ORB_SLAM3环境配置

ORB-SLAM3是一个支持视觉、视觉加惯导、混合地图的SLAM系统，可以在单目，双目和RGB-D相机上利用针孔或者鱼眼模型运行

1.下载软件安装包

ORB-SLAM3源码

Pangolin

Eigen3

Opencv3.4.3

boost 库

2.依次安装软件包

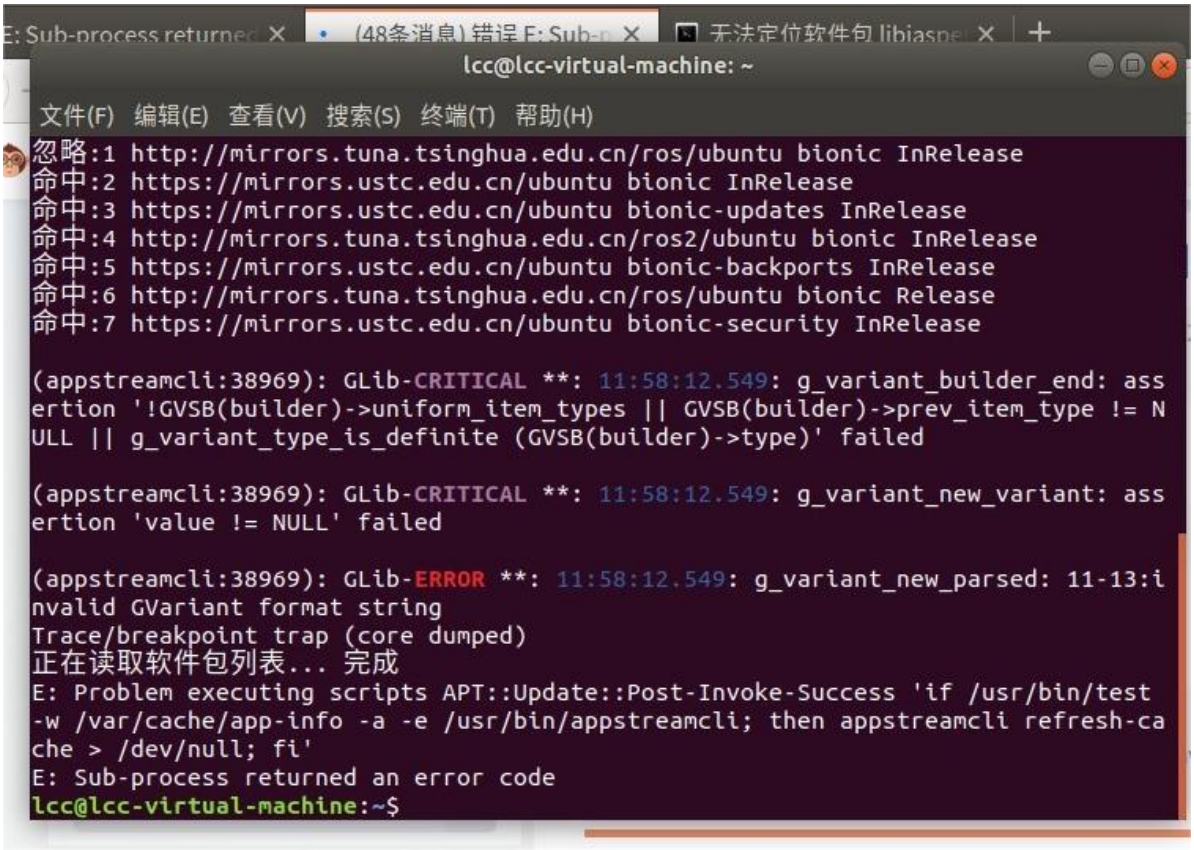
1.补齐前置库

```
#顺序可能有误，根据需求安装即可
sudo apt install libgl1-mesa-dev
sudo apt install vim
sudo apt install git
sudo apt install libglew-dev
sudo apt install cmake
sudo apt install libpython2.7-dev
sudo apt install pkg-config
sudo apt install libegl1-mesa-dev libwayland-dev libxkbcommon-dev wayland-
protocols
sudo apt-get install build-essential libgtk2.0-dev libavcodec-dev libavformat-dev
libjpeg-dev libtiff5-dev libswscale-dev libjasper-dev
sudo apt-get install libssl-dev
```

注意事项

出现问题A

```
E：Sub-process returned an error code
#或
未找到软件包……
#原因：未更换下载源，执行update失败
```



解决方式1

解决方法：

```
sudo pkill -KILL appstreamcli
wget -P /tmp https://launchpad.net/ubuntu/+archive/primary/+files/appstream_0.9.4-1ubuntu1_amd64.deb https://launchpad.net/ubuntu,
sudo dpkg -i /tmp/appstream_0.9.4-1ubuntu1_amd64.deb /tmp/libappstream3_0.9.4-1ubuntu1_amd64.deb
```

