# 第一次作业

## 2熟悉Linux

1. 在Ubuntu 中安装软件使用sudo apt-get install命令,通常软件安装在都安装在/usr或/usr/share或/usr/local文件目录下
2. 环境变量是Linux系统预定义的参数,添加当前shell的环境变量使用export命令。
   定义当前用户的环境变量在.bash_profile进行定义，定义所有用户的环境变量在etc/profile进行定义。
   ROS系统中setup脚本实现环境变量的设置，在，bashrc中添加执行脚本命令

> PATH 定义 shell将到哪些目录中寻找命令或程序
> HOME 定义 当前用户主目录

3. 根目录的结构为，

| 文件夹 | 作用 |
|---|---|
| include | 存放源文件 |
| src | 生成动态库的源文件 |
| Examples | 生成可执行程序 |

4. 执行chmod +x a.sh 命令
5. 输入命令 sudo chown xiang a.sh && sudo chgrp xiang a.sh

## 3LAM综述文献阅读

1. 应用领域：增强现实，三维重建，定位与地图构建
2. SLAM 中定位与建图是相互依存的，为了在环境中精确地定位，需要正确的地图，但是为了构建好的地图，当元素被添加到地图时，必须正确定位。
3. 经典时期（1986-2004）：研究重点在滤波器 算法研究时期（2004 - 2015年）算法分析期间研究了SLAM的基本性质
4. 列举三篇在 SLAM 领域的经典文献。
   - 提出ORBSLAM:Mur-Artal R, Montiel J M M, Tardos J D. ORB-SLAM: a ver-satile and accurate monocular SLAM system[J]. IEEE Transac-tions on Robotics, 2015, 31(5): 1147-1163
   - 提出LSD_SLAM,基于直接法 :Engel J, Schöps T, Cremers D. LSD-SLAM: large-scale direct monocular SLAM[C] //Proceedings of Computer Vision – ECCV 2014. Heidelberg: Springer, 2014: 834-849

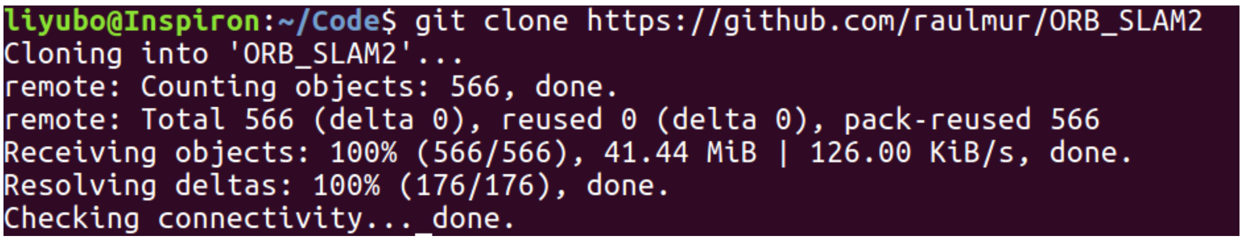
- TSDF算法：Curless B, Levoy M. A volumetric method for building com-plex models from range images[C] //Proceedings of the 23rd Annual Conference on Computer Graphics and Inter-ActiveTechniques. New York: ACM Press, 1996: 303-312

## 4Cmake练习

```
cmake_minimum_required(VERSION 2.8)

project( HelloSLAM )

set( CMAKE_BUILD_TYPE "Release" )

include_directories( "include" )
 #.a 静态库 STATIC .so 动态库 SHARED
add_library( libhello SHARED src/hello.cpp )

add_executable( sayhello useHello.cpp )

target_link_libraries( sayhello libhello )

INSTALL
(
    #LIBRARY 动态库 #ARCHIVE 静态库
    TARGETS  libhello
    LIBRARY DESTINATION /usr/local/lib
)
INSTALL
(
    DIRECTORY include/ DESTINATION /usr/local/include
)
```

## 5理解ORB-SLAM2

1. 下载ORB-SLAM2 截图为



```
liyubo@Inspiron:~/Code$ git clone https://github.com/raulmur/ORB_SLAM2
Cloning into 'ORB_SLAM2'...
remote: Counting objects: 566, done.
remote: Total 566 (delta 0), reused 0 (delta 0), pack-reused 566
Receiving objects: 100% (566/566), 41.44 MiB | 126.00 KiB/s, done.
Resolving deltas: 100% (176/176), done.
Checking connectivity... done.
```

