Lecture 2: Manipulation with moveit

Object Manipulation and Task Planning

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1 Goal of today

Make a package for MoveIt configure. It will contain a python script for moving the robot.

2 MoveIt

It is only used for manipulators.
ROS2 cannot do closed loop kinematics. It has to be an open loop articulated configuration.

3 MoveIt Setup Assistant

Generates SRDF files (Semantic Robot Description Format)

1. Self-collision: This is the part where we define self collisions. If the URDF is changed, this step should be redone.
2. Virtual Joints: (attach the robot to the world)
3. Planning Groups: Remember to select the kinematic solver. (KDLKinematicsPlugin). The gripper is a different kinematic profile. There is no way to use inverse kinamtics solvers, as they only work for articulated robots. Select Joints instead.
4. Robot Poses: Here we define predefined poses.
5. End-Effectors: More advanced end effector planning.
6. Passive joints: Underactuated tools or e.g. in delta robots. These joints are not used for trajectory planning.
7. Controllers: Autogenerate or manual. Each active joint must have a controller. The Franka Robot can also do some other things with empedance control. (Use effort controllers)
8. Simulation:
9. Configuration: Add "_movit_config" as a postfix to the package name.

Go into the `ros_controllers.yaml` file and tune PID gains (18000)