

Python Opencu Workshop

Yan Myo Aung

ME(Electronic)

Jump Into Python

mr.maheindra@gmail.com

09795838275

Agenda

- Image Processing
- Pixel
- Image
- Type of Images
- RGB Images
- Grayscale Image
- Binary Image
- Introduction to OpenCV
- Python IDE
- Install OpenCV in Spyder IDE

Image Processing

Computer Vision is a field of deep learning that enables machines to see, identify and process images like humans.

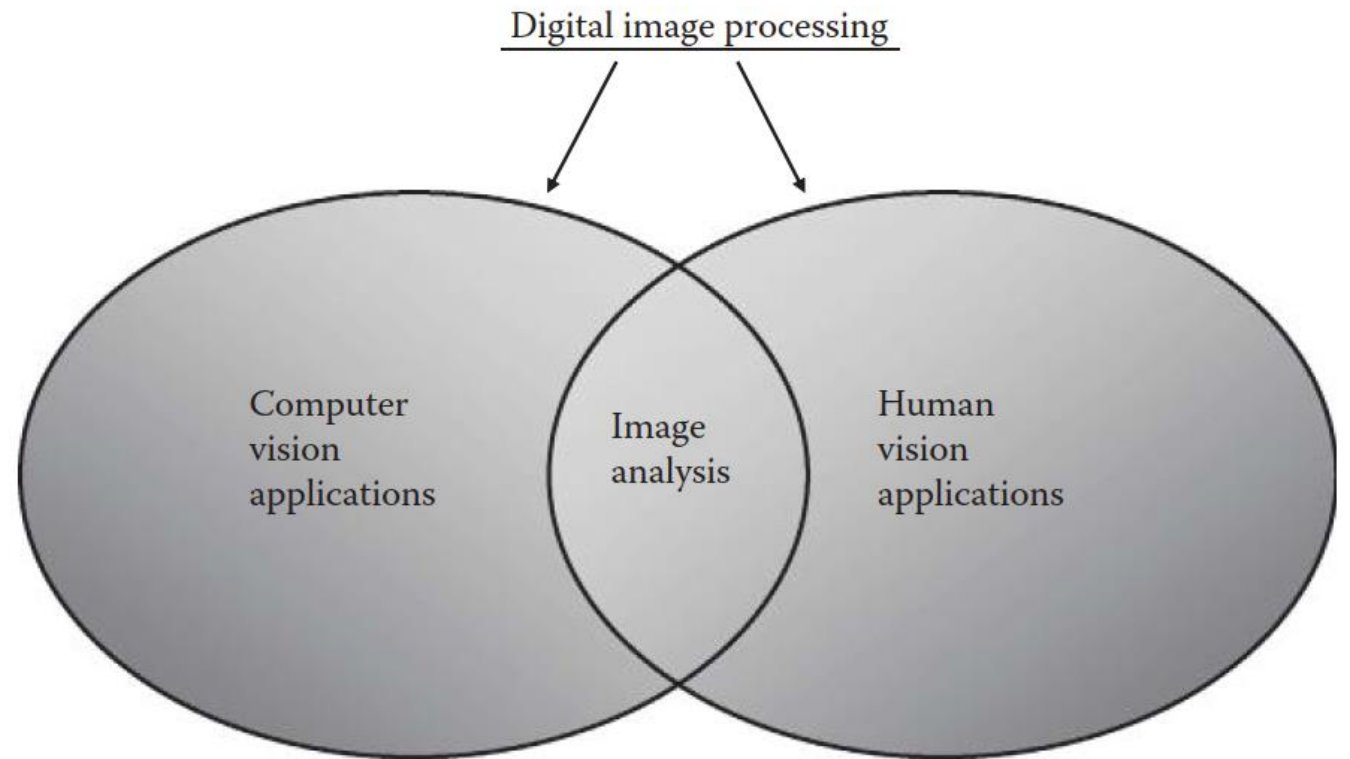


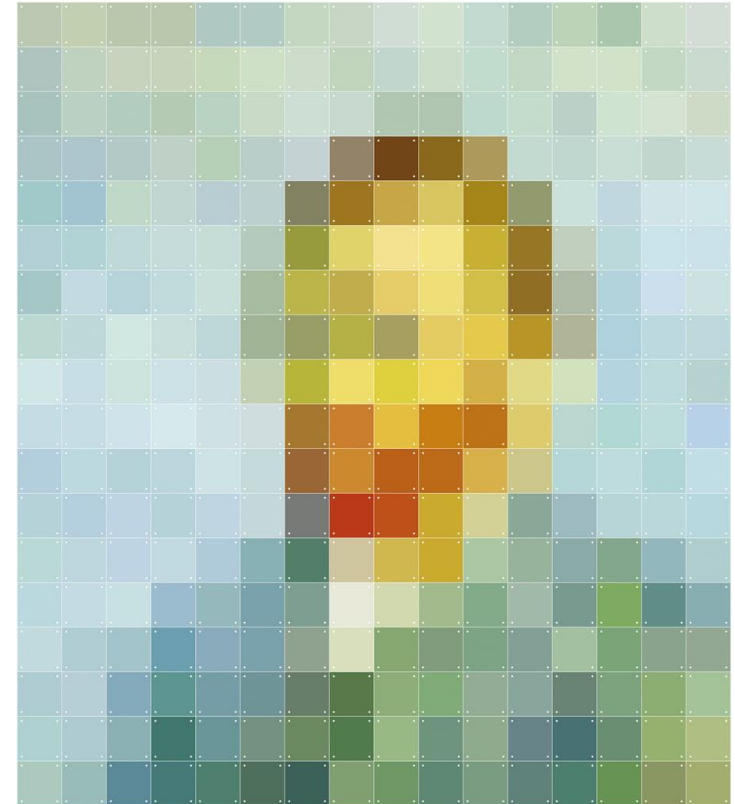
Image Processing

one picture is
worth a thousand
words....



Pixel

The word "pixel" means a picture element.



Image

An image is a 2D array value, or a matrix of square pixel arranged in columns and rows



