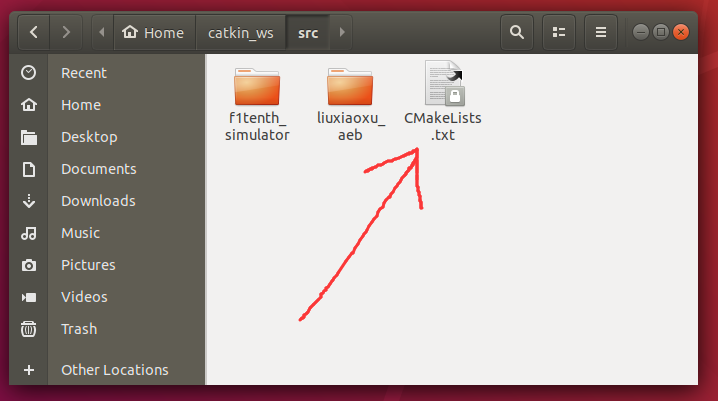
201250123 刘晓旭 AEB作业

一、实验流程 复现

1.新建文件夹并初始化工作空间

在home下新建catkin\_ws，在catkin\_ws下新建src，src打开终端输入

Catkin\_init\_workspace

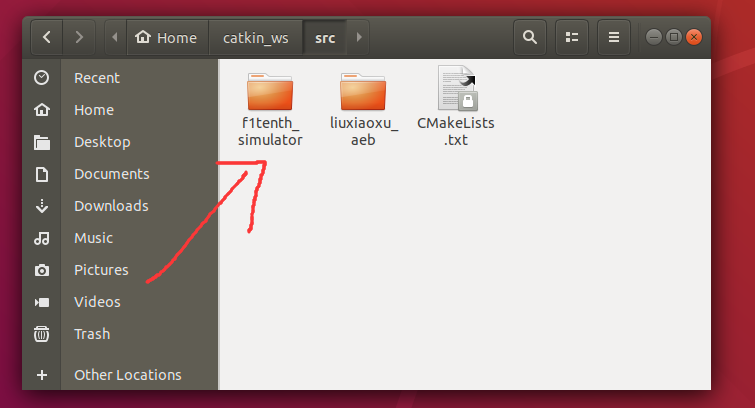


生成CMakeLists.txt

2.下载f1tenth\_simulator

在src打开终端，输入

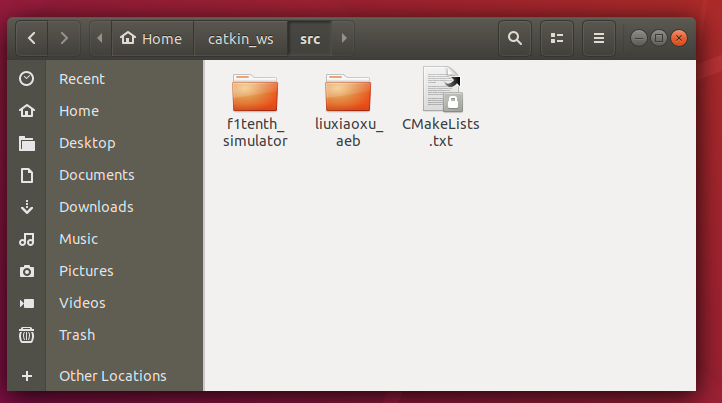
git clone https://github.com/f1tenth/f1tenth\_simulator.git



