

Assignment 1

Hello ROS

Due Date: Sept 19

In this assignment, you will write a ROS package that finds the desired twist for tele-operating a husky robot.

1 Installation

- Download husky startup code
`git clone git@gitlab.cs.mcgill.ca:applied-robotics/robots/husky.git`
- Download Keyboard reader
`git clone git@gitlab.cs.mcgill.ca:applied-robotics/examples/keyboard_reader.git`

2 Preparation

Note: you only need to do this for the first assignment.

1. Follow the instructions [here](#) to setup your CS repository .
2. Create a new package `robotic-coursework-f2022` under your gitlab account
3. Create a catkin workspace
4. Add `husky`, `keyboard_reader`, and `robotic-coursework-f2022` into your catkin workspace (using symbolic links)

3 Specifications

1. In `robotic-coursework-f2022`, create a new ROS package called `husky_teleop_controller`. You can copy from the ROS Package Template. This package should read the input from the keyboard and publish a twist for the robot.
2. The package `keyboard_reader` checks the keyboard inputs and publishes a topic `teleop/cmd`. Create a node and subscribe to the topic `teleop/cmd`.
3. Determine the twist based on `teleop/cmd`. We will only use three keys:
 - I: move forward. Set the linear velocity on x-axis to 1
 - U: turn left. Set the linear velocity on x-axis to 1 and angular velocity on z-axis to 1
 - O: turn right. Set the linear velocity on x-axis to 1 and angular velocity on z-axis to -1
 - Otherwise, the twist should be a zero vector
4. We can control the Husky robot by providing the desired twist. Publish your twist to the topic `/husky_velocity_controller/cmd_vel`
5. Write a launch file called `a1.launch`. This launch file should start the node you created in `husky_teleop_controller`
6. To run your program, you need to have 3 terminals, each of them run one the following command:

```
> roslaunch husky_gazebo husky_empty_world.launch
> rosrunc keyboard_reader keyboard_reader
> roslaunch husky_teleop_controller a1.launch
```

4 Useful Tricks

- What topics does a node publish?
> rosnod info [node name]

item What is the data type of a topic?
> rostopic type [topic name]
- When ROS or Gazebo does not close properly, run
> rosnod kill -a ; rosnod cleaup ; killall -9 gzclient ; killall -9 gzserver

5 Evaluation

We will test your implementations by running

```
> roslaunch husky_teleop_controller a1.launch
```

Therefore, please make sure you have the correct package name and file name.

[5 pt] for packages correctly setup and run

[2 pt] for correct publisher and subscriber

[3 pt] for correct twists