realistic range for this sensor was around five meters; with any practical data being only generated when the sensor was within two to three meters away.

Conclusions

Our goal is to create a system that can turn manually controlled vehicles into fully autonomous vehicles. This project brings together two different types of sensors to create a more accurate representation of the surrounding environment.

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