

Coding exercise 3 for CS 498

Total points: 200

In this coding laboratory, we will collect data from a ground robot and process it to do basic SLAM.

The learning outcomes are:

1. Obtain data from robot, process data from robot, plot and analyze
2. Understand how to interpret data from active radiation based sensors, such as scanning lasers (LIDARs)

Questions for the report and points:

The data has been collected for you from the lab. The data will be shared with you as ROS bag.

Q1: Use Python/ROS functionality to plot the LIDAR data, demonstrate that with your script one can manually identify the walls and the opening on screen shots of the plots. (Hint: you can use RVIZ to do this) (20 points)

Q2. Write software in Python to find and fit lines and corners from the LIDAR data. (100)

Q3. Create software in Python to create a complete geometric map of the corridor using one of the line fitting algorithms discussed in chapter 4.7.2 of Siegwart. (40)

Q4. Use an inbuilt ROS package, such as gmap or ros-navigation to create a map based on the ROS bag and compare that with the geometric map that your software generated. (40)