



CHALMERS
UNIVERSITY OF TECHNOLOGY

SSY235 - DECISION MAKING FOR AUTONOMOUS SYSTEM

TIAGo tutorials (Control)

Assignment - 5

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1 Teleoperating the mobile base with the keyboard

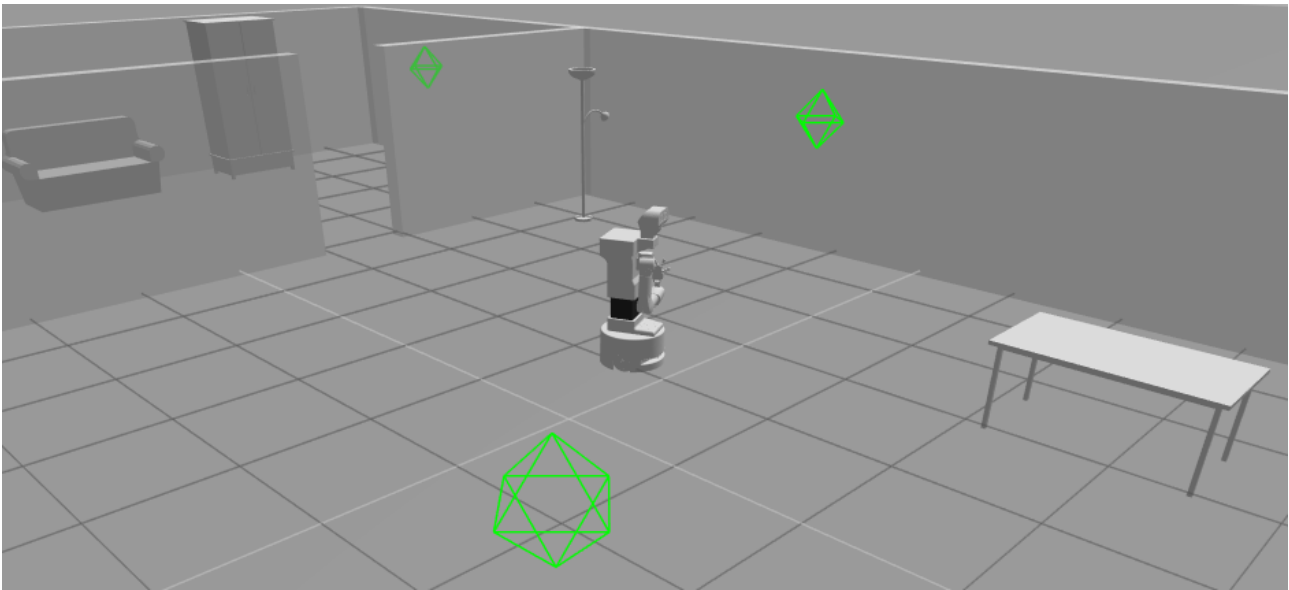


Figure 1: The interface showing TiAgo

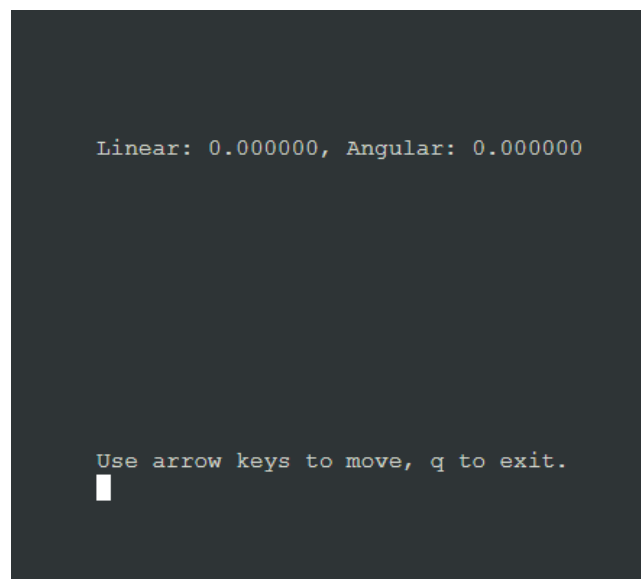


Figure 2: The interface for velocity input

From the Figure 1 and Figure 2 above, if we use the arrow key to control the direction the robot is moving and press it long, then the robot will move to that direction with higher speed, whereas when we press it not too long, then the robot will move to that direction with relatively lower speed.

