

ROS 中级教程_第一篇 创建一个可以用键盘遥控的仿真小车

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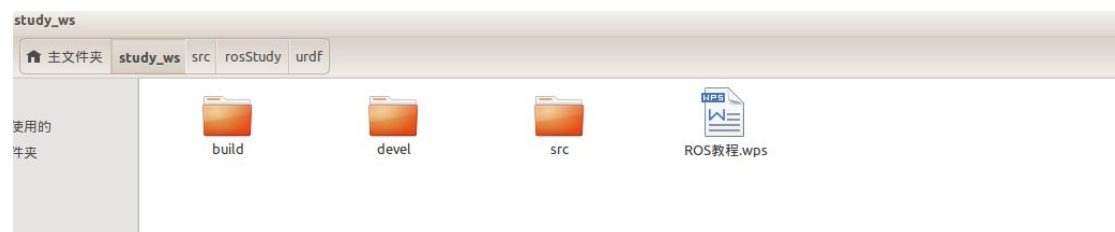
QQ:2385909406

时间 2017.1.24

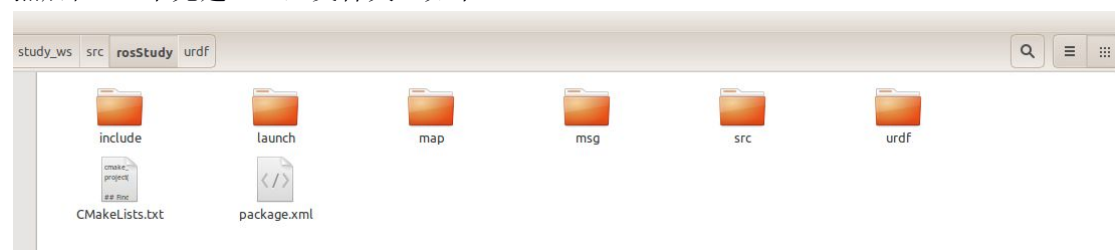
所有的文件代码 都有在 study_ws 文件夹里

先期准备

首先创建自己的工作空间 study_ws 然后创建 rosstudy 包如下



然后在 src 下先建立一些文件夹 如下



第一章 创建自己的四轮小车

进入 urdf 文件夹

创建一个 car.urdf

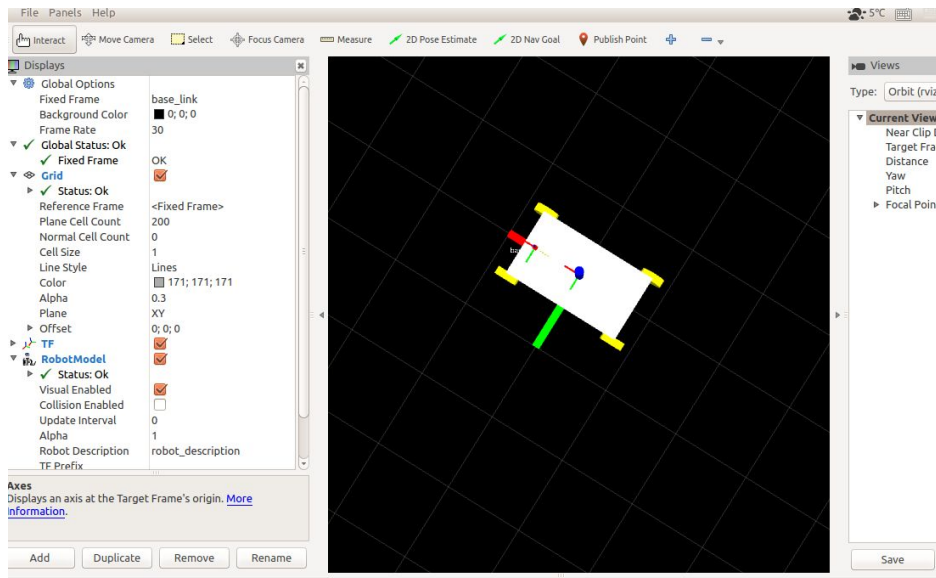
创建一个 car.rviz

进入 launch 文件夹 创建一个 car.launch 文件

显示小车

命令如下

```
$ roslaunch rosStudy car.launch
```



第二章 小车虚拟仿真控制节点

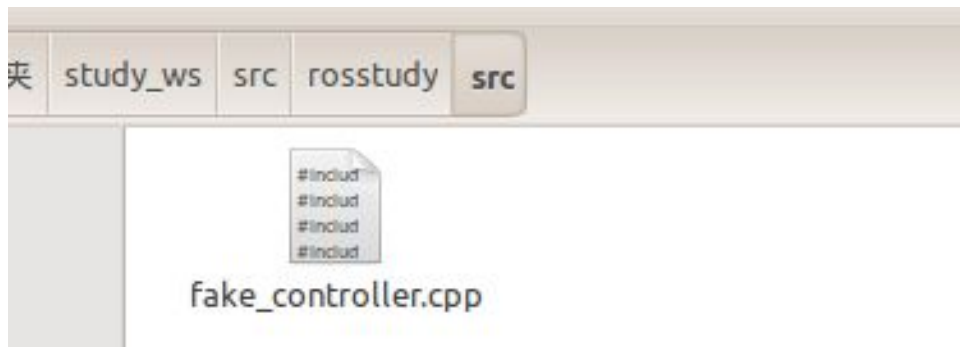
小车速度监听话题 `/cmd_vel`

监听信息类型 `geometry_msgs/Twist` 类型

小车里程计信息发布话题 `/odom`

发布信息类型 `nav_msgs/Odometry`

进入 `src` 文件夹 创建一个 `fake_controller.cpp`



打开 `rosstudy` 下的 `CMakeLists.txt` 添加如图所示文字

```
5 ## if COMPONENTS list like find_package(catkin REQUIRED COMPONENTS
6 ## is used, also find other catkin packages
7 find_package(catkin REQUIRED COMPONENTS
8   roscpp
9   rospy
10  tf
11  urdf
12  nav_msgs
13  geometry_msgs
14  sensor_msgs
15 )
16
```

```

104 ## CATKIN_DEPENDS: catkin_packages dependent projects
105 ## DEPENDS: system dependencies of this project
106 catkin_package(
107   INCLUDE_DIRS include
108   LIBRARIES rosstudy
109 #   CATKIN_DEPENDS roscpp rospy tf urdf
110 #   DEPENDS system_lib
111 )
112

```

并在文件末尾添加

```
add_executable(fake_odo_publiser src/fake_controller.cpp)
```

```
target_link_libraries(fake_odo_publiser ${catkin_LIBRARIES})
```

```

130 ## as an example, code may need to be generated before libraries
131 ## either from message generation or dynamic reconfigure
