RobotLab 0: Preparation

ENGN 4627/6627 Robotics 2018 S2

July 28, 2018

1 Purpose

This lab is meant to get you started with the TurtleBots that you will be using for the rest of the semester.

In this lab, you will first learn how to use some common ROS commands. You will also learn how different ROS nodes run and communicate with each other.

2 Preparation

This lab assumes that you're comfortable with Linux command terminal. If you're not already comfortable with Linux command terminal, you should probably look over the relevant tutorials to make sure you understand the core concepts.

In your own time, go through tutorials at:
`http://wiki.ros.org/ROS/Tutorials` (Beginner Level)
`http://wiki.ros.org/Robots/TurtleBot` (choose Kinetic, sections 1 to 5)

3 Task 1: Set up TurtleBot and wifi connection

1. Log in to your TurtleBot.
2. Connect it to your nearest wifibot router
3. Find IP address of your TurtleBot using *ifconfig* command.
4. Update your */.bashrc* file to use this IP address.
5. Open an new command terminal (press Ctr+Shift+T) and try each of these commands in a new terminal:

```
# Initialisation on TurtleBot computer:
$ roslaunch turtlebot_bringup minimal.launch
$ roslaunch openni_launch openni.launch

# Control (on TurtleBot or remote machine):
$ roslaunch turtlebot_teleop keyboard_teleop.launch

# Visualisation (on TurtleBot or remote machine):
$ rosrun image_view image_view image:=/camera/rgb/image_raw
$ rosrun image_view disparity_view image:=/camera/depth/disparity
$ roslaunch turtlebot_rviz_launchers view_robot.launch
$ roslaunch turtlebot_dashboard turtlebot_dashboard.launch
$ rosrun rqt_graph rqt_graph
```

4 Task 2: Navigate ROS

Practise ROS demo TurtleSim commands:

```
$ echo $ROS_PACKAGE_PATH
$ rospack find turtlesim
$ roscd turtlesim
$ tree /opt/ros/kinetic/share/turtlesim # or $ rosls turtlesim
$ rospack libs-only-L turtlesim
$ tree /opt/ros/kinetic/lib/turtlesim
$ tree /opt/ros/kinetic/lib/python2.7/dist-packages/turtlesim
```

Run each of these commands in a separate terminals:

```
$ roscore
$ rosrun turtlesim turtlesim_node
$ rosrun turtlesim turtle_teleop_key
$ rosrun rqt_graph rqt_graph
```

Display information:

```
$ rostopic -h
$ rostopic list
$ rostopic type /turtle1/cmd_vel
$ rosmsg show geometry_msgs/Twist
$ rostopic type /turtle1/cmd_vel | rosmsg show
$ rostopic echo /turtle1/cmd_ve
```

Control TurtleSim from commandline:

```
$ rostopic pub -1 /turtle1/cmd_vel geometry_msgs/Twist -- '[2.0,
    0.0, 0.0]' '[0.0, 0.0, 1.8]'
$ rostopic pub /turtle1/cmd_vel geometry_msgs/Twist -r 1 --
    '[2.0, 0.0, 0.0]' '[0.0, 0.0, 1.8]
```