2 Moving the base through velocity commands

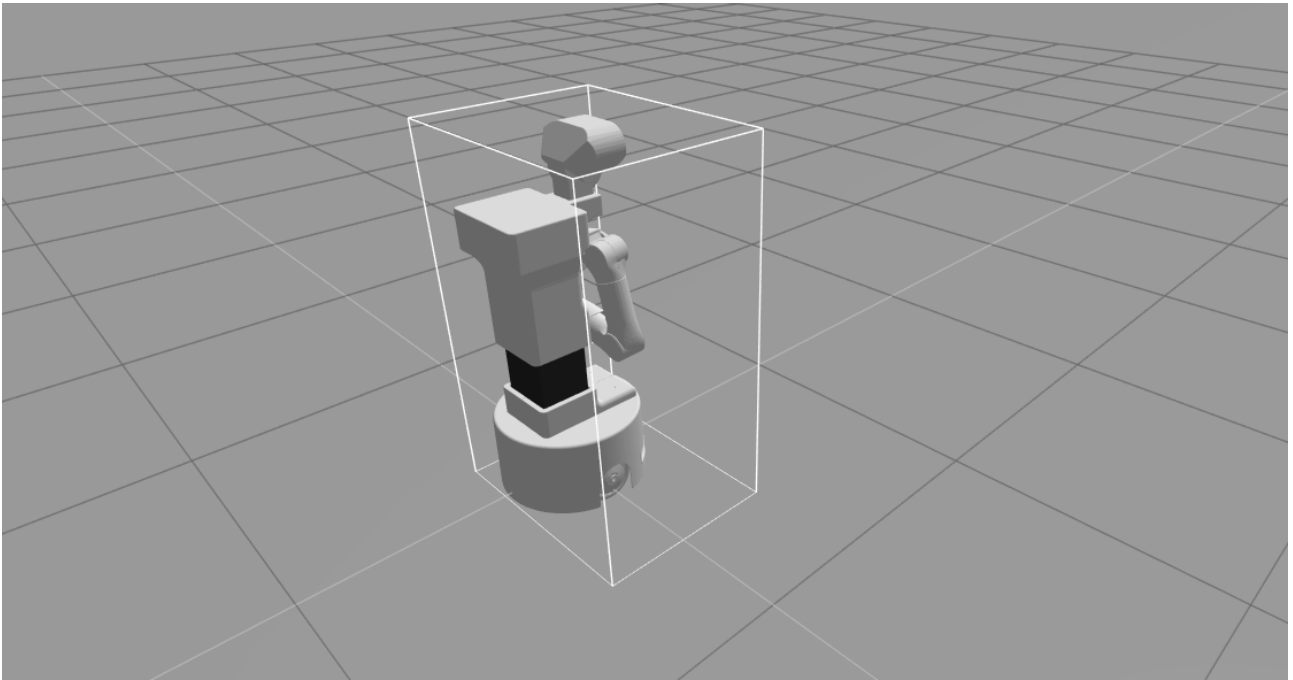


Figure 3: The interface for empty world

By using the command **world:=empty**, the robot will be spawned with an empty world as opposed to the previous tutorial as shown in figure 1. Secondly, by adding the command **-r 3**, combined with addition of linear velocity of 0.5 in the x-direction as instructed in the tutorial, the robot will keep moving in the right direction with constant velocity of 0.5 m/s. If we add a rotational velocity of 0.5 in the z-direction, the robot will have its base keep rotating on its axis as expected.

3 Joint Trajectory Controller

There seems to be no problem with the tutorial. It works as intended as arm moved to both waypoints. trying to add the third waypoint by adding similar lines with the first two waypoints. The result is that the final arm position will be different to the first two waypoints with the joints resting in different position.

