

Jaka_ros 使用说明

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Jaka_ros 使用说明

一 jaka_ros 功能说明

1 目前支持内容

1.1 节卡 Ros 提供相应的驱动接口，关于驱动接口的详细信息请查阅《jaka_driver_interface》（注意：机器人运动指令驱动接口的运动路径还是机器人控制器自行规划的）；

1.2 节卡 Ros 提供 Zu3、Zu7、Zu12、Zu18 四款机器人的 Rviz, 并且能够连接实体机器人；

2 暂不支持内容

2.1 暂时不支持 Moveit（如果客户需要自行规划机器人路径，建议直接采用 Jaka 机器人的 SDK 中的 servo_j 功能）；

2.2 暂时不支持 Gazebo；

二 准备工作

2.1 安装 Ubuntu（以 Ubuntu 18.04 为例）

Ubuntu18 安装教程参考网址：

https://blog.csdn.net/baidu_36602427/article/details/86548203

2.2 安装 ROS（与 Ubuntu 18.04 版本对应为 Melodic）

Ubuntu18 安装 ROS 教程参考网址：

[https://blog.csdn.net/qz_41450811/article/details/99079041/](https://blog.csdn.net/qz_41450811/article/details/99079041)（Ubuntu18.04 安装 ROS Melodic 详细过程）

2.3 注意事项：

（1）具体的 Ubuntu 版本根据客户自己的实际情况安装（16.04、18.04 和 20.04 的版本都可以支持节卡的 Ros 包）。

（2）目前只支持 Ros1 版本。

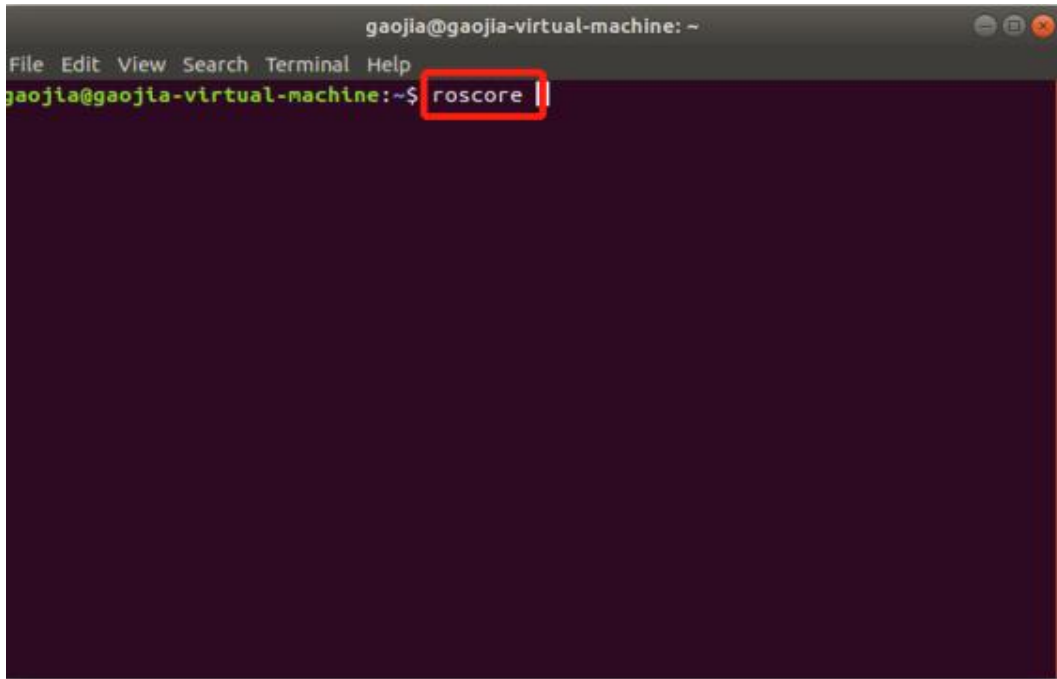
（3）Ros 包是在 Ubuntu18.04 版本下测试的。如果在使用过程中，出现一些报错，建议将工作空间（jaka_ros_driver_cpp）中的 build 文件夹和 devel 文件夹删除，重新编译。

三 使用 Jaka Jog Panel

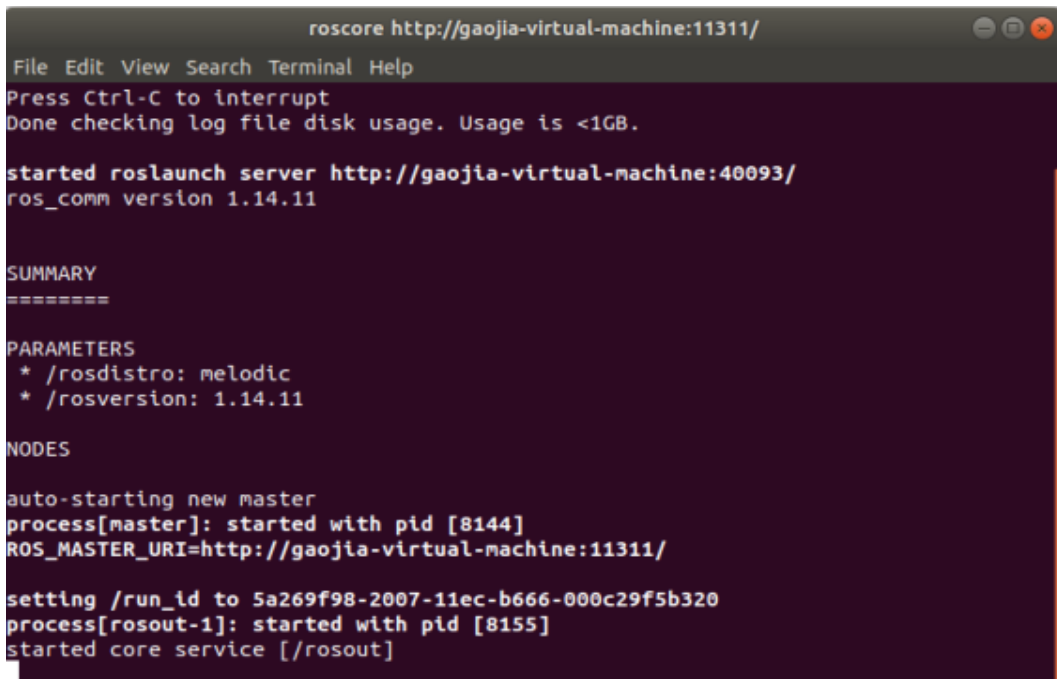
3.1 使用 Jog Panel 直接控制机械臂

(1) 打开一个新的终端，运行 ‘roscore’

```
$ roscore
```



A terminal window titled 'gaojia@gaojia-virtual-machine: ~'. The command 'roscore' is entered at the prompt and is highlighted with a red box.



