



Installation Required Packages

https://docs.opencv.org/trunk/d7/d9f/tutorial_linux_install.html

Required Packages

GCC 4.4.x or later

CMake 2.8.7 or higher

Git

GTK+2.x or higher including headers (libgtk2.0-dev)

pkg-config

Python 2.6 or later, Numpy 1.5 or later with developer packages (python-dev, python-numpy)

ffmpeg or libav development packages: libavcodec-dev, libavformat-dev, libswscale-dev

[optional] libtbb2 libtbb-dev

[optional] libdc1394 2.x

[optional] libjpeg-dev, libpng-dev, libtiff-dev, libjasper-dev, libdc1394-22-dev

[optional] CUDA Toolkit 6.5 or higher

Getting OpenCV from Git Repository: Launch Git client and clone OpenCV repository. If you need modules from OpenCV contrib repository then clone it as well:

```
cd ~/<my_working_directory>
git clone https://github.com/opencv/opencv.git
git clone https://github.com/opencv/opencv_contrib.git
```

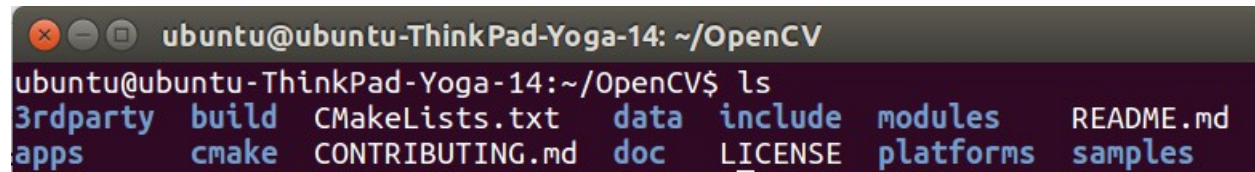
Steps Build From Source Distribution (1)

Building OpenCV from Source Using CMake

1. Create a temporary directory, denote as <cmake_build_dir> to put the generated Makefiles, project files as well the object files and output binaries, as:

```
cd ~/opencv  
mkdir build  
cd build
```

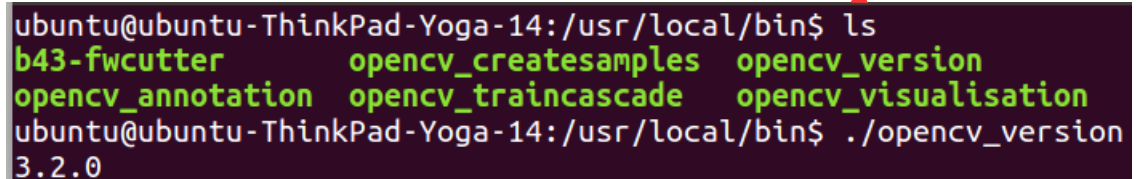
Note I choose /home/ubuntu/OpenCV/



```
ubuntu@ubuntu-ThinkPad-Yoga-14: ~/OpenCV  
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV$ ls  
3rdparty  build  CMakeLists.txt  data  include  modules  README.md  
apps      cmake  CONTRIBUTING.md  doc   LICENSE  platforms  samples
```

2. Configuring: cmake [<some optional parameters>] <path to the OpenCV source directory> For example

```
cmake -D CMAKE_BUILD_TYPE=Release -D CMAKE_INSTALL_PREFIX=/usr/local ..
```



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/usr/local/bin$ ls  
b43-fwcuter      opencv_createsamples  opencv_version  
opencv_annotation  opencv_traincascade  opencv_visualisation  
ubuntu@ubuntu-ThinkPad-Yoga-14:/usr/local/bin$ ./opencv_version  
3.2.0
```

3. Description of some parameters

build type: CMAKE_BUILD_TYPE=Release\Debug

to build with modules from opencv_contrib set OPENCV_EXTRA_MODULES_PATH to <path to opencv_contrib/modules/>

set BUILD_DOCS for building documents

set BUILD_EXAMPLES to build all examples

Steps Build From Source Distribution (2)

Building OpenCV from Source Using CMake

4. [optional] Building python. Set the following python parameters:

PYTHON2(3)_EXECUTABLE = <path to python>

PYTHON_INCLUDE_DIR = /usr/include/python<version>

PYTHON_INCLUDE_DIR2 = /usr/include/x86_64-linux-gnu/python<version>

PYTHON_LIBRARY = /usr/lib/x86_64-linux-gnu/libpython<version>.so

PYTHON2(3)_NUMPY_INCLUDE_DIRS = /usr/lib/python<version>/dist-packages/numpy/core/include/

5. [optional] Building java.

6. Build. From build directory execute make, do this in several threads, for example

\$make -j7 # runs 7 jobs in parallel

7. [optional] Building documents.

temporary directory <cmake_build_dir>



8. Install libraries, execute the following command from build directory

\$sudo make install

9. [optional] Running tests by the required test data from OpenCV extra repository. For example

\$git clone https://github.com/opencv/opencv_extra.git

set OPENCV_TEST_DATA_PATH environment variable to <path to opencv_extra/testdata>. Then execute tests from build directory, for example
<cmake_build_dir>/bin/opencv_test_core

Compile and Build with cmake

https://docs.opencv.org/trunk/db/df5/tutorial_linux_gcc_cmake.html

CMake is the easiest way with advantages: No need to change anything when porting between Linux and Windows, Can easily be combined with other tools by CMake(i.e. Qt, ITK and VTK)

1. Create an OpenCV program