解决方式2

1、首先，先备份原来源文件sources.list

```
sudo cp /etc/apt/sources.list /etc/apt/sources.list.bcakup
```

2、使用 gedit 编辑，更改源文件sources.list内容

执行命令：

```
sudo gedit /etc/apt/sources.list
```

删除sources.list内容，并将以下内容全部复制到sources.list中

```
deb http://mirrors.aliyun.com/ubuntu/ bionic main restricted universe multiverse
deb http://mirrors.aliyun.com/ubuntu/ bionic-security main restricted universe multiverse
deb http://mirrors.aliyun.com/ubuntu/ bionic-updates main restricted universe multiverse
deb http://mirrors.aliyun.com/ubuntu/ bionic-proposed main restricted universe multiverse
deb http://mirrors.aliyun.com/ubuntu/ bionic-backports main restricted universe multiverse
deb-src http://mirrors.aliyun.com/ubuntu/ bionic main restricted universe multiverse
deb-src http://mirrors.aliyun.com/ubuntu/ bionic-security main restricted universe multiverse
deb-src http://mirrors.aliyun.com/ubuntu/ bionic-updates main restricted universe multiverse
deb-src http://mirrors.aliyun.com/ubuntu/ bionic-proposed main restricted universe multiverse
deb-src http://mirrors.aliyun.com/ubuntu/ bionic-backports main restricted universe multiverse
```

保存文件，退出。

3、重新执行更新命令，更新软件列表，检测出可以更新的软件。

```
sudo apt-get update
```

解决方式3

1. 确认软件包名称

首先要确认的是，我们要安装的软件包名称是否正确。在终端中输入以下命令，查看可用的包列表：

```
apt-cache search libjasper-dev
```

如果返回值为空，则说明该包不存在于源列表中，我们需要尝试其他的软件源。

2. 更换软件源

如果我们确认软件包名称正确，但是在默认的软件源中找不到这个包，我们需要自己手动添加额外的软件源。这可以通过编辑 /etc/apt/sources.list 文件来完成。
在文件的末尾添加以下两行代码，分别是Ubuntu官方源和Ubuntu中科大源：

```
deb http://archive.ubuntu.com/ubuntu bionic main restricted universe multiverse
deb http://mirrors.ustc.edu.cn/ubuntu/ bionic main restricted universe multiverse
```

保存更改后，执行以下命令，更新软件源：

```
sudo apt-get update
```

然后再次尝试安装 libjasper-dev 库：

```
sudo apt-get install libjasper-dev
```

如果没有报错信息，说明安装成功。

解决方式4

解决方法

1. 首先运行如下命令

```
1 sudo add-apt-repository "deb http://security.ubuntu.com/ubuntu xenial-security main"
```

若运行成功，则跳至第 **3** 步

```
#再执行
sudo apt-get update
```

2.安装Eigen3

```
cd Eigen3
mkdir build
cd build
cmake ..
sudo make install
```

3.安装Pangolin

```
cd Pangolin
mkdir build
cd build
cmake ..
cmake --build .
```

4.安装Opencv3.4.3

```
cd opencv-3.4.3
mkdir build
cd build
cmake -D CMAKE_BUILD_TYPE=Release -D CMAKE_INSTALL_PREFIX=/usr/local ..
make -j4
sudo make install
#配置环境.....
```