A terminal window titled 'roscore http://gaojia-virtual-machine:11311/'. The output shows the process starting a roslaunch server and initializing ROS components.

```
roscore http://gaojia-virtual-machine:11311/
File Edit View Search Terminal Help
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://gaojia-virtual-machine:40093/
ros_comm version 1.14.11

SUMMARY
=====

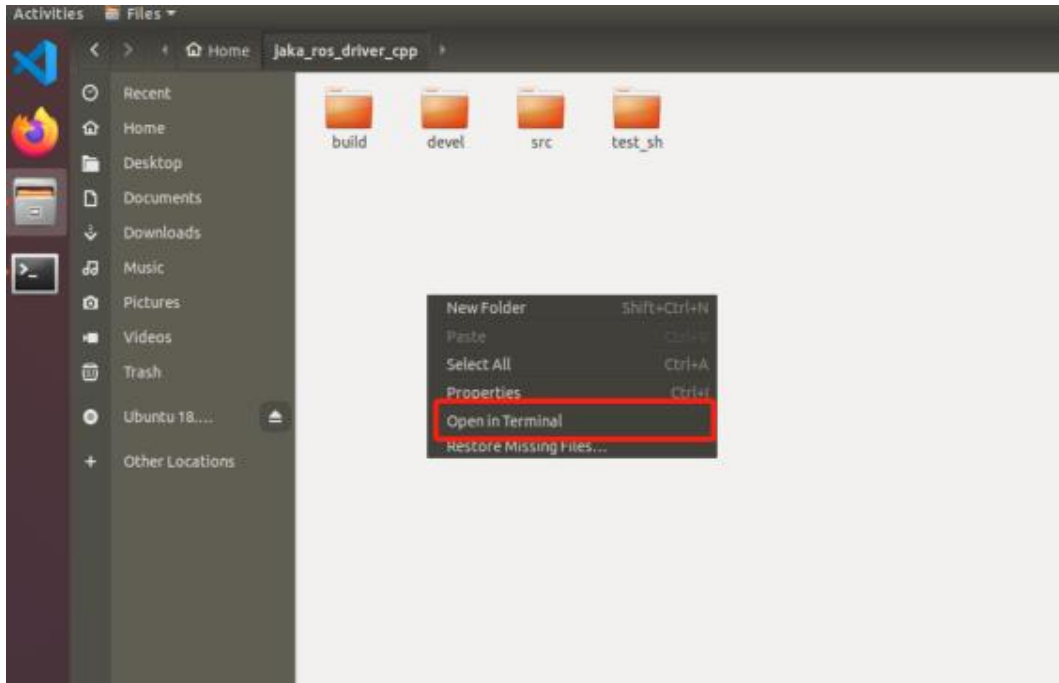
PARAMETERS
* /rostdistro: melodic
* /rosversion: 1.14.11

NODES

auto-starting new master
process[master]: started with pid [8144]
ROS_MASTER_URI=http://gaojia-virtual-machine:11311/

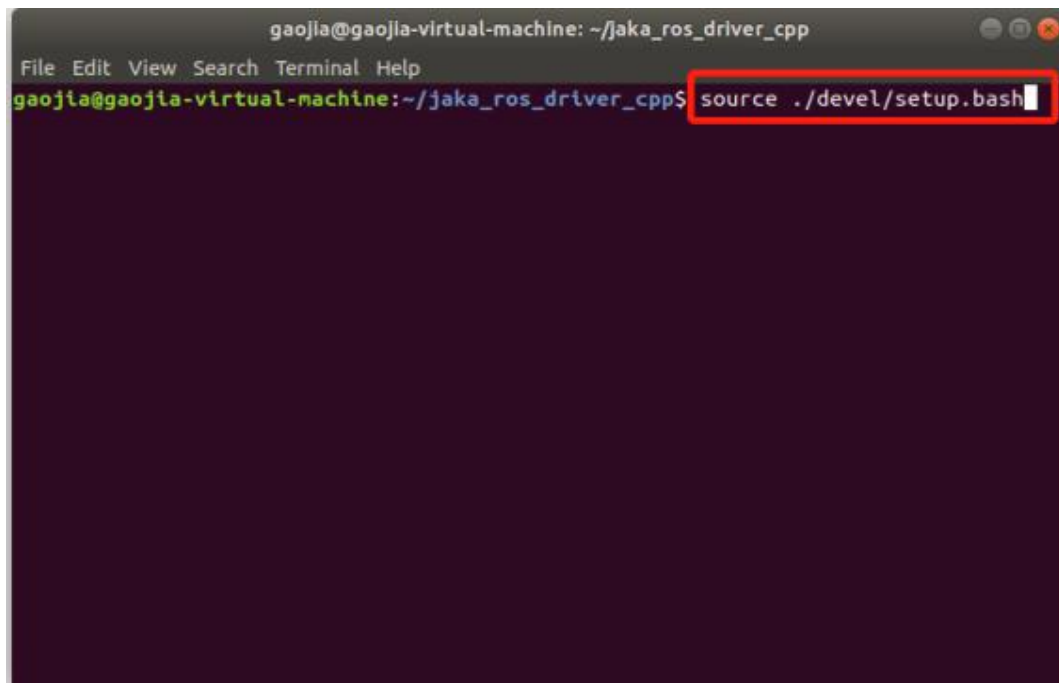
setting /run_id to 5a269f98-2007-11ec-b666-000c29f5b320
process[rosout-1]: started with pid [8155]
started core service [/rosout]
```

