Setting Up Computer Vision Course Environment (Anaconda, Python, and OpenCV) on Windows

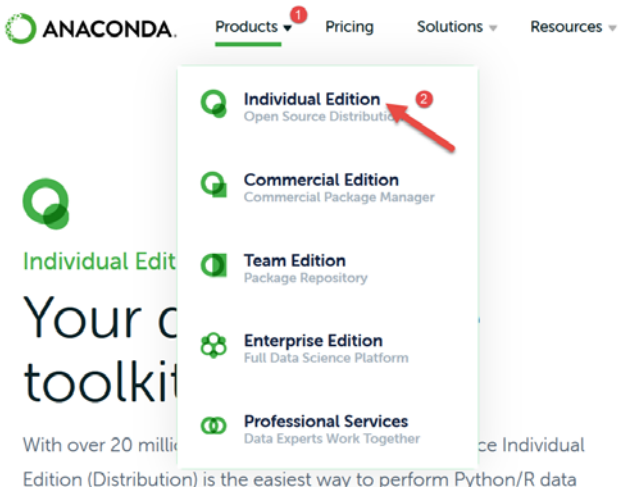
This Document written in December 2020

Contents

Install Anaconda (Python) on Windows

Anaconda is a package manager, an environment manager, and Python distribution that contains a collection of many open source packages (numpy, scikit-learn, scipy, pandas to name a few). If you need additional packages after installing Anaconda, you can use Anaconda's package manager, conda or pip to install those packages. This is highly advantageous as you don't have to manage dependencies between multiple packages yourself.

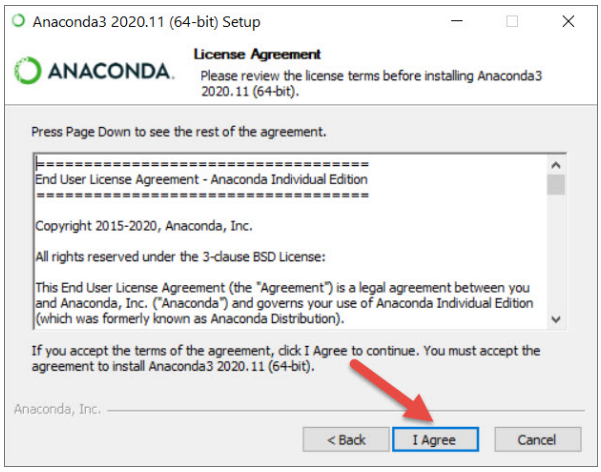
Step1. Download Anaconda. Go to the Anaconda Website, select **Products** then choose **Individual Edition**.



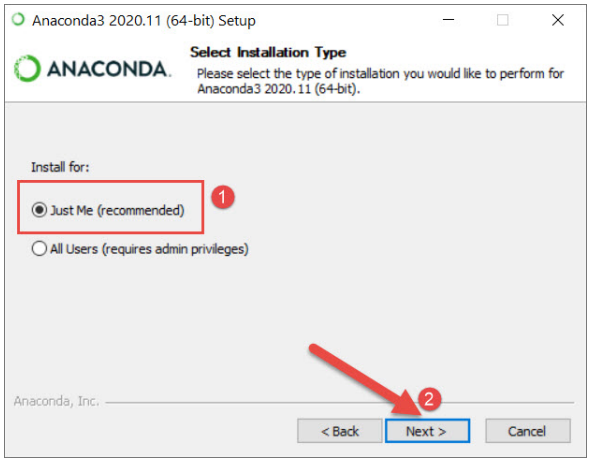
Step2. Scroll down until you see the **Anaconda Installers**. These installer for different OS. **In this document for Windows OS**. Select a **Python 3.8 (or 3.x) graphical installer**

Step3. Locate your downloaded file (.exe), and then run the file (you can run the file as administrator). When the screen below appears, click on Next.

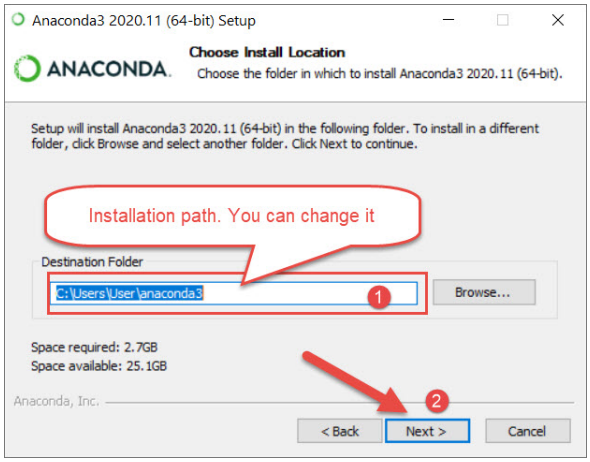
Step4. Read the License Agreement and click on I **Agree**.



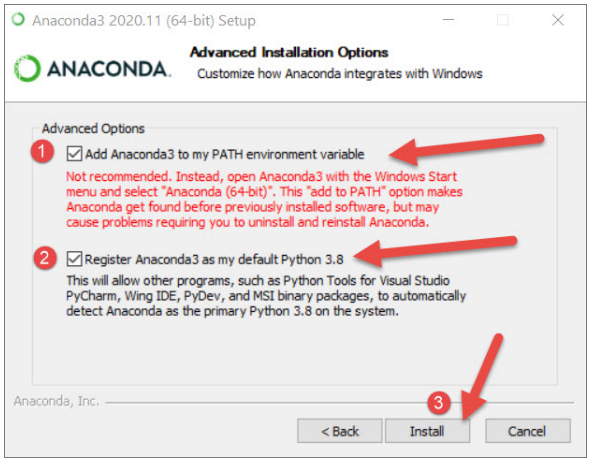
Step5. Choose either Just Me (recommended) or All Users.

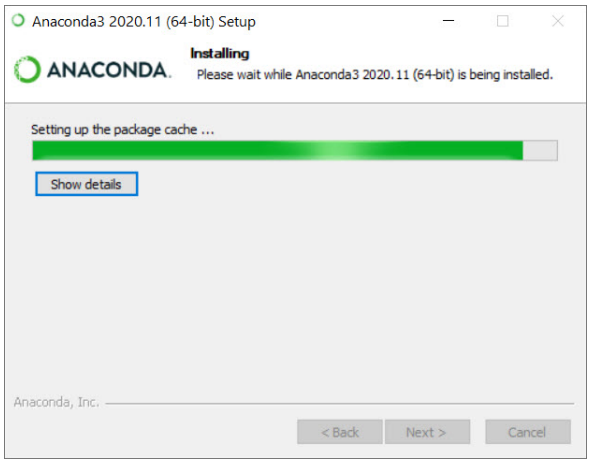


Step6. Please make a note of your installation path location

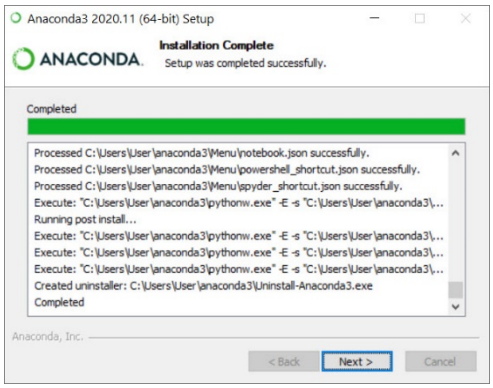


Step7. This is an important part of the installation process. **The recommended approach is to not check the first box to add Anaconda to your path**. This means you will have to use Anaconda Navigator or the Anaconda Command Prompt (located in the Start Menu under "Anaconda") when you wish to use Anaconda (you can always add Anaconda to your PATH later if you don't check the box). **Click on Install**.





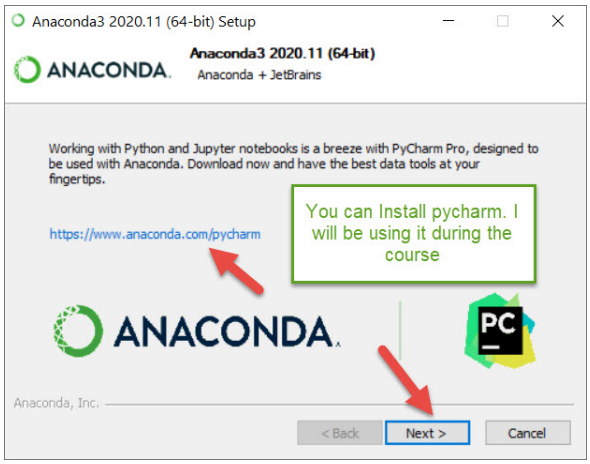
Step8. Click on Next.