Type of Images

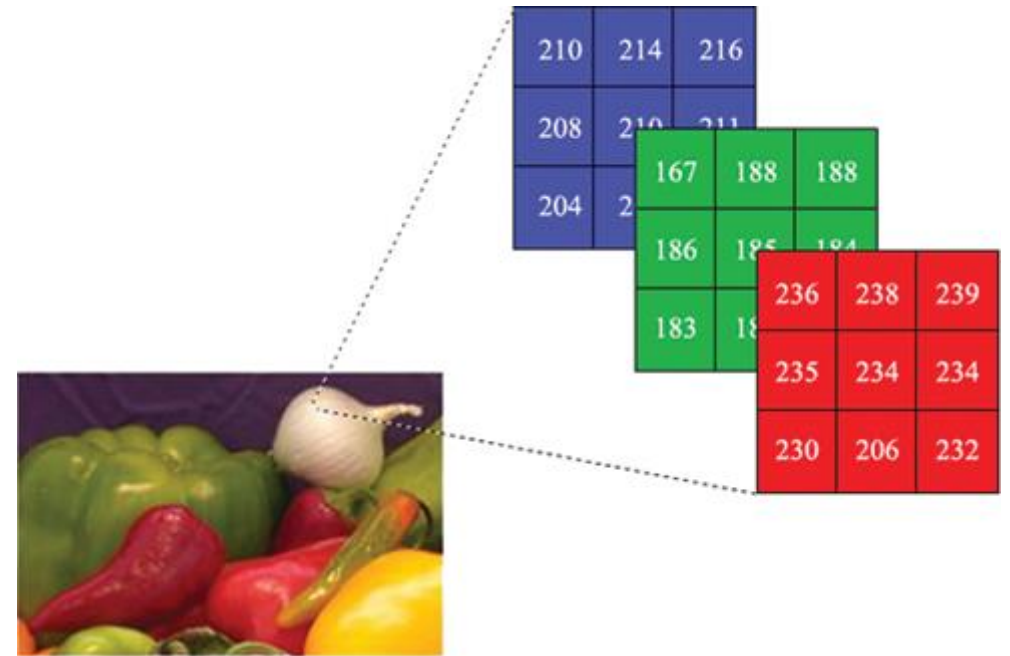
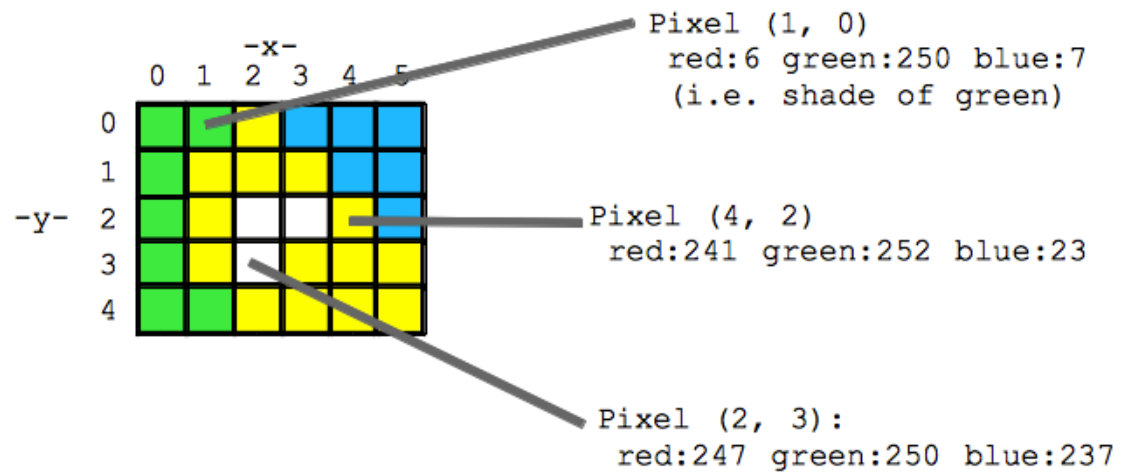
- RGB Image (color)
- Grayscale Image
- Binary Image

