Simulating Robot in Gazebo and RViz

In this tutorial you will learn how to **simulate robot** in **gazebo** and **RViz**.

NOTE: Gazebo is the actual real world physics **simulator.** In this you can set up a world and simulate your robot moving around world . Rviz is the **visualization software** that is used for **path planning and localization** of your robot inside gazebo.

- Open a terminal and enter the following command:

  roslaunch task_1 simple_robot_gazebo.launch

You would see a Firebird robot inside the gazebo simulator. The output of above command is shown in Figure 1.1. You need to **go through the urdf model of Firebird** to understand about the blue region ahead of the Firebird robot model.

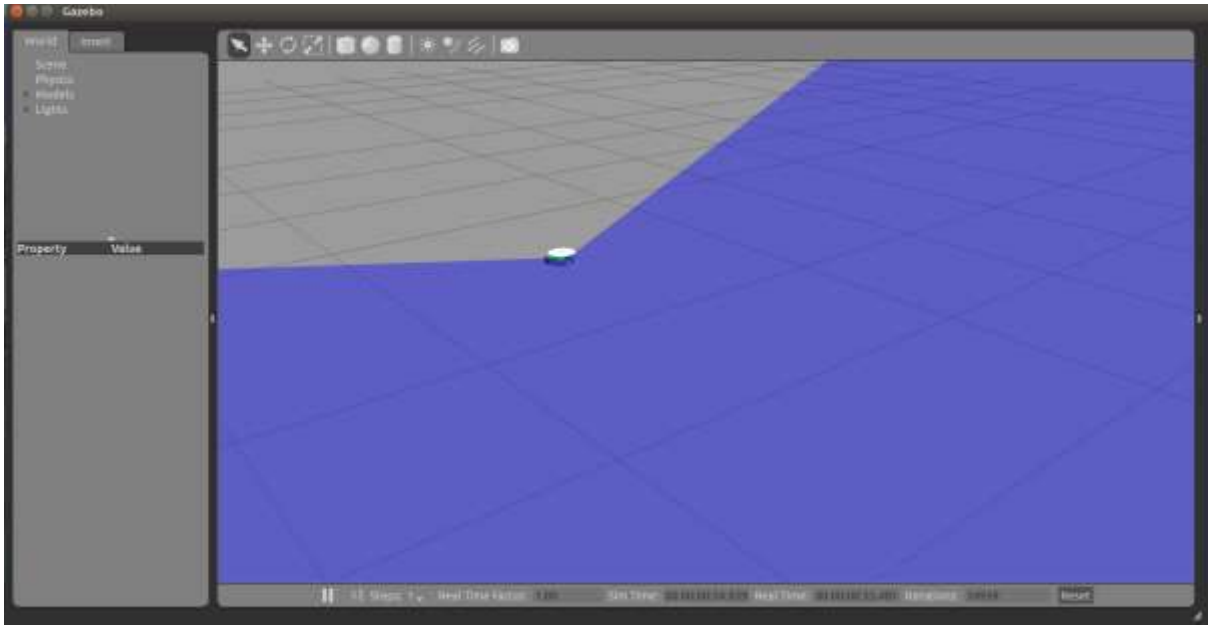

Figure 1.1: Firebird in Gazebo simulator

- **While Gazebo is running**, launch **RViz** in a new terminal by following command

  roslaunch task_1 simple_robot_urdf.launch

You would see the **Firebird model in RViz** as shown in Figure 1.2. **Choose the "odom" frame** as a **fixed frame from drop down list** to see any **movement in RViz**.

