MRT Assignment 3 - Gazebo Tutorial

Pranav Mylarassu

December 2024

1 Exercise 1:

No issues faced

2 Exercise 2:

It was a slight pain, without a GUI editor for gazebo ignition. I thought of editing in Gazebo Classic and then exporting it to Gazebo ignition, but then I decided I'd rather do that for bigger things, coz it didn't seem that hard to manage with altering the code each time I had to make a change.

2.1 Screenshots:

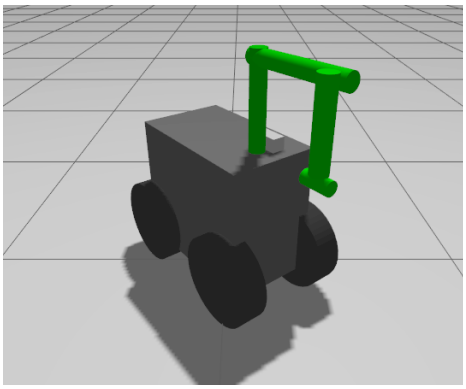

Figure 1: Exercise 2 Image 1

3 Exercise 3:

The images below show the process of rotation of the joints in the arm of the rover. The third image represents fallen warrior pose. Issues faced: Annoying

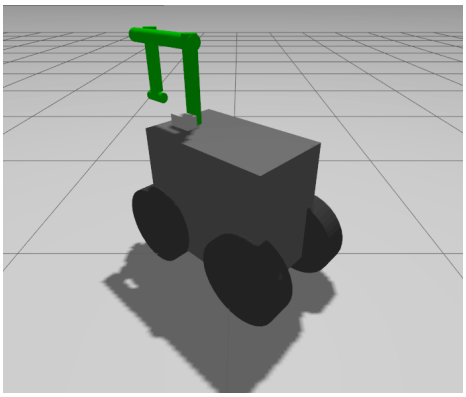

Figure 2: Exercise 2 Image 2

calculation of positions and stuff (pose).

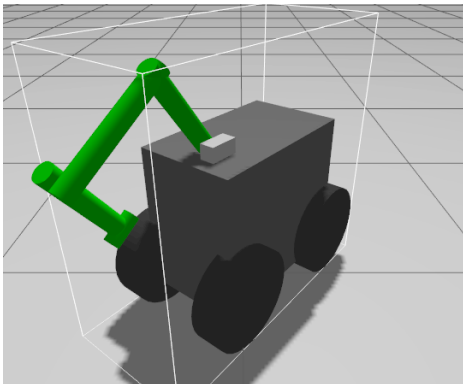

Figure 3: Exercise 3 Image 1

4 Exercise 4:

Issues: Every single step was an issue, so there's no point in listing them out. Main issue is lack of official information. No official documentation. Just "tutorials" which have minimal explanation and I personally found them useless in solving my issues. I ended up reading and understanding the literal differential drive code files on github and seeing where I went wrong.

Ultimately what I did was: 1. In order to launch gazebo from the launch file, I used the ExecuteCommand function and passed the regular command that I would use to launch gazebo on the terminal as argument. 2. The gazebo ros bridge was created using the ros_gz_bridge package. Figuring out the correct

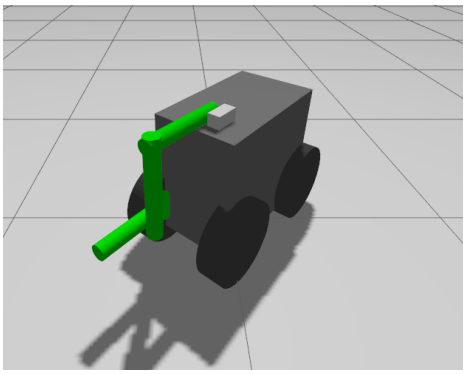

Figure 4: Exercise 3 Image 2

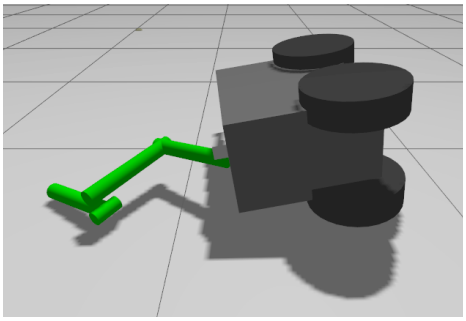

Figure 5: Exercise 3 Image 3

topic name (whether it should be /cmd_vel or /model/simple_rover/cmd_vel) was an issue. 3. Velocity commands are to be given on a separate terminal.

4.1 Commands used:

Navigate to the root directory of the terminal. Source the ros2 setup files, then launch the launch file as shown below.

```
cd
source ros2_ws/install/setup.bash
ros2 launch my_diff_drive my_diff_drive.launch.py
```

In another terminal, begin sending commands to the ros2 topic as shown below.

```
ros2 topic pub -1 /model/simple_rover/cmd_vel geometry_msgs/msg/Twist
"{linear: {x: 1}, angular: {z: 0.5}}"
```

4.2 Observations:

I don't have a maximum acceleration value in the sdf file. As a result, when the linear velocity of the rover is **decreased** by a minimum value of 2 m/s or so, the rover flips over. But if an upper cap is placed on the magnitude of acceleration this won't happen.

If the angular velocity is high, the rover flips over. The limit for that value depends on the linear velocity.