RGB Image

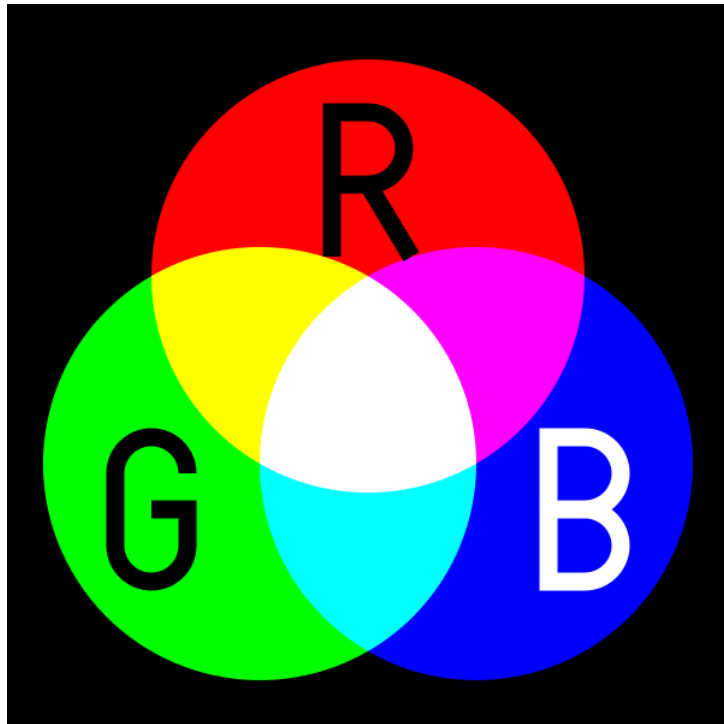


$$f(x, y) = \begin{bmatrix} r(x, y) \\ g(x, y) \\ b(x, y) \end{bmatrix}$$

RGB Image

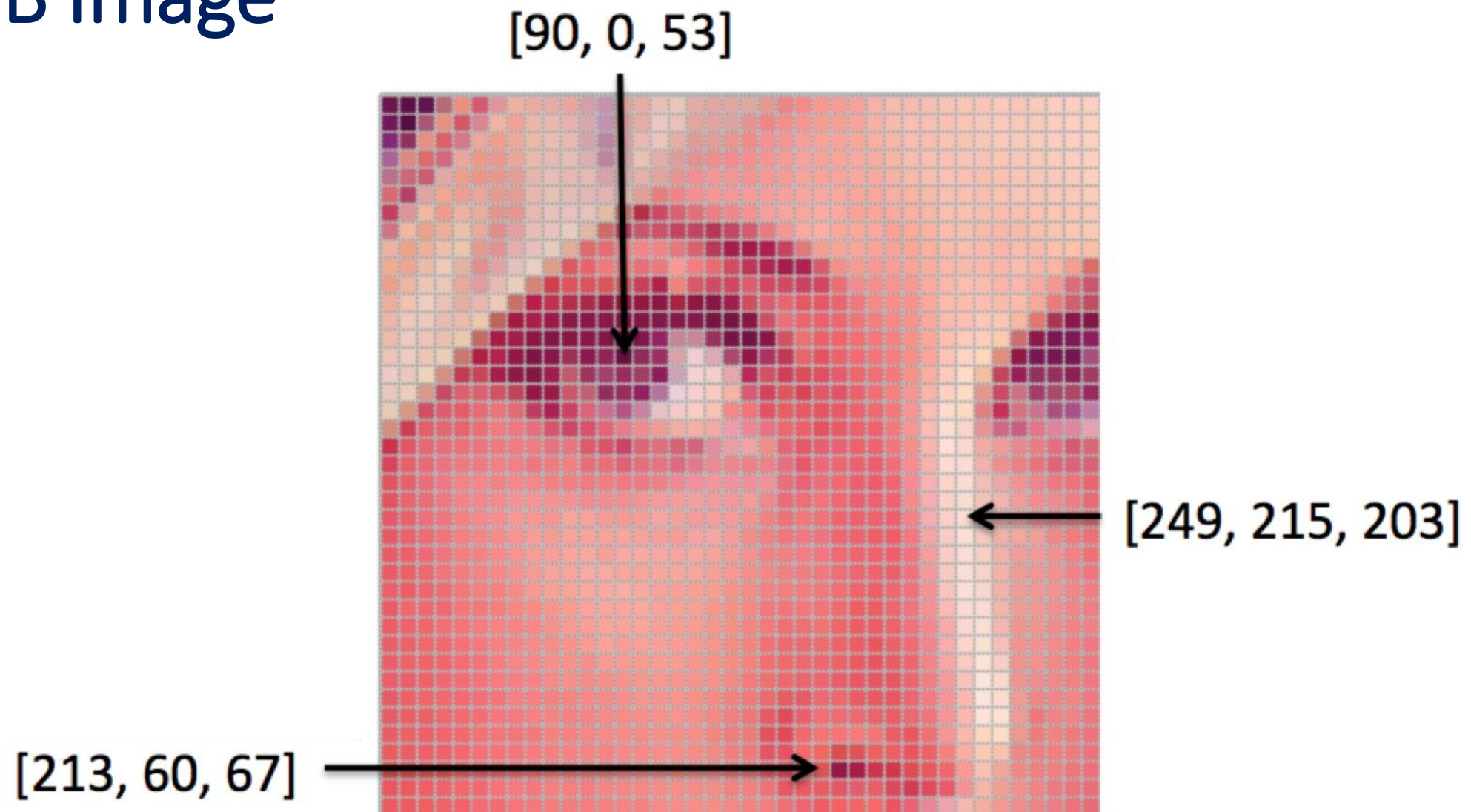


RGB Image

