



Tutorial: OpenCV & CUDA

Francisco Madrigal, Ramon Aranda, Francisco Hernandez-Lopez
{pacomd, arac, fcoj23}@cimat.mx

Install OpenCV and CUDA in Linux

Requirements:

1. A video card (GPU) NVIDIA with CUDA support (Check [here](#) if your GPU is CUDA-enabled)
2. Operative System: Ubuntu 12.04 32/64 bits
3. Download the DEB file of CUDA 5.5 32/64 bits from:
<https://developer.nvidia.com/cuda-downloads>
4. Download OpenCV 2.4.6 for Linux/Mac from:
<http://opencv.org/>

Install CUDA:

1. In a terminal of Ubuntu:
 - a. sudo apt-get update
 - b. sudo apt-get upgrade
 - c. Go to the folder which contain the DEB file
 - d. sudo dpkg -i cuda-repo-ubuntu1210_5.5-0_amd64.deb
 - e. sudo apt-get install cuda
 - f. Go to home folder (cd ~)
 - g. sudo nano .bashrc
 - i. Add:

```
export CUDA_HOME=/usr/local/cuda-5.5
export LD_LIBRARY_PATH=${CUDA_HOME}/lib64
```

- ```

PATH=${CUDA_HOME}/bin:${PATH}
export PATH

```
- h. Ctrl + O
  - i. Ctrl + X
  - j. sudo reboot
  - k. sudo nvidia-xconfig
2. Test a cuda sample:
    - a. Go to folder: /usr/local/cuda-5.5 and copy the folder samples in another directory (for example in home ~)
    - b. Go to deviceQuery example: /samples/1\_Utilities/deviceQuery/
    - c. make
    - d. ./deviceQuery
    - e. The GPU characteristics should be displayed

## Install OpenCV

1. Copy the opencv-2.4.6.1.tar.gz file in the home (~) directory
2. In a terminal of Ubuntu:
  - a. cd ~
  - b. tar -xvf opencv-2.4.6.1.tar.gz
  - c. sudo apt-get install cmake-qt-gui libgtk2.0-dev libjpeg-dev libtiff4-dev libjasper-dev libopenexr-dev libtbb-dev libeigen2-dev yasm libfaac-dev libopencv-amrnb-dev libopencv-amrwb-dev libtheora-dev libvorbis-dev libxvidcore-dev libx264-dev libqt4-dev libqt4-opengl-dev sphinx-common texlive-latex-extra libv4l-dev libdc1394-22-dev libavcodec-dev libavformat-dev libswscale-dev
  - d. cd ~/opencv-2.4.6.1
  - e. mkdir build
  - f. cd build
  - g. cmake -D CMAKE\_CXX\_COMPILER=/usr/bin/g++ -D WITH\_CUDA=ON -D BUILD\_NEW\_PYTHON\_SUPPORT=OFF -D WITH\_V4L=ON -D INSTALL\_C\_EXAMPLES=OFF -D INSTALL\_PYTHON\_EXAMPLES=OFF -D BUILD\_EXAMPLES=OFF -D WITH\_QT=ON -D WITH\_OPENGL=ON -D BUILD\_DOCS=OFF BUILD\_EXAMPLES=OFF -D BUILD\_opencv\_python=OFF -D BUILD\_opencv\_java=OFF ..
  - h. make -j2
  - i. sudo make install

- j. Go to home folder (cd ~)
- k. sudo nano .bashrc
  - i. Add:

```
PKG_CONFIG_PATH=$PKG_CONFIG_PATH:/usr/local/lib/pkgconfig
export PKG_CONFIG_PATH
```
- f. Ctrl + O
- g. Ctrl + X
- h. sudo reboot
- i. sudo ldconfig

**Finally, when you have installed OpenCV and CUDA in your machine, you can run the examples of the Tutorial (download the Code\_PSIVT2013.7z file [here](#))**

1. Go to folder CodePSIVT2013/All
2. In a terminal of Ubuntu:
  - a. make
3. And you can run any example
4. Next, go to foler CodePSIVT2013/Work
5. And you can do the homework (Remember to fix all /\*HERE\*/ labels in .cpp and .cu files)