

Lab 2

Zeta Group:

Justin Evaristo

Aditya Malik

Ben Poreh

Andrew Wood

Our lab was focused on deploying our code from HW 2 on a turtlebot platform inside the lab. Our code did not differentiate in its architecture between the two platforms (STDR and the turtlebot) except for the message topics that it subscribed and published to. What was different was the behavior of the robot in the real world versus the behavior of the robot in simulation.

In simulation, LIDAR scans are “perfect:” the points in each scan correspond to the ground truth at each angle and there are no fake points. In addition, obstacles in a 2D simulator have no height, so it is a safe assumption that if an obstacle in the simulation exists, the LIDAR will detect it if the robot moves within a clear line of sight within the LIDAR range. Therefore, the code given is perfect for it’s job. The code that executes will perfectly protect the robot in simulation from hitting any obstacles that exist in the simulation for all time. In contrast, the real world does not have these nice properties. LIDAR scans are inaccurate and biased; a point in a scan may not correspond to an obstacle at the indicated point, and even if there is, the distance to the obstacle may not be what is represented in the scan. Additionally, a LIDAR can only see obstacles in a plane, any obstacle that the plane does not touch is not seen by the LIDAR which can lead to the robot becoming “closelined” or “tripped” by obstacles that it did not see. Therefore, the code given to it will not perfectly protect the robot from all obstacles in the real world, and other techniques must be taken.

Our code is located at <https://github.com/aew61/eecs376> and a video of our robot running the code from this lab is located at <https://www.youtube.com/watch?v=JKXRF8CRheI&feature=youtu.be&app=desktop>