注意事项

出现问题A

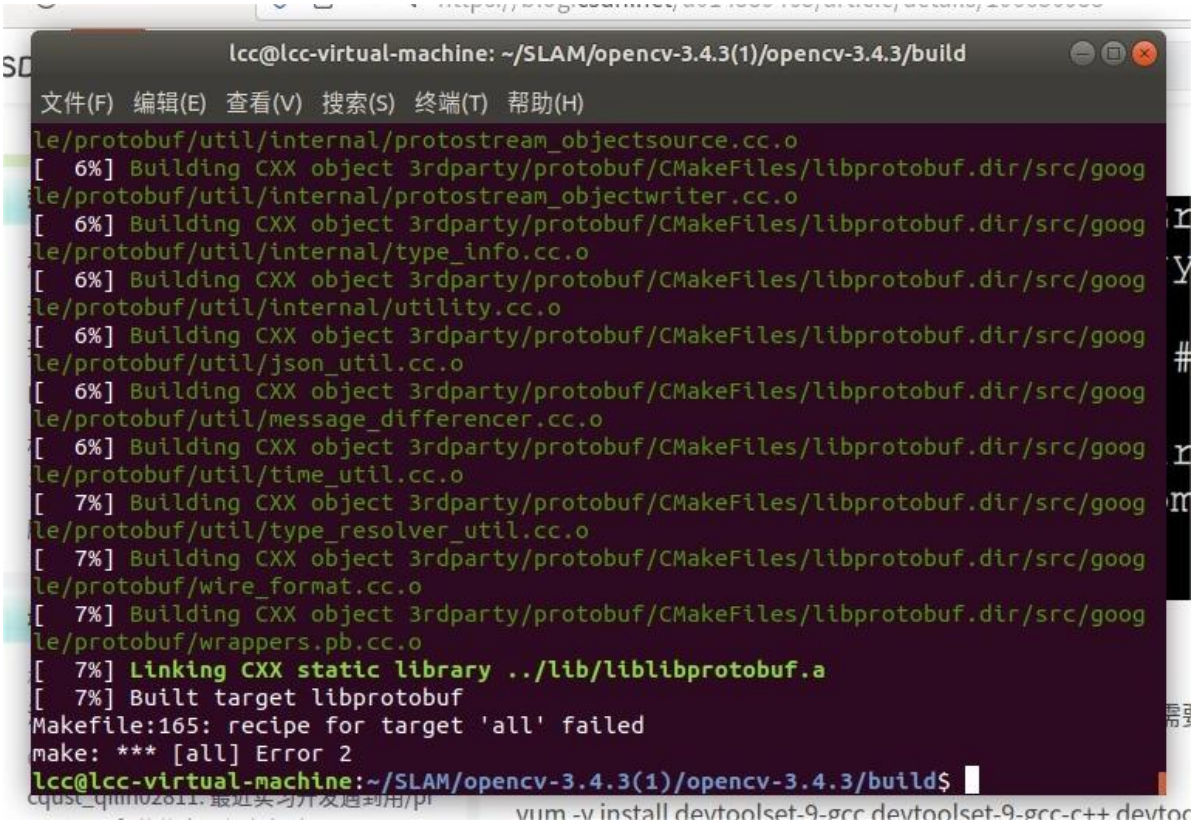
```
E: 软件包 libjasper-dev 没有可安装候选
```

解决方式

```
sudo add-apt-repository "deb http://security.ubuntu.com/ubuntu xenial-security main"
sudo apt update
sudo apt install libjasper1 libjasper-dev
```

出现问题B

```
#安装opencv gcc版本过低 make报错
```



解决方式

出现问题C

死机

解决方式

重装虚拟机

5.安装boost 库

```
sudo ./bootstrap.sh
sudo ./b2 install
```

6.安装ORB-SLAM3

1.源码编译

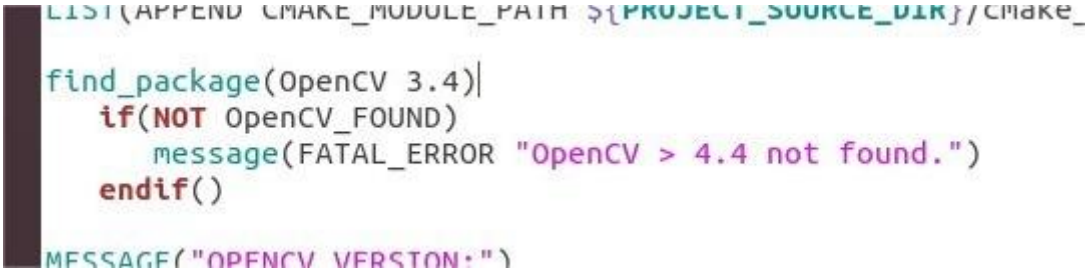
```
chmod +x build.sh
```

注意事项

出现问题A

```
#cmakelist中opencv版本不同
```

解决方式



2.安装

依次安装DBoW2，g2o，Sophus后安装ORB_SLAM3即可。

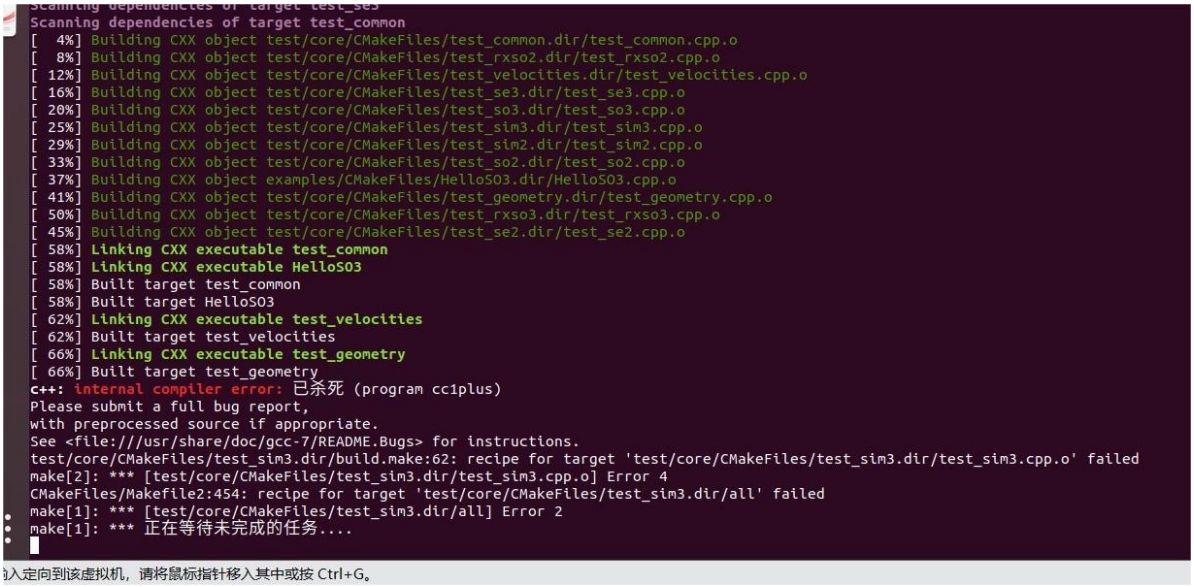
验证案例代码：

```
./Examples/Monocular-Inertial/mono_inertial_euroc ./Vocabulary/ORBvoc.txt
./Examples/Monocular-Inertial/EuRoC.yaml ./dataset/V102 ./Examples/Monocular-
Inertial/EuRoC_TimeStamps/V102.txt dataset-V102_monoi
```