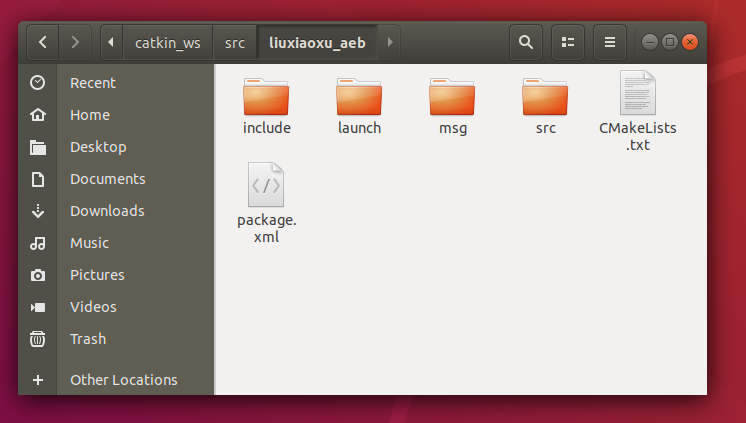
3.生成liuxiaoxu\_aeb

在src打开终端，输入

catkin\_create\_pkg lliuxiaoxu\_aeb roscpp sensor\_msgs rospy std\_msgs roslaunch message\_generation



4.在liuxiaoxu\_aeb中新建文件夹launch 和 msg



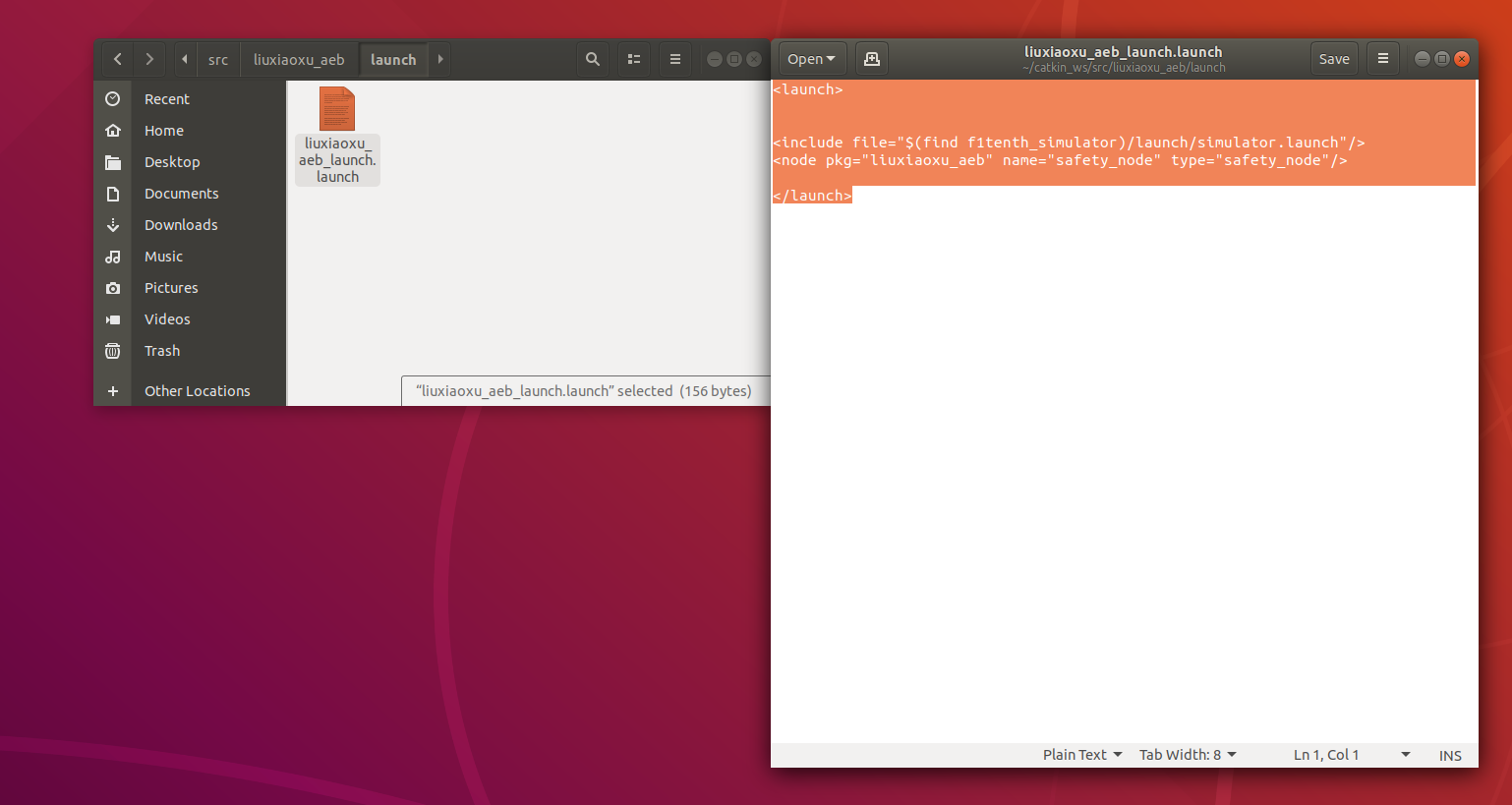
5.launch文件夹中新建liuxiaoxu\_aeb\_launch.launch，并输入以下内容：

