



Setting Up Computer Vision Course Environment using Anaconda, Python, and OpenCV on Windows Machines

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Created on: February 2024

Credit: Mufleh Al-Shatnawi, PhD, PEng

Install Anaconda (Python) on Windows

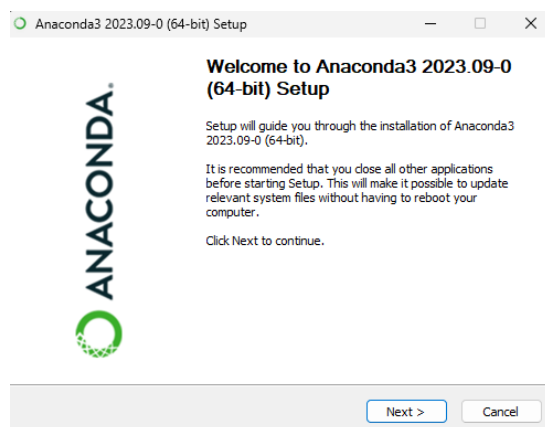
When you wish to work on your local machine, you should use a virtual environment. It is strongly recommended to use the free Anaconda Python distribution which provides an easy way for you to handle package dependencies.

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 do not have to manage dependencies between multiple packages yourself. The other advantage of Anaconda is that it ships with MKL optimizations by default, which means your numpy and scipy code benefit from significant speed-ups without having to change a single line of code.

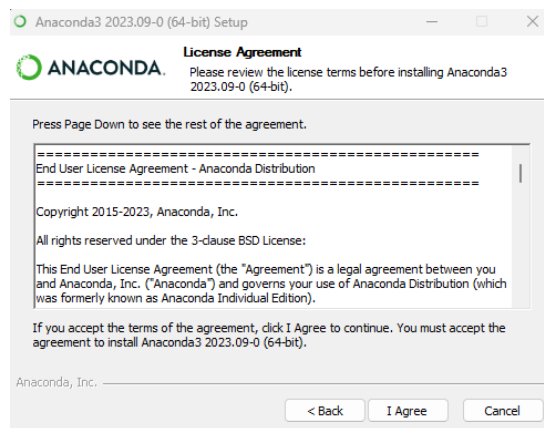
Please note that most parts of this document are for Windows OS. To create virtual environment a virtual environment for Linux and MacOS please refer to the FAQ at the end of this document. You can test your environment after creating the virtual environment.

Step1. Download Anaconda for Windows. (Go to the [Free Download | Anaconda](#)).

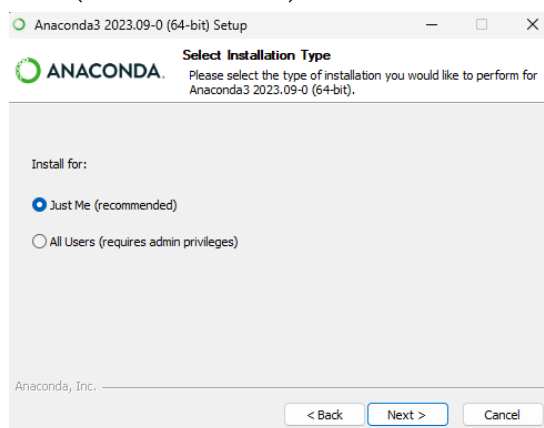
Step2. Locate your downloaded file (.exe), and then run the file (you can run the file as administrator). When the screen below appears, click on Next.



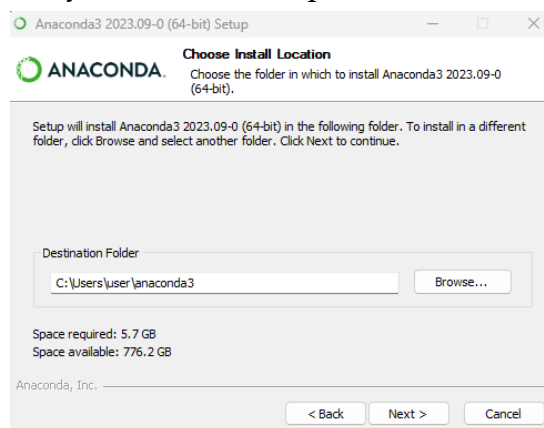
Step3. Read the License Agreement and click on [I Agree](#).