(2) 在工作空间（jaka_ros_driver_cpp）右键打开一个终端。



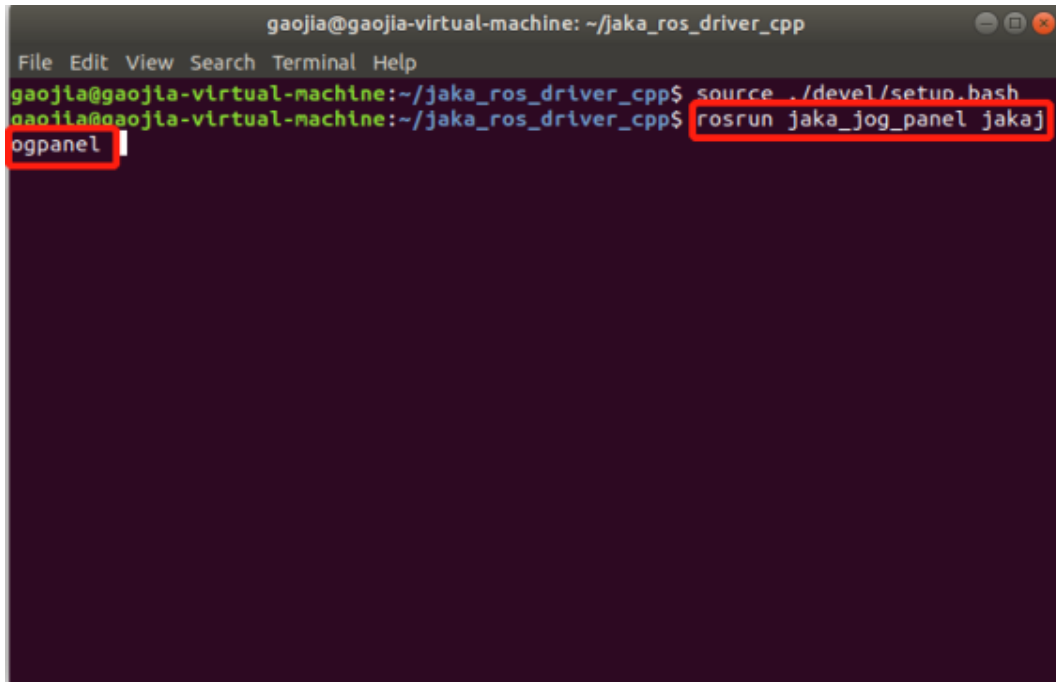
(3) 从 'setup.bash' 文件添加环境变量。

```
$ source devel/setup.bash
```

