

## Directions for Installing Python, Numpy, Scipy, Open CV, Serial, and pyFirmata for Computer Vision and Robotics Projects

Version: PyCharm IDE with Python 2.7 already installed on Machine

### Computational Perception and Artificial Intelligence

#### Description:

We will use Python 2.7 and several associated Python tools for developing and creating with computer vision. The libraries are:

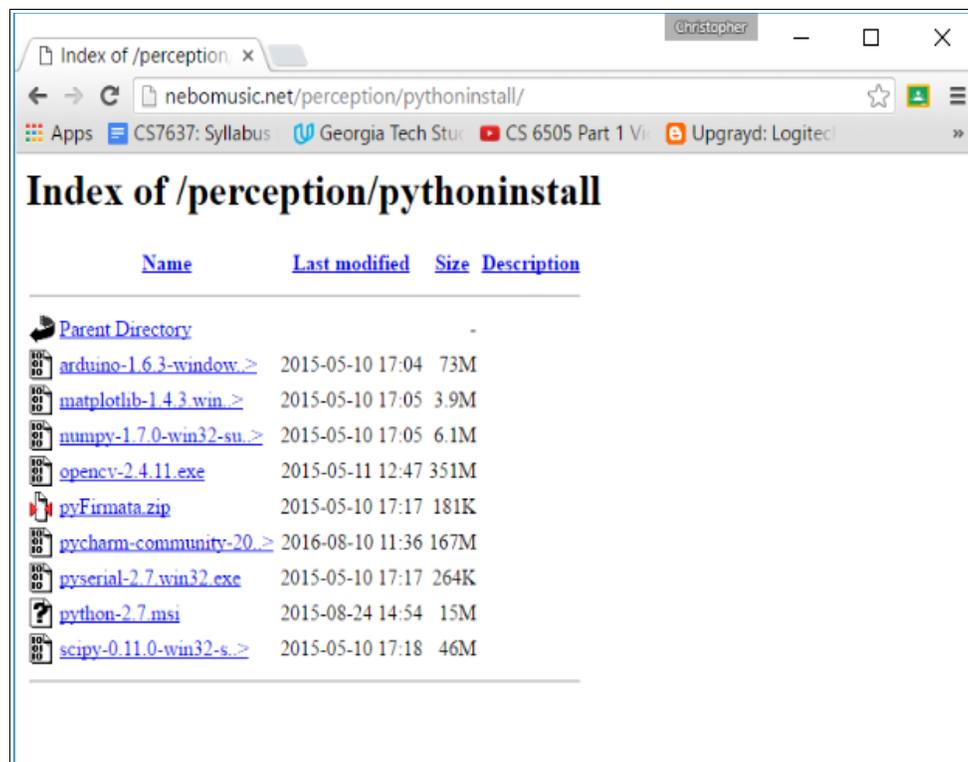
<b>Python 2.7:</b> Stable release of Python compatible with many libraries and add-ons for Python Language. We will use the 32 bit version in order to take advantage of stable releases with Numpy, Scipy, and OpenCV.
<b>Numpy:</b> “Numerical Python”. Library for Linear Algebra and other advanced math functions for python. Features operations on multiple dimension arrays without having to use iteration. Foundational library for vision, sound, large datasets, statistics, and artificial intelligence research.
<b>Scipy:</b> “Scientific Python” Works with the Numpy library for advanced math functions.
<b>Open CV2:</b> Open Computer Vision. Library that uses Numpy and Scipy for graphics and computer vision. Provides access to cameras, reading and writing image files, image arrays, filters, Harr Cascades, and many other features used in Computer Vision.
<b>Serial:</b> Python library that provides for communication between Python applications and Serial devices such as the Arduino Uno Board. Used in controlling motors and sensors in robotic systems.
<b>pyFirmata:</b> Library for Python providing connectivity to Arduino devices for robotics. Depends on the Serial library.
<b>Matplotlib:</b> Matlab library for plotting data. Useful developing visuals for complex data. Used at university and research levels for big data projects.
<b>Arduino 1.6.3:</b> Programming IDE for Arduino microprocessors.

These directions will outline the download and install of these required files for Computer Vision.

## Process:

1. Go to <http://nebomusic.net/perception/pythoninstall> and download the following to your Downloads Folder: (Note that you DO NOT download all of the files. Some of them are already installed on your computer.)

