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Mobile Robotics
PS8

       For this assignment, the robot was to navigate the 2nd floor of Glennan's hallway. Using a simulation of the space, from the robot's starting position in front of the lab doors, the robot was to travel down the long hallway to the service elevator and then return to its starting position.

       The path client in the "pub_des_state" package was used to publish a path of poses to accomplish the desired route. Coupled with the respective service and the lidar alarm, the robot would follow the desired route unless it encounters an obstacle, in which case a graceful halt is performed. The path would then continue once the obstacle is removed.

       To help the robot navigate via odometry, the linear steering node was included in execution. This allows it to follow the straight lines that make up its path execution from point A to point B. However, as this relies on odometry, drifting odometry means the desired path execution will be off, which could mean the robot does not reach the desired goal. The drifty odometer node was included in execution to force this possibility to be accounted for.

       To account for this, the AMCL node performs the Monte Carlo algorithm against a reference map of the 2nd floor of Glennan. This allows for (fairly precise) estimation of where the robot is, and the odometry frame is altered accordingly to account for any discrepancy. With a verified odometer, the steering algorithm is able to drive the robot in the desired straight lines, which means the path client is able to direct the robot to the service elevator and back.

       The video showing the test run of these procedures is included in the directory of this report. The effects of the drifty odometer are visible as the robot wobbles here and there, but beyond that the straight-line execution of the path is achieved with decent success. While the graceful halt system was not exercised, by nature of this simulation and the desired goal, the other systems in place show the expected results.

       The launch file used to run the simulation, as well as copies of altered code and the lidar alarm, are included in the directory of this report.