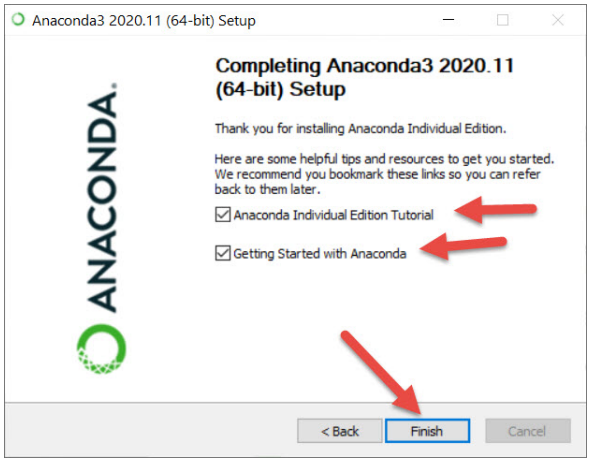
Step9. You can install **PyCharm** if you like (***I will be using PyCharm during this semester***), but it is optional. Click on Next.

You can download the community edition of **Pycharm** for your operating system

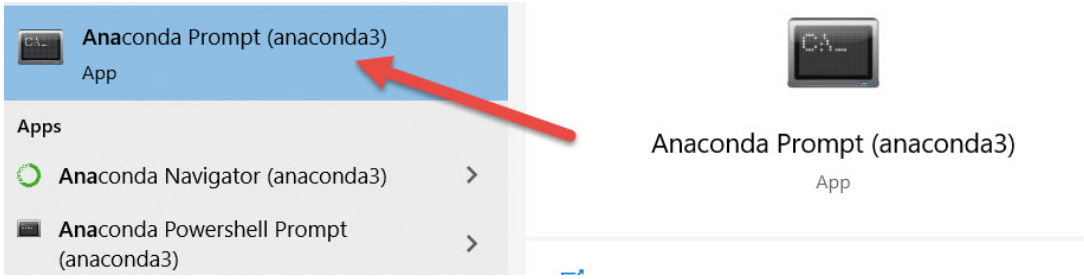
https://www.jetbrains.com/pycharm/download/#section=windows



Step10. Click on Finish.



Step11. How to Test Your installation. There are many ways to test your Anaconda installation. This is one way of doing the test. Locate Anaconda Prompt.



Step12. Note it open the (**base**)environment.

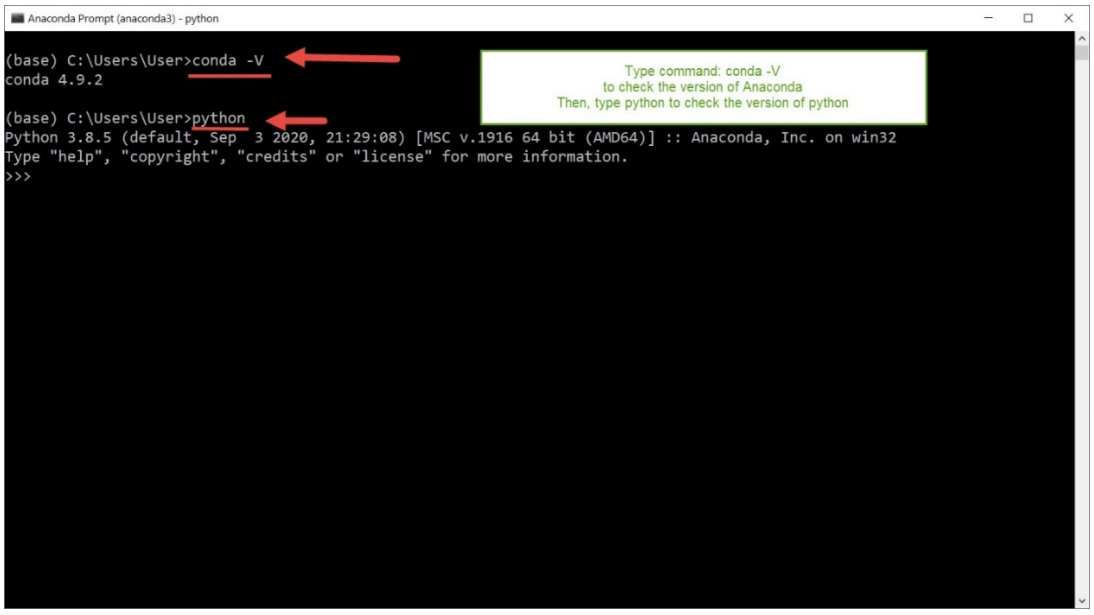
We will create our own environment for this course.