```
#include <stdio.h>
#include <opencv2/opencv.hpp>
using namespace cv;
int main(int argc, char** argv )
{
    if ( argc != 2 )
    {
        printf("usage: DisplayImage.out <Image_Path>\n");
        return -1;
    }
    Mat image;
    image = imread( argv[1], 1 );
    if ( !image.data )
    {
        printf("No image data \n");
        return -1;
    }
    namedWindow("Display Image", WINDOW_AUTOSIZE );
    imshow("Display Image", image);
    waitKey(0);
    return 0;
}
```

2 Create a CMakeLists.txt

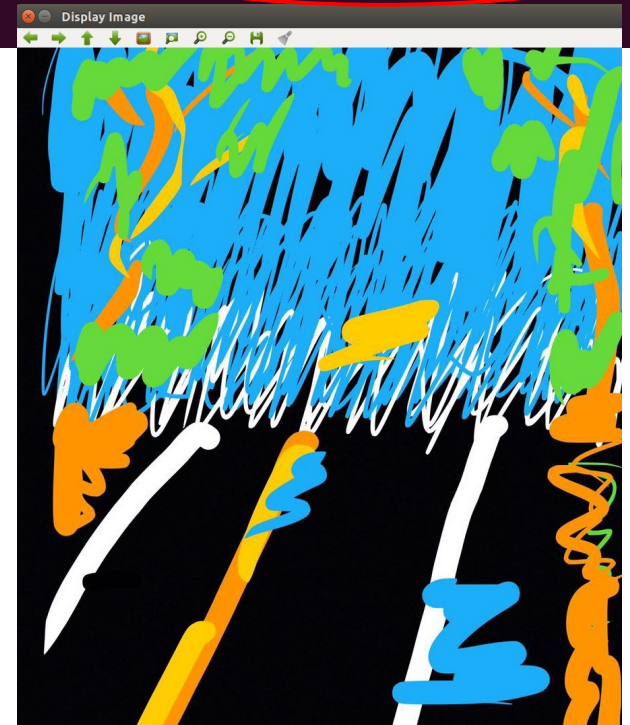
```
cmake_minimum_required(VERSION 2.8)
project( DisplayImage )
find_package( OpenCV REQUIRED )
include_directories( ${OpenCV_INCLUDE_DIRS} )
add_executable( DisplayImage DisplayImage.cpp )
target_link_libraries( DisplayImage ${OpenCV_LIBS} )
```

Run DisplayImage

https://docs.opencv.org/trunk/db/df5/tutorial_linux_gcc_cmake.html

```
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec2-display$ cmake .
-- Found OpenCV: /usr/local (found version "3.2.0")
-- Configuring done
-- Generating done
-- Build files have been written to: /home/ubuntu/OpenCV/samples/cpp/harry-test/lec2-display
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec2-display$ make
Scanning dependencies of target DisplayImage
[100%] Building CXX object CMakeFiles/DisplayImage.dir/DisplayImage.cpp.o
Linking CXX executable DisplayImage
[100%] Built target DisplayImage
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec2-display$ ls
art-road1.jpg  CMakeFiles  CMakeLists.txt  DisplayImage  Makefile
CMakeCache.txt  cmake_install.cmake  CMakeLists.txt~  DisplayImage.cpp
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec2-display$ ./DisplayImage art-road1.jpg
init done
opengl support available
```

1. \$cmake .
2. \$make
3. \$./yourExecutable <_image_input>



Appendix: CMake



<https://cmake.org/cmake-tutorial/>

1. CMake a "common build system use cases"
2. The most basic project is an executable built from source code files. 2 lines CMakeLists.txt file can do the job as:

```
cmake_minimum_required (VERSION 2.6)
project (Tutorial)
add_executable(Tutorial tutorial.cxx)
```

Note lower case commands are used in this CMakeLists.txt file. Upper, lower, and mixed case commands are supported by CMake. The source code for tutorial.cxx computes the square root as follows:

```
// A simple program computes the square root
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
int main (int argc, char *argv[])
{
    if (argc < 2)
    {
        fprintf(stdout,"Usage: %s number\n",argv[0]);
        return 1;
    }
    double inputValue = atof(argv[1]);
    double outputValue = sqrt(inputValue);
    fprintf(stdout,"The square root of %g is %g\n",
            inputValue, outputValue);
    return 0;
}
```

Appendix: Use Cmake

1. Create your working directory, in my case, ~/OpenCV/samples/cpp/harry-test/lec1-Cmake\$
2. Create "CmakeLists.txt" and the program to be compiled and built "Tutorial.cxx"

3. To start the process

an old-style for C++ source files -- the plus signs turned 45 degrees

\$cmake .

```
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec1-Cmake$ cmake .
-- Configuring done
-- Generating done
-- Build files have been written to: /home/ubuntu/OpenCV/samples/cpp/harry-test/lec1-Cmake
```

Then, build the executable by
\$make

```
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec1-Cmake$ make
Scanning dependencies of target Tutorial
[100%] Building CXX object CMakeFiles/Tutorial.dir/tutorial.cxx.o
Linking CXX executable Tutorial
[100%] Built target Tutorial
ubuntu@ubuntu-ThinkPad-Yoga-14:~/OpenCV/samples/cpp/harry-test/lec1-Cmake$ ls
CMakeCache.txt  cmake_install.cmake  CMakeLists.txt~  Tutorial  tutorial.cxx
CMakeFiles      CMakeLists.txt      Makefile         tutorial.cpp
```