

Project

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Course: *Robotic Systems Control* – Professor: *Tassos Natsakis*

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Robotic platform description

The robot I have chosen is **Sciurus17**. The robot is part of the manipulators category. Sciurus17 is a 17DoF upper-body humanoid robot with a 3D head camera and an RGB chest camera. Main features:

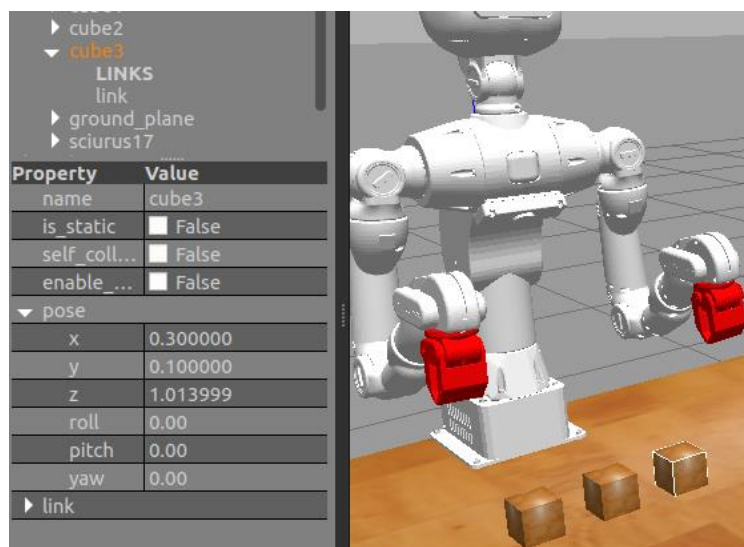
1. Selectable Mode
2. ROS Adaptive
3. Two Finger Hand End effector equipped
4. 7-axis-structure per arm + 1-axis back + 2-axis neck

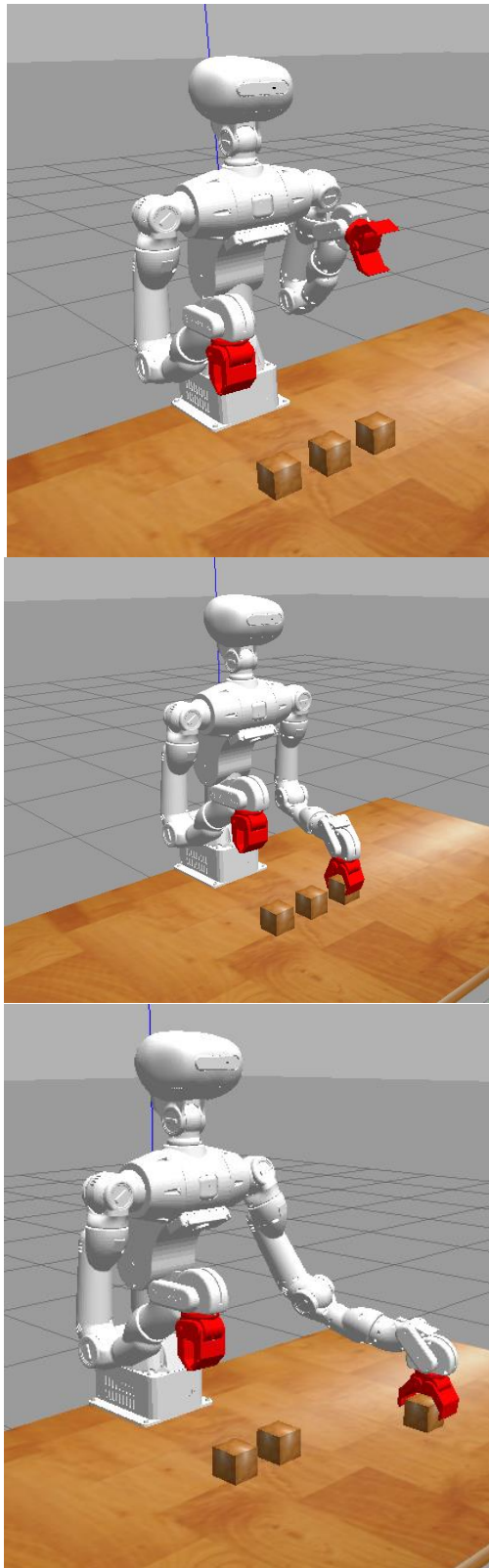
The simulation is done in Gazebo Simulator and the control is assured by the MoveIt Framework.

Description of the implemented task

The task I have chosen to implement on my robot is a “pick and place” task. The script with the implementation code was written in Python programming language. In the Gazebo Simulator there is a table and which there are 3 cubes. The one on the robot’s left (viewer’s right) must be moved to a more left and ahead point, whose coordinates are specified in the script.

At first, the 3 cubes are placed in the same line, the “Y” coordinate being different to each one of them. The coordinates of the cubes can be edited directly in Gazebo.





Accuracy and performance

Accuracy: Taking into considerations that there is a large number of approximations and operations, the accuracy is quite good but it could be better, for instance when the cube is set back on the table, it's coordinates are not perfectly the same with those which are written in the code, but the difference is quite small.

Performance: The performance is good, the general steps that the robot is doing are:

1. Opens the gripper (to get rid of anything that might be in its gripper from previous runs)
2. Moves the arm to a starting position
3. Checks presence of the cube
4. Gets the cube's coordinates
5. Approaches the cube
6. Grabs the cube
7. Picks up the cube and moves it to the final coordinates
8. Places the cube
9. Opens the gripper

The process lasts approximately 3 minutes. The arias where the cubes can be placed are limited.

Link to video

<https://drive.google.com/file/d/1gAljELz0002jj7ahL17VUOSTVVQclz0h/view?usp=sharing>

Link to code

<https://docs.google.com/document/d/14yQmertwgZ3gWN6d90e5emB9lYjLIWGYtYjgEhpic/edit?usp=sharing>

Resources

<https://robots.ros.org/sciurus17/>
https://github.com/rt-net/sciurus17_ros
<https://wiki.ros.org/>