4 Moving individual joints

There is no error in this tutorial. It is in fact a very simple way to setting through a GUI. However, using play motion package, trying for different combination of value sometimes result in error if the robot could not move into the desired position in time.

```
user:~$ rosrun play_motion move_joint
head_2_joint 5 1.2
Moving joint head_2_joint to position
5.0 in 1.2s
Execution failed with status ABORTED.
```

Figure 4: Error using playmotion package

5 Head control

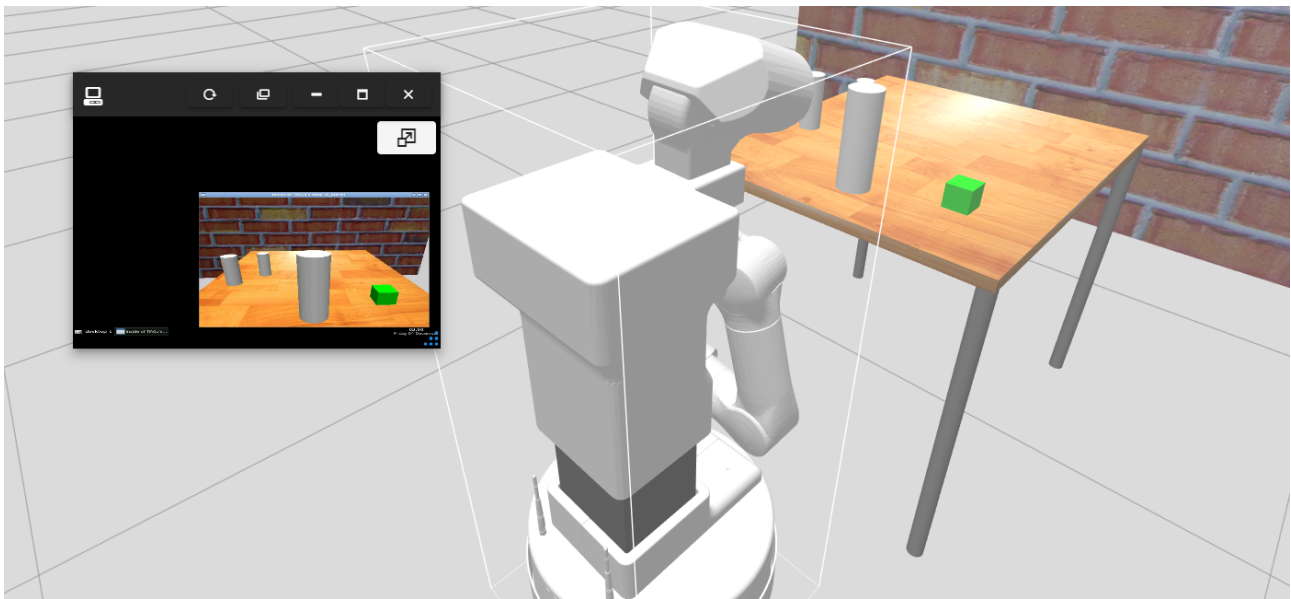


Figure 5: Result of simulation

There is no error in the simulation. If we move the mouse on the **inside of TIAGO's head** tab to other point, the head of the robot move to the point intended. However, the red pointer as shown in the tutorial is not shown. Thus, we need to add some command to get this red pointer.

6 Playing pre-defined upper body motions

The tutorial work as intended. This tutorial make use of pre-defined set of motion for the arm to do a waving motion.

7 Special teleop command

Trying the command as instructed in the notebook will give us more option of control inputs as we can do the Holonomic mode as well as the moving around mode where the input is not only \leftarrow , \uparrow , \rightarrow , \downarrow as shown in the figure in the next page.

```
Reading from the keyboard and Publishing to Twist!
-----
Moving around:
  u   i   o
  j   k   l
  m   ,   .

For Holonomic mode (strafing), hold down the shift key:
-----
  U   I   O
  J   K   L
  M   <   >

t : up (+z)
b : down (-z)

anything else : stop

q/z : increase/decrease max speeds by 10%
w/x : increase/decrease only linear speed by 10%
e/c : increase/decrease only angular speed by 10%

CTRL-C to quit

currently:      speed 0.5      turn 1
.0
```

Figure 6: Result of simulation with special teleop