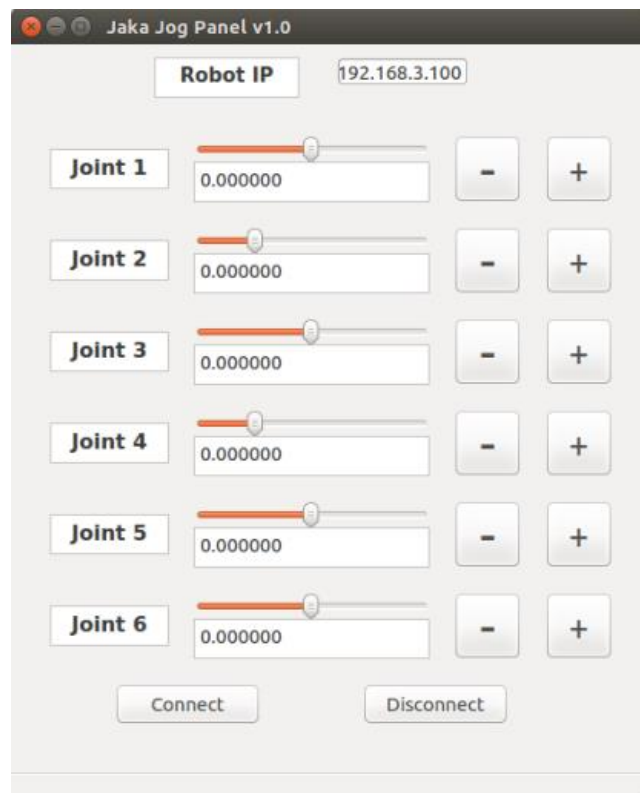


(4) 运行 jakajogpanel 节点。

```
$ rosrn jakajogpanel jakajogpanel
```



生成界面如下。

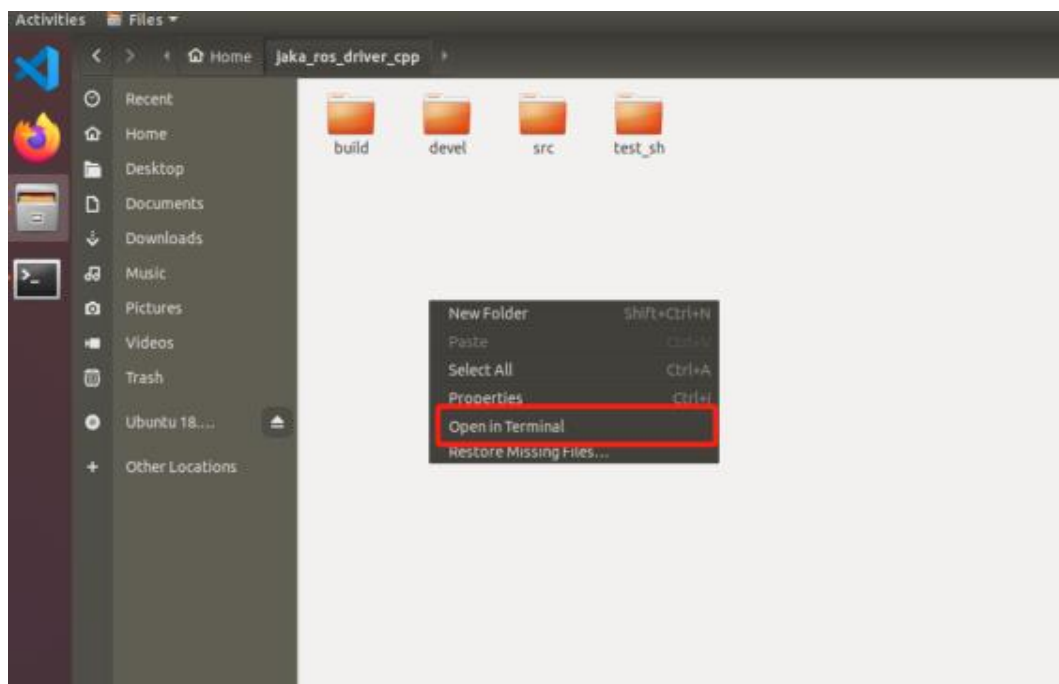




(5) 修改机器人 IP 与实际机器人一致，点击连接按钮后，可通过按钮控制 jaka 机械臂关节运动。

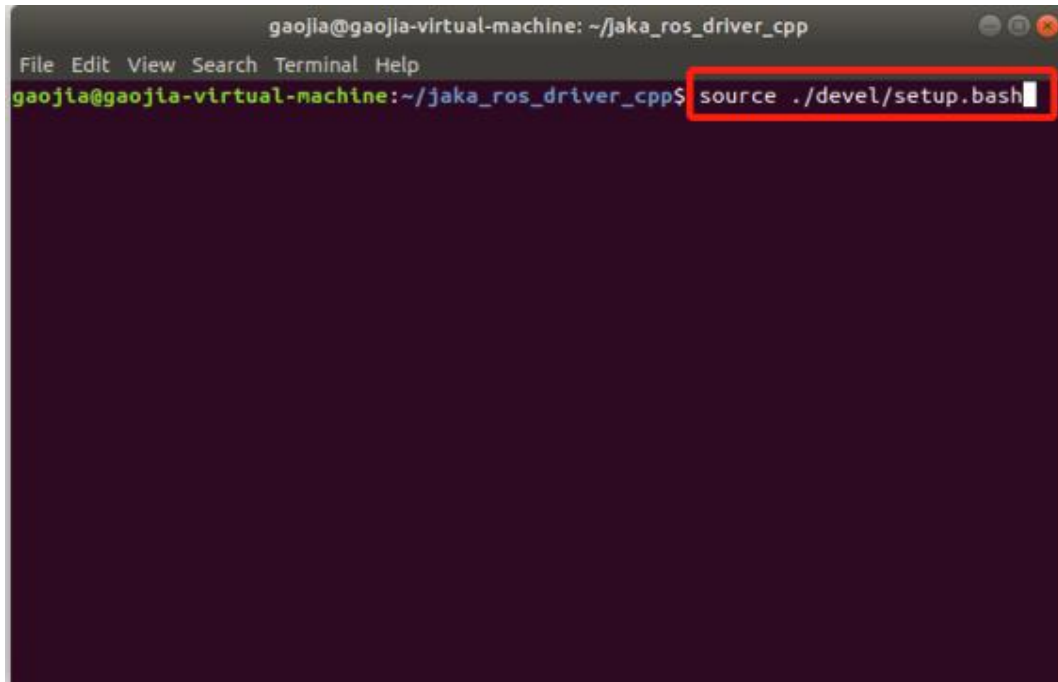
3.2 使用 RVIZ 显示并控制机械臂

(1) 在工作空间（jaka_ros_driver_cpp）右键打开一个终端。



(2) 从 'setup.bash' 文件添加环境变量。

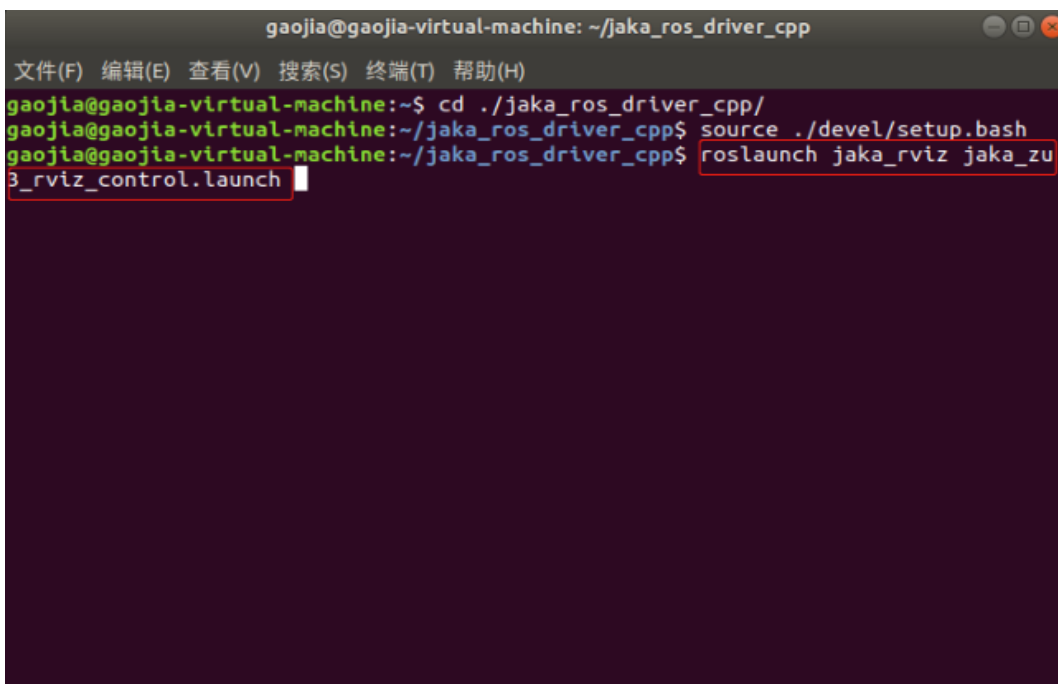
```
$ source devel/setup.bash
```



```
gaojia@gaojia-virtual-machine: ~/jaka_ros_driver_cpp
File Edit View Search Terminal Help
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ source ./devel/setup.bash
```

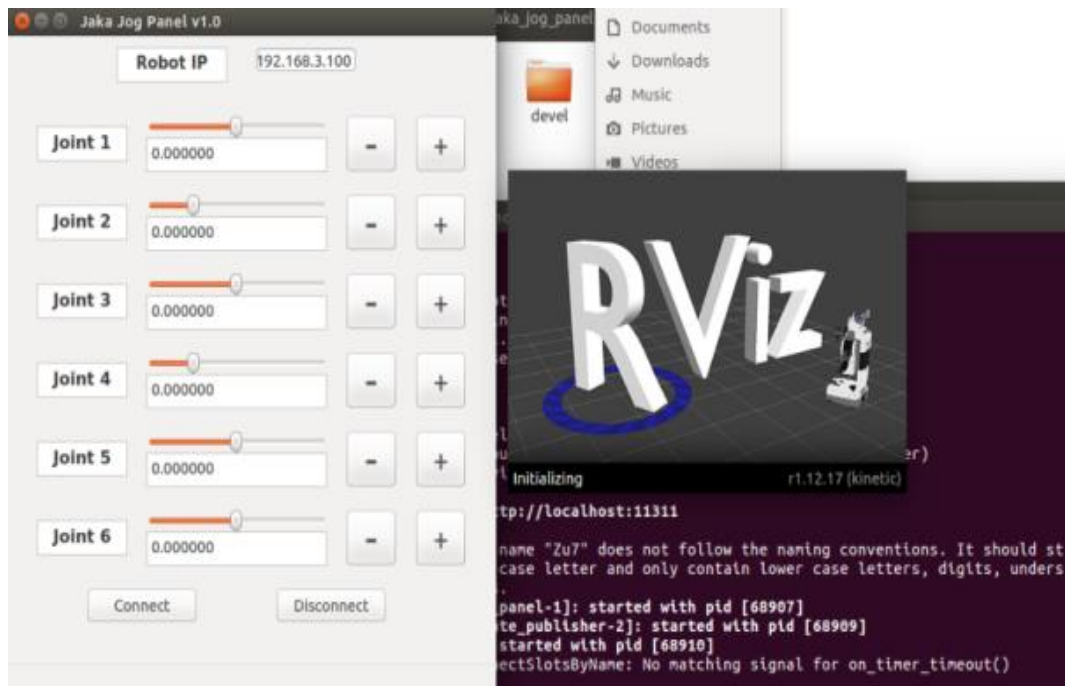
(3) 启动 jaka_zu3_rviz_control.launch 文件

```
$ roslaunch jaka_rviz jaka_zu3_rviz_control.launch
```

