ROS Hackathon

21st March 2017

1 General instructions

You will have to create a ROS node that will run on the youBot. Once you are done creating the node(or before you start), create tests using gtest or unittest. For examples of testing, refer First link Second link.

2 Task 1 - Move the robot left and right

2.1 Simulation

2.1.1 Requirements

- Gazebo simulator. If you don't have it, install it from Gazebo

- YouBot Model. Install from youBot model, if you do not have it.

2.1.2 Languages that you can use

Python or C++

2.1.3 Task

Wait until "e_start" is received. Use the last received input to publish relative poses to achieve required direction in which the robot will move.

Use latest received relative pose to publish to /cmd_vel and subscribe to /odom and use tf listener until relative pose is reached. Publish to /event_out once movement is complete.

2.1.3.1 Input

- ~/event_in: "e_start" and "e_stop" to start and stop the node.

- ~/input: Input strings "left" and "right"

2.1.3.2 Parameters

- ~/distance: this parameter defines how many metres to travel if "left", "right" is received as input.

- ~/x_vel: velocity of robot in x (m/s)

- ~/y_vel: velocity of robot in y (m/s)

- ~/theta_val: rotation of robot in (rad/s)

2.1.3.3 Output

- ~/event_out: Indicate success or failure of movement with "e_done" and "e_failed" .

- /cmd_vel: Publish the velocities to the base.

2.2   Implementation on the real robot.

Implement the same scenario on the youBot.

3   Task 2 - Moving the youBot a specific distance from a person/object

You have to create a ROS node that interacts with the laser scanners on the youBot. Your task is to move to the youBot away from a person/object when the person/object is at a certain distance from the Laser Scanners of the youBot.

Some important information you need to know:

- LaserScan belongs to the sensor_msgs. Refer Laser scan for information about the LaserScan.

- The distances are stored in the "ranges" part of the LaserScan message.

- Refer ROS python programming examples

- Visualize the sensor data on RViz and notice the changes as you get closer to the sensors.