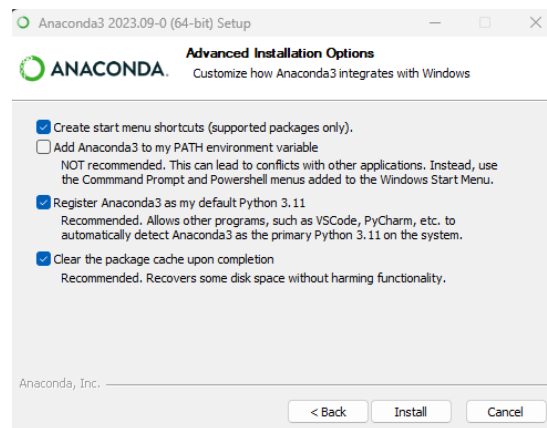
Step4. Choose either Just Me (recommended) or All Users.



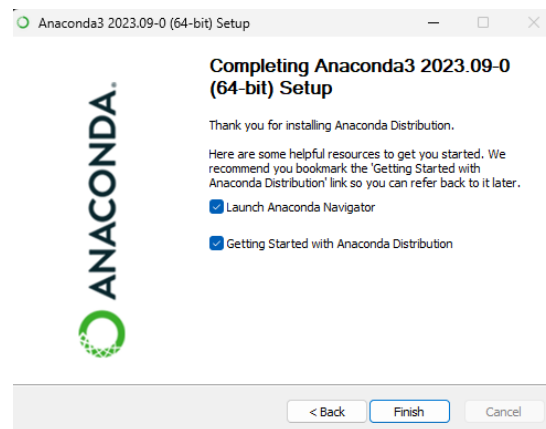
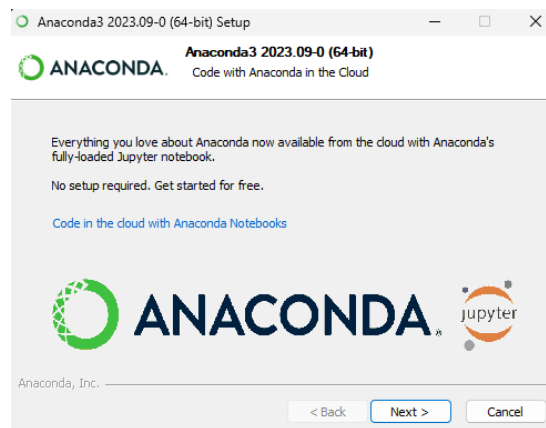
Step5. Please make a note of your installation path location.



Step6. This is an important part of the installation process. **The recommended approach is to not check “add Anaconda to PATH environment”**. 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 do not check the box). **Click on Install.**

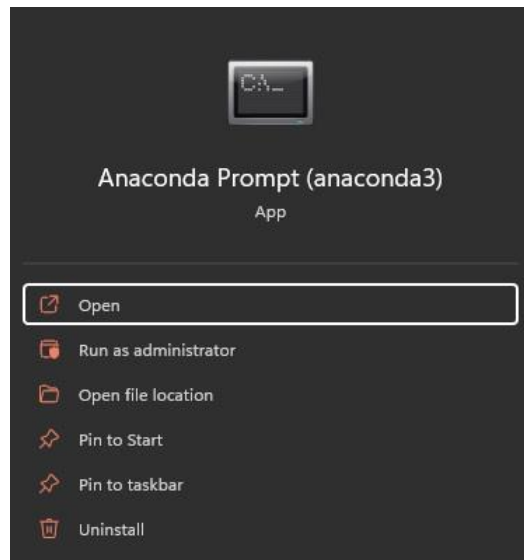


Step7. Click on Next and Finish the installation process.



Step8. Test Your installation. There are many ways to test your Anaconda installation.

This is one way of doing the test. Locate Anaconda Prompt and select Open. It will open the in the (base) environment.