注意事项

出现问题A

卡死



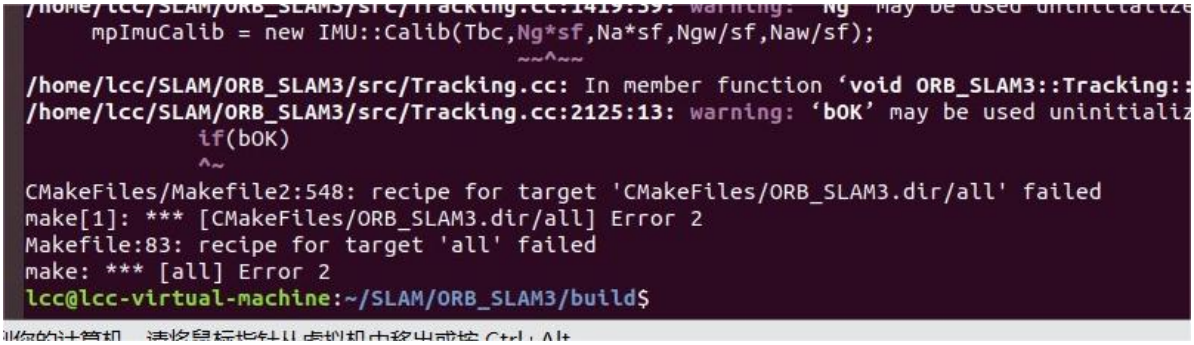
入定向到该虚拟机，请将鼠标指针移入其中或按 Ctrl+G。

解决方式

```
#切换
make  ->  make -j4
```

出现问题B

```
make: *** [all] Error 2
```



解决方式

```
#切换
make -j4  ->  make
```

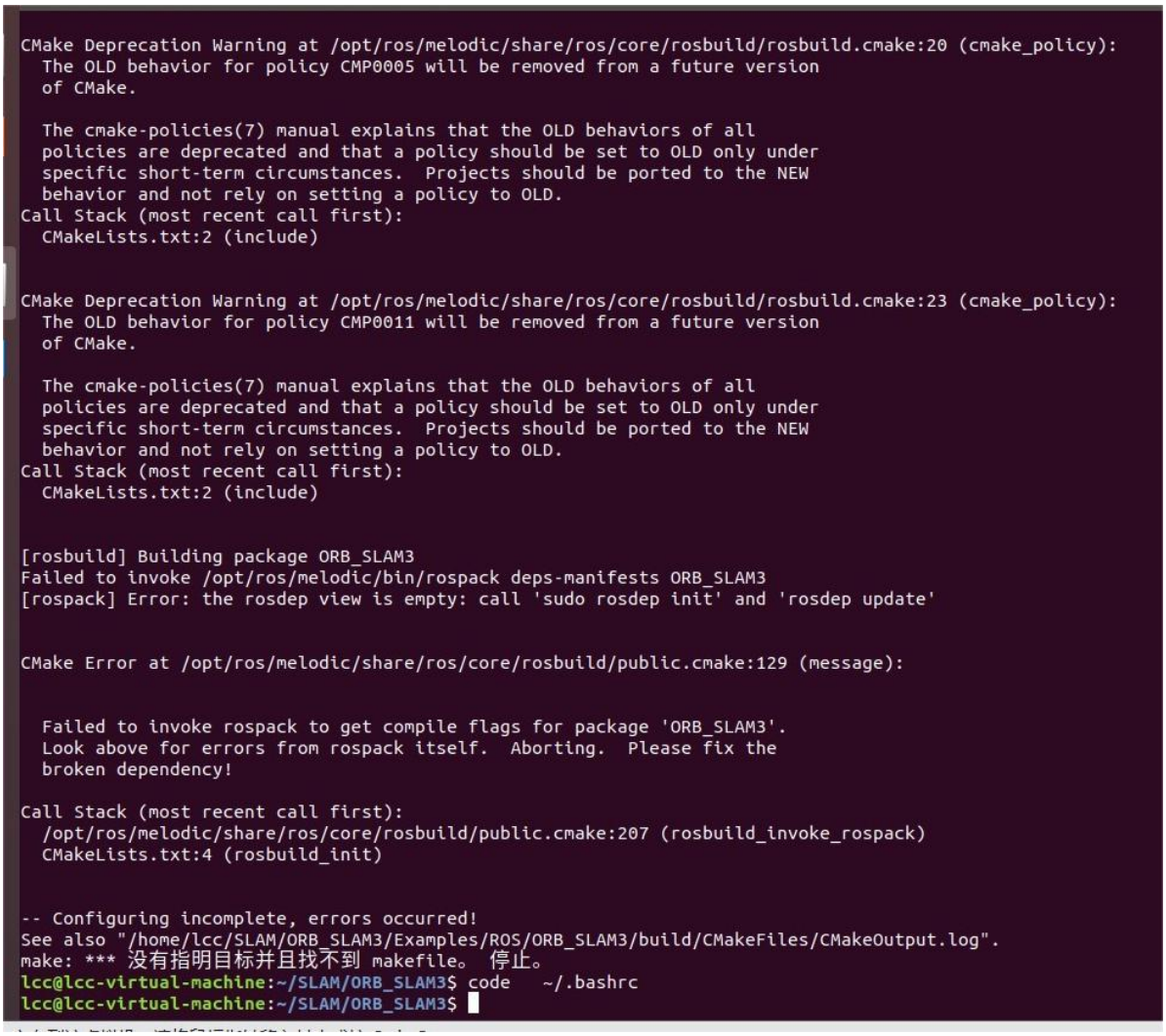
3.编译ORB_SLAM3 ROS模块

```
cp -r Examples_old/ROS Examples
vim
~/.bashrcexportROS_PACKAGE_PATH=${ROS_PACKAGE_PATH}:/home/raypc/codes/orb/Exampl
es/ROS/
chmod +x build_ros.sh
./build_ros.sh
```