Numpy 1.7  
Scipy 0.11.0  
Pyserial 2.7  
pyFirmata.zip  
OpenCV2  
pycharm-community-2016



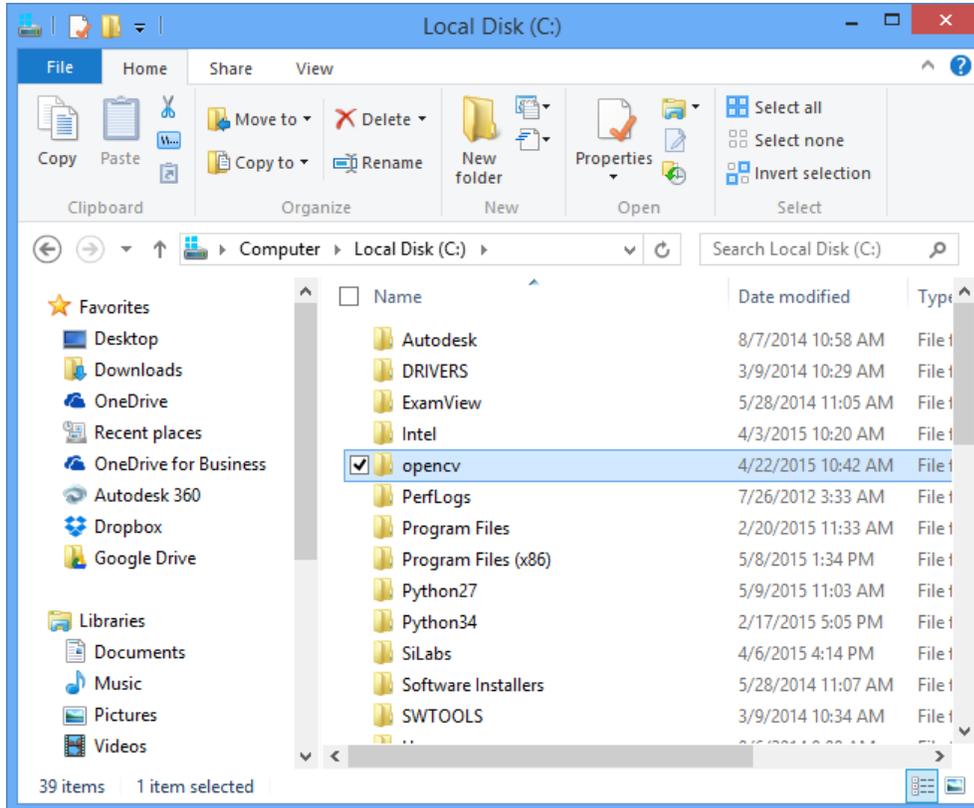
2. Run the Numpy installer. (*numpy-1.7.0-win32-superpack-python2.7.exe*) This installer will produce a 'blue screen' that looks somewhat dated, but it will install on your computer.