<launch>

<include file="$(find f1tenth\_simulator)/launch/simulator.launch"/>

<node pkg="liuxiaoxu\_aeb" name="safety\_node" type="safety\_node"/>

</launch>

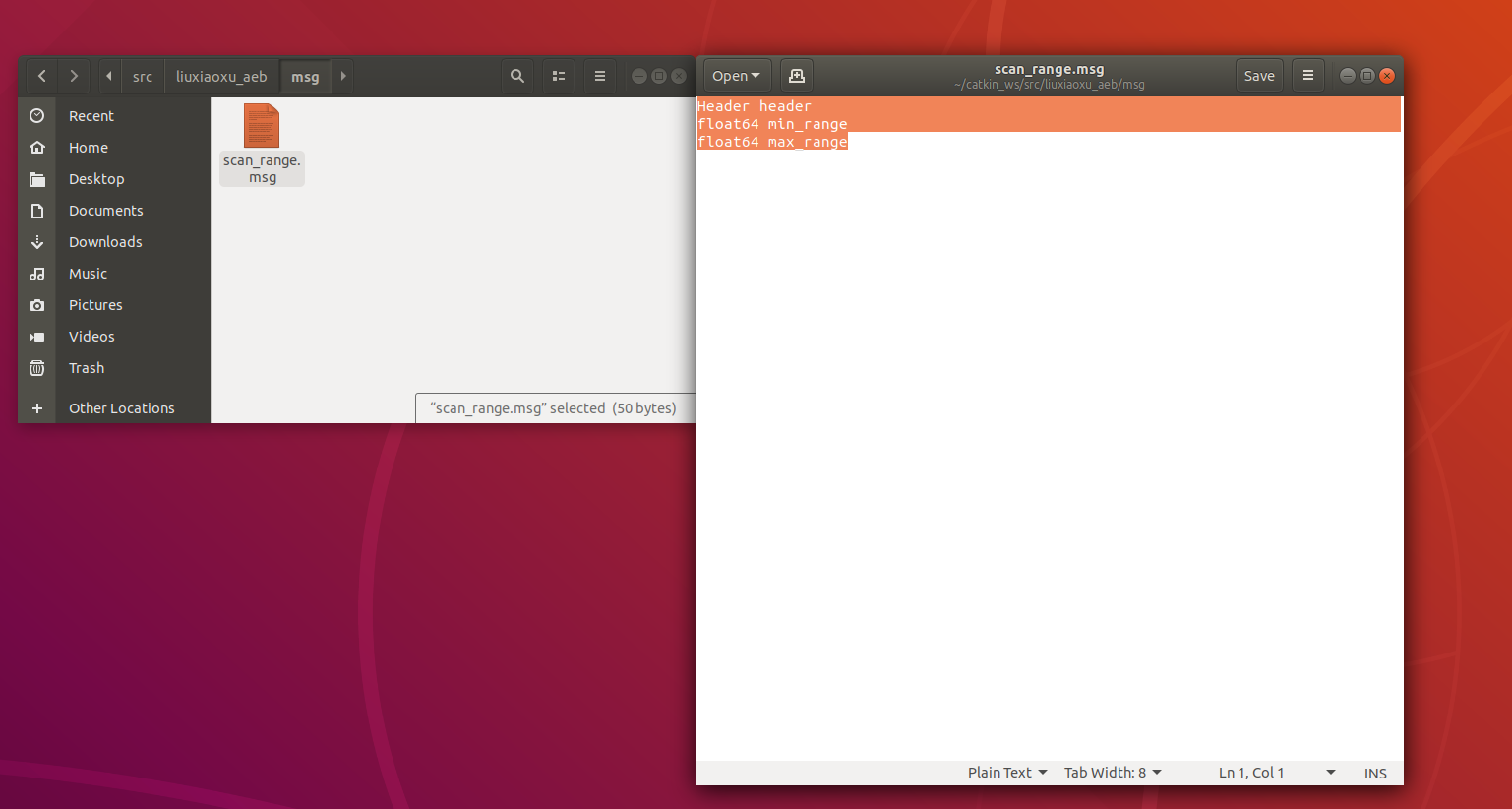


6.msg文件夹中新建scan\_range.msg，并输入以下内容：

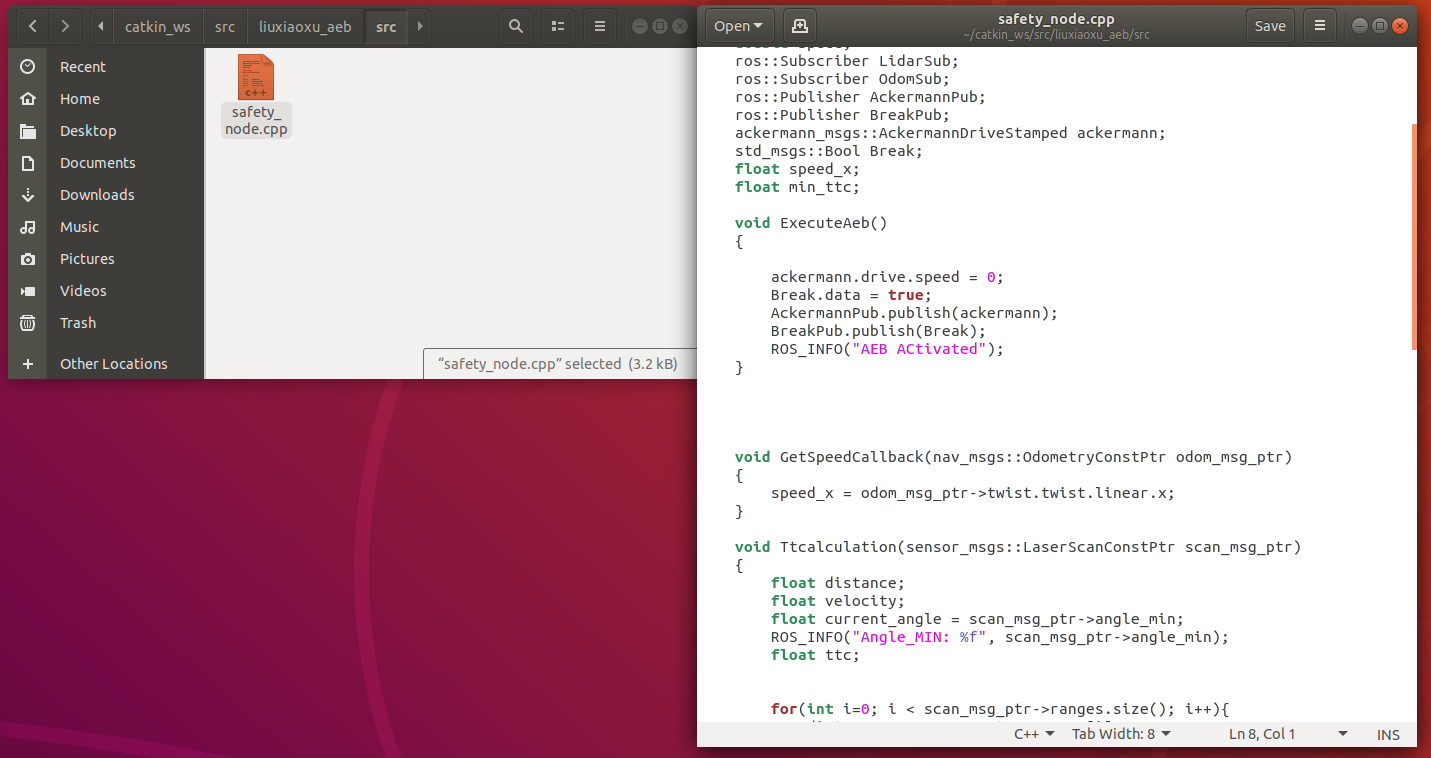