132 # add_dependencies(rosStudy ${${PROJECT_NAME}_EXPORTED_TARGETS} ${catkin_EXPORTED_TARGETS})
133
134 add_executable(fake_odo_publiser src/fake_controller.cpp)
135 target_link_libraries(fake_odo_publiser ${catkin_LIBRARIES})
136

```

然后打开 package.xml 添加以下语句

```

1 <!-- buildtool_depend:catkin-->
2 <!-- Use run_depend for packages you need at runtime: -->
3 <!-- run_depend:message_runtime-->
4 <!-- Use test_depend for packages you need only for testing: -->
5 <!-- test_depend:gtest-->
6 <buildtool_depend>catkin</buildtool_depend>
7 <build_depend>roscpp</build_depend>
8 <build_depend>rospy</build_depend>
9 <build_depend>tf</build_depend>
10 <build_depend>urdf</build_depend>
11 <run_depend>roscpp</run_depend>
12 <run_depend>rospy</run_depend>
13 <run_depend>tf</run_depend>
14 <run_depend>urdf</run_depend>
15
16 <build_depend>nav_msgs</build_depend>
17 <run_depend>nav_msgs</run_depend>
18 <build_depend>geometry_msgs</build_depend>
19 <run_depend>geometry_msgs</run_depend>
20 <build_depend>sensor_msgs</build_depend>
21 <run_depend>sensor_msgs</run_depend>
22
23 <!-- The export tag contains other, unspecified, tags -->

```

回到工作空间 进行编译

```
$ catkin_make
```

成功就会出现

```
-- Configuring done
-- Generating done
-- Build files have been written to: /home/jobs/study_ws/build
####
#### Running command: "make -j4 -l4" in "/home/jobs/study_ws/build"
####
Scanning dependencies of target fake_odo_publiser
[100%] Building CXX object rosstudy/CMakeFiles/fake_odo_publiser.dir/src/fake_controller.cpp.o
Linking CXX executable /home/jobs/study_ws/devel/lib/rosstudy/fake_odo_publiser
[100%] Built target fake_odo_publiser
```