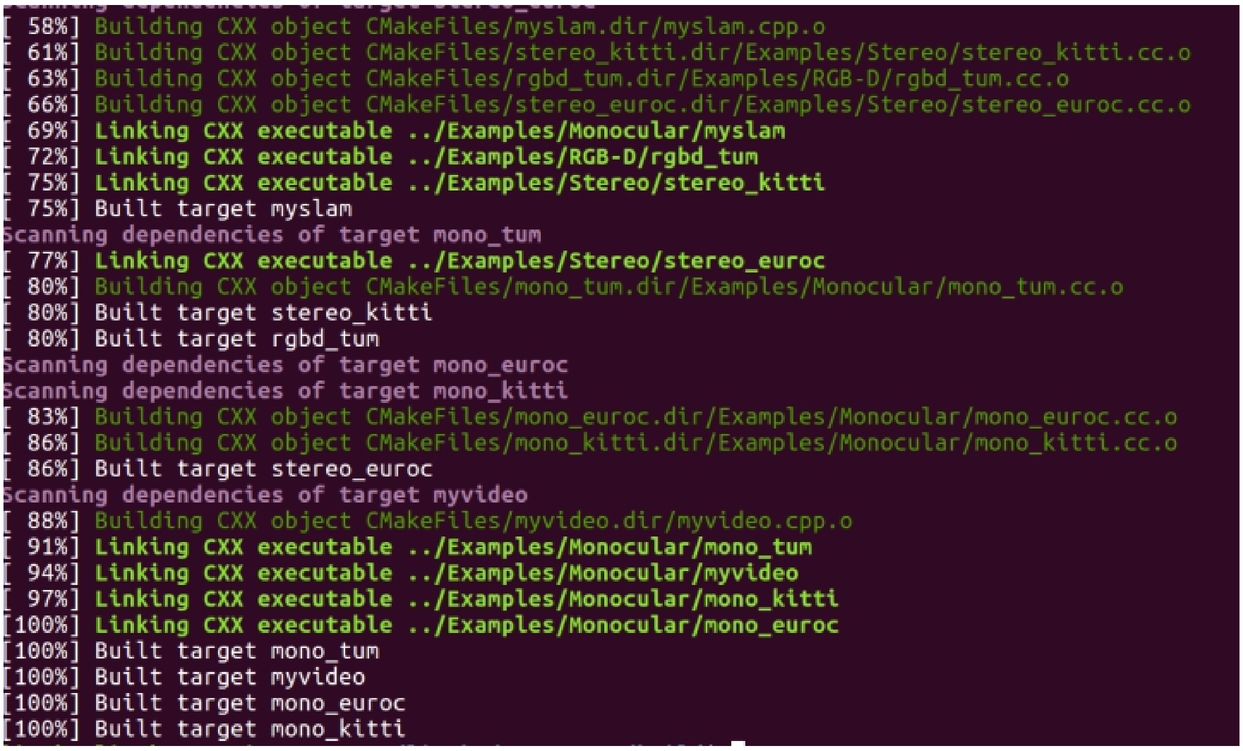
2. 分析ORB-SLAM2

- 生成一个动态函数库，路径为lib/libORB_SLAM2.so
  生成7个可执行文件,fenbieweirgbd_tum，stereo_kitti，stereo_kitti，stereo_euroc，mono_tum，mono_kitti，mono_euroc ;链接的库为：OpenCV,EIGEN3,Pangoli,DBoW2,g2o
- 文件夹内容为
-

| 文件夹 | 内容 |
|---|---|
| include | 存放源文件 |
| src | 生成动态库的源文件 |
| Examples | 生成可执行程序 |