Header header

float64 min\_range

float64 max\_range



7.在src中导入写好的safety\_node.cpp



8.打开CMakeLists.txt，清空并输入如下内容：

find\_package(catkin REQUIRED COMPONENTS

roscpp

rospy

std\_msgs

sensor\_msgs

nav\_msgs

ackermann\_msgs

message\_generation

roslaunch

)

roslaunch\_add\_file\_check(launch)

add\_message\_files(

FILES

scan\_range.msg

)

generate\_messages(

DEPENDENCIES

std\_msgs

)

catkin\_package()

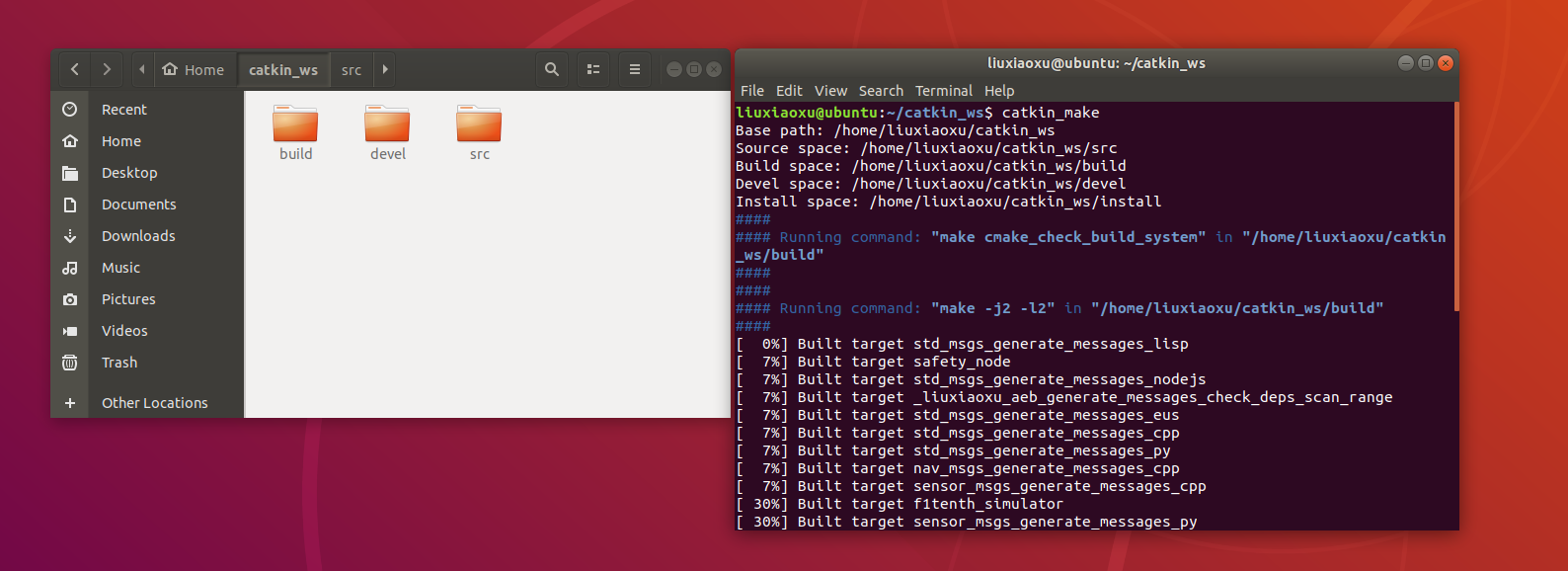
include\_directories(include ${catkin\_INCLUDE\_DIRS})