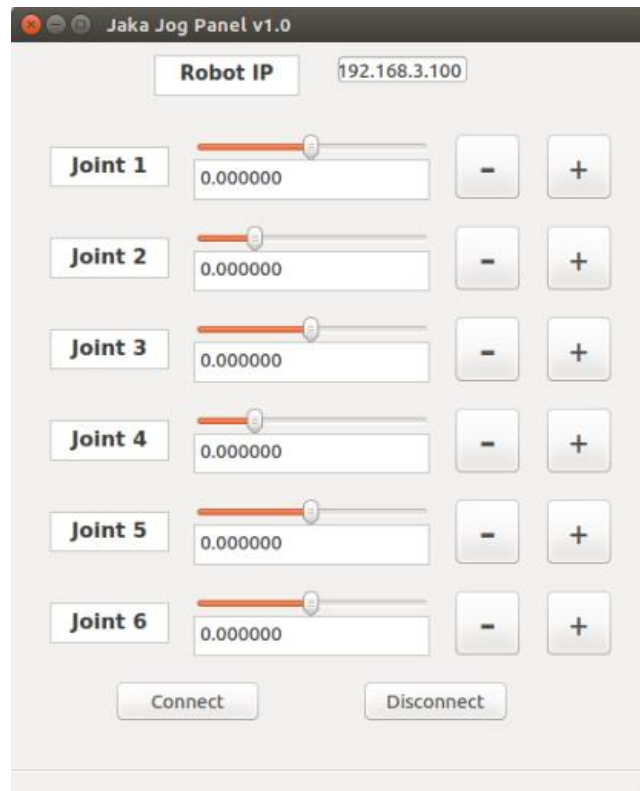


```
gaojia@gaojia-virtual-machine: ~/jaka_ros_driver_cpp
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
gaojia@gaojia-virtual-machine:~$ cd ./jaka_ros_driver_cpp/
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ source ./devel/setup.bash
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ roslaunch jaka_rviz jaka_zu3_rviz_control.launch
```