Step9. Type the commands below:

conda -V

python

```
Anaconda Prompt (anaconda3)  X  +  v  -  □  X

(base) C:\Users\user>conda -V
conda 23.7.4

(base) C:\Users\user>python
Python 3.11.5 | packaged by Anaconda, Inc. | (main, Sep 11 2023, 13:26:23) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> |
```

Create a New Anaconda Environment Using Command Line

Once you have Anaconda installed, it makes sense to create a virtual environment for the course. If you choose not to use a virtual environment, it is up to you to make sure that all dependencies for the code are installed globally on your machine.

Create a new Anaconda Environment. You can do it using [Command Line](#) or [Anaconda Navigator](#).

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?

We will use Command Line here.

Step10. Download and extract “[envs.zip](#)”.

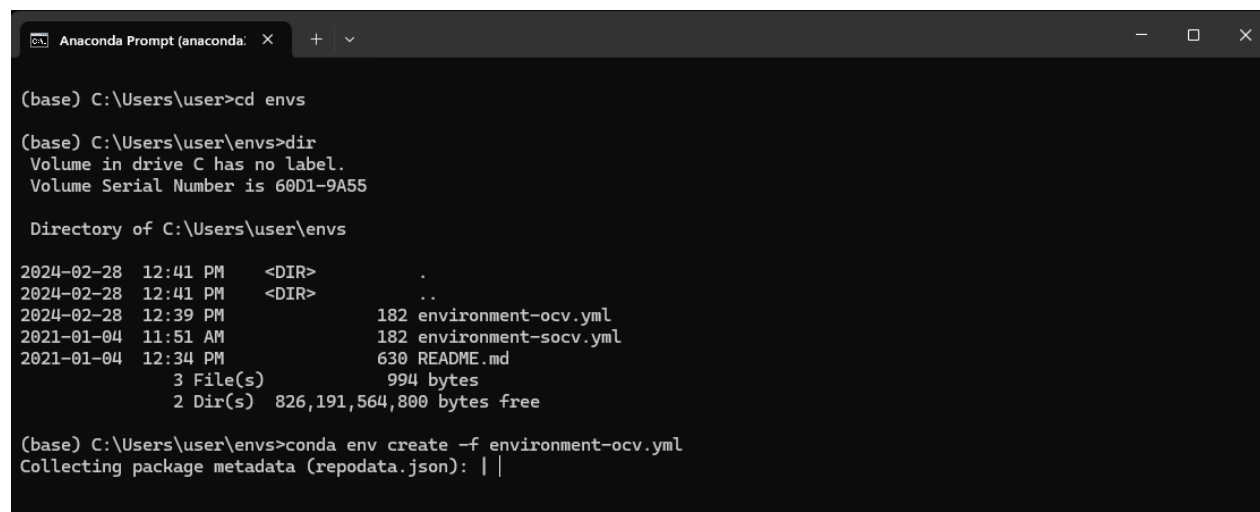
Step11. Open Anaconda Prompt and locate the envs folder/directory.

Step12. Execute the following command.

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

or

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



```

Anaconda Prompt (anaconda) X + v
(base) C:\Users\user>cd envs
(base) C:\Users\user\envs>dir
Volume in drive C has no label.
Volume Serial Number is 60D1-9A55

Directory of C:\Users\user\envs

2024-02-28 12:41 PM <DIR>      .
2024-02-28 12:41 PM <DIR>      ..
2024-02-28 12:39 PM      182 environment-ocv.yml
2021-01-04 11:51 AM      182 environment-socv.yml
2021-01-04 12:34 PM      630 README.md
                3 File(s)      994 bytes
                2 Dir(s)  826,191,564,800 bytes free

(base) C:\Users\user\envs>conda env create -f environment-ocv.yml
Collecting package metadata (repodata.json): | |
```

```
Anaconda Prompt (anaconda: X + v
Downloading and Extracting Packages
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
# $ conda activate ocv
#
# To deactivate an active environment, use
#
# $ conda deactivate

(base) C:\Users\user\envs>
```

Step13. You can use your virtual environment now. Open Anaconda Prompt.