add\_executable(safety\_node src/safety\_node.cpp)

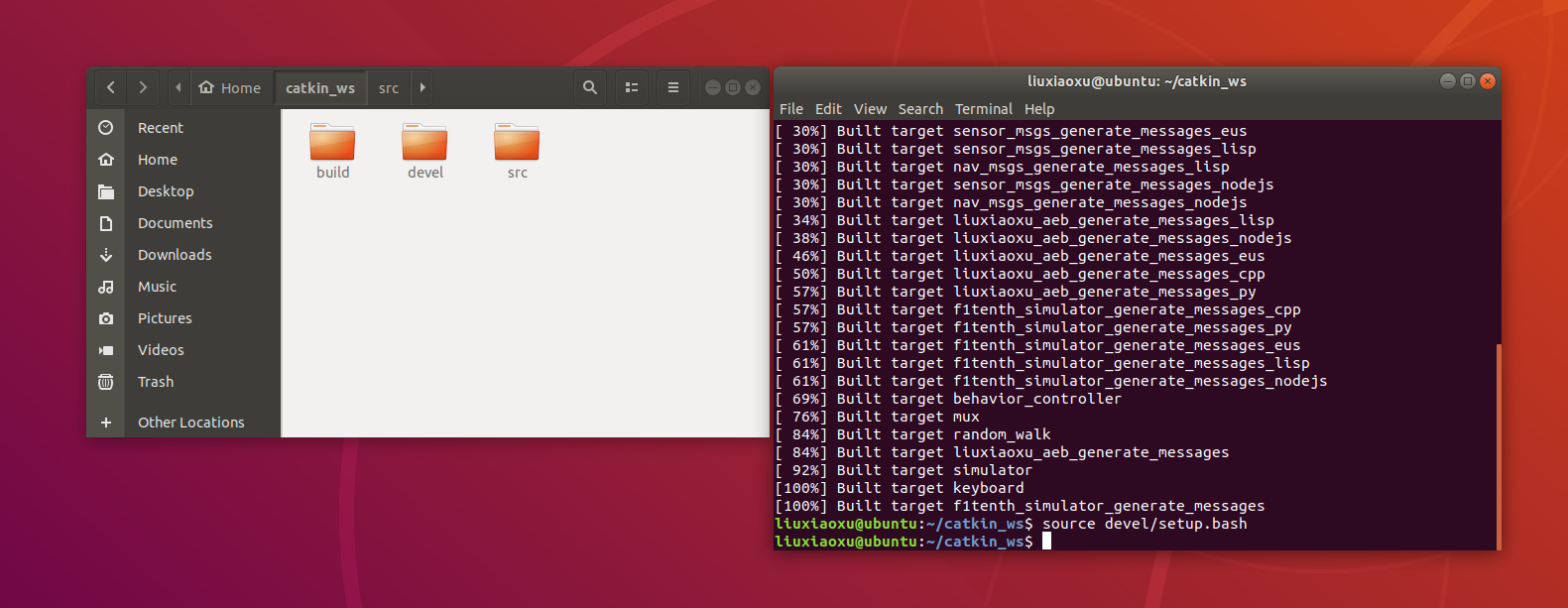
target\_link\_libraries(safety\_node ${catkin\_LIBRARIES})