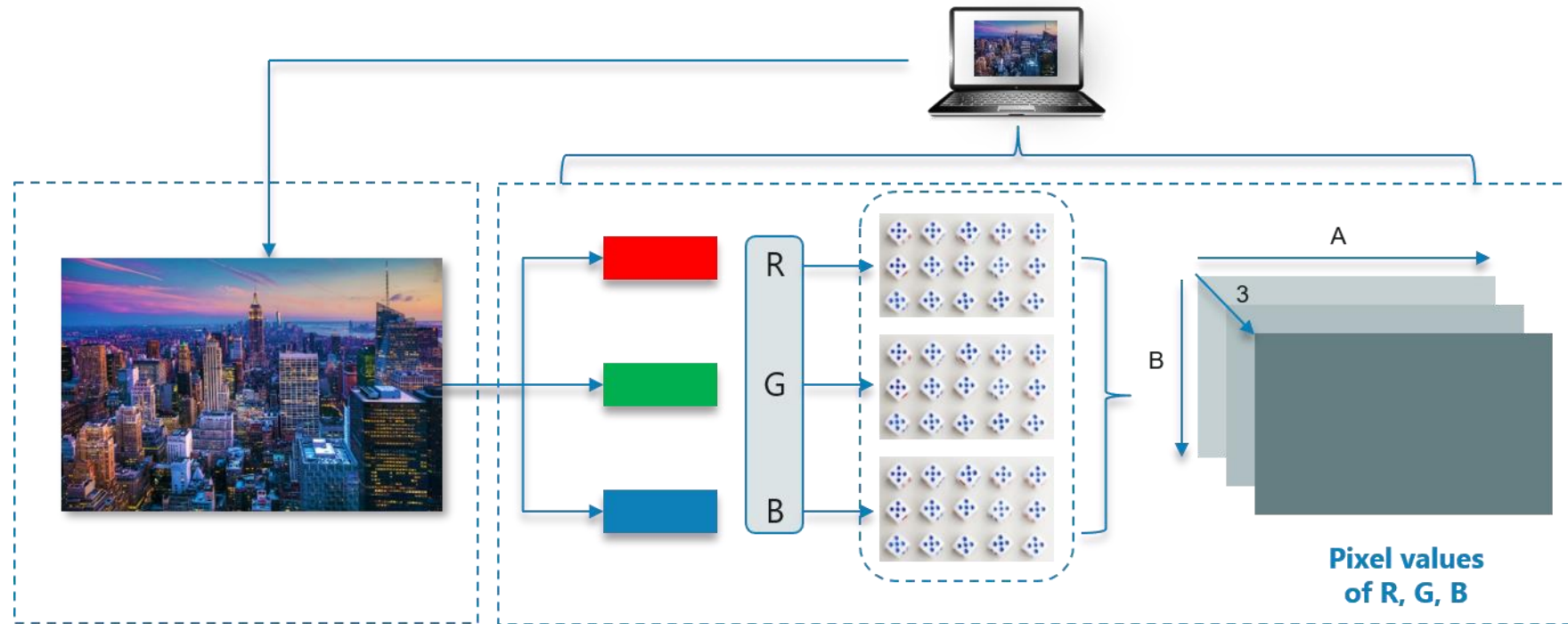


Color	Red number	Green number	Blue number
red	255	0	0
purple	255	0	255
yellow	255	255	0
dark yellow	100	100	0
white	255	255	255
black	0	0	0