第三章 让你的小车动起来

启动机器人显示界面

`roslaunch rosstudy car.launch`

启动机器人虚拟控制节点

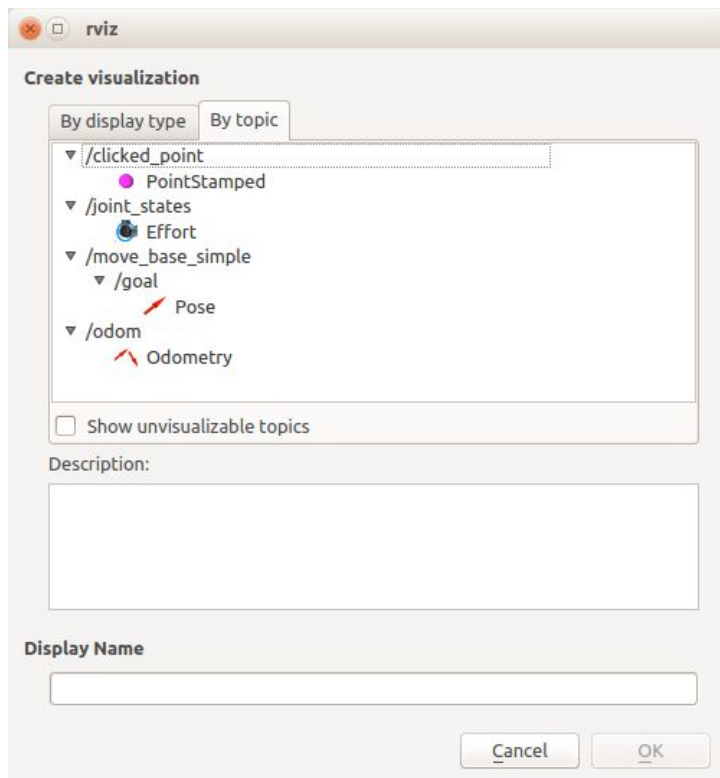
`roslaunch rosstudy fake_odo_publiser`

打开另外一个终端

输入复制下面的字符串

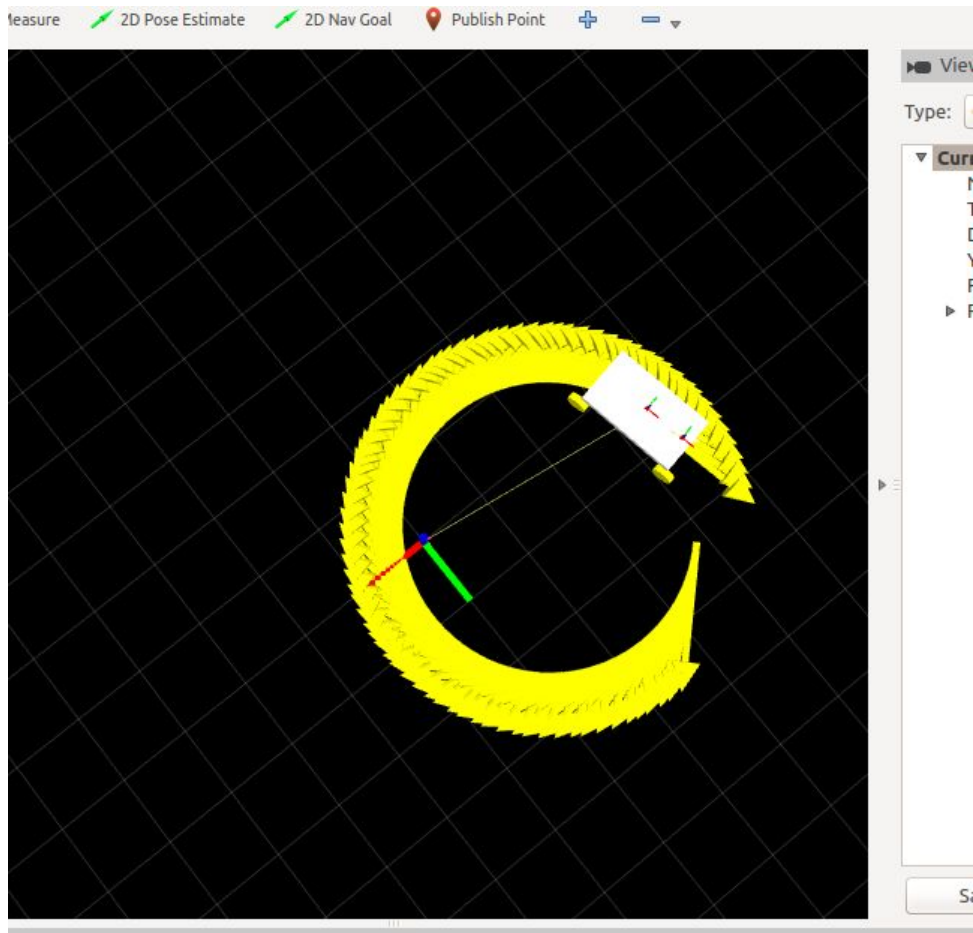
```
rostopic pub -r 10 /cmd_vel geometry_msgs/Twist '{linear: {x: 1.0, y: 0, z: 0}, angular: {x: 0, y: 0, z: -0.5}}'
```