9.编译运行

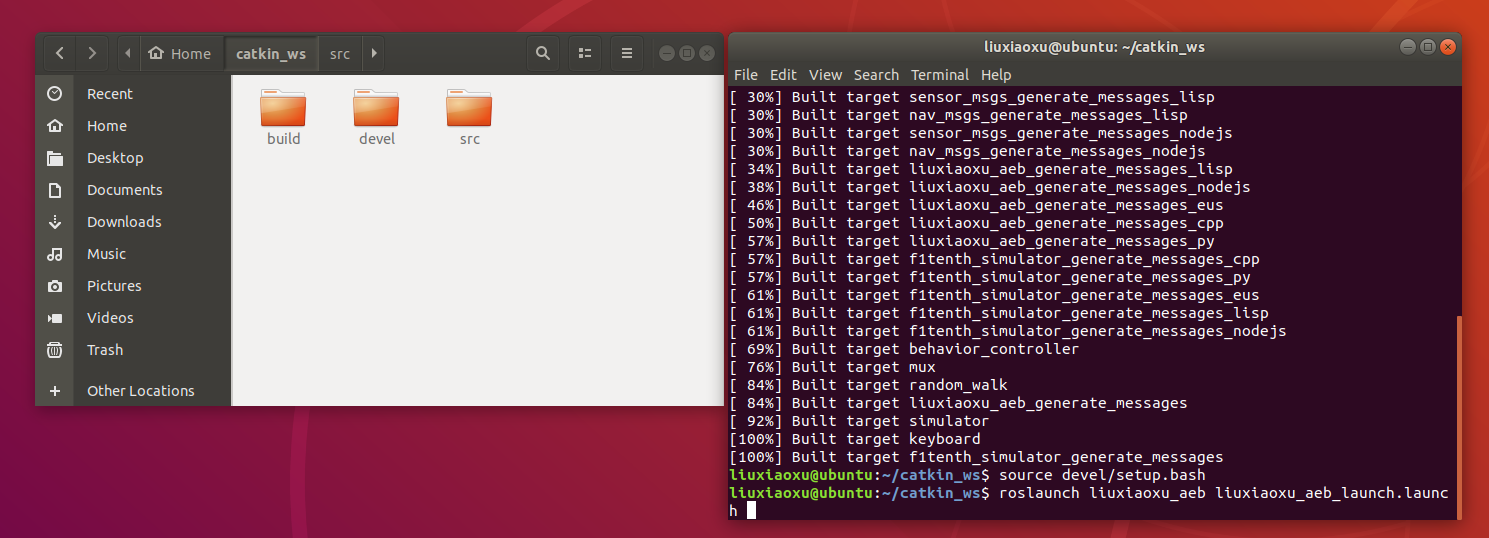
Catkin\_make



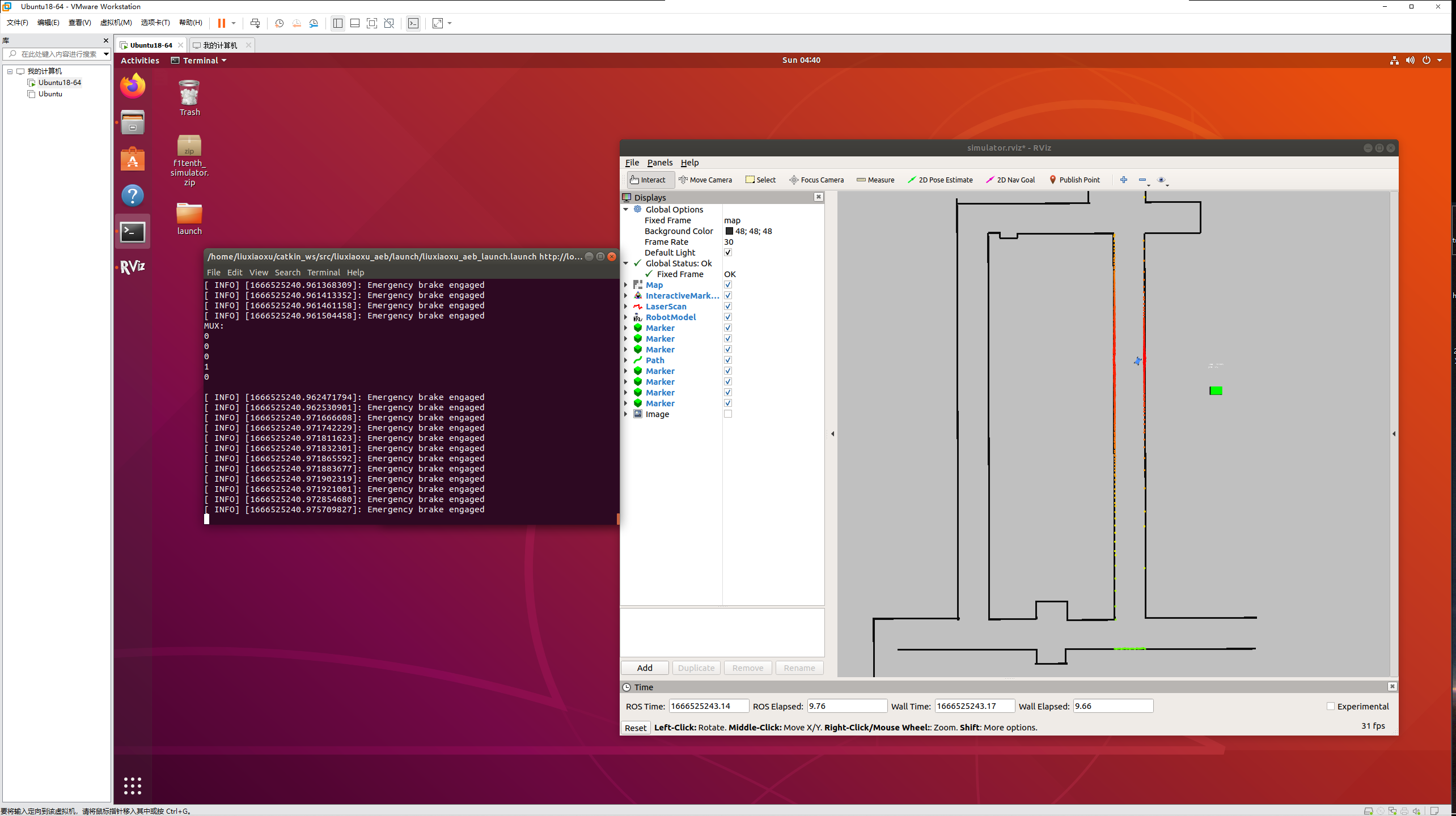
Source devel/setup.bash



Roslaunch liuxiaoxu\_aeb liuxiaoxu\_aeb\_launch.launch



10.测试



测试成功

二、来源

[F1Tenth-Labs-/Lab2\_AEB/tiong\_hee\_roslab at main · Khoo395/F1Tenth-Labs- (github.com)](https://github.com/Khoo395/F1Tenth-Labs-/tree/main/Lab2_AEB/tiong_hee_roslab)

三、理解

1.***Safety类***承载了***紧急制动的过程***

创建一个***Node Handle类***，便于***节点的启动和关闭***

创建了***激光雷达和里程表***，他们是***订阅者subscriber***

创建了***阿克曼小车和制动系统***，他们是***发布者publisher***

当启动AEB时，小车的速度变为0（不考虑惯性）。

2.判断何时启用AEB采用的是***TTC法则***

采样距离，沿某一方向的速度和当前角度，

定义min\_ttc，

Real\_ttc=距离除以沿某一方向速度的绝对值，

当real\_ttc小于min\_ttc时，产生紧急制动。