RGB Image

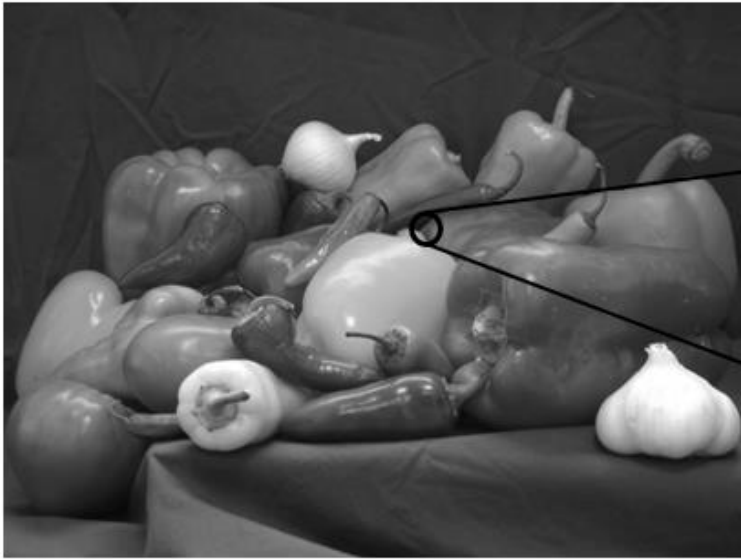


How does a computer read an image?



Grayscale Image

- A grayscale image is a data matrix whose values represent intensities of one image pixel.
- Grayscale image has only single channel and pixel intensity varies between 0 (black) to 255(white).