3. Run the Scipy installer. (*scipy-0.11.0-win32-superpack-python2.7.exe*) This will look similar to Numpy.

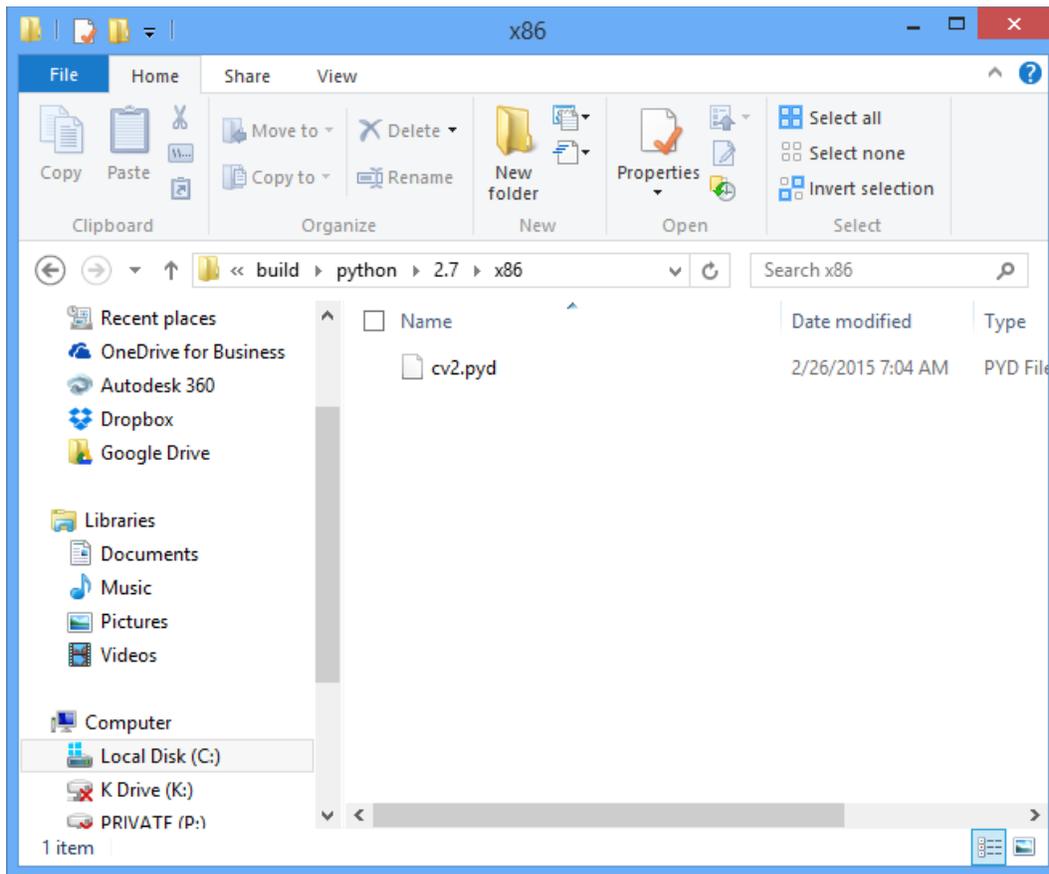
4. Run the Serial installer. (*pyserial-2.7.win32.exe*) Same format as Numpy and Scipy.

5. Double click on the OpenCV2 installer. (*opencv-2.4.11.exe*) This is actually a 7zip archive of the opencv folder. Extract to your downloads folder.

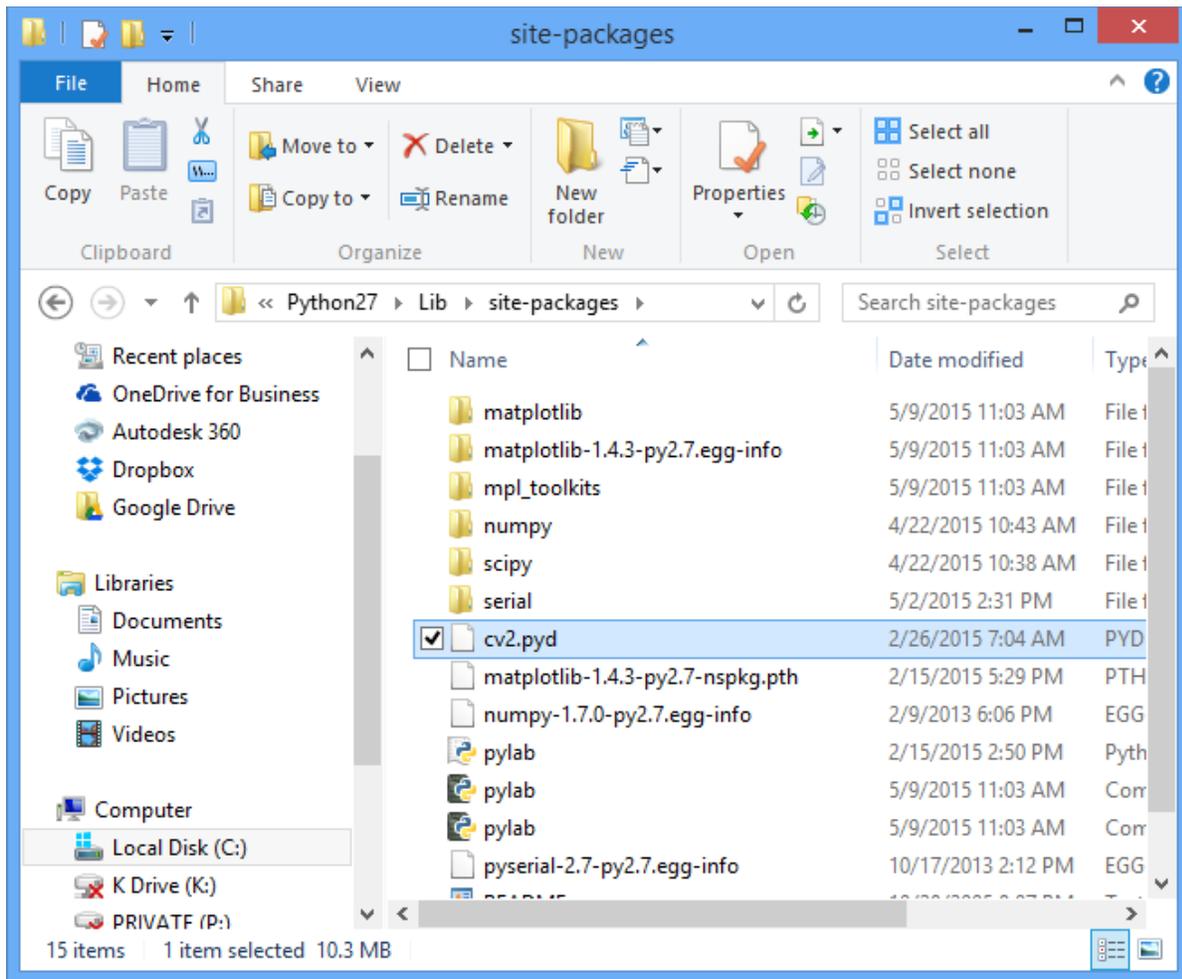
6. Copy the 'opencv' directory to your C:\ drive.



