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RGB-D SLAM

RGB-D SLAM Tutorial

ee cmake

e *

August 25, 2015

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SLAM Simultaneous Localization and Mapping   SLAM
SLAM   SLAM
SLAM

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SLAM

rgbd-slam

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SLAM

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2

SLAM

-

1. GUI

2.

3.

C++

- OpenCV.

- PCL.

- g2o

ubuntu 12.04   Arch/Fedora/Mac……

2.1 OpenCV

- OpenCV http://opencv.org/downloads.html 2015.6 2.4 3.0

-

```
1          sudo apt−get install ebuild−essentiale libgtk2.0−devel ibjpeg−deve
              libtiff4−dev elibjasper−dev elibopenexr−dev ecmake epython−deve
              python−numpy epython−tke libtbb−devel ibeigen2−dev eyasm elibfaac−
              devel ibopencore−amrnb−devel ibopencore−amrwb−devel ibtheora−deve
              libvorbis−devel ibxvidcore−devel ibx264−devel ibqt4−devel ibqt4−
              opengl−dev esphinx−common etexlive−latex−extra elibv4l−deve
              libdc1394−22−devel ibavcodec−devel ibavformat−devel ibswscale−dev
```

- OpenCV cmake

```
1          mkdir ebuild
2          cd ebuild
3          cmake e . .
4          make
5          sudo emake einstall
```

OpenCV

/usr/local/include/ opencv opencv2 opencv2

2 1

/usr/local/lib/ install

cmake

cmake linux C++ g++ Makefile cmake makefile makefile

- PCL

  PCL Point Cloud Library

  …… RGB-D SLAM

  ……

  PCL (http://pointclouds.org) ubuntu ubuntu ubuntu

  PCL

```
1    sudo add−apt−repository eppa : v−launchpad−jochen−sprickerhof−de/pcl
2    sudo apt−get eupdate
3    sudo apt−get e install e libpcl −all
```

  PCL

  PCL

---

  e

  ……

3 Hello SLAM!

  OpenCV PCL

  SLAM

......

SLAM

CMake

Linux CMake   slam   slam

```
bin

src

lib

include
```

opencv pcl

cmake   CMakeLists.txt cmake   opencv

CMakeLists.txt:

```
1   touch CMakeLists.txt
```

```
1
2       CMAKE_MINIMUM_REQUIRED( VERSION 2.8 ) #
3       PROJECT( slam ) #
4       SET( CMAKE_CXX_COMPILER "g++" ) #
5
6       #
7       SET( EXECUTABLE_OUTPUT_PATH ${PROJECT_SOURCE_DIR}/bin )
8
9       #
10      SET( LIBRARY_OUTPUT_PATH ${PROJECT_SOURCE_DIR}/lib )
11      #
12      LINK_DIRECTORIES( ${PROJECT_SOURCE_DIR}/lib )
13
14      #
15      INCLUDE_DIRECTORIES( ${PROJECT_SOURCE_DIR}/include )
16
17      #
18      ADD_SUBDIRECTORY( ${PROJECT_SOURCE_DIR}/src )
```

CMakeLists.txt   CMake

main

src/ main.cpp

```cpp
1  #include <iostream>
2
3  int main(int argc, char **argv)
4  {
5      std::cout << "Hello SLAM!" << std::endl;
6      return 0;
7  }
```

src/ CMakeLists.txt

```
1  #
2  ADD_EXECUTABLE( main main.cpp )
```

cmake main.cpp main

```
1  mkdir bulid
2  cd build
3  cmake ..
4  make
```

bin/ main

[width=.5]figure/p1.pdf

e1: main

……

cmake

opencv