

xArm6应用测试

笔记本： 实训台

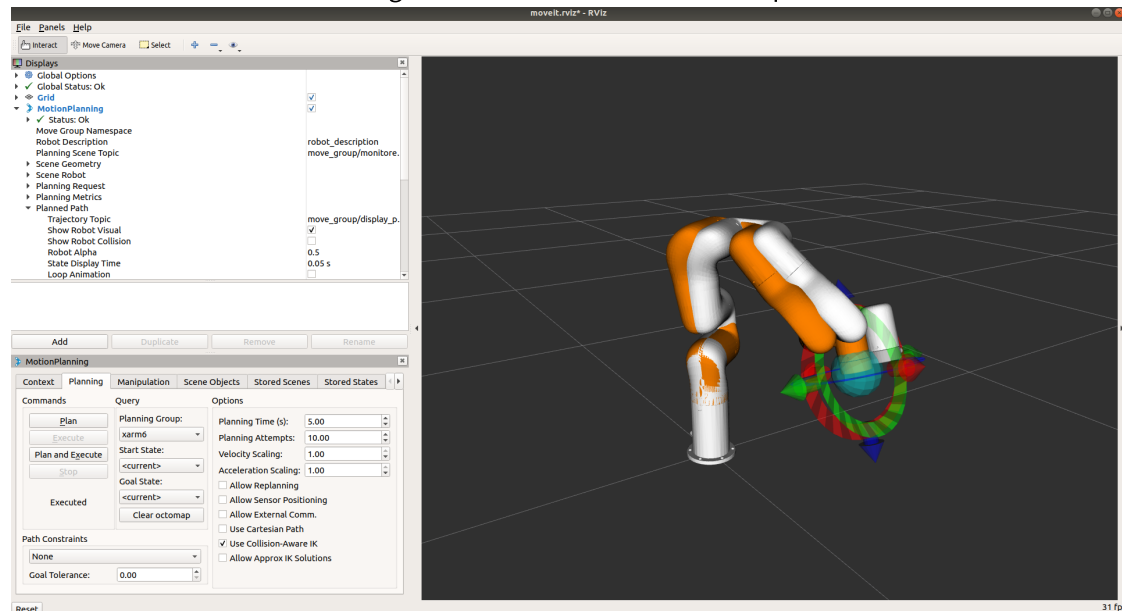
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作者： hcx

1.启动xArm6

`roslaunch xarm6_moveit_config realMove_exec.launch robot_ip:=192.168.1.196`



2.运行例程

`roslaunch xarm6_demo moveit_cartesian_demo.py`

`roslaunch xarm6_demo draw_star_demo.py`

`roslaunch xarm6_demo motion_demo.py`

`roslaunch xarm6_demo moveit_circle_demo.py`

3. 带有夹爪的启动

`roslaunch xarm6_gripper_moveit_config realMove_exec.launch robot_ip:=192.168.1.196`

控制夹爪：

`rosservice call /xarm/gripper_config "pulse_vel: 1500"`

`rosservice call /xarm/gripper_move "pulse_pos: 300"`

笛卡尔轨迹规划的时候不能添加起始点作为第一个点，否则会报错：

Trajectory message contains waypoints that are not strictly increasing in time.

4.视觉抓取（需要依赖opencv3.3）

标定过程

启动机械臂+夹爪

```
roslaunch xarm6_gripper_moveit_config realMove_exec.launch robot_ip:=192.168.1.196
```

启动摄像头和识别节点

```
roslaunch object_color_detector object_detect_hsv.launch
```

启动自动标定程序

```
roslaunch object_color_detector camera_calibration_hsv.launch
```

抓取过程

```
roslaunch xarm6_gripper_moveit_config realMove_exec.launch robot_ip:=192.168.1.196
```

```
roslaunch object_color_detector object_detect_hsv.launch
```

```
roslaunch xarm_demo vision_sorting_demo.py
```

5.写字

```
roslaunch xarm6_moveit_config realMove_exec.launch robot_ip:=192.168.1.196
```

```
roslaunch writing_demo writing_demo.py
```

6.传送带测试

IO控制，需要使用xArm的python SDK

<https://github.com/xArm-Developer/xArm-Python-SDK>

传送带视觉抓取

```
rosservice call /xarm/set_controller_dout 5 1
```

标定过程

启动机械臂+夹爪

```
roslaunch xarm6_gripper_moveit_config realMove_exec.launch robot_ip:=192.168.1.196
```

启动摄像头和识别节点

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roslaunch object_color_detector object_detect_hsv.launch
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启动自动标定程序

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roslaunch object_color_detector camera_calibration_hsv.launch
```

