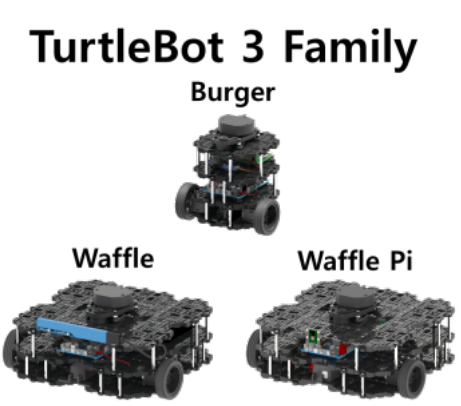
ROS Workshop - Tutorial 5 - Turtlebot3 Simulator

ME 4140 - Introduction to Robotics - Fall 2021



Overview:

After completing *Tutorial 4 - Create Package*, You have learned some basics of ROS, and you can are ready for a more advanced robot. You can read more here and here.

System Requirements:

- **ROS+OS**: This tutorial is intended for a system with ROS Melodic installed on the Ubuntu 18.04 LTS operating system. Alternate versions of ROS (i.e. - Kinetic, Noetic, etc.) may work but have not been tested. Versions of ROS are tied to versions of Ubuntu.
- **ROS:** Your computer must be connected to the internet to proceed. Update the system before you begin.
- **Workspace Setup:** You must have successfully setup a Catkin Workspace in tutorial 4.

Disclaimer:

- **Backup the System:** If you are using a virtual machine, it is recommend to make a snaphot of your virtual machine before you start each module. In the event of an untraceable error, you can restore to a previous snapshot.
- ROSLAUNCH: This tutorial involves using the roslaunch command which runs a multiple of nodes at once as described in the launch file. We will learn more about this later.

Part 1 - Turtlebot3 Installation:

1. Update your linux system before you get started.

```
sudo apt update
```

2. Install the necessary nodes into your ROS system. This tutorial comes from here.
turtlebot3

```
sudo apt install ros-melodic-turtlebot3
```

turtlebot3_simulations

```
sudo apt install ros-melodic-turtlebot3-simulations
```

turtlebot3_gazebo

```
sudo apt install ros-melodic-turtlebot3-gazebo
```

Part 2 - Turtlebot3 Testdrive:

1. Test the simulator. The environment variable TURTLEBOT_MODEL must be set to choose your robot type. Use echo to add this line to the .bashrc script so you do not have to do it for each terminal.

```
echo "export TURTLEBOT3_MODEL=burger" >> ~/.bashrc
```

Now that run that script. It will also run each time you open a new terminal.

```
source ~/.bashrc
```

Then turn on the simulator.

```
roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

You should see the gazebo window open containing your robot. Test that the keyboard drives the robot. Enter the following command in a new terminal.

```
roslaunch turtlebot3_teleop turtlebot3_teleop_key.launch
```

2. Now turn on the node to produce robot data in the simulated world.

```
roslaunch turtlebot3_gazebo turtlebot3_simulation.launch
```

Open RVIZ to view the data. This is a very useful tool.

```
roslaunch turtlebot3_gazebo turtlebot3_gazebo_rviz.launch
```

Tutorial Complete:

After completing *Tutorial 5 - Turtlebot3 Simulator*, you are ready to learn about robot navigation with SLAM and GMAPPING ! Please see the tutorial referenced above if you are ready to proceed.