(4) 等待启动 RVIZ 与 jaka.jogpanel

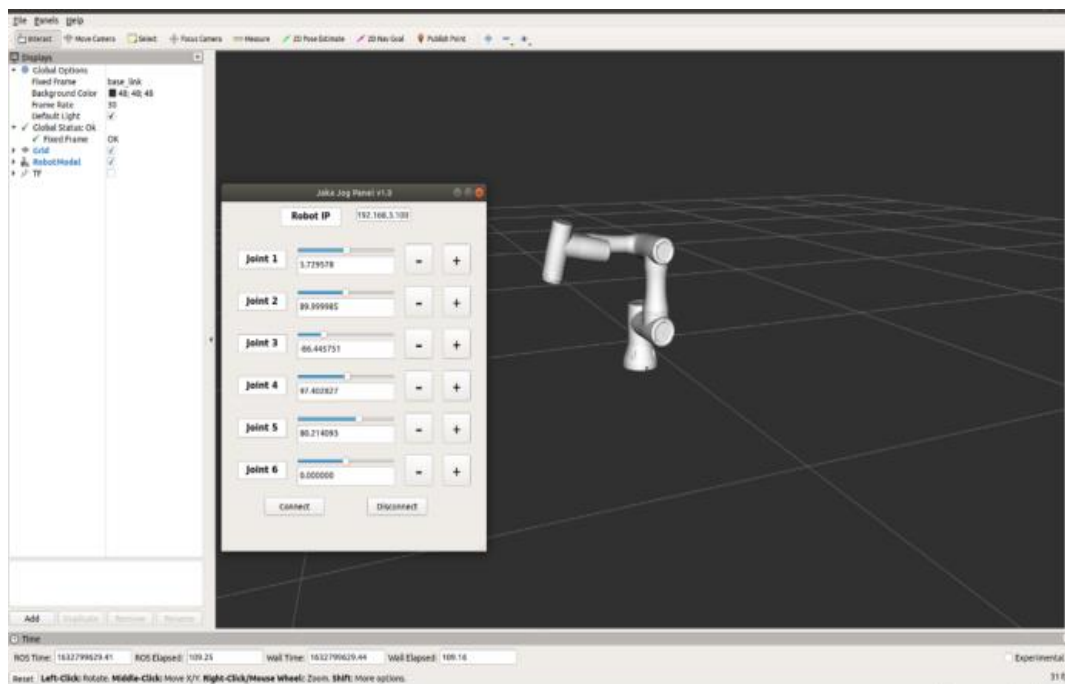


生成界面如下。

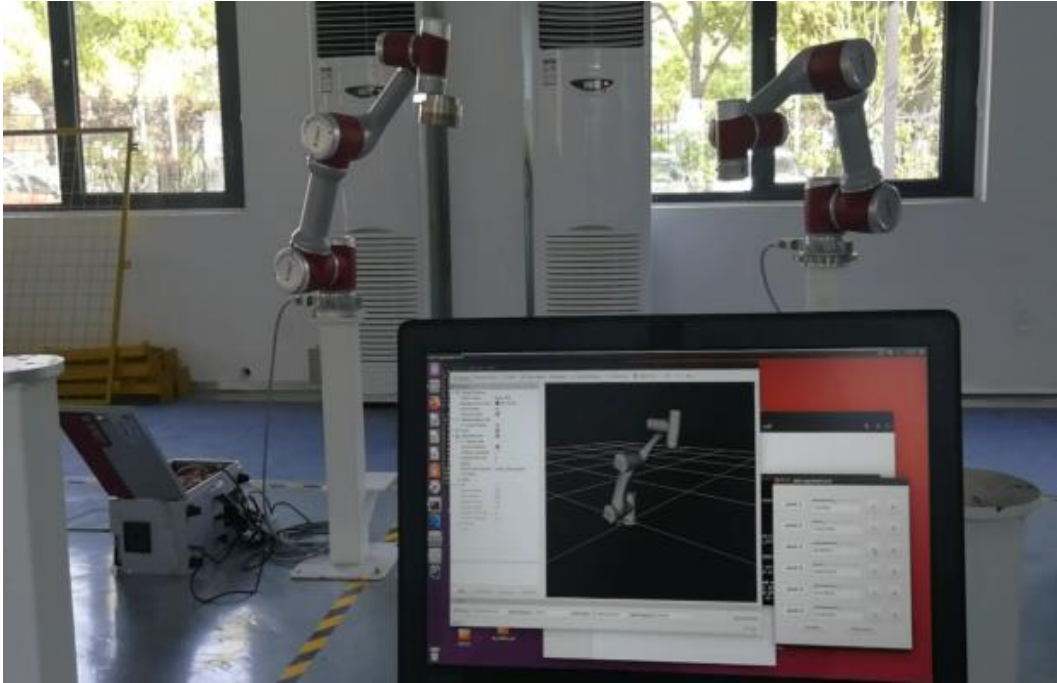




(5) 在未连接机械臂的状态下，拖动滑条和点击按钮可控制 RVIZ 中 jaka 机械臂关节。



(6) 修改机器人 IP 与实际机器人一致，点击连接按钮后，RVIZ 显示机械臂实时位置，可通过按钮控制真实 jaka 机械臂关节运动。



三 关于 Jaka_Ros 驱动接口

3.1 具体 Ros 驱动接口通讯协议详见《jaka_driver_interface》;

3.2 测试机器人关节运动服务: /robot_driver/move_joint 的参考

(1) 修改功能包 (jaka_ros_driver) 的 launch 文件夹下的

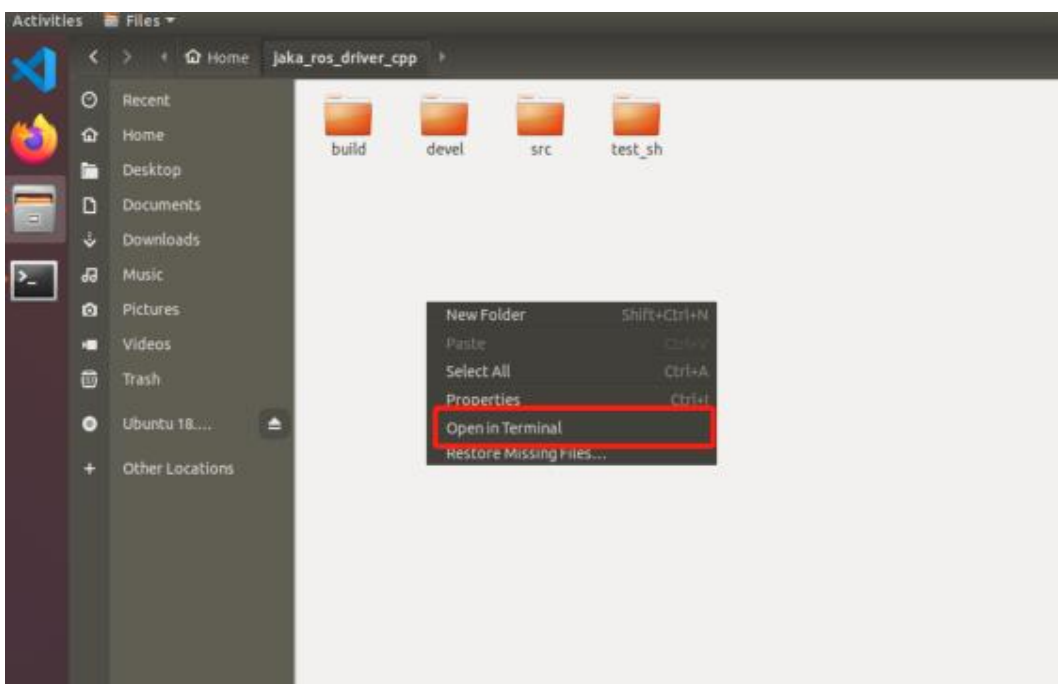
start.launch 文件中的机器人 IP 地址(与实际机器人 IP 地址保持一致), 如图:

```
<!--group ns="l_arm_controller"-->
<param name="robot_ip" value="10.5.5.100" type="str" />
<node pkg="jaka_ros_driver" type="connect_robot" name="connect_robot" output="screen" />

<!--group ns="r_arm_controller"-->
<param name="robot_ip" value="192.168.1.109" type="str"/>
<node pkg="jaka_ros_driver" type="connect_robot" name="connect_robot" output="screen">
  <remap from="/robot_driver/move_line" to="/l_arm_controller/robot_driver/move_line"/>
  <remap from="/robot_driver/move_joint" to="/l_arm_controller/robot_driver/move_joint"/>
  <remap from="/robot_driver/move_jog" to="/l_arm_controller/robot_driver/move_jog"/>
  <remap from="/robot_driver/servo_line" to="/l_arm_controller/robot_driver/servo_line"/>
  <remap from="/robot_driver/stop_move" to="/l_arm_controller/robot_driver/stop_move"/>
  <remap from="/robot_driver/tool_point" to="/l_arm_controller/robot_driver/tool_point"/>
  <remap from="/robot_driver/joint_states" to="/l_arm_controller/robot_driver/joint_states"/>
  <remap from="/robot_driver/robot_states" to="/l_arm_controller/robot_driver/robot_states"/>
  <remap from="/robot_driver/set_user_frame" to="/l_arm_controller/robot_driver/set_user_frame"/>
  <remap from="/robot_driver/set_tcp" to="/l_arm_controller/robot_driver/set_tcp"/>
  <remap from="/robot_driver/teach_drag" to="/l_arm_controller/robot_driver/teach_drag"/>
  <remap from="/robot_driver/servo_ctr" to="/l_arm_controller/robot_driver/servo_ctr"/>
  <remap from="/robot_driver/set_payload" to="/l_arm_controller/robot_driver/set_payload"/>
  <remap from="/robot_driver/clear_err" to="/l_arm_controller/robot_driver/clear_err"/>
  <remap from="/robot_driver/set_collision" to="/l_arm_controller/robot_driver/set_collision"/>
</node>
</group>

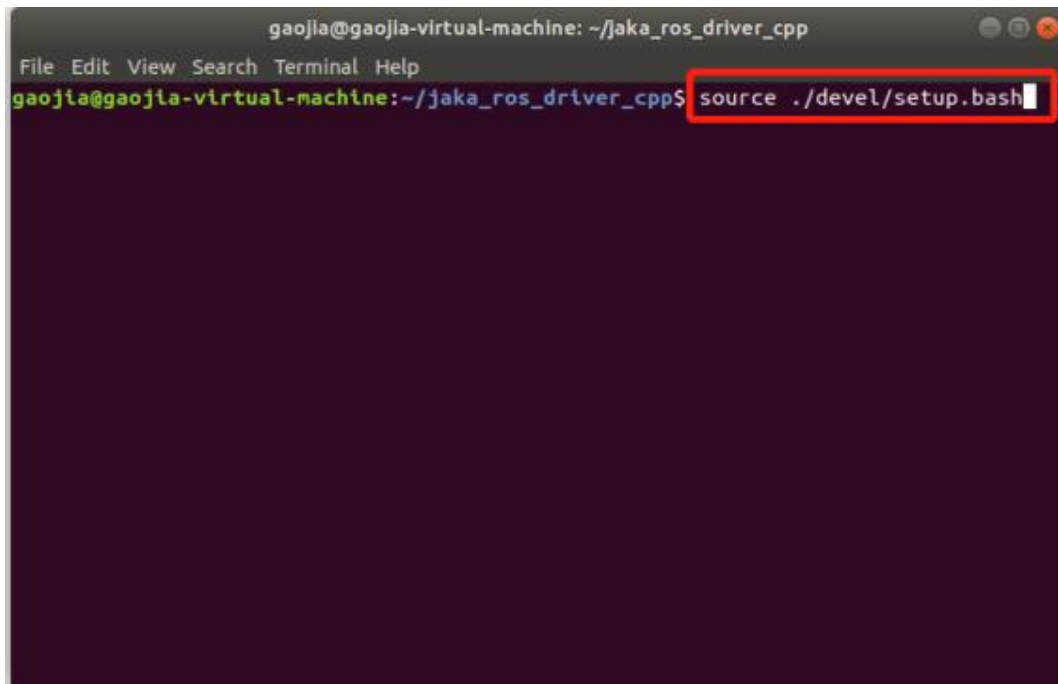
<group ns="r_arm_controller">
<param name="robot_ip" value="192.168.1.101" type="str"/>
<node pkg="jaka_ros_driver" type="connect_robot" name="connect_robot" output="screen">
  <remap from="/robot_driver/move_line" to="/r_arm_controller/robot_driver/move_line"/>
  <remap from="/robot_driver/move_joint" to="/r_arm_controller/robot_driver/move_joint"/>
  <remap from="/robot_driver/move_jog" to="/r_arm_controller/robot_driver/move_jog"/>
  <remap from="/robot_driver/servo_line" to="/r_arm_controller/robot_driver/servo_line"/>
  <remap from="/robot_driver/stop_move" to="/r_arm_controller/robot_driver/stop_move"/>
  <remap from="/robot_driver/tool_point" to="/r_arm_controller/robot_driver/tool_point"/>
  <remap from="/robot_driver/joint_states" to="/r_arm_controller/robot_driver/joint_states"/>
  <remap from="/robot_driver/robot_states" to="/r_arm_controller/robot_driver/robot_states"/>
  <remap from="/robot_driver/set_user_frame" to="/r_arm_controller/robot_driver/set_user_frame"/>
  <remap from="/robot_driver/set_tcp" to="/r_arm_controller/robot_driver/set_tcp"/>
  <remap from="/robot_driver/teach_drag" to="/r_arm_controller/robot_driver/teach_drag"/>
  <remap from="/robot_driver/servo_ctr" to="/r_arm_controller/robot_driver/servo_ctr"/>
  <remap from="/robot_driver/set_payload" to="/r_arm_controller/robot_driver/set_payload"/>
  <remap from="/robot_driver/clear_err" to="/r_arm_controller/robot_driver/clear_err"/>
  <remap from="/robot_driver/set_collision" to="/r_arm_controller/robot_driver/set_collision"/>
</node>
</group-->
</launch>
```