Step13. Type the commands below

`conda -V`

then

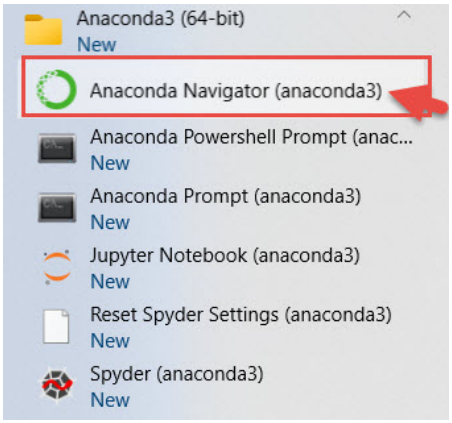
`python`

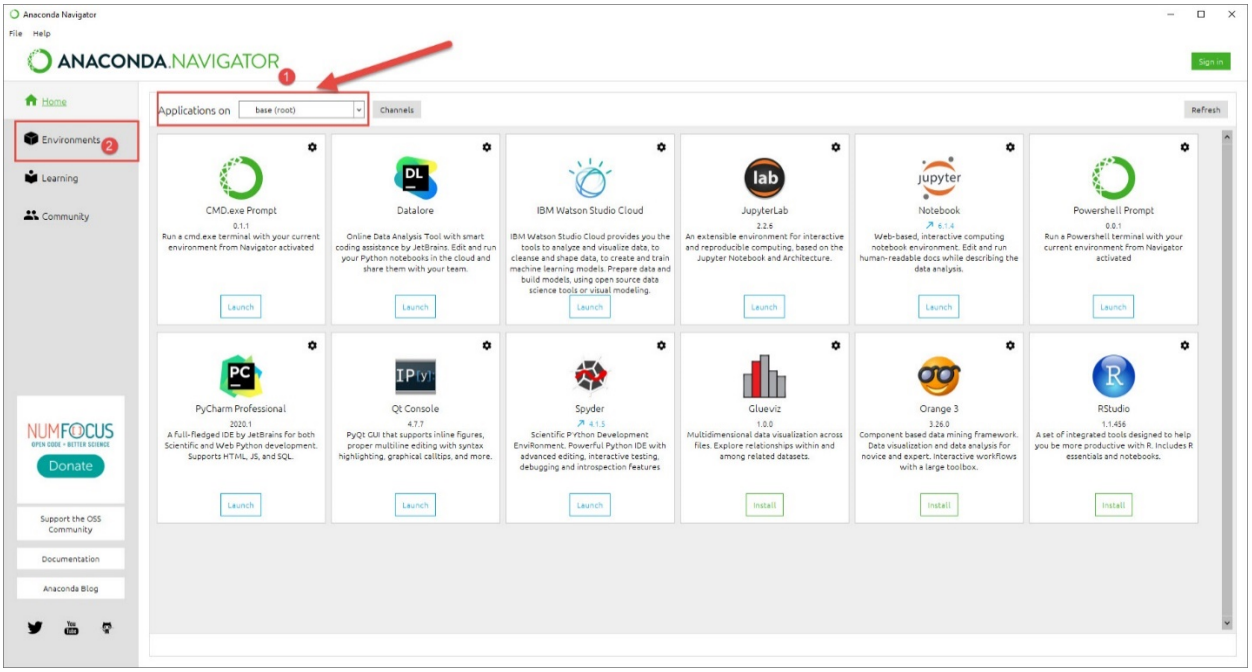


Create a new Anaconda Environment

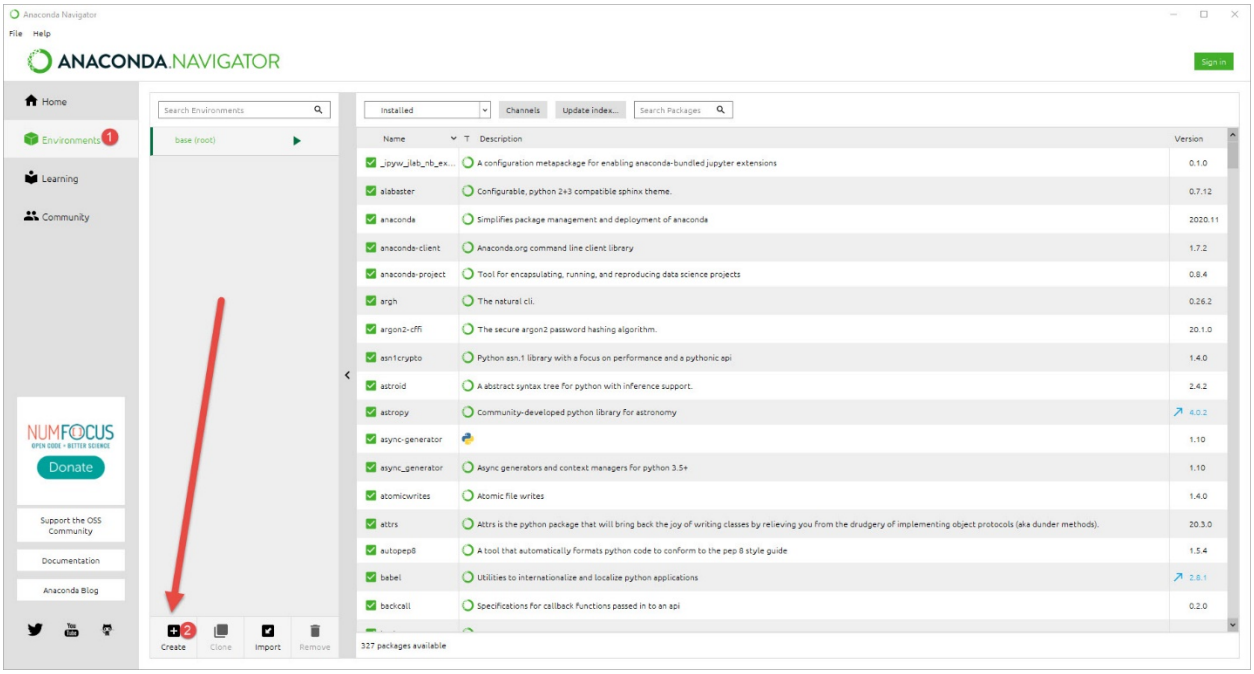
Step14. Create a new Anaconda Environment. There **Command Line** way and **Anaconda Navigator** way. I will explain here the Anaconda Navigator way.

Here we will create a new anaconda environment for our course usage so that it will not affect the root of Anaconda. Amazing!! isn't it?



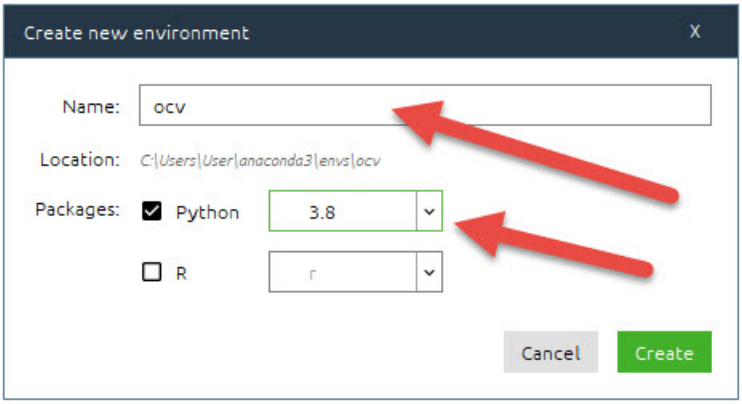


Step15. At the bottom of the environments list, click the Create button.

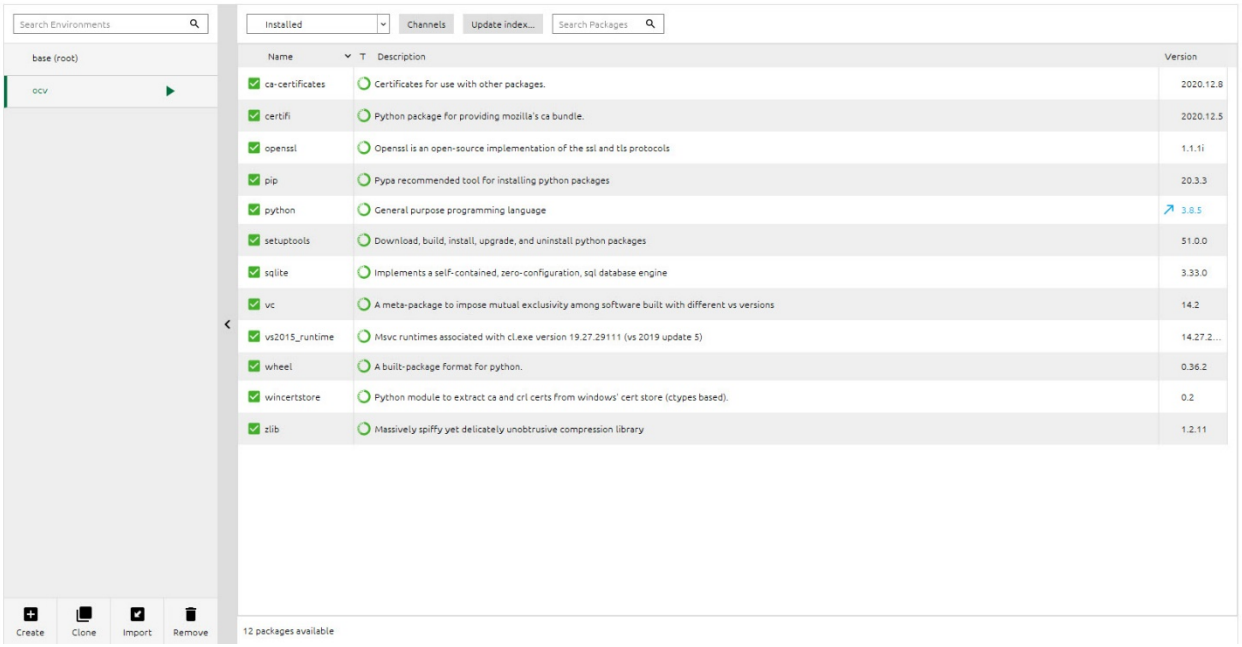


Step16. Name the environment as "**ocv**", then Select Python

To create a new environment, press the **Create** button. In the pop-up window, enter a name for your environment (**preferably something descriptive of its purpose**) and choose a **Python** version to use



Step17. Finally, press **Create** in the pop-up and Anaconda will proceed to create the new environment, which presents the most basic packages. To really make use of this environment we'll need to install other packages.