Step14. Activate the **ocv** environment by typing:

conda activate **ocv**

Type **python** in the command prompt.

You can later exit Python by typing **exit()**

```
Anaconda Prompt (anaconda: X + v
(base) C:\Users\user>conda activate ocv

(ocv) C:\Users\user>python
Python 3.11.5 | packaged by conda-forge | (main, Aug 27 2023, 03:23:48) [MSC v.1936 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>
>>>
>>> exit()

(ocv) C:\Users\user>
```

You can deactivate the environment by closing the Anaconda Prompt or by typing:
conda deactivate

Step15. Write the following commands, then you should get the following output:

conda activate ocv

python

import cv2

cv2.__version__

```
Anaconda Prompt (anaconda: X) + v
(base) C:\Users\user>conda activate ocv
(ocv) C:\Users\user>python
Python 3.11.5 | packaged by conda-forge | (main, Aug 27 2023, 03:23:48) [MSC v.1936 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> cv2.__version__
'4.9.0'
>>> |
```

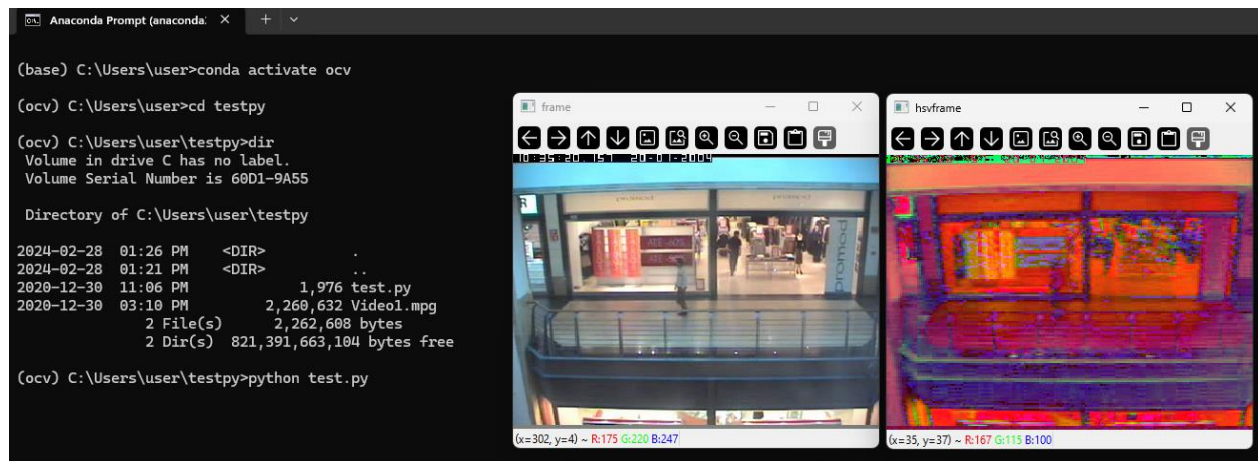

Test Your Installation by Reading and Writing Video Files (using Anaconda Prompt)

Step16. Download [testpy.zip](#) file, and then extract it.

