Trevor Rocks

3/30/16

Lab 2 Report

The robot uses odometry in order to track its own location in a global frame. Using the simulated area created in the RViz program the robot determines in location. By calling the function tCallback every .01 seconds the position of the robot was updated constantly throughout the processing of any other function. By utilizing the lookupTransform function the position and orientation of the robot could be determined, from which the quaternion could be determined. The quaternion holds the location of the robot which can then be used in terms of roll, pitch and yaw to describe the position in a 3 dimensional space. The most commonly used of these is the yaw, as a turtlebot has no ability to roll or pitch on its Kabuki base. The yaw is given in radians which is converted to degrees using the math.degrees(int) function. The position gained from the lookupTransform function could be divided into the x and y Cartesian coordinates. This gave the necessary positional data of X, Y and Θ which are necessary to complete this lab. This data could be used to ensure that the turtlebot rotates to the correct direction, and that it drives the correct distance by tracking the changes in yaw and location of the robot. By converting the x and y position to a polar distance magnitude and comparing the current position to the desired condition, the distance the robot needed to travel could be determined with a high degree of accuracy. Instead of comparing speed data, which can be fairly inaccurate depending on a variety of external forces.

The only section of the lab I was unable to complete was the Bumper Press Trajectory. The Bumper press trajectory was not working in the gazebo simulation environment. I suspect that the built in function in response to the bumper press caused the error. As the code function given to us to simulate a bumper press simulated a 3 second continuous press the robot continuously was commanded to move backwards in a circle which prevented the code from working. I also was unable to drive the robot in the real world. Several connection issues between both my personal computer and the lab computers prohibited my from completing demonstrations in real life.