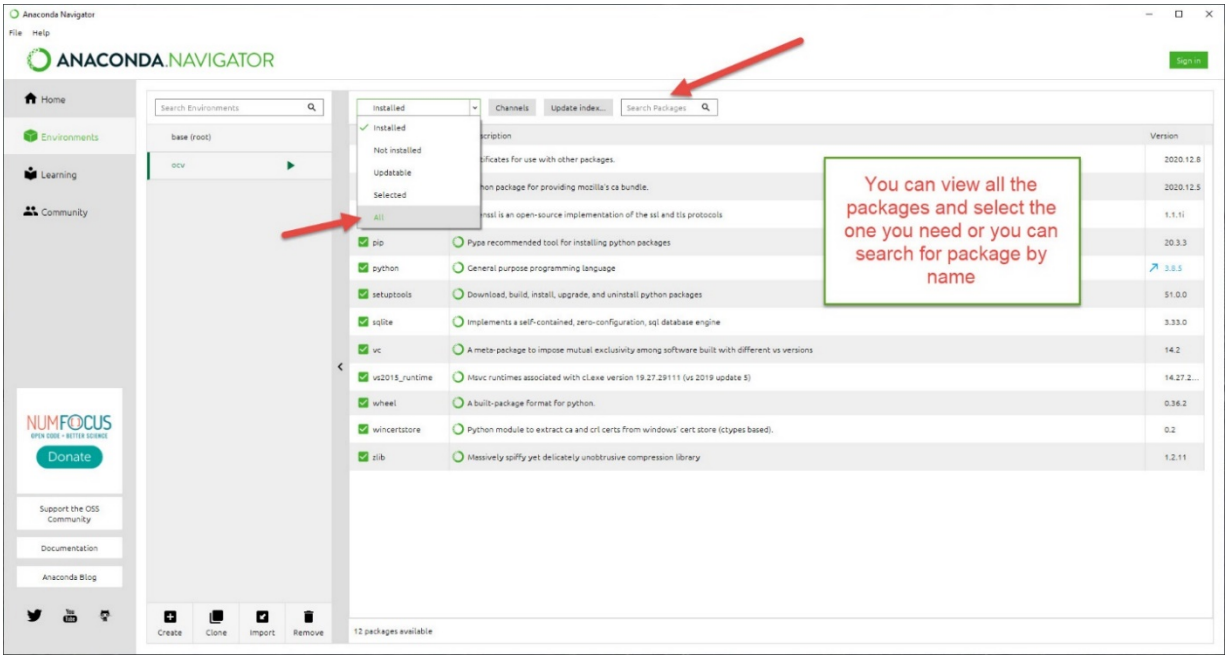


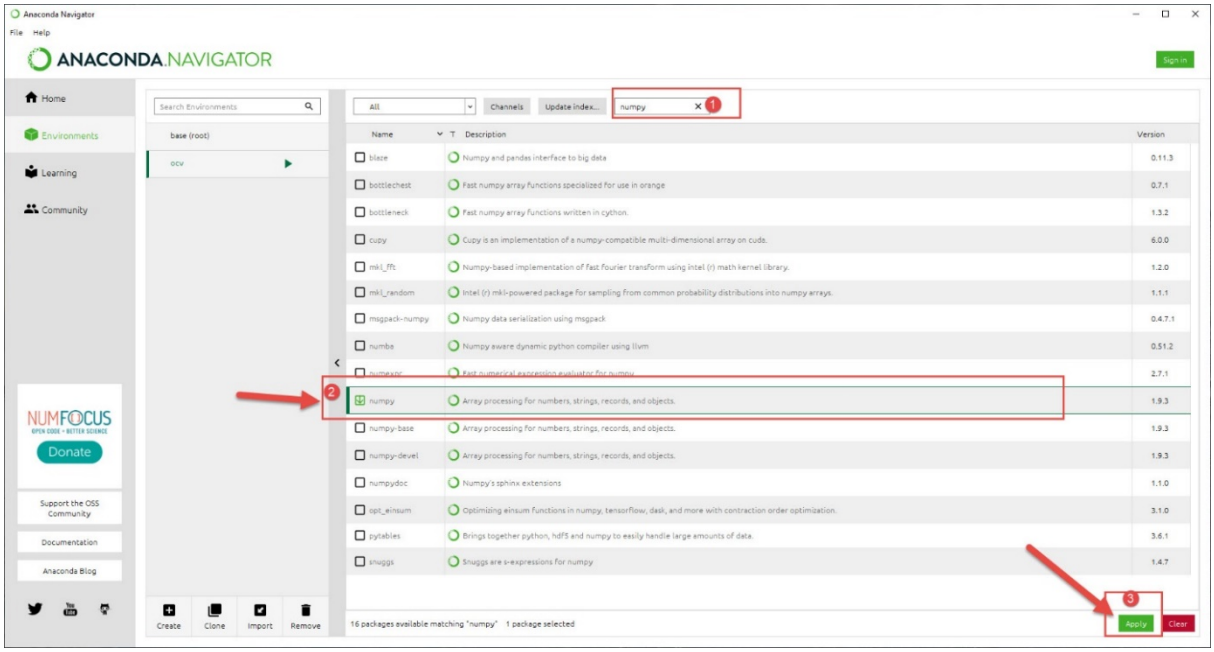
Installing Python packages in Anaconda Navigator

One essential package for any Machine Learning project is Numpy, which implements a N dimensional array that is widely used in working with data.

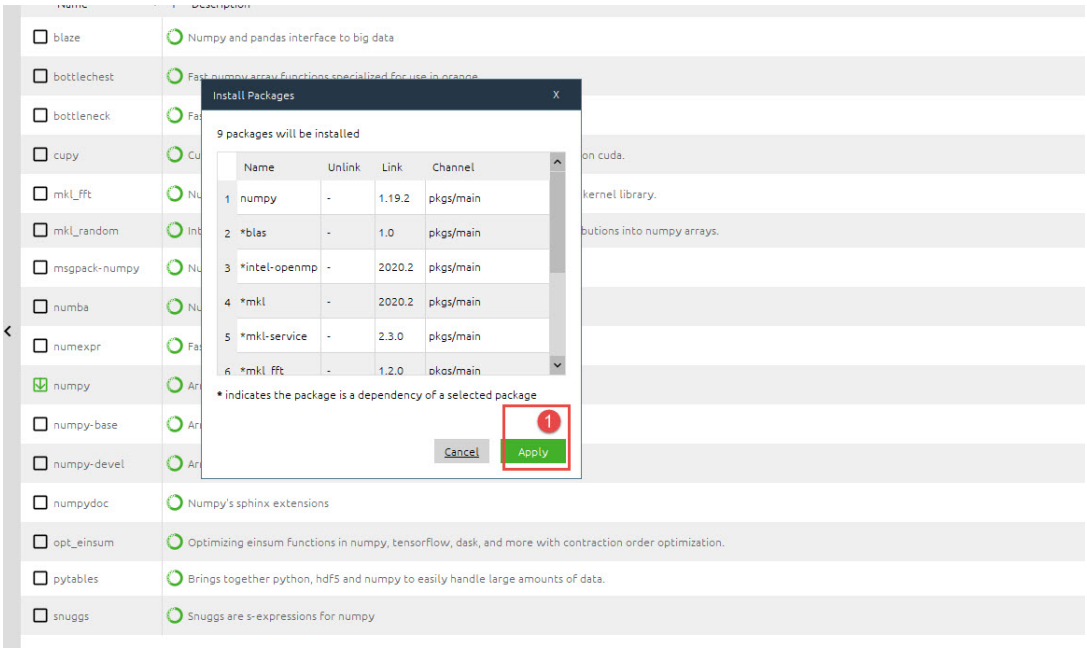
Step18. First thing, all packages need to be displayed in the list, not just the installed ones, so in the dropdown filter, select All.

Once all packages are in the list, search for "**numpy**", select it in the results and press the **Apply** button in the lower right side of the UI.