# 6使用摄像头或视频运行 ORB-SLAM2

1. 编译完成图为

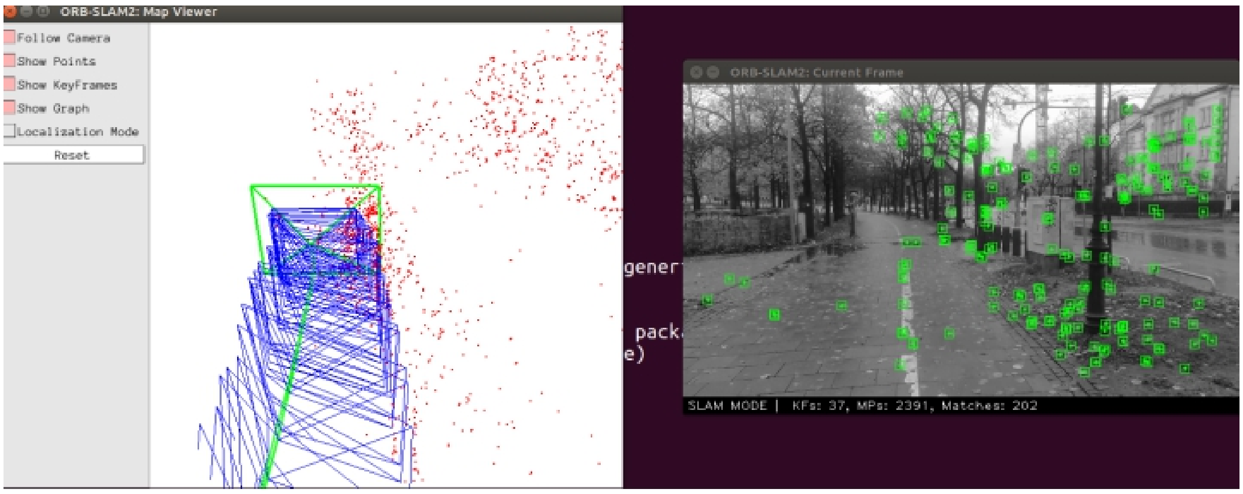


```
[ 58%] Building CXX object CMakeFiles/myslam.dir/myslam.cpp.o
[ 61%] Building CXX object CMakeFiles/stereo_kitti.dir/Examples/Stereo/stereo_kitti.cc.o
[ 63%] Building CXX object CMakeFiles/rgbd_tum.dir/Examples/RGB-D/rgbd_tum.cc.o
[ 66%] Building CXX object CMakeFiles/stereo_euroc.dir/Examples/Stereo/stereo_euroc.cc.o
[ 69%] Linking CXX executable ../Examples/Monocular/myslam
[ 72%] Linking CXX executable ../Examples/RGB-D/rgbd_tum
[ 75%] Linking CXX executable ../Examples/Stereo/stereo_kitti
[ 75%] Built target myslam
Scanning dependencies of target mono_tum
[ 77%] Linking CXX executable ../Examples/Stereo/stereo_euroc
[ 80%] Building CXX object CMakeFiles/mono_tum.dir/Examples/Monocular/mono_tum.cc.o
[ 80%] Built target stereo_kitti
[ 80%] Built target rgbd_tum
Scanning dependencies of target mono_euroc
Scanning dependencies of target mono_kitti
[ 83%] Building CXX object CMakeFiles/mono_euroc.dir/Examples/Monocular/mono_euroc.cc.o
[ 86%] Building CXX object CMakeFiles/mono_kitti.dir/Examples/Monocular/mono_kitti.cc.o
[ 86%] Built target stereo_euroc
Scanning dependencies of target myvideo
[ 88%] Building CXX object CMakeFiles/myvideo.dir/myvideo.cpp.o
[ 91%] Linking CXX executable ../Examples/Monocular/mono_tum
[ 94%] Linking CXX executable ../Examples/Monocular/myvideo
[ 97%] Linking CXX executable ../Examples/Monocular/mono_kitti
[100%] Linking CXX executable ../Examples/Monocular/mono_euroc
[100%] Built target mono_tum
[100%] Built target myvideo
[100%] Built target mono_euroc
[100%] Built target mono_kitti
```

2. 修改CmakeList.txt 添加如下代码

```
set(CMAKE_RUNTIME_OUTPUT_DIRECTORY ${PROJECT_SOURCE_DIR}/code)
add_executable(myvideo
        code/myvideo.cpp)
target_link_libraries(myvideo ${PROJECT_NAME})

add_executable(myslam
        code/myslam.cpp)
target_link_libraries(myslam ${PROJECT_NAME})
```

3. 运行ORB-SLAM2,截图如下



SLAM MODE | KFs: 37, MPs: 2391, Matches: 202