注意事项

出现问题A

```
Error: the rosdep view is empty: call 'sudo rosdep init' and 'rosdep update'
#ros一键安装时漏掉了
```



解决方式

> 解决方法：
> 把sudo rosdep init和rosdep update执行成功就可以了，下次编译就没有问题了。

出现问题B

Sophus安装出现问题

```
fatal error: sophus/se3.hpp:没有那个文件或目录
#include <sophus/se3.hpp>
```

```
         ^~~~~~~~~~~~~~~~
compilation terminated.
CMakeFiles/MonoAR.dir/build.make:198: recipe for target 'CMakeFiles/MonoAR.dir/src/AR/ViewerAR.cc.o' failed
make[2]: *** [CMakeFiles/MonoAR.dir/src/AR/ViewerAR.cc.o] Error 1
make[2]: *** 正在等待未完成的任务....
In file included from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Frame.h:30:0,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/KeyFrame.h:28,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/MapPoint.h:23,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/FrameDrawer.h:24,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Viewer.h:23,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Tracking.h:26,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/System.h:31,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/src/AR/ros_mono_ar.cc:31:
/home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/ImuTypes.h:29:10: fatal error: sophus/se3.hpp: 没有那个文件或目录
 #include <sophus/se3.hpp>
          ^~~~~~~~~~~~~~~~
compilation terminated.
CMakeFiles/MonoAR.dir/build.make:118: recipe for target 'CMakeFiles/MonoAR.dir/src/AR/ros_mono_ar.cc.o' failed
make[2]: *** [CMakeFiles/MonoAR.dir/src/AR/ros_mono_ar.cc.o] Error 1
CMakeFiles/Makefile2:631: recipe for target 'CMakeFiles/MonoAR.dir/all' failed
make[1]: *** [CMakeFiles/MonoAR.dir/all] Error 2
make[1]: *** 正在等待未完成的任务....
In file included from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Frame.h:30:0,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/KeyFrame.h:28,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/MapPoint.h:23,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/FrameDrawer.h:24,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Viewer.h:23,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/Tracking.h:26,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/System.h:31,
                 from /home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/src/ros_mono_inertial.cc:34:
/home/lcc/SLAM/ORB_SLAM3/Examples/ROS/ORB_SLAM3/../../../include/ImuTypes.h:29:10: fatal error: sophus/se3.hpp: 没有那个文件或目录
 #include <sophus/se3.hpp>
          ^~~~~~~~~~~~~~~~
compilation terminated.
```

解决方式

重装Sophus

```
1 cd Sophus
2 mkdir build
3 cd build
4 cmake ..
5 make
6 sudo make install
```