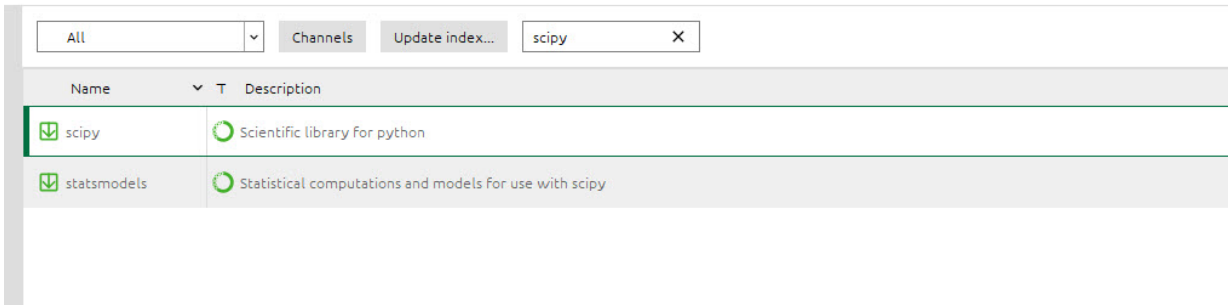


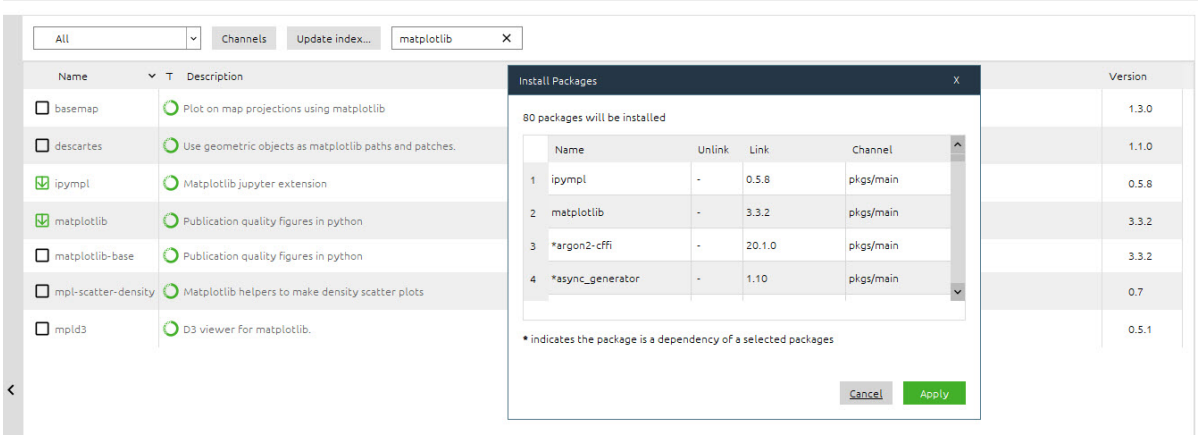
Step19. A pop-up with dependencies will be displayed. This indicates all the other packages which **numpy** requires. Any missing packages from the environment will also be installed.



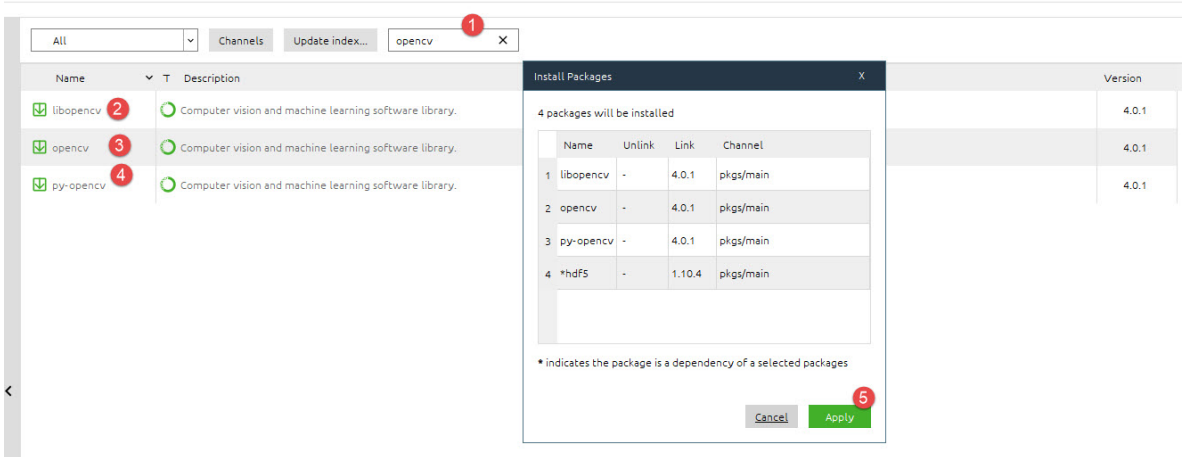
Step20. Repeat the above step and install the following packages

scipy, **matplotlib** **and** **cmake**





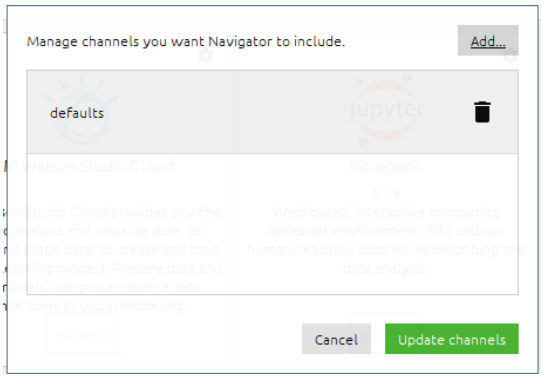
Step21. Now, search for **opencv** , then follow the steps in figure below

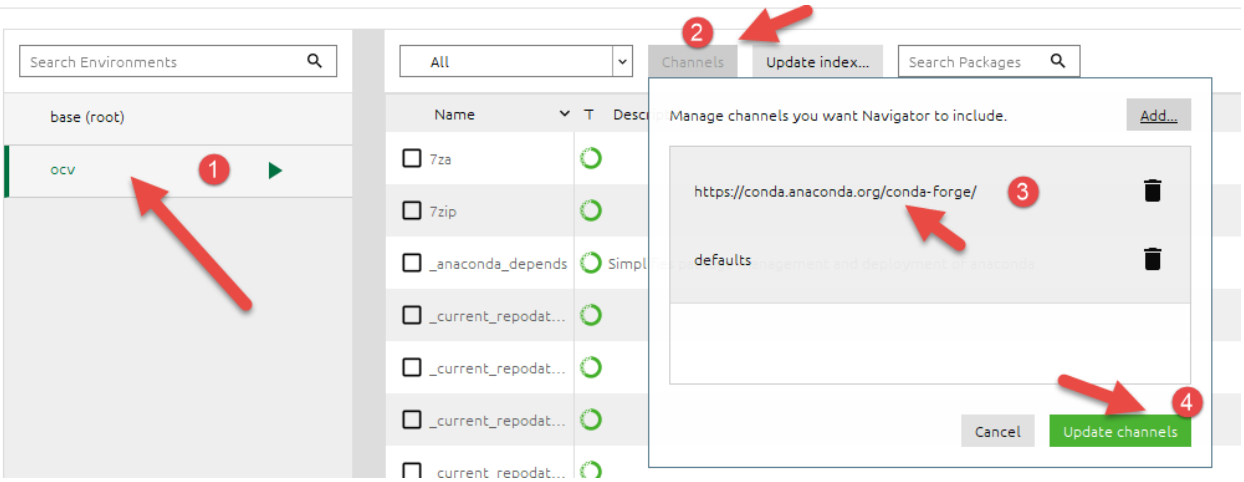


How to install Dlib Python API on Windows PC

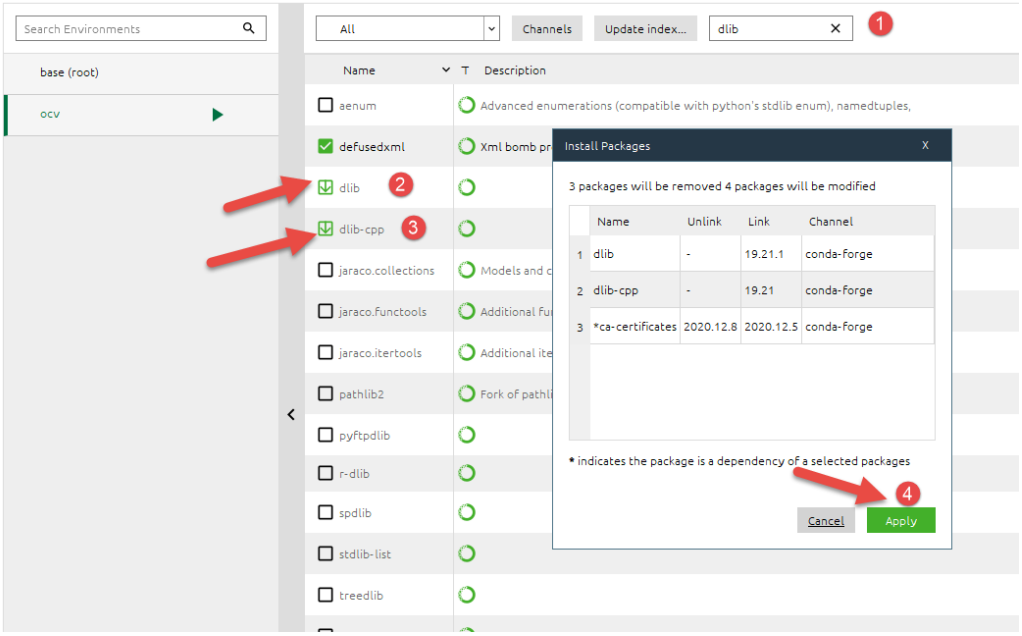
Install Dlib Python API on computer running on Windows operating system.