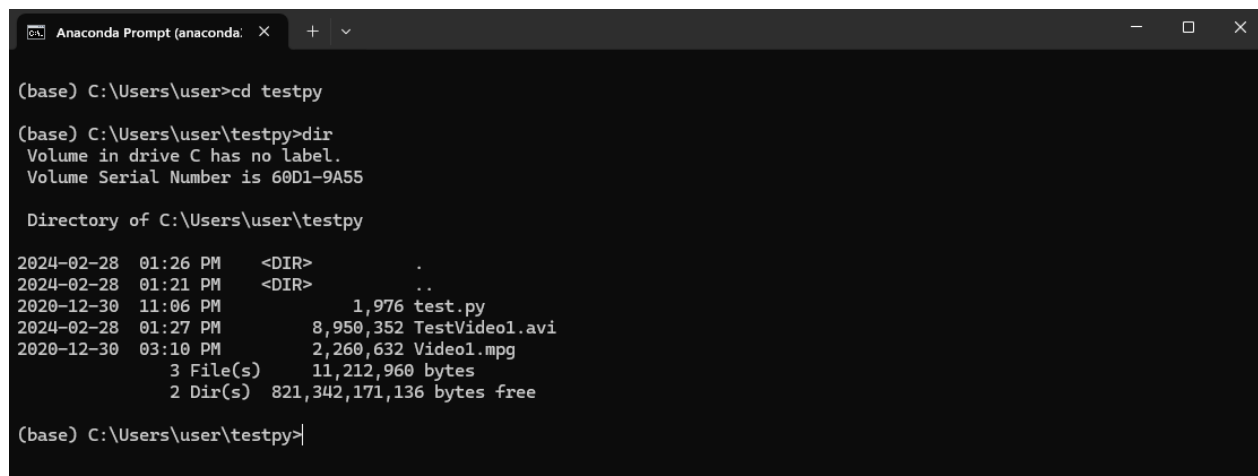
Step17. Open Anaconda Prompt and Activate the **ocv** environment.

Step18. Locate the extracted [testpy](#) directory.

Step19. Type “[python test.py](#)”, then two windows will appear.

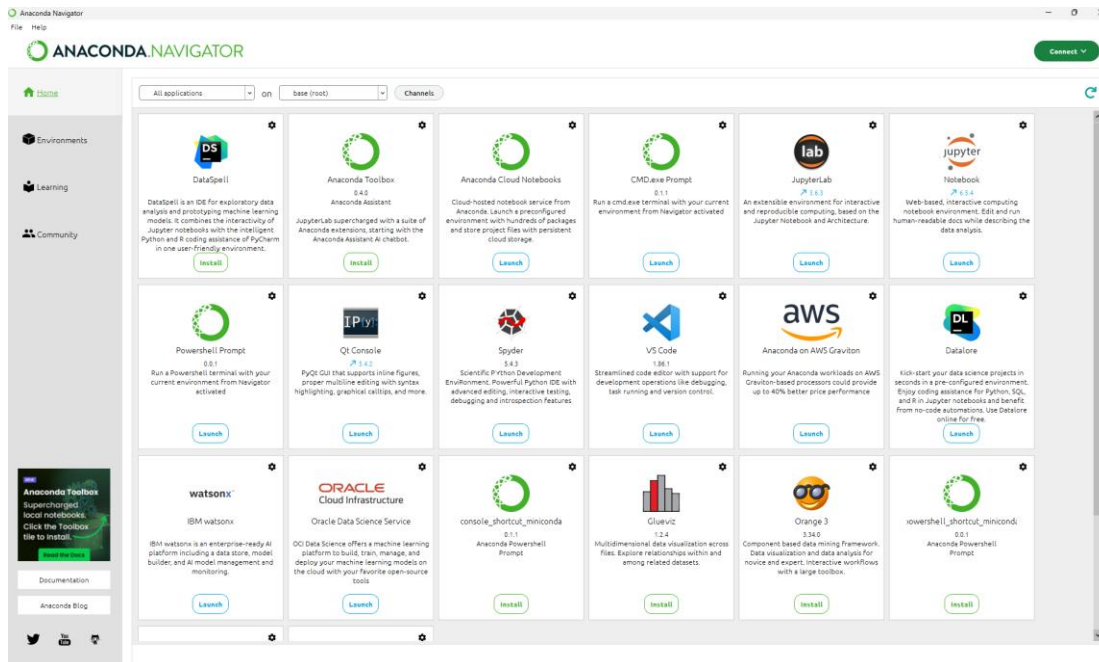


If you check the [testpy](#) directory, you will find [TestVideo.avi](#) video file.