出现问题C

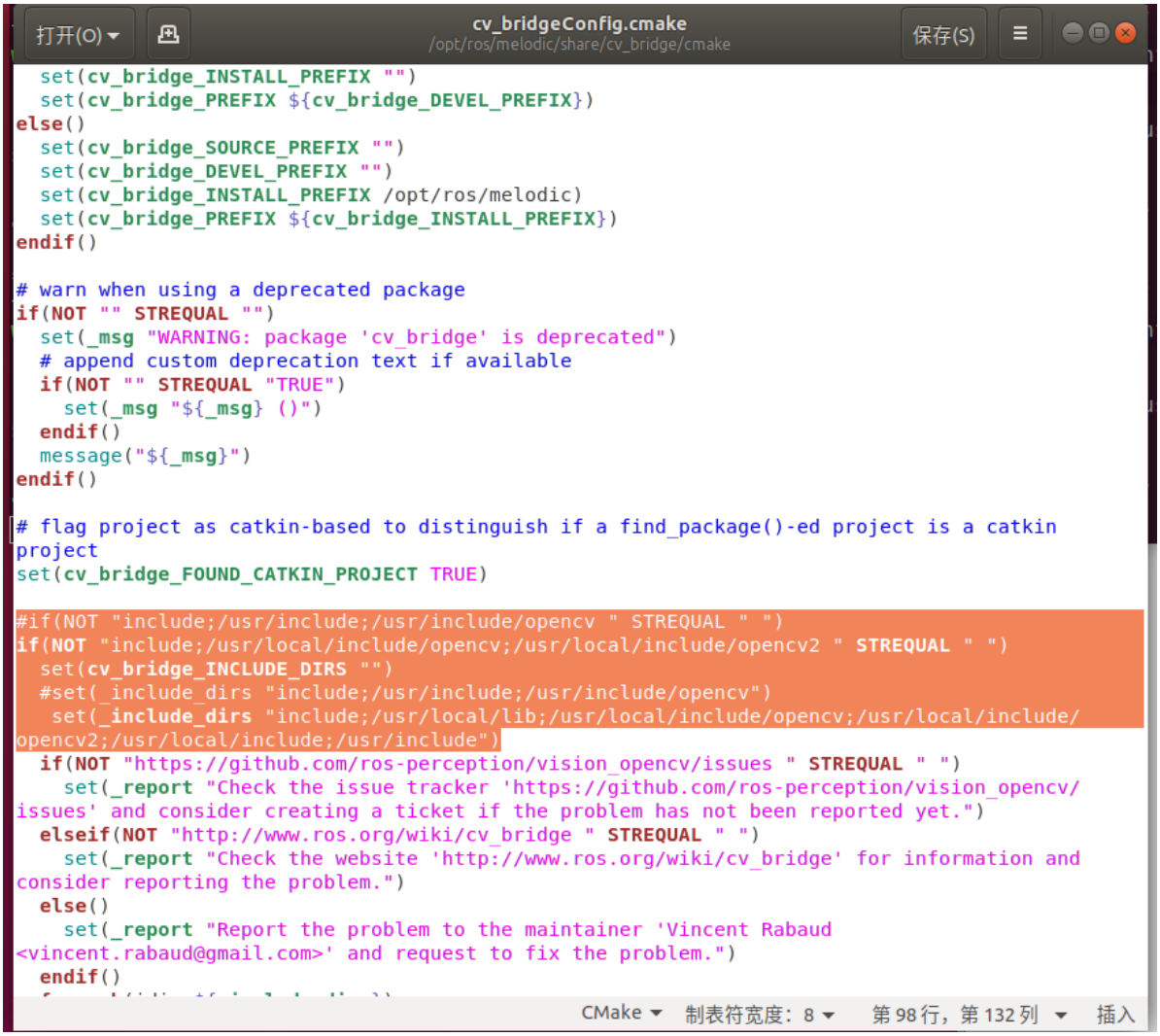
opencv默认版本与使用版本不符，引起冲突

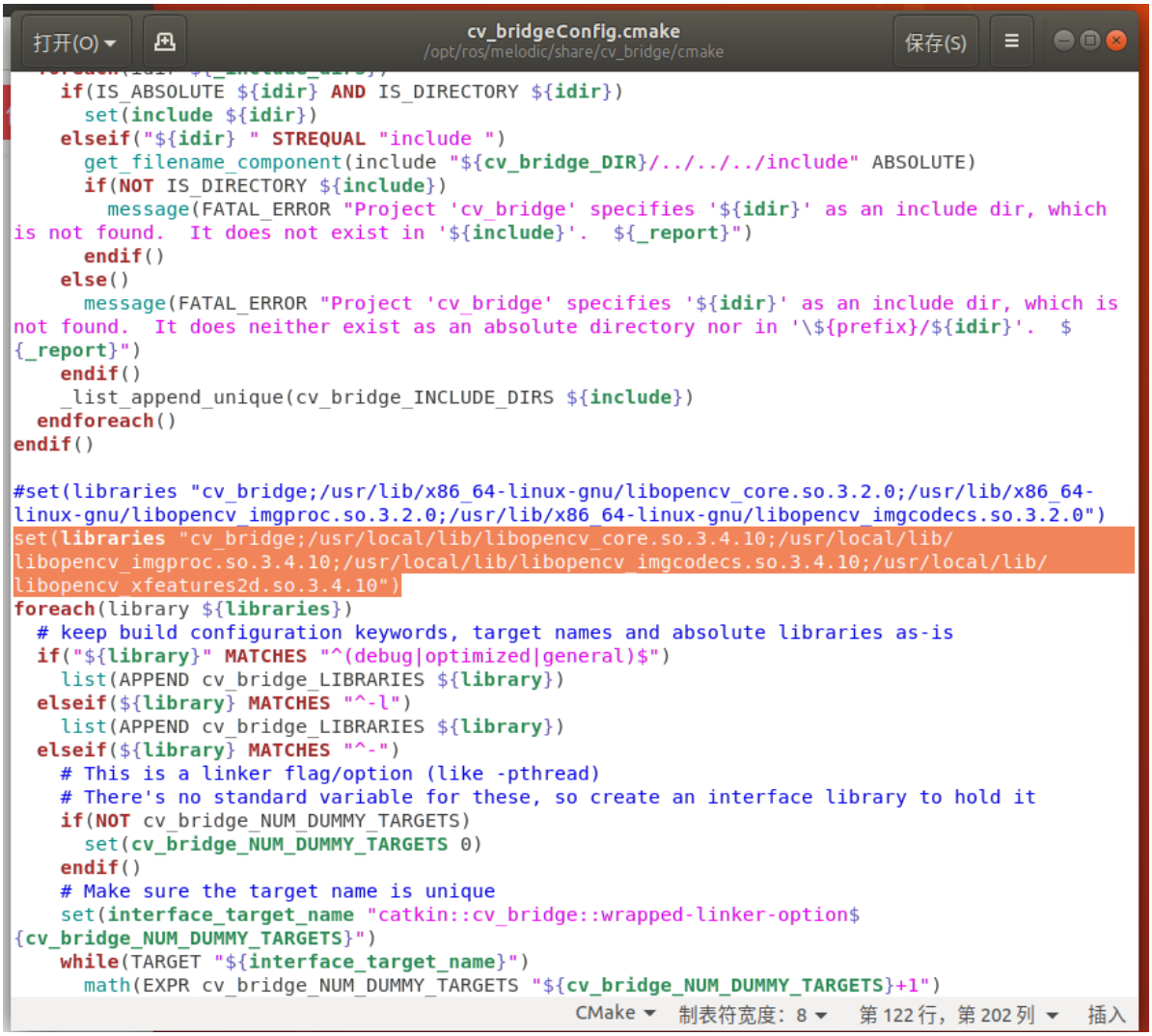
```
warning: libopencv_imgporc.so.3.2, needed by /……/libcv_bridge.so, may conflict
with libopencv_imgporc.so.3.4
```

```
make[2]: *** 正在等待未完成的任务....
c++: internal compiler error: 已杀死 (program cc1plus)
Please submit a full bug report,
with preprocessed source if appropriate.
See <file:///usr/share/doc/gcc-7/README.Bugs> for instructions.
CMakeFiles/Mono.dir/build.make:118: recipe for target 'CMakeFiles/Mono.dir/src/ros_mono.cc.o' failed
make[2]: *** [CMakeFiles/Mono.dir/src/ros_mono.cc.o] Error 4
CMakeFiles/Makefile2:504: recipe for target 'CMakeFiles/Mono.dir/all' failed
make[1]: *** [CMakeFiles/Mono.dir/all] Error 2
make[1]: *** 正在等待未完成的任务....
virtual memory exhausted: 无法分配内存
CMakeFiles/Mono_Inertial.dir/build.make:118: recipe for target 'CMakeFiles/Mono_Inertial.dir/src/ros_mono_inertial.cc.o' failed
make[2]: *** [CMakeFiles/Mono_Inertial.dir/src/ros_mono_inertial.cc.o] Error 1
CMakeFiles/Makefile2:67: recipe for target 'CMakeFiles/Mono_Inertial.dir/all' failed
make[1]: *** [CMakeFiles/Mono_Inertial.dir/all] Error 2
[ 61%] Linking CXX executable ../Stereo_Inertial
[ 69%] Linking CXX executable ../RGBD