在 rviz 左下角添加 点击 Add



添加 Odometry

然后查看机器人运动效果



同时在机器人虚拟仿真串口控制节点会显现出来

```
INFO] [1485259313.629298544]: vx is 1.000000
INFO] [1485259313.629378866]: vy is 0.000000
INFO] [1485259313.629450933]: vth is -0.500000
INFO] [1485259313.729228362]: I have got a cmd_vel message
INFO] [1485259313.729362876]: vx is 1.000000
INFO] [1485259313.729467610]: vy is 0.000000
INFO] [1485259313.729580998]: vth is -0.500000
INFO] [1485259313.829250028]: I have got a cmd_vel message
INFO] [1485259313.829417867]: vx is 1.000000
INFO] [1485259313.829534031]: vy is 0.000000
INFO] [1485259313.829676835]: vth is -0.500000
INFO] [1485259313.929247453]: I have got a cmd_vel message
INFO] [1485259313.929423920]: vx is 1.000000
INFO] [1485259313.929607403]: vy is 0.000000
INFO] [1485259313.929710677]: vth is -0.500000
INFO] [1485259314.029257503]: I have got a cmd_vel message
INFO] [1485259314.029419320]: vx is 1.000000
INFO] [1485259314.029538765]: vy is 0.000000
INFO] [1485259314.029677595]: vth is -0.500000
INFO] [1485259314.129269807]: I have got a cmd_vel message
INFO] [1485259314.129436475]: vx is 1.000000
INFO] [1485259314.129518632]: vy is 0.000000
INFO] [1485259314.129600527]: vth is -0.500000
```

第四章 用键盘遥控你的小车

用键盘遥控你的小车需要做的就是 第一 监控键盘的输入 第二 然后在/cmd_vel 上发布速度控制命令

这次 我们使用 python 建立一个键盘监控并发布速度命令的文件

进入 rosstudy/src 创建一个文件夹 KeyBoardControl 进入这个文件夹创建一个 telecon.py

文件 并执行 chmod +x telecon.py 让这个文件具有可执行权限

启动机器人显示界面

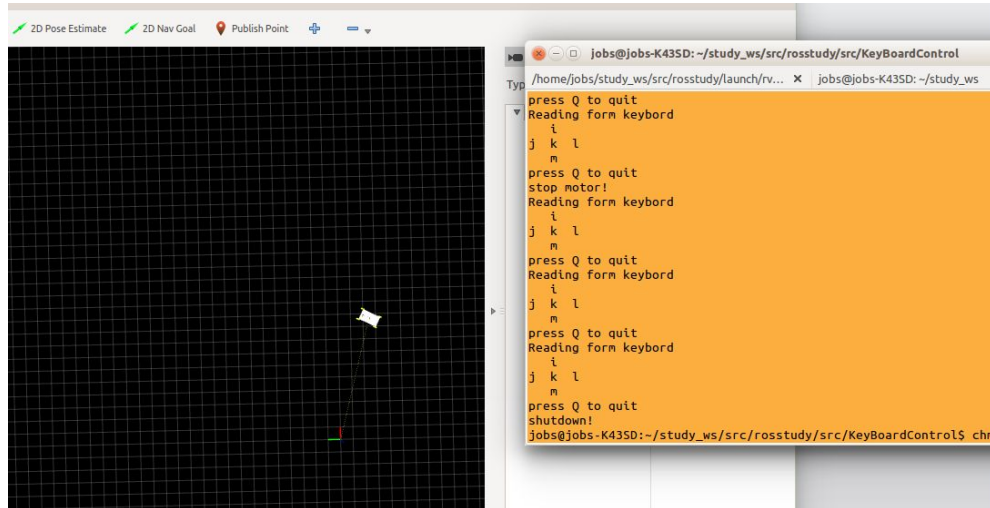
roslaunch rosstudy car.launch

启动机器人虚拟控制节点

roslaunch rosstudy fake_odo_publisher

启动机器人键盘遥控程序

roslaunch rosstudy telecon.py



到此 你已经可以用键盘来遥控这个小车了