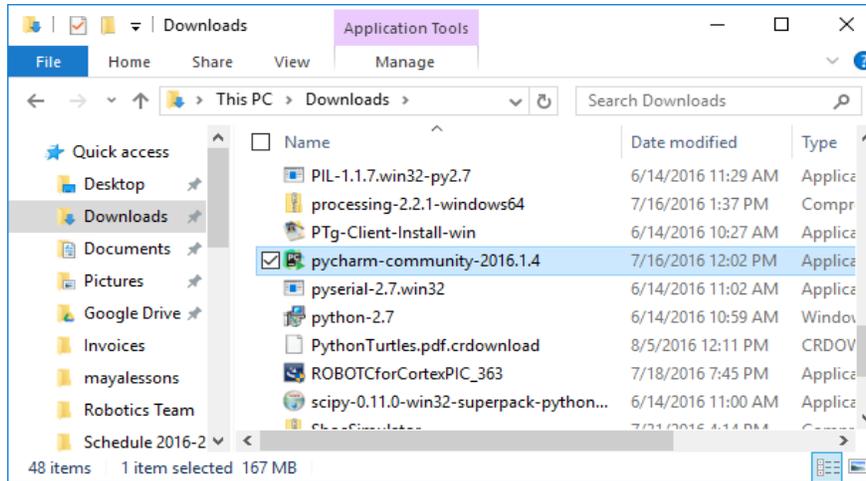
7. Navigate to C:\opencv\build\python\2.7\x86\cv2.pyd



8. Copy this file 'cv2.pyd' and paste it into the 'C:\Python27\Lib\site-packages\ folder



9. Double click on the “pycharm-community-2016.1.4” in your downloads folder. Run the installation of PyCharms. This is the IDE we will use this term. PyCharms is based on the IntelliJ IDE and provides a professional environment for software development.



10. We will now create a folder to store our programs. On your Google Drive, create a folder called “Computer Vision Lastname”. Inside this folder, create another folder called “Python Programs”.

11. Go back to your Downloads folder and find the pyFirmata.zip file. Extract this file into your “Python Programs” folder you created in step 10.

12. To test your installation, touch the windows key and type in IDLE. You should see the IDLE install:



13. Start IDLE and type the following commands into the interpreter. (Python Shell)

A screenshot of the Python Shell window. The title bar says "Python Shell". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Windows", and "Help". The main text area shows the following content:

```
Python 2.7 (r27:82525, Jul 4 2010, 09:01:59) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> import numpy as np
>>> import scipy as sc
>>> import cv2 as cv2
>>> import serial
>>> |
```

The status bar at the bottom right indicates "Ln: 7 Col: 4".

If these commands can be entered without errors – then the installation is complete! See Mr. Michaud if you have questions.