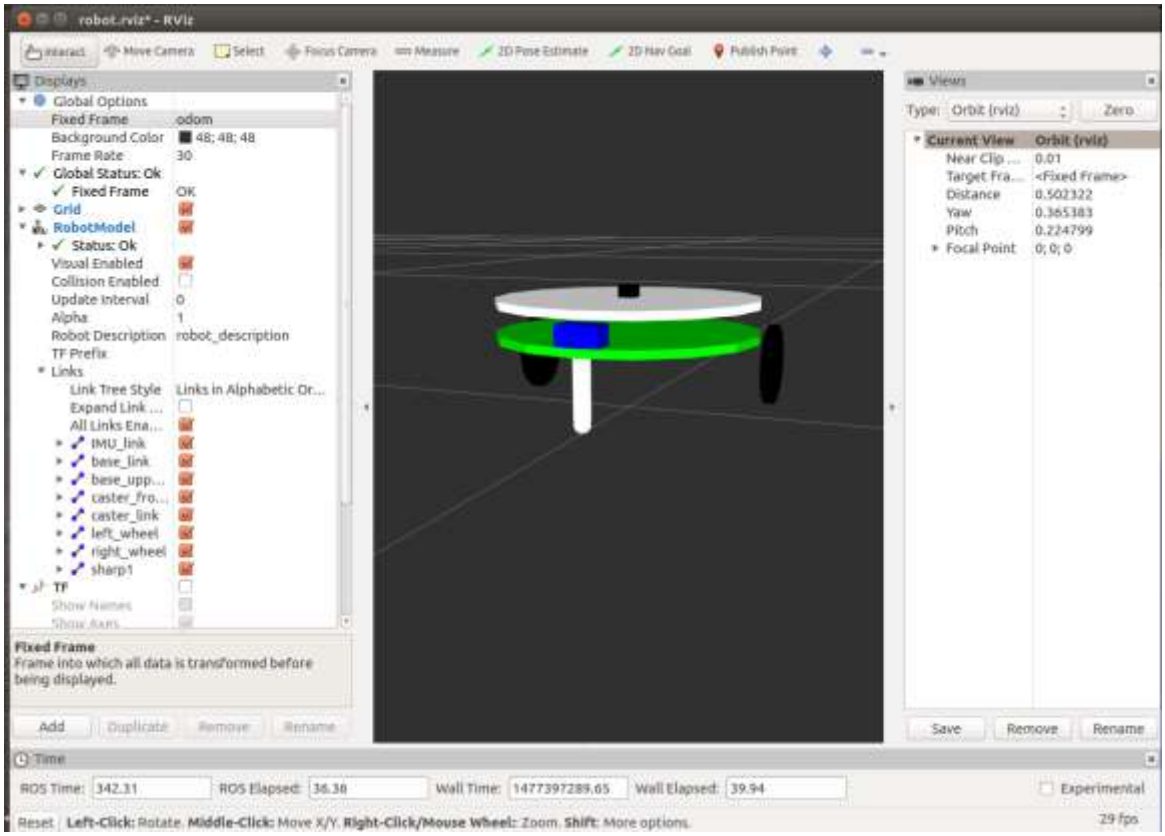

Figure 1.2: Firebird Model in RViz

You can navigate to ***"launch"*** folder of package to check the launch files by using the following command:

roscd task_1/launch

Take a look at all these launch files which helps you to understand things better.

- To check how this robot model is connected, you can run the following command in another terminal:

rosrun rqt_tf_tree rqt_tf_tree

The output of above command is shown in Figure 1.3.

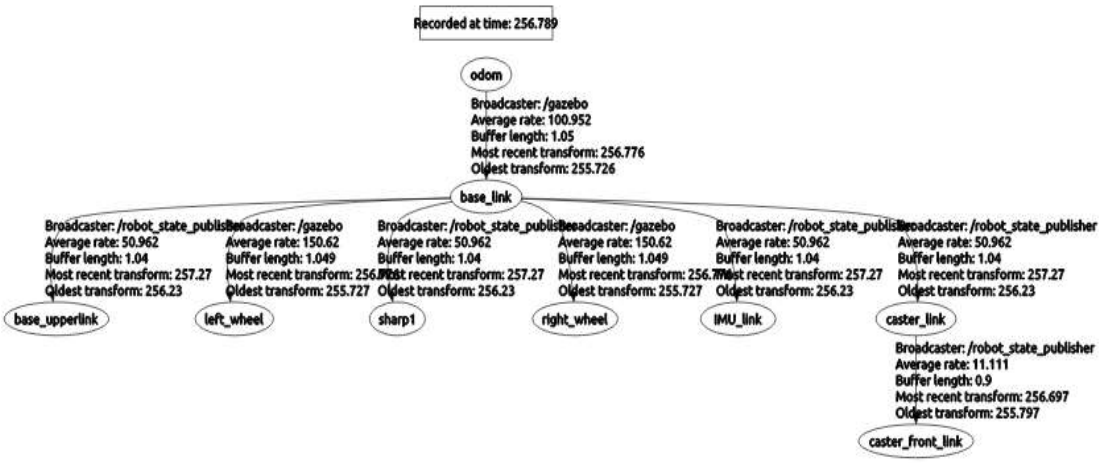

Figure 1.3: tf_tree

- To know how **topics and nodes are connected**, you can run the following command in terminal to check the **graph of nodes**:

  rqt_graph

- To move robot, you have to make necessary Python nodes executable:

  roscd task_1/scripts

  sudo chmod u+x robot_teleop.py

- To **move robot** in gazebo and rViz run the following command:

  roslaunch task_1 simple_tele_top.launch

The output of command is shown in Figure 1.4.

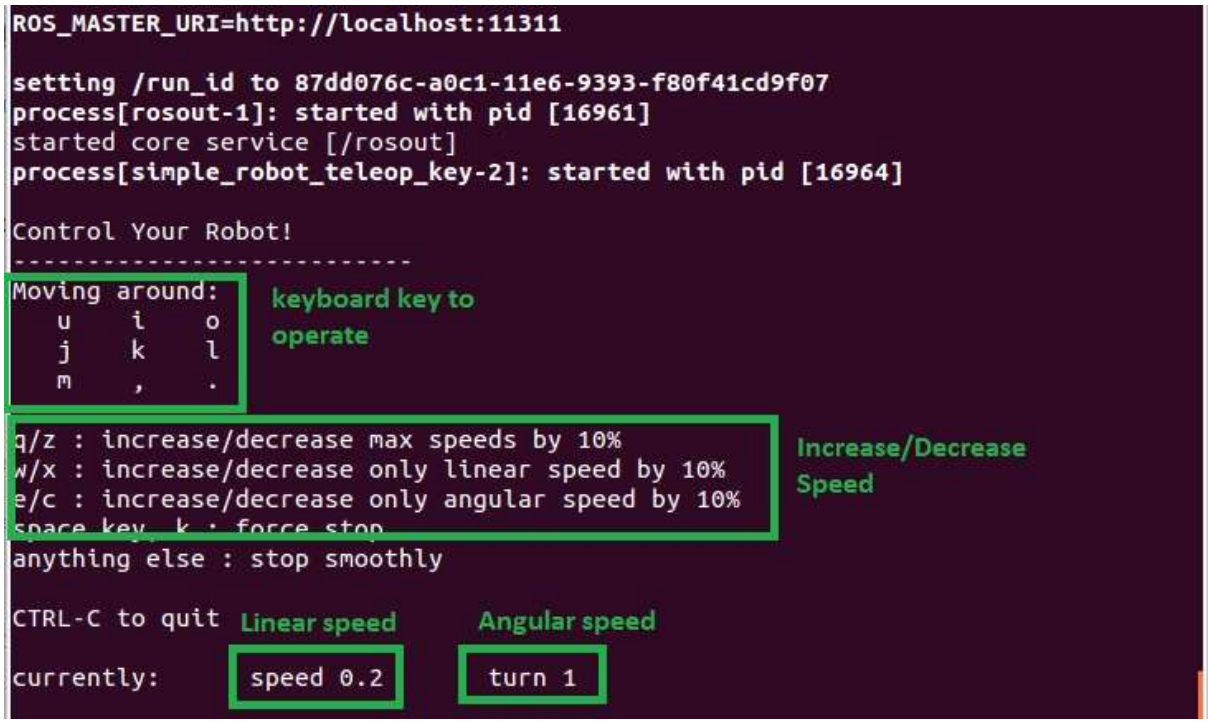

Figure 1.4: Keyboard teleop key

Now you can **move** the robot in the environment by **pressing the keyboard key**.

Check your understanding:

Can you answer these questions?

1. How is the robot set to motion?
2. What nodes are running to enable motion?
3. How these nodes and topics are communicating or connected with each other?

Hint: Use rqt_graph to analyze

If you are not able to answer these questions, please go through this book: "Programming Robots with ROS: A Practical Introduction to the Robot Operating **-** Brian Gerkey, Morgan L. Quigley, and William D. Smart **"**