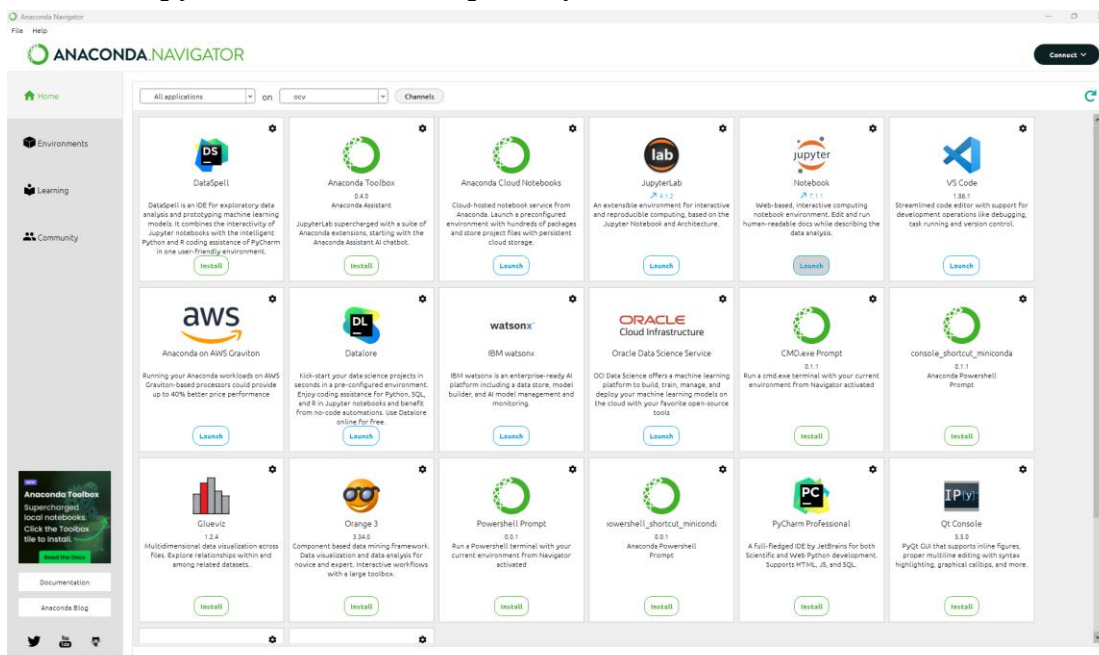


Test Your Installation using Anaconda Navigator

Step20. Locate and Open Anaconda Navigator.

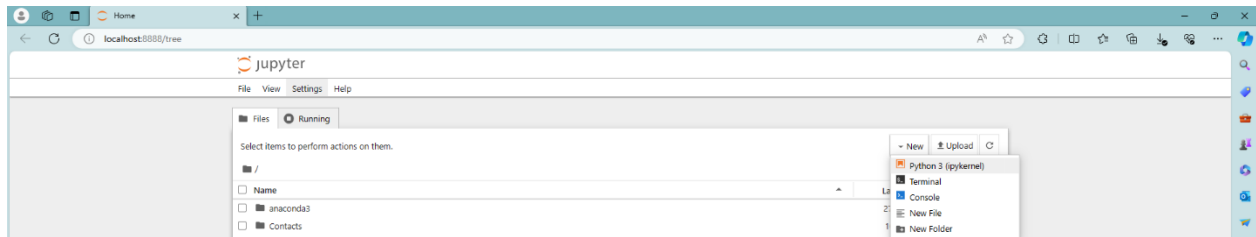


Step21. Click on home and choose **ocv**. Launch Jupyter Notebook. (If it is not installed, install it first.) Jupyter Notebook will open in your default web browser.



