3. MoveIt moves randomly

This lesson takes the MoveIT simulation as an example. If you need to set the synchronization between the real machine and the simulation, please refer to the lesson [02, MoveIt Precautions and Controlling the Real Machine]. ! ! ! be careful! ! !

The effect demonstration is a virtual machine, and other masters are running (related to the performance of the master, depending on the actual situation).

3.1. Start

Start the MoveIT

```
roslaunch transbot_se_moveit_config demo.launch
```

Start random motion node (choose one of two)

```
rosrun transbot_se_moveit_config 01_random_move.py  # python
rosrun transbot_se_moveit_config 01_random_move  # C++
```

The effect diagram is as follows

The effect of the source code is the same as that of the MoveIT interface [MotionPlanning--->Planning--->Goal State (random)].

3.2. Python source code

Import header file

```
import rospy
from time import sleep
from moveit_commander.move_group import MoveGroupCommander
```

Initialize nodes and create planning group instances

```
    # 初始化节点 Initialize node
    rospy.init_node("transbot_set_move")
    # 初始化机械臂 Initialize the robotic arm
    transbot = MoveGroupCommander("arm_group")
```

Set planning parameters

```
    # 当运动规划失败，允许重新规划 When motion planning fails, re-planning is
allowed
    transbot.allow_replanning(True)
    transbot.set_planning_time(5)
    # 尝试规划的次数 Number of planning attempts
    transbot.set_num_planning_attempts(10)
    # 设置允许目标位置误差 Set the allowable target position error
    transbot.set_goal_position_tolerance(0.01)
    # 设置允许目标姿态误差 Set the allowable target attitude error
    transbot.set_goal_orientation_tolerance(0.01)
    # 设置允许目标误差 Set the allowable target error
    transbot.set_goal_tolerance(0.01)
    # 设置最大速度 Set maximum speed
    transbot.set_max_velocity_scaling_factor(1.0)
    # 设置最大加速度 Set maximum acceleration
    transbot.set_max_acceleration_scaling_factor(1.0)
```

Loop to set random target points

```
while not rospy.is_shutdown():
        # 设置随机目标点 Set random target points
        transbot.set_random_target()
        # 开始运动 Start
        transbot.go()
        sleep(0.5)
```

3.3. C++ source code

Import header file

```
#include <iostream>
#include "ros/ros.h"
#include <moveit/move_group_interface/move_group_interface.h>
```

Create nodes and planning groups

```
    rros::init(argc, argv, "transbot_random_move_cpp");
    ros::NodeHandle n;
    ros::AsyncSpinner spinner(1);
    spinner.start();
    moveit::planning_interface::MoveGroupInterface transbot("arm_group");
```

Set planning parameters and initial position

```
    // 设置最大速度 Set maximum speed
    transbot.setMaxVelocityScalingFactor(1.0);
    // 设置最大加速度 Set maximum acceleration
    transbot.setMaxAccelerationScalingFactor(1.0);
    //设置目标点 Set target point
    transbot.setNamedTarget("down");
    //开始移动 Start moving
    transbot.move();
    sleep(0.1);
```

Loop to set random target points

```
  while (!ros::isShuttingDown()){
        //设置随机目标点 Set random target points
        transbot.setRandomTarget();
        transbot.move();
        sleep(0.5);
    }
```

3.4. Node diagram

Take C++ node as an example