

Andrew Tarnoff

Mobile Robot Programming Problem Set #4

CODE LINKS:

Lidar Alarm: https://github.com/art81/EECS373/tree/master/MobileRobotics/mobile_PS4_traj_gen/lidar_alarm_2/src

Traj Builder: https://github.com/art81/EECS373/tree/master/MobileRobotics/mobile_PS4_traj_gen/traj_builder/src

Theory of Operation:

The first thing that I did for this assignment was update lidar alarm. I first implemented the estop and clear_estop services into this node and made it so that when it detects an obstacle it calls the estop service once and when this obstacle goes away it will call the clear_estop service only once as well. It is important to note that estop is only called when there is a blockage and there previously wasn't one and clear_estop is only called when there is no blockage and there previously was one (in this case "previously" means the last lidar scan received). This will make it so that the robot will be able to resume motion as normal once it has stopped safely and the blockage has been removed.

In order to make the robot stop safely in front of the blockage, I implemented "build_braking_traj." This function is called from the "pub_des_state" node once the estop is initiated (by the lidar alarm). My theory/approach was to write a trajectory that started the robot at max speed (worst case for braking) and slowed it down at max acceleration. This was easily implemented using the global variables for max speed/acceleration, a simple "for" loop to fill the "vec_of_states" object that holds the generated braking trajectory, and simple kinematics.