Step22. Open **Anaconda Navigator** by running anaconda-navigator
Step23. Go to the **Environments** tab.
Step24. Click the **Channels** button.
Step25. Enter the channel url `https://conda.anaconda.org/conda-forge/`
Step26. Press the **Enter key** on your keyboard.
Step27. Click the **Update channels** button.





Step28. Now, search for **dlib** , then follow the steps in figure below

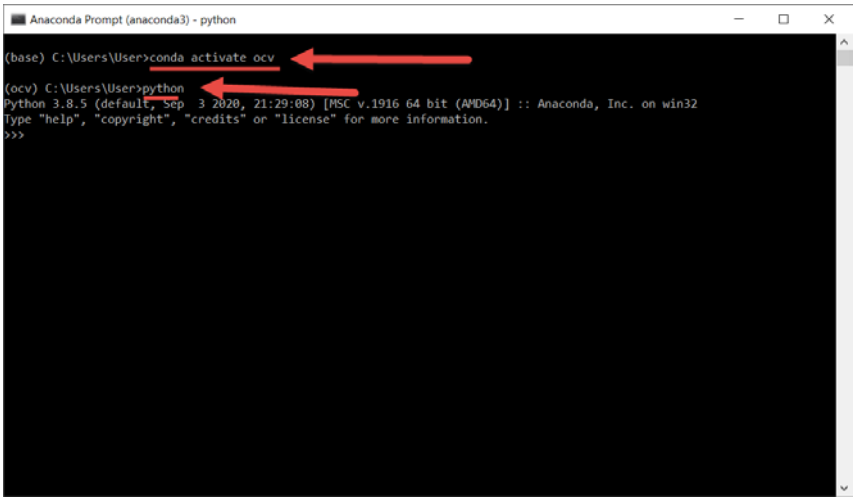


Test your installation by checking Opencv and dlib versions

Step29. Open Anaconda Prompt

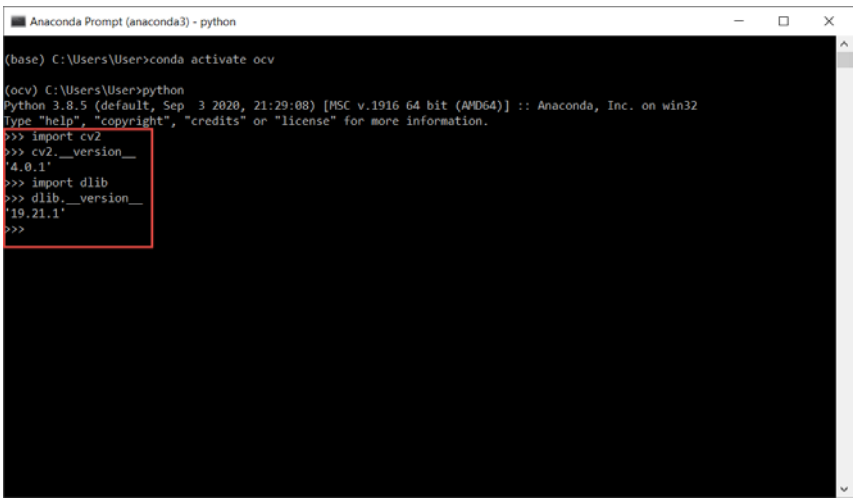
Step30. Activate the ocv environment, then open the python prompt on the command line by typing python on the command prompt

```
conda activate ocv
```



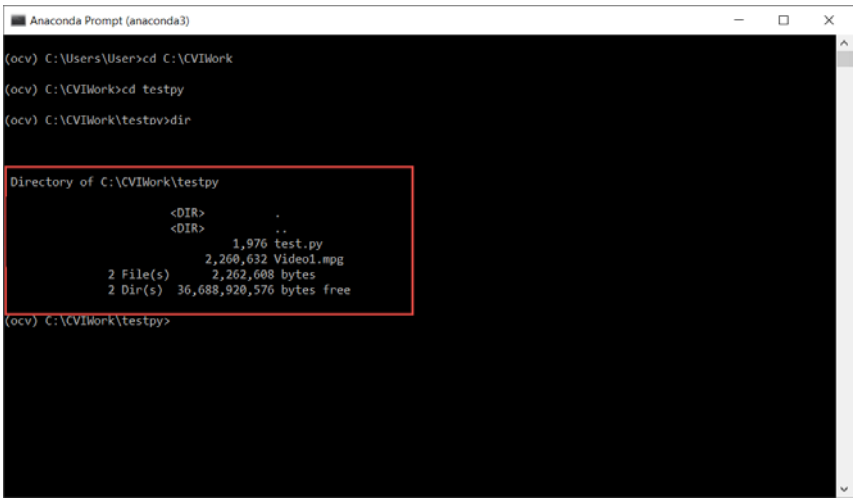
Step31. Write the following commands, then you should get the following output

```
import cv2
cv2.__version__
import dlib
dlib.__version__
```

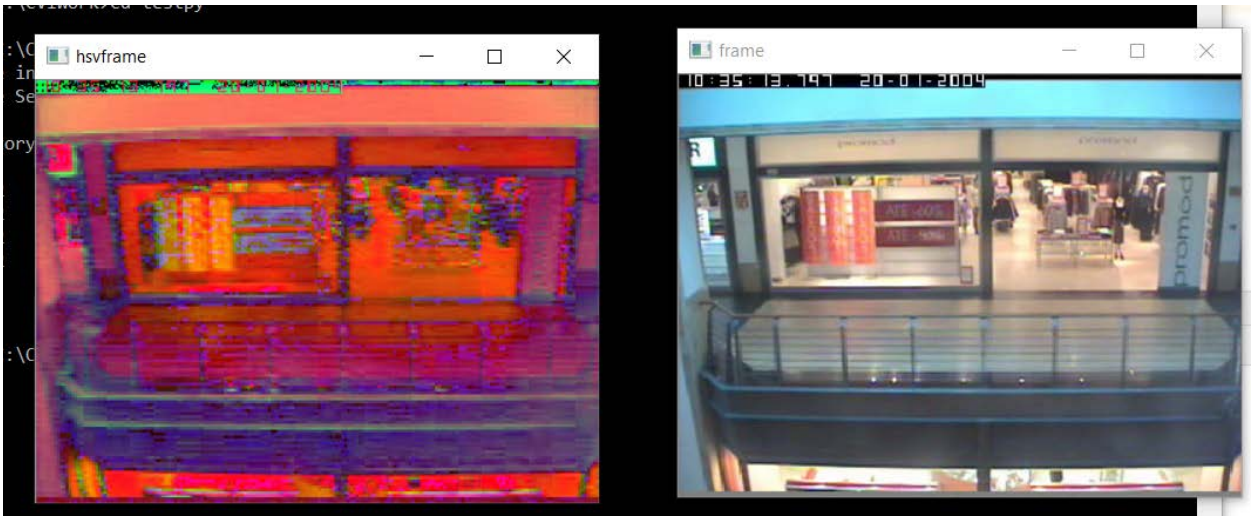


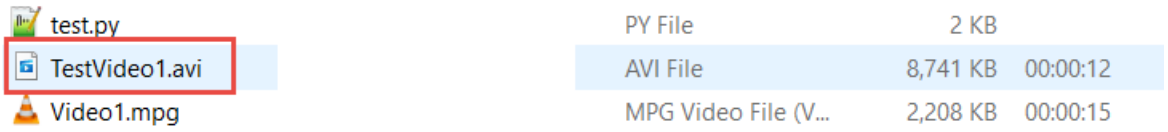
Test your installation by reading and writing video file

Step32. Download **testpy.zip** file, and then extract it
Step33. Open Anaconda Prompt and Activate the **ocv** environment.
Step34. Locate the extract **testpy** directory.