/usr/bin/ld: warning: libopencv_imgproc.so.3.2, needed by /opt/ros/melodic/lib/libcv_bridge.so, may conflict with libopencv_imgproc.so.3.4
/usr/bin/ld: warning: libopencv_core.so.3.2, needed by /opt/ros/melodic/lib/libcv_bridge.so, may conflict with libopencv_core.so.3.4
[ 69%] Built target Stereo_Inertial
/usr/bin/ld: warning: libopencv_core.so.3.2, needed by /opt/ros/melodic/lib/libcv_bridge.so, may conflict with libopencv_core.so.3.4
[ 69%] Built target RGBD
[ 76%] Linking CXX executable ../Stereo
/usr/bin/ld: warning: libopencv_imgproc.so.3.2, needed by /opt/ros/melodic/lib/libcv_bridge.so, may conflict with libopencv_imgproc.so.3.4
/usr/bin/ld: warning: libopencv_core.so.3.2, needed by /opt/ros/melodic/lib/libcv_bridge.so, may conflict with libopencv_core.so.3.4
[ 76%] Built target Stereo
CMakeFiles/MonoAR.dir/build.make:118: recipe for target 'CMakeFiles/MonoAR.dir/src/AR/ros_mono_ar.cc.o' failed
make[2]: *** [CMakeFiles/MonoAR.dir/src/AR/ros_mono_ar.cc.o] Error 1
CMakeFiles/Makefile2:573: recipe for target 'CMakeFiles/MonoAR.dir/all' failed
make[1]: *** [CMakeFiles/MonoAR.dir/all] Error 2
Makefile:129: recipe for target 'all' failed
make: *** [all] Error 2
lcc@lcc-virtual-machine:~/SLAM/ORB_SLAM3$
```

