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**Visual SLAM Install Instructions**

1. **Description**

This project is to develop a SLAM algorithm running on Raspberry Pi with camera. The SLAM algorithm does both mapping and localization (location and orientation) at the same time using only a camera. In addition, colored landmarks can be recognized during navigation.

1. **Environment**

Linux Ubuntu 18.04

g++ 7.3.0

OpenCV 2.4.13.6 (Required at least 2.4.3)

Eigen 3.3.4 (Required at least 3.1.0)

1. **Dependencies**
2. C++ compiler is prerequisite
3. Required development tools:

sudo apt-get install cmake

sudo apt-get install libpython2.7-dev

sudo apt-get install libblas-dev liblapack-dev libglew-dev

1. Required dependencies
   1. **OpenCV** ([Download](https://opencv.org/releases.html))

*Installing required packages:*

sudo apt-get install build-essential

sudo apt-get install cmake git libgtk2.0-dev pkg-config libavcodec-dev libavformat-dev libswscale-dev

sudo apt-get install python-dev python-numpy libtbb2 libtbb-dev libjpeg-dev libpng-dev libtiff-dev libjasper-dev libdc1394-22-dev

*Downloading OpenCV sources and installing it:*

cd ~/opencv

mkdir release

cd release

cmake -D CMAKE\_BUILD\_TYPE=RELEASE –D CMAKE\_INSTALL\_PREFIX=/usr/local ..

make

sudo make install

* 1. **Eigen3**

*Installing Eigen3:*

sudo apt-get install libeigen3-dev

* 1. **Pangolin** ([Download](https://github.com/stevenlovegrove/Pangolin))

*Downloading Pangolin sources and installing it:*

cd ~/Pangolin

mkdir build

cd build

cmake ..

cmake –build .

* 1. **DBoW2** (in project libs)

*Installing DBoW2:*

cd DBoW2

mkdir build

cd build

cmake .. -DCMAKE\_BUILD\_TYPE=Release

make

* 1. **G2o** (in project libs)

*Installing g2o:*

cd g2o

mkdir build

cd build

cmake .. -DCMAKE\_BUILD\_TYPE=Release

make

**Note: Some errors might be occurring due to different environments. Common errors fixing:**

* Pangolin error – deprecated constants

=> Adjust code in ffmpeg.cpp as [here](https://github.com/stevenlovegrove/Pangolin/commit/d9daba62dfa3f6c786699723621b5ca4566206dd)

* DBoW2 error: 'stdint-gcc.h' file not found

=> Replace 'stdint-gcc.h with stdint.h ([Reference](https://github.com/raulmur/ORB_SLAM/issues/104))

* G2o error: ‘tr1/unordered\_map’ file not found

=> Remove all the tr1 references ([Reference](https://github.com/PXLVision/g2o/commit/95dc775dd9e7234d46698cf39e6617ffea7955c0))

1. **Visual SLAM**

ORB-SLAM2 is a C++ Visual SLAM algorithm library used in this project.

Github link: <https://github.com/raulmur/ORB_SLAM2>

*Downloading project sources from* [*Github*](https://github.com/biorobaw/SLAM-S2018) *and building it:*

cd config

tar -xf ORBvoc.txt.tar.gz

cd ..

mkdir build

cd build

cmake .. -DCMAKE\_BUILD\_TYPE=Release

make

“main” file will be generated in build folder after building.

**Note: Some errors might be occurring due to different environments. Common errors fixing:**

* Error: ‘usleep’ was not declared in this scope

=> Include <unistd.h> in System.h ([Reference](https://github.com/raulmur/ORB_SLAM2/issues/405))

* Error: static\_assert failed "Allocator::value\_type must be same type as value\_type"

=> Replace const KeyFrame\* with KeyFrame\* const ([Reference](https://groups.google.com/forum/#!msg/mpc.lists.freebsd.hackers/mqeLrRHdue0/Yb6KYRv9BQAJ))

* Error: No rule to make target

=> Replace libDBoW2.so and libg2o.so with libDBow.dylib and libg2o.dylib ([Reference](https://github.com/raulmur/ORB_SLAM2/issues/94))

1. **Camera Calibration**

Camera Calibration is necessary before running the project

*Building it:*

cd camera-calibration

mkdir build

cd build

cmake ..

make

“camera-calibration” file will be generated in build folder after building.