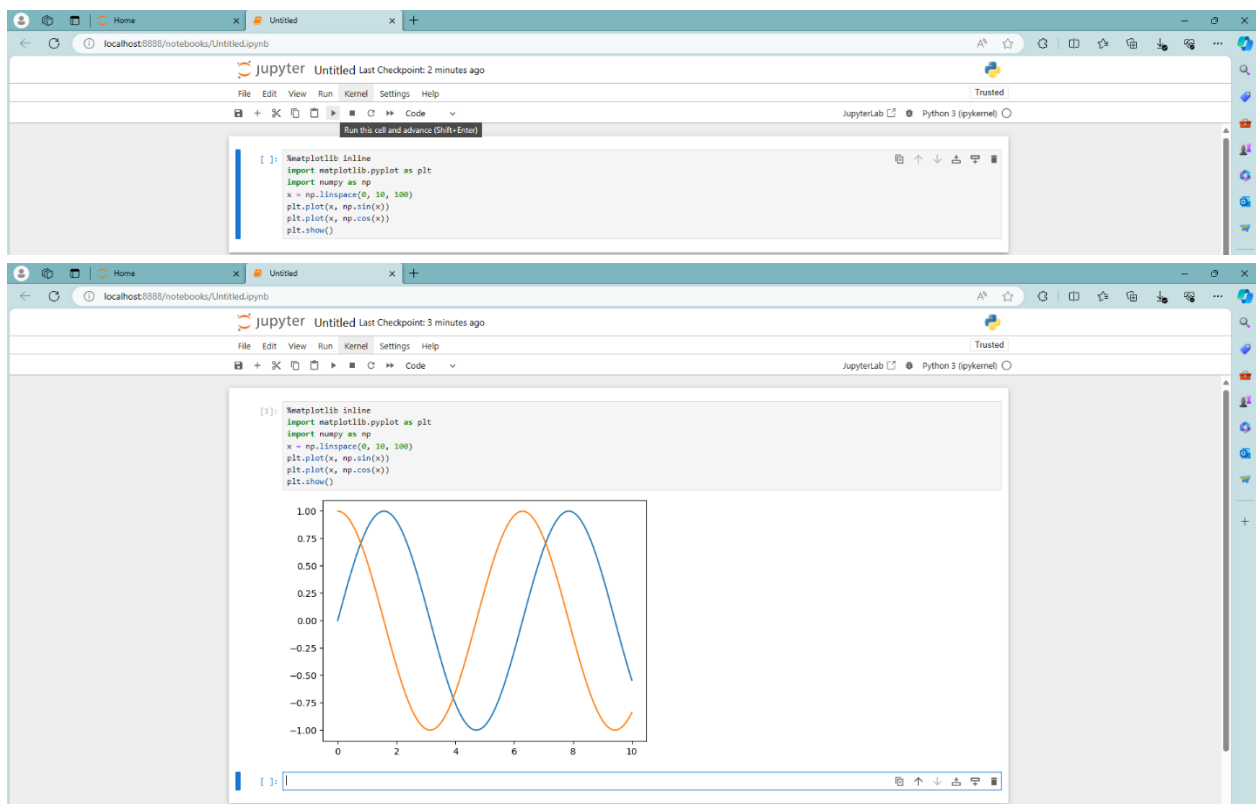
Step22. Click **New** and choose **Python 3 (ipykernel)**

This creates a new Notebook with Python 3 interpreter.



Write the following code and then click Run to run the cell:

```
%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()
```



Frequently Asked Questions

1. In envs folder, you can find a readme file for other OS; MacOS and Linux. On MacOS and Linux, you can just use a terminal window to run the command: `conda env create -f environment-ocv.yml`.
2. In envs folder, you can find two environments:
 - Environment-ocv creates ocv and uses Python 3.11.5 and OpenCV 4.9.0
 - Environment-scov creates socv and uses Python 3.8.5 and OpenCV 4.6.0
3. Depending on your OS and/or Anaconda distribution, these environments might not work.
4. If you are using older machines, you might need to use earlier distributions of Anaconda. You can find them here:
[Index of / \(anaconda.com\)](#)
5. You can create different environments using different releases of OpenCV and Python simply by changing the name of the environment, OpenCV and Python release in the .yml file.
6. To remove any environments, in the Anaconda Prompt use:
`conda remove -n ENV_NAME -all`
7. For more information on Virtual Environment see:
[Managing environments — conda 24.1.3.dev37 documentation](#)
[Set up virtual environment for Python using Anaconda - GeeksforGeeks](#)
8. For more information on setting up OpenCV with Anaconda see:
[Set up Opencv with anaconda environment - GeeksforGeeks](#)
9. You can install OpenCV using pip: `pip install opencv-python`
[opencv-python · PyPI](#)
Please note that this is the pre-built CPU-only OpenCV packages for Python.