Tiago simulation guide

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1 Getting started

Use following link to install fresh Ubuntu and ROS:
`http://wiki.ros.org/Robots/TIAGo/Tutorials/Installation/InstallUbuntuAndROS`
And the following link to install Tiago simulatior:
`http://wiki.ros.org/Robots/TIAGo/Tutorials/Installation/TiagoSimulation`
You should now have a workspace at

```
~/tiago_public_ws
```

When using the public simulator you have two robot options when launching:

- TIAGo Steel: in this configuration the end-effector is a parallel gripper
- TIAGo Titanium: the wrist has a 6-axis force/torque sensor and the end-effector is the under-actuated 5-finger Hey5 hand.

To lauch the simulator, run the following command in your workspace:

```
roslaunch tiago_gazebo tiago_gazebo.launch public_sim:=true robot:=steel
```

or

```
roslaunch tiago_gazebo tiago_gazebo.launch public_sim:=true robot:=titanium
```

You can also launch the simulation in a small office environment with people in it:

```
roslaunch tiago_gazebo tiago_gazebo.launch public_sim:=true robot:=titanium
↪  world:=simple_office_with_people
```

2 Controlling the simulation

2.1 Controlling the robot with your keyboard

Open two terminals and direct to your workspace in both and source the workspace:

```
cd ~/tiago_public_ws
source ./devel/setup.bash
```

Launch the simulation:

```
roslaunch tiago_gazebo tiago_gazebo.launch public_sim:=true robot:=titanium
↪  world:=simple_office_with_people
```

In the second terminal, run the following command:

```
rosrun key_teleop key_teleop.py
```

In this terminal windows you can now push your arrowkeys and see the robot move in the simulation.

2.2 Move through velocity commands

The velocity commands are sent to the simulation through the topic mobile_base_controllercmd_vel of type *geometry_msgs/Twist* which is composed of:

- *geometry_msgs/Vector3 linear*
- *geometry_msgs/Vector3 angular*

and is specified by a linear and an angular velocity.
How to:
Once again direct to your workspace and source the workspace:

```
cd ~/tiago_public_ws
source ./devel/setup.bash
```

And Launch the simulation:

```
roslaunch tiago_gazebo tiago_gazebo.launch public_sim:=true robot:=steel
```

In the second terminal windows you can now send commands specifying the linear and angular velocity by either:

```
rostopic pub /mobile_base_controller/cmd_vel geometry_msgs/Twist "linear:
        x: 0.5
        y: 0.0
        z: 0.0
angular:
        x: 0.0
        y: 0.0
        z: 0.0" -r 3
```

or

```
rostopic pub /mobile_base_controller/cmd_vel geometry_msgs/Twist -r 3 --
↪  '[0.5,0.0,0.0]' '[0.0, 0.0, 0.0]'
```

To make the robot move with a constant linear velocity of 0.5 m/s and -r denotes that the message is published 3 times per second.
The same can be done with angular velocity:

```
rostopic pub /mobile_base_controller/cmd_vel geometry_msgs/Twist "linear:
        x: 0.0
        y: 0.0
        z: 0.0
angular:
        x: 0.0
        y: 0.0
        z: 0.3" -r 3
```

or

```
rostopic pub /mobile_base_controller/cmd_vel geometry_msgs/Twist -r 3 --
↪  '[0.0,0.0,0.0]' '[0.0, 0.0, 0.3]'
```

to make the robot rotate around its own axis at 0.3 rad/s.