

COMP4500: Checkpoint One

due on Thursday 1/24/2019 before 2:00pm

For this checkpoint, you will need to show that you have a working **Python.3.x** and **OpenCV** installation on your machine. The purpose of this document is to provide instructions for installing both on Windows, Linux, and Mac.

Note that the computers in room 409 have the correct versions of python and opencv already setup. If you want to use these computers, please see Dr. Ahmadzadeh to arrange getting keycard access to the room.

Important Note: Python.2.x will not be sufficient for this class, so even if you have Python2.x already installed, you'll need to install Python.3.x alongside it.

Installing Python

The first link below is where you go to download the latest version of Python; the second link directs you to a blog giving detailed instructions for setup on a slew of different operating systems.

<https://www.python.org/downloads/>

<https://realpython.com/installing-python/>

After you have installed Python.3.x according to the links above, verify that you have pip3 installed (this should have been installed alongside python, but as you will be needing it to install things in the future, it is a good idea to double check). This is as simple as just typing `pip3 -h` in the commandline and just making sure that it is recognized as a valid command.

Important Note #1: Be sure to Python.3.x, with the emphasis being on the three. Within that requirement, any version will do (although the latest version might make the most sense).

Important Note #2: Be sure take special care to add python to your computer's PATH environment variable. If you follow the instructions carefully as given, it shouldn't be an issue, but it's a nuisance to do manually if you skip that step.

Some Thoughts on IDEs

You can use whatever is most convenient for you as an IDE for this class. Here are some links to some nice ones (although to reiterate, it literally does not matter what you use).

- Visual studio code is a nice GUI and integrates with python really well in my opinion:
<https://code.visualstudio.com/docs/python/python-tutorial>

- PyCharm Community Edition is a Python IDE that offers an intelligence python assistance <https://www.jetbrains.com/pycharm/download/#section=windows>
- Vim may have a bit of an initial learning curve but it can really speed you up in the long run: <http://vim.wikia.com/wiki/Tutorial>

Installing OpenCV

OpenCV is an open source computer vision library that has a lot of common vision algorithms and concepts built into it. It's a good tool to use when you need computer vision but might not want to implement some nitty gritty details yourself.

The links below show how to get opencv such that it is compatible with Python.3.x. If you are having issues installing, google your issues; most likely your problem is common, and has a known solution. If you are really struggling to get these things installed, please notify the TA so that we can get everything up and running for you.

Windows Installation

The link below gives comprehensive instructions for how to download the correct version of python, numpy, and opencv. Since you already installed python, you can skip that part, but be sure not to skip the next step, downloading and installing a VS upgrade, otherwise you may not have the DLL's necessary to actually use opencv.

<https://solarianprogrammer.com/2016/09/17/install-opencv-3-with-python-3-on-windows/>

iOS Installation

The link below gives instructions for how to install the correct version of python and opencv with homebrew. Since you already installed python, you can feel free to skip over that part. The virtual environment part can also be skipped. The second link provides some guidance if you are getting issues with QTKit when compiling opencv.

<https://www.pyimagesearch.com/2015/06/29/install-opencv-3-0-and-python-3-4-on-osx/>

<https://stackoverflow.com/questions/39590741/fatal-error-qtkit-qtkit-h-file-not-found-when-i-build-opencv-on-mac>

Linux Installation

The link below gives instructions for how to install the correct version of python and opencv for linux. The instructions here are very similar to those for iOS installation. Similarly, the virtual environment part can also be skipped here too.

<https://www.pyimagesearch.com/2015/07/20/install-opencv-3-0-and-python-3-4-on-ubuntu/>

Verifying Installation

To verify that you have Python installed correctly, open the commandline and run the following command. If python is properly installed, the Python version number you installed will be displayed.

```
$ python --version
```

To verify that you have opencv installed correctly, create and run a python file containing the following two lines of code. The program should print the version of opencv you installed. Since the print() function in this syntax is unique to Python.3.x, this will ensure not only that you have opencv, but that it is working with the necessary version of python.

```
1 import cv2
2 print(cv2.__version__)
```

Getting Started

Here's a sample opencv program which opens up an image and converts it to grayscale, displaying both in separate windows.

```
1 import cv2
2 image = cv2.imread("clouds.jpg")
3 gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
4 cv2.imshow("Over the Clouds", image)
5 cv2.imshow("Over the Clouds - gray", gray_image)
6 cv2.waitKey(0)
7 cv2.destroyAllWindows()
```

Be sure to download an image to the same directory as the python file and name it "clouds.jpg", otherwise the program will not be able to find the image to open. If python can't find your image, you'll get the issue detailed at the link below.

<https://stackoverflow.com/questions/43572387/error-215-size-width0-size-height0-occurred-when-attempting-to-display-a>

There's also a lot of useful tutorials and good documentation associated with this library. Below is a link to the OpenCV-Python tutorials.

https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_tutorials.html