

Assignment

Turtlebot is low-cost robot kit with open source software, used extensively in research and testing of robot-based solutions. The most recent version of Turtlebot is called Turtlebot3, and is built and maintained by Robotis

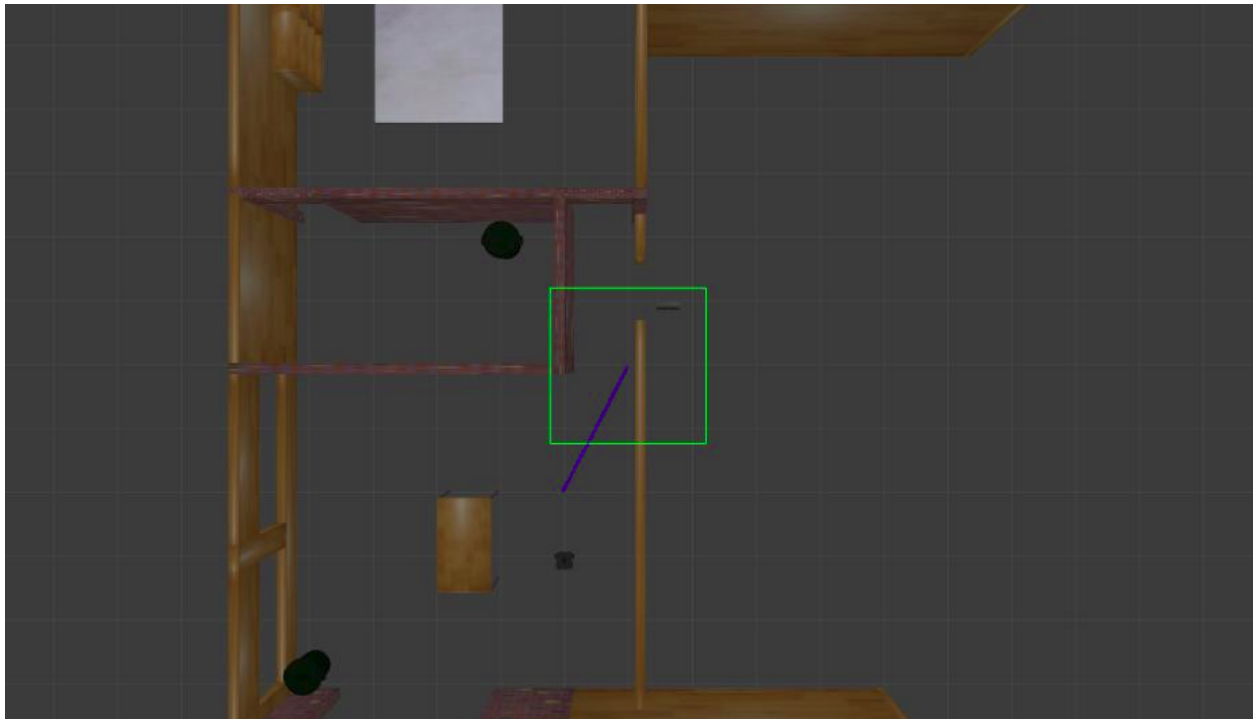
[Turtlebot e-manual](#)

To complete the assignment, you will need to have the following prerequisites :

1. Ros Kinetic or Ros Melodic full version Installed on your computer.
2. Turtlebot3 installed on your PC. Configure to use Turtlebot3 Waffle as your Robot model.
3. Turtlebot3 simulations installed on your PC
4. OpenSlam - Gmapping and its ROS Wrapper (Gmapping) installed to use with ROS

Assignment :

1 - Run Turtlebot3_Gazebo / Turtlebot3_House Simulation. The environment should look something like this :



2 - Design a program using Python , that takes various modes of operations as input :

Operation ID	Task
1	TeleOperation
2	Capture Screen-Shot
3	Showcase Real-Time Graph (Using Matplotlib)
4	Save Log Mode

3 - Create a Ros node within your python program, that takes following keyboard inputs to move right/left/front/back.

Keys	Task
A	Move Left (Angular Velocity - 0.22)
D	Move Right (Angular Velocity 0.22)
W	Move Forward (Velocity 0.22)
X	Move Backward (Velocity 0.11)

4 - Create another node in your program that subscribes to the robot pose, and plots the movement of robot in 2d space. Assume the initial position of the robot be (0,0)

5 - Create a node that publishes a custom topic called Swarooph_diagnostics, and subscribes to camera info and diagnostics topics.

6 - Use Save log mode to save the snapshot of the message of any topic requested into either a JSON file, or as an entry into a custom SQL table.

[Bonus Question]

7 - Use your program and Gmapping/OpenSlam_Gmapping to create static map for the above mentioned Gazebo World, and overlay your changes in position on top of the map.