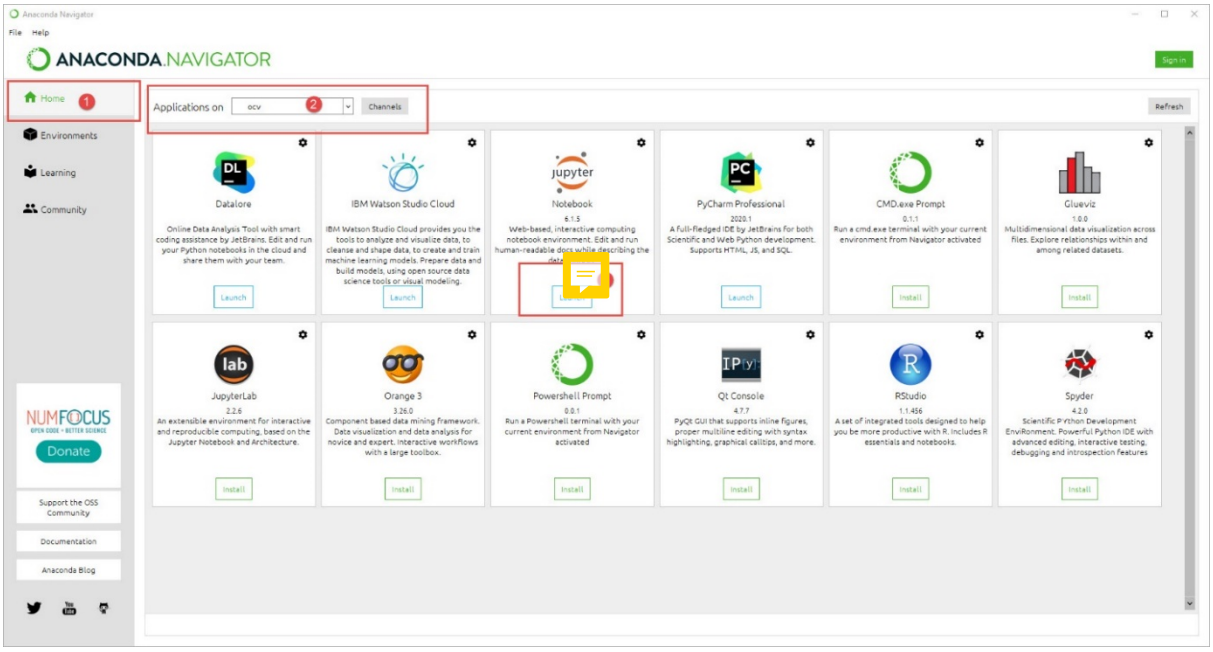
Step35. Type "**`python test.py`**" , then two windows will appear. Check the **testpy** directory you will find **TestVideo.avi** video file.



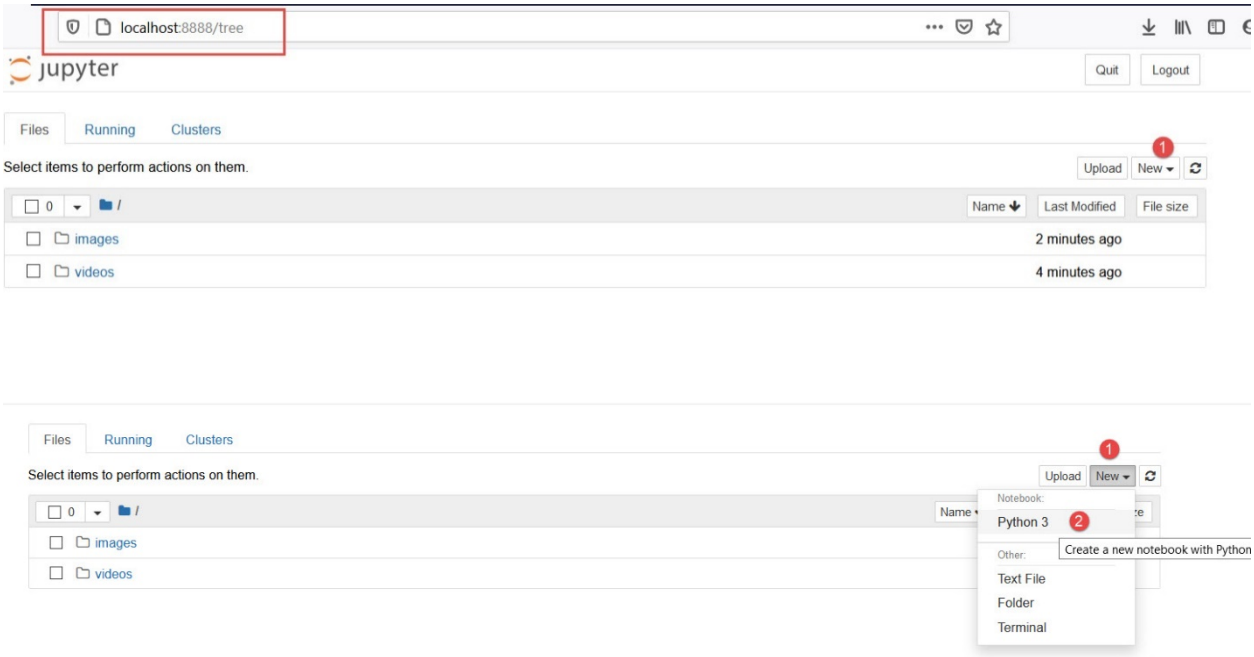


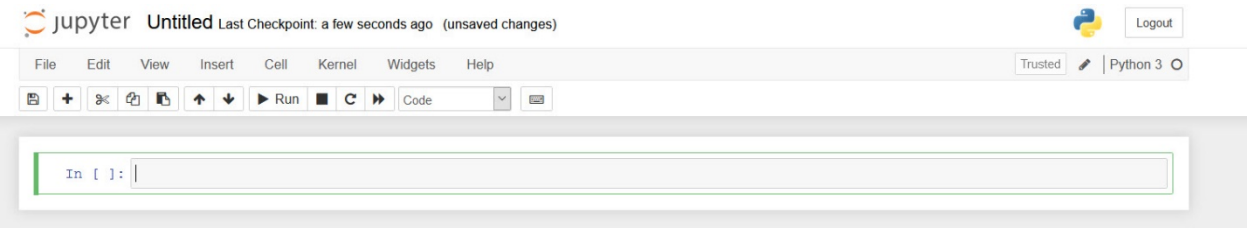
Make sure that Jupyter notebook is installed

Step36. activate and install **Jupyter notebook**. Click on Home, make sure you **ocv** selected.



Step37. The Jupyter in web browser. Click **new** and choose **Python 3**

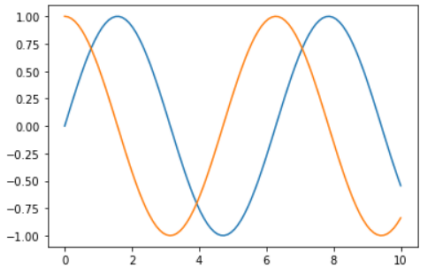




Write the following code and then click run

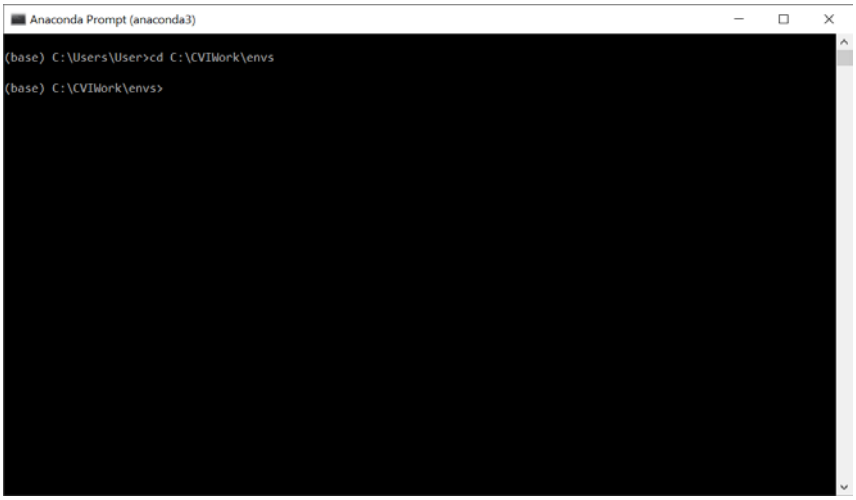
```
%matplotlib inline
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0, 10, 100)
plt.plot(x, np.sin(x))
plt.plot(x, np.cos(x))
plt.show()
```