解决方式

修改cv_bridgeConfig.cmake

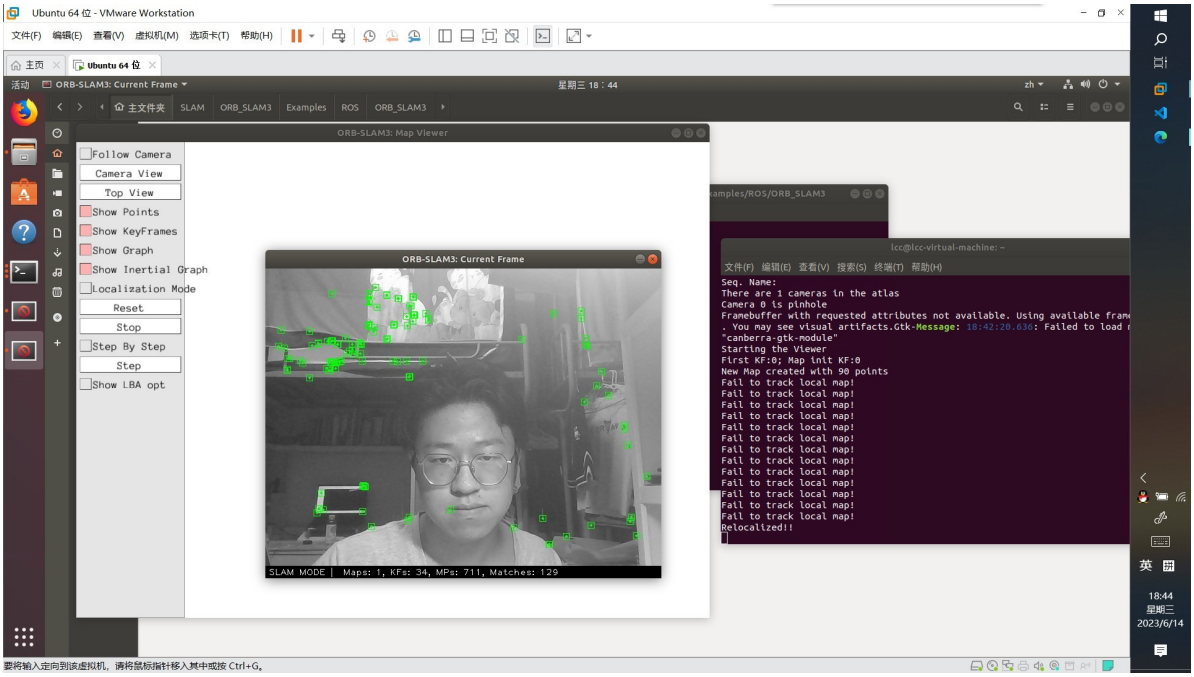




(其实我修改完之后还是不行就又改回来了，但就能编译了)

3.开启摄像头连接

```
#将camera.py放入 /Examples/ROS/ORB_SLAM3/文件夹下
chmod +x camera.py
rosrun ORB_SLAM3 camera.py
rosrun ORB_SLAM3 Mono /home/lcc/SLAM/ORB_SLAM3/Vocabulary/ORBvoc.txt
/home/lcc/SLAM/ORB_SLAM3/Examples/Monocular/TUM1.yaml
```



注意事项

出现问题A

```
#运行后系统提示如下
[ WARN:0] global /tmp/pip-req-build-
6amqbhlx/opencv/modules/videoio/src/cap_v4l.cpp (893) open
VIDEOIO(V4L2:/dev/video0): can't open camera by index
```

解决方式

启动 虚拟机->可移动设备->关于摄像头设备的选项

出现问题B

初始摄像头黑屏没有画面

解决方式

调整摄像头的位置（物理）