(2) 在工作空间 (jaka_ros_driver_cpp) 右键打开一个终端。



(3) 从 'setup.bash' 文件添加环境变量。

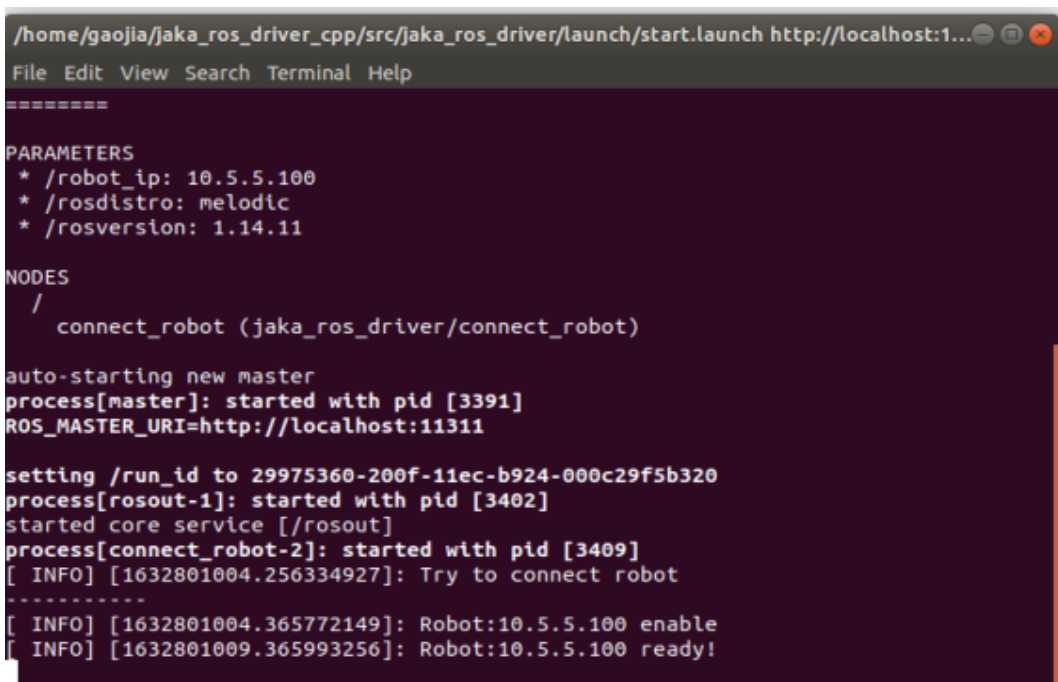
```
$ source devel/setup.bash
```



```
gaojia@gaojia-virtual-machine: ~/jaka_ros_driver_cpp
File Edit View Search Terminal Help
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ source ./devel/setup.bash
```

