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Learning Module 8: Autonomous Vehicles/Navigation

Module 1: Wandering

Week 1: Basic Operation

Homework 5 Question: You should roughly reiterate the activity, discuss how it was accomplished, demonstrate through images (if possible) the functionality, then briefly note any observations (including cases where it may not work so faithfully, or what is needed to work very well):

In this activity we connected the turtlebot to gtother with loose security. We then launched the minimal version of turtlebot_bringup on the turtlebot which serves to startup the robots operating system. We then used a separate laptop to ssh into the turtlebot and launched the turtlebot's teleoperating system. This allowed us to have basic control over the turtlebot from our laptop. We were able to move the turtlebot in all directions including forward, backwards, and various different ways to turn. We were also able to adjust the speed. One of the problems we encountered was that the turtlebot was often slow to respond to our commands. We need to further investigate this issue as we aren't sure if it is the speed of our laptops virtual machine, an unreliable connection with the turtlebot, or something else entirely.

Turtlebot Adventures Answers

1. The teleoperate code performs some of the tasks that you will need to do, which are to drive forward/backward, turn, adjust velocities, etc. What are the commands to do that? What are the different options possible?
   The commands for the teleoperate code are as follows:
   Moving around:

   u i o

   j k l

   m , .

   q/z : increase/decrease max speeds by 10%

   w/x : increase/decrease only linear speed by 10%

   e/c : increase/decrease only angular speed by 10%

   space key, k : force stop

   anything else : stop smoothly

Where ‘i’ is forward and the ‘,’ is reverse. The ‘j’ and ‘l’ turn counter-clockwise and clockwise, and ‘u’, ‘o’, ‘m’, and ‘.’ do a combination of turning and moving. q/z, w/x, e/c, space, and k all describe what they do above.

When these keys are hit, different values are assigned to the linear and angular speeds of a Twist message which is then published to the cmd_vel topic.

2. What are the topics that are published to in order to send the commands?
   The Keyboard Teleop publishes to the cmd_vel topic. This topic is for the command velocity and has a scale for the linear and angular velocity. This is done via a Twist message that is constructed and whose data is filled in based on the key pressed.

Source for 1 and 2:

https://github.com/turtlebot/turtlebot_apps/blob/hydro/turtlebot_teleop/scripts/turtlebot_teleop_key

https://github.com/turtlebot/turtlebot_apps/blob/hydro/turtlebot_teleop/src/turtlebot_key.cpp