- It usually has shades of gray



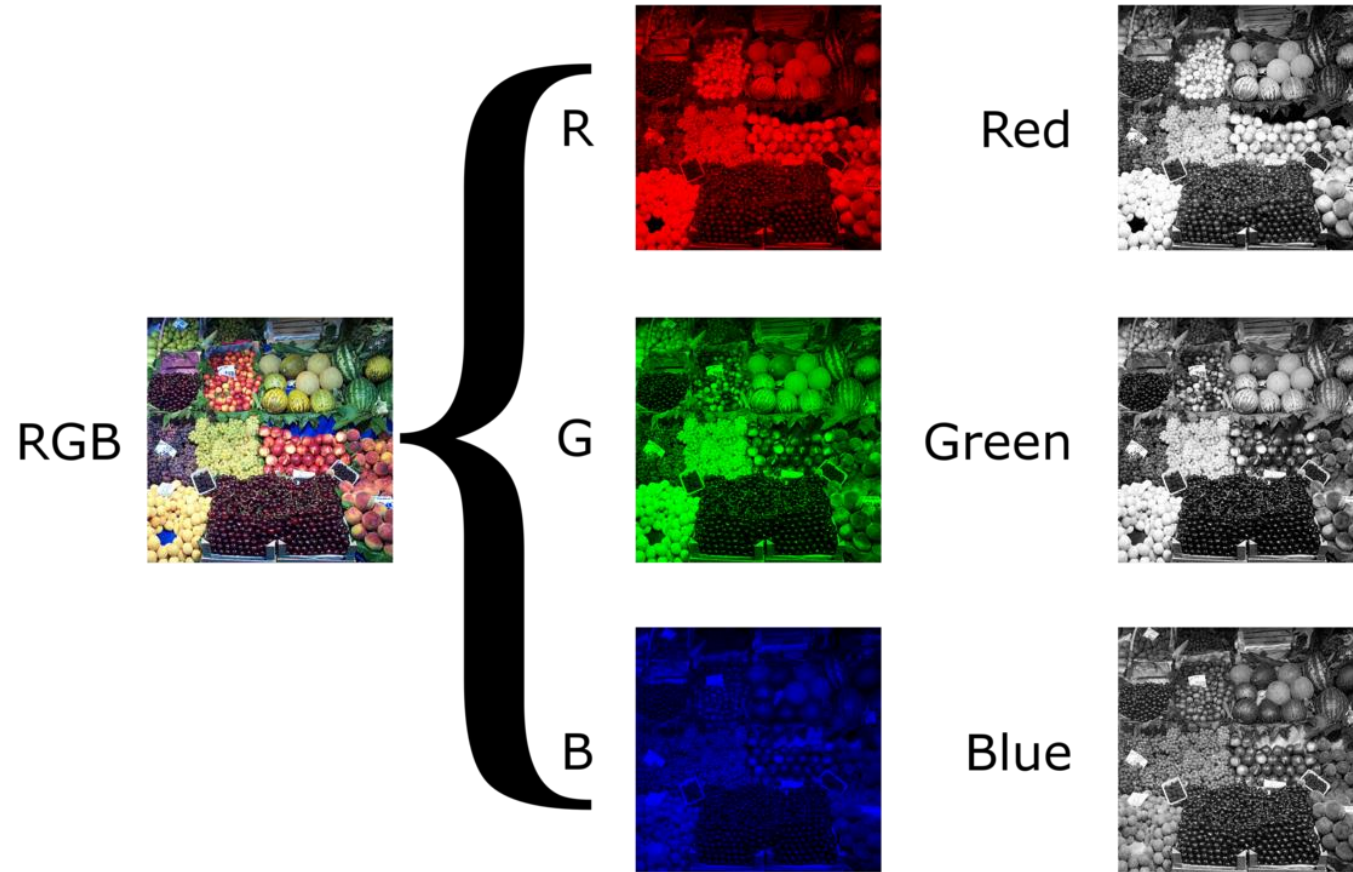
0.1216	0.1255	
0.1176	0.1176	0.1137
0.1020	0.1020	0.1059
0.1490	0.0980	0.0902
0.5020	0.4196	0.2941
0.6392	0.6431	0.6510
0.7255	0.6667	0.6353
0.6824	0.7137	0.6863
0.6784	0.7373	0.7373
0.6980	0.7176	0.7176
0.7255	0.7216	