In [1]:
```
%matplotlib inline
import matplotlib.pyplot as plt
import numpy as np
x = np.linspace(0, 10, 100)
plt.plot(x, np.sin(x))
plt.plot(x, np.cos(x))
plt.show()
```



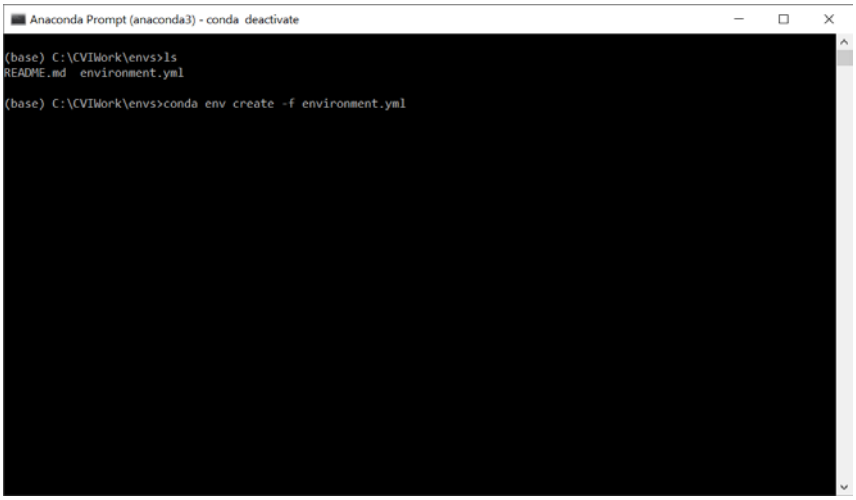
Create a new Anaconda Environment using command line

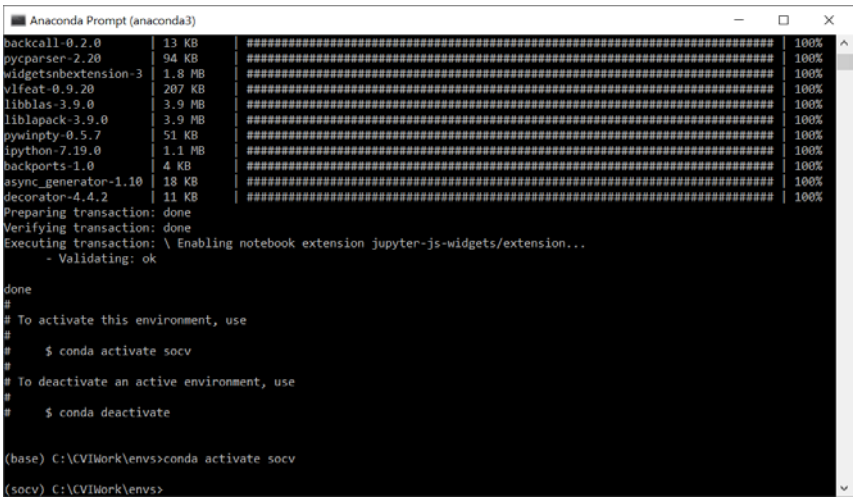
Step38. Download and extract "**envs.zip**".
Step39. Open Anaconda Prompt and locate the envs folder/directory.

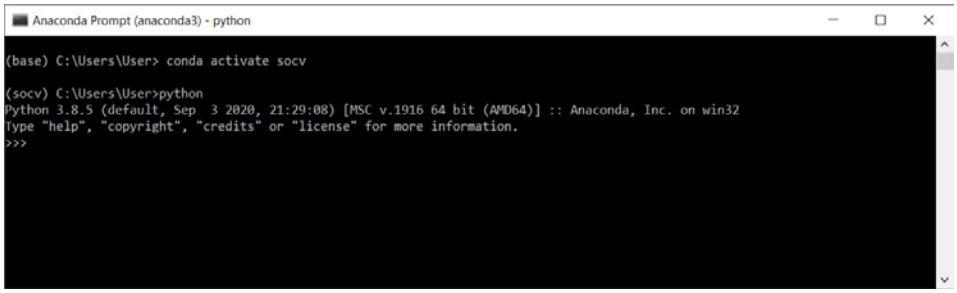


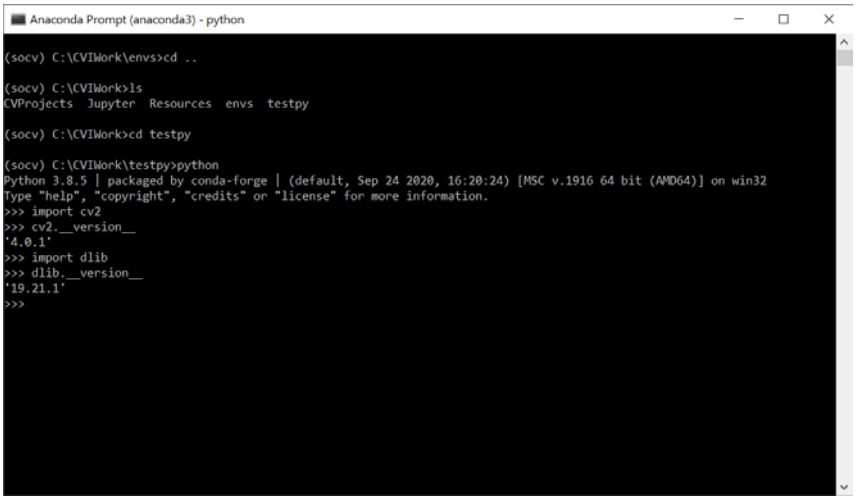
Step40. execute the following command.

```
conda env create -f environment.yml
```




Anaconda Prompt (anaconda3)
backcall-0.2.0 | 13 KB | ########## | 100%
pycparser-2.20 | 94 KB | ########## | 100%
widgetsnbextension-3 | 1.8 MB | ########## | 100%
vlfeat-0.9.20 | 207 KB | ########## | 100%
libblas-3.9.0 | 3.9 MB | ########## | 100%
liblapack-3.9.0 | 3.9 MB | ########## | 100%
pywinpty-0.5.7 | 51 KB | ########## | 100%
ipython-7.19.0 | 1.1 MB | ########## | 100%
backports-1.0 | 4 KB | ########## | 100%
async_generator-1.10 | 18 KB | ########## | 100%
decorator-4.4.2 | 11 KB | ########## | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: \ Enabling notebook extension jupyter-js-widgets/extension...
- Validating: ok
done
To activate this environment, use
$ conda activate socv
To deactivate an active environment, use
$ conda deactivate
(base) C:\CVIWork\envs>conda activate socv
(socv) C:\CVIWork\envs>


Anaconda Prompt (anaconda3) - python
(base) C:\Users\User> conda activate socv
(socv) C:\Users\User>python
Python 3.8.5 (default, Sep 3 2020, 21:29:08) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>


Anaconda Prompt (anaconda3) - python
(socv) C:\CVIWork\envs>cd ..
(socv) C:\CVIWork>ls
CVProjects Jupyter Resources envs testpy
(socv) C:\CVIWork>cd testpy
(socv) C:\CVIWork\testpy>python
Python 3.8.5 | packaged by conda-forge | (default, Sep 24 2020, 16:20:24) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> cv2.__version__
'4.0.1'
>>> import dlib
>>> dlib.__version__
'19.21.1'
>>>

Step41. Download **testpy.zip** file, and then extract it

Step42. Open Anaconda Prompt and Activate the **socv** environment.

Step43. Locate the extract **testpy** directory.

Step44. Type "**`python test.py`**" , then two windows will appear. Check the **testpy** directory you will find **TestVideo.avi** video file.