```
roslaunch xarm6_gripper_moveit_config realMove_exec.launch robot_ip:=192.168.1.196
```

```
python pick_place_with_conveyer_belt.py
```

```
python3 conveyer_belt_test.py
```

问题总结

1.连接一段时间后（大概10分钟静置），move group挂掉，上位机重启可恢复，使用3小时过程中只出现过一次，报错如下：

```
/home/hcx/catkin_ws/src/xarm_ros/xarm6_moveit_config/launch/realMove_exec.launch http://localhost:11311
File Edit View Search Terminal Help
[ INFO] [1592491305.480370349]: Controller successfully finished
[ INFO] [1592491305.779680076]: Completed trajectory execution with status SUCCEEDED ...
[ INFO] [1592491305.779797665]: Execution completed: SUCCEEDED
terminate called after throwing an instance of 'std::runtime_error'
  what():  Time is out of dual 32-bit range
[ INFO] [1592462650.302401592]: Stopping planning scene monitor
[ WARN] [1592462650.308939311]: Moved backwards in time (probably because ROS clock was reset), re-publishing joint trans
forms!
[ WARN] [1592462650.310023264]: Detected jump back in time of 28800.3s. Clearing TF buffer.
[ WARN] [1592462650.310022045]: Detected jump back in time of 28800.3s. Clearing TF buffer.
[ WARN] [1592462650.368427402]: SEVERE WARNING!!! Attempting to unload library while objects created by this loader exist
in the heap! You should delete your objects before attempting to unload the library or destroying the ClassLoader. The l
ibrary will NOT be unloaded.
[ INFO] [1592462650.371356807]: Loading robot model 'xarm6'...
[ INFO] [1592462650.371430510]: No root/virtual joint specified in SRDF. Assuming fixed joint
[xarm/xarm_traj_controller-3] process has died [pid 6963, exit code -6, cmd /home/hcx/catkin_ws/devel/lib/xarm_controller
/xarm_traj_controller ip=192.168.1.196 __name:=xarm_traj_controller __log:=/home/hcx/.ros/log/8e327b1e-b171-11ea-929b-d43
a65078239/xarm-xarm_traj_controller-3.log].
log file: /home/hcx/.ros/log/8e327b1e-b171-11ea-929b-d43a65078239/xarm-xarm_traj_controller-3*.log
[ INFO] [1592462650.698852230]: Starting planning scene monitor
[ INFO] [1592462650.701225678]: Listening to '/move_group/monitored_planning_scene'
[ INFO] [1592462650.721110238]: Constructing new MoveGroup connection for group 'xarm6' in namespace ''
[ERROR] [1592462680.722244781]: Unable to connect to move_group action server 'move_group' within allotted time (30s)
```

2.有一次在运动过程中出现中途突然停止，终端报错，6个关节都报位置不对，关节会有异响，急停处理了，也是只出现过出一次。

```
/home/hcx/catkin_ws/src/xarm_ros/xarm6_moveit_config/launch/realMove_exec.launch http://localhost:11311
File Edit View Search Terminal Help
s constructed.
[ INFO] [1592467212.180333174]: RRT: Starting planning with 1 states already in datastructure
[ INFO] [1592467212.191953949]: RRT: Created 95 states
[ INFO] [1592467212.191997283]: Solution found in 0.011683 seconds
[ INFO] [1592467212.193380249]: SimpleSetup: Path simplification took 0.001326 seconds and changed from 3 to 2 states
[ERROR] [1592467215.204625955]: joint 3 abnormal command! previous: -0.586276, this: -0.624682
[ERROR] [1592467215.214634115]: joint 3 abnormal command! previous: -0.586276, this: -0.626834
[ERROR] [1592467215.224627740]: joint 3 abnormal command! previous: -0.586276, this: -0.628973
[ERROR] [1592467215.234803664]: joint 3 abnormal command! previous: -0.586276, this: -0.631117
[ERROR] [1592467215.244632159]: joint 3 abnormal command! previous: -0.586276, this: -0.633254
[ERROR] [1592467215.254628458]: joint 3 abnormal command! previous: -0.586276, this: -0.635393
[ERROR] [1592467215.264685857]: joint 3 abnormal command! previous: -0.586276, this: -0.637543
[ERROR] [1592467215.274699801]: joint 3 abnormal command! previous: -0.586276, this: -0.639687
[ERROR] [1592467215.284699804]: joint 3 abnormal command! previous: -0.586276, this: -0.641827
[ERROR] [1592467215.294637411]: joint 3 abnormal command! previous: -0.586276, this: -0.643953
```

3.机器人moveit轨迹规划的稳定性不足，已经通过限制机器人的关节限位值做优化。

