

Advanced Robotics: Preliminary exercise with Franka Panda robot!

Requirements: Ubuntu 16.04 with ROS Kinetic, programming in C++ or Python

Robolab Franka Panda: PC has ROS Kinetic installed. Schedule in 4 hour slots! Or use your own PC.

Work individually!

Questions session: 12.9.2018 @ 2PM in K2341D

Evaluation: 17.9.2018 @ 2PM in TB220

Git: https://gitlab.tut.fi/AUT/Advanced_Robotics

Use git to keep track of your developments (repository) and documentation (text with explanation and images/videos).

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Steps:

1. Install ROS and all requirements (MoveIt! packages + dependencies)
See: http://docs.ros.org/kinetic/api/moveit_tutorials/html/doc/getting_started/getting_started.html
2. Bringup Franka Panda and move the robot (motion planning) in **simulation** with Rviz

```
# roslaunch panda_moveit_config demo.launch rviz_tutorial:=true
```

If there's any issues, see:

http://docs.ros.org/kinetic/api/moveit_tutorials/html/doc/quickstart_in_rviz/quickstart_in_rviz_tutorial.html

Try out the different capabilities within Rviz with MoveIt!, e.g. different goal positions, different planners, etc.

3. Create a new package for your ROS code.
4.
 1. Create a new node and program the robot to move it to a new **Cartesian goal pose**.
 2. Create a new node and program the robot to move it to a new **7DOF joint goal position**.

You can use either Python or C++ to program your node!

Show the execution of the simulation via the rosrn command and via a launch file.
5. Place an obstacle in front of the robot that the robot should avoid.
You can add an obstacle in Rviz by importing a .stl/.dae file, or you can hard-code it in your (Python/C++) node.

Demonstrate a motion plan that avoids the obstacle.

For this exercise only simulation! Real experiments with Panda robot will be done in following exercises.

All information you need in order to the exercise can be found on the MoveIt! tutorial page:

http://docs.ros.org/kinetic/api/moveit_tutorials/html/index.html

After the exercise, you should be able to answer the following questions in detail:

1. What controller(s) is/are used to move the robot? What do they control?
2. What planner is used in MoveIt! to generate the motion plan? What does it do?