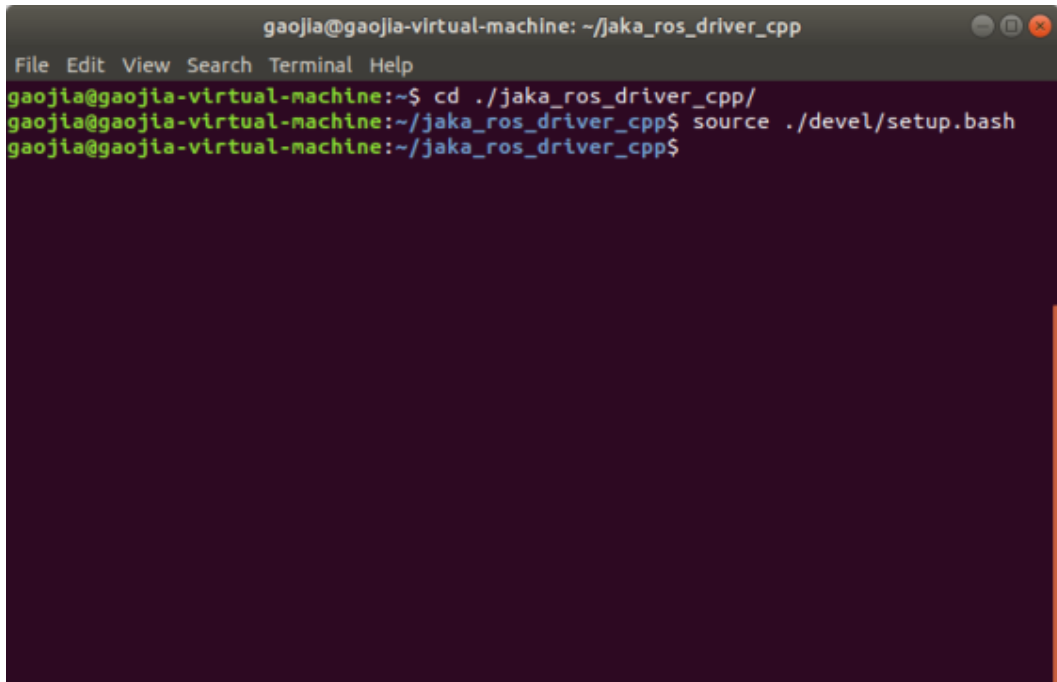
(4) 启动 start.launch 文件

```
$ roslaunch jaka_ros_driver start.launch
```



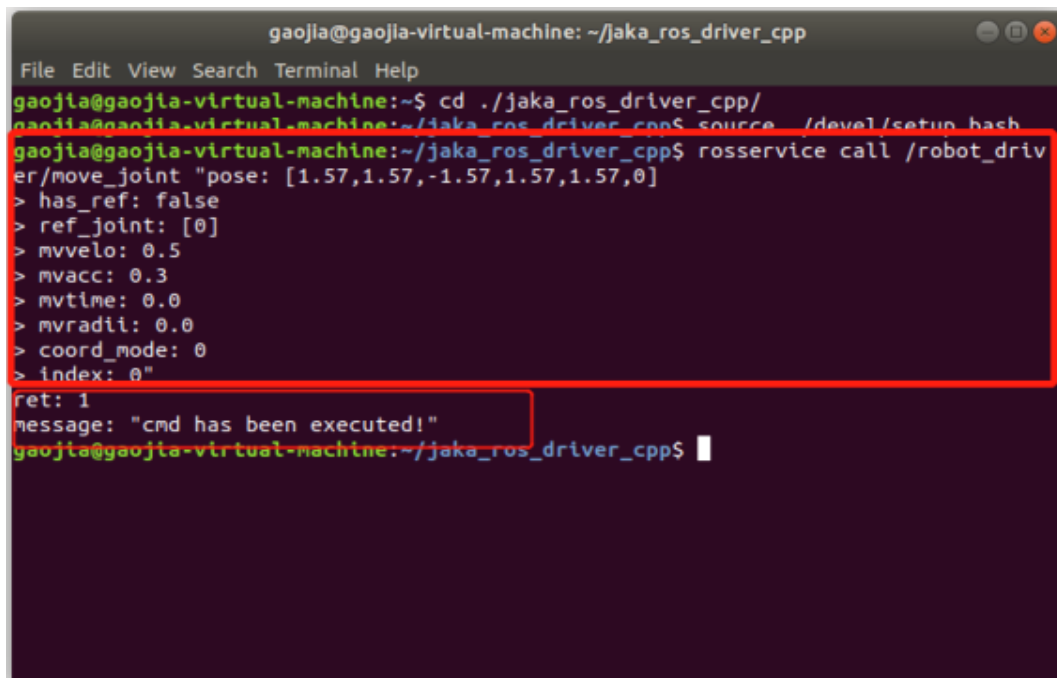
```
/home/gaojia/jaka_ros_driver_cpp/src/jaka_ros_driver/launch/start.launch http://localhost:1...
File Edit View Search Terminal Help
=====
PARAMETERS
* /robot_ip: 10.5.5.100
* /rostdistro: melodic
* /rosversion: 1.14.11
NODES
/
  connect_robot (jaka_ros_driver/connect_robot)
auto-starting new master
process[master]: started with pid [3391]
ROS_MASTER_URI=http://localhost:11311
setting /run_id to 29975360-200f-11ec-b924-000c29f5b320
process[rosout-1]: started with pid [3402]
started core service [/rosout]
process[connect_robot-2]: started with pid [3409]
[ INFO] [1632801004.256334927]: Try to connect robot
.....
[ INFO] [1632801004.365772149]: Robot:10.5.5.100 enable
[ INFO] [1632801009.365993256]: Robot:10.5.5.100 ready!
```


(5) 在工作空间(jaka_ros_driver_cpp)右键新打开一个终端, 然后从' setup.bash' 文件添加环境变量。



```
gaojia@gaojia-virtual-machine: ~/jaka_ros_driver_cpp
File Edit View Search Terminal Help
gaojia@gaojia-virtual-machine:~$ cd ./jaka_ros_driver_cpp/
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ source ./devel/setup.bash
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$
```

(6) 使用 `rosservice call /robot_driver/move_joint` 并按要求输入参数, 控制机器人运动



```
gaojia@gaojia-virtual-machine: ~/jaka_ros_driver_cpp
File Edit View Search Terminal Help
gaojia@gaojia-virtual-machine:~$ cd ./jaka_ros_driver_cpp/
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ source ./devel/setup.bash
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$ rosservice call /robot_driver/move_joint "pose: [1.57,1.57,-1.57,1.57,1.57,0]"
> has_ref: false
> ref_joint: [0]
> mvvelo: 0.5
> mvacc: 0.3
> mvtime: 0.0
> mvradii: 0.0
> coord_mode: 0
> index: 0"
ret: 1
message: "cmd has been executed!"
gaojia@gaojia-virtual-machine:~/jaka_ros_driver_cpp$
```