Grayscale Image

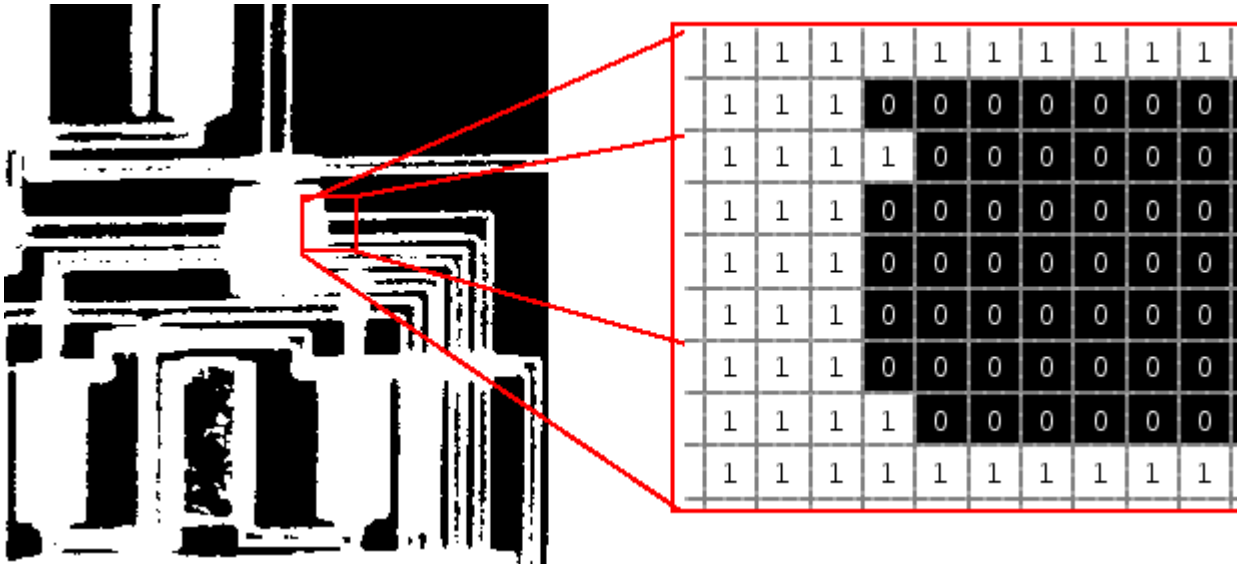


Grayscale Image



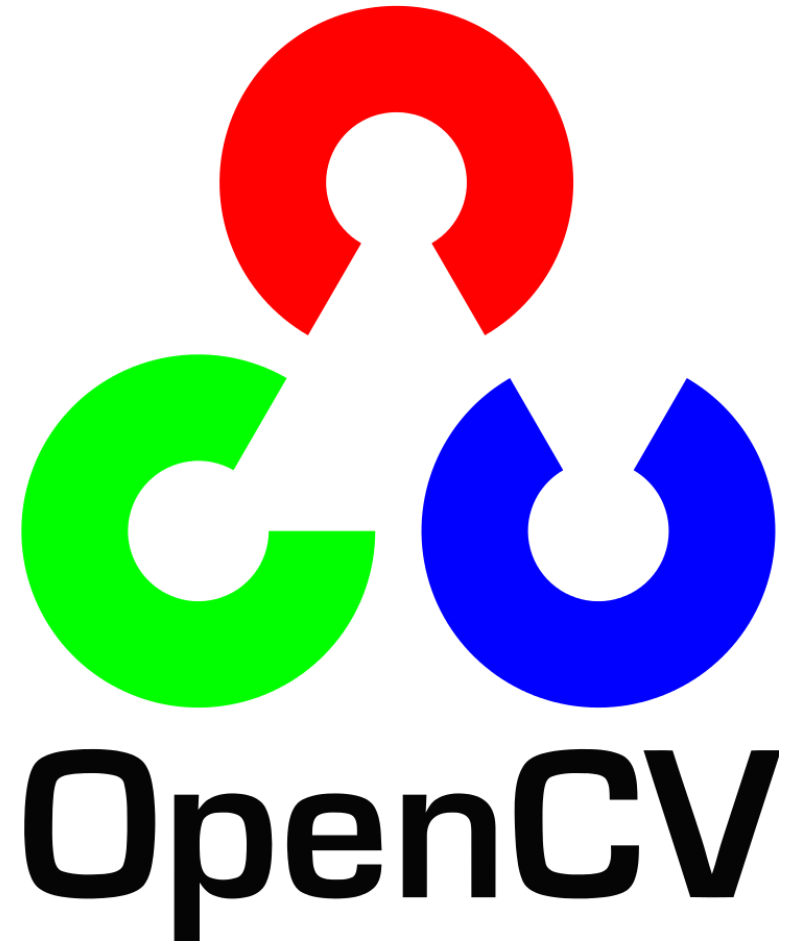
Binary Image

In a binary image, each pixel has one of only two discrete values: 1 or 0.



Introduction to OpenCV

- OpenCV was originally developed in 1999 by Intel, but later, it was supported by Willow Garage.
- Written in optimized C/C++, the library can take advantage of multi-core processing.
- It supports a wide variety of programming languages such as C++, Python, Java interface and supports Windows, Linux, Mac OS, iOS and Android.
- OpenCV was designed for computational efficiency and with a strong focus on real-time applications.
- The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms.



Python IDE (Spyder)

Download Anaconda from following link :

<https://www.anaconda.com/products/individual>

Anaconda Installers

Windows 

Python 3.8

64-Bit Graphical Installer (466 MB)


32-Bit Graphical Installer (397 MB)

MacOS 

Python 3.8

64-Bit Graphical Installer (462 MB)

64-Bit Command Line Installer (454 MB)

Linux 

Python 3.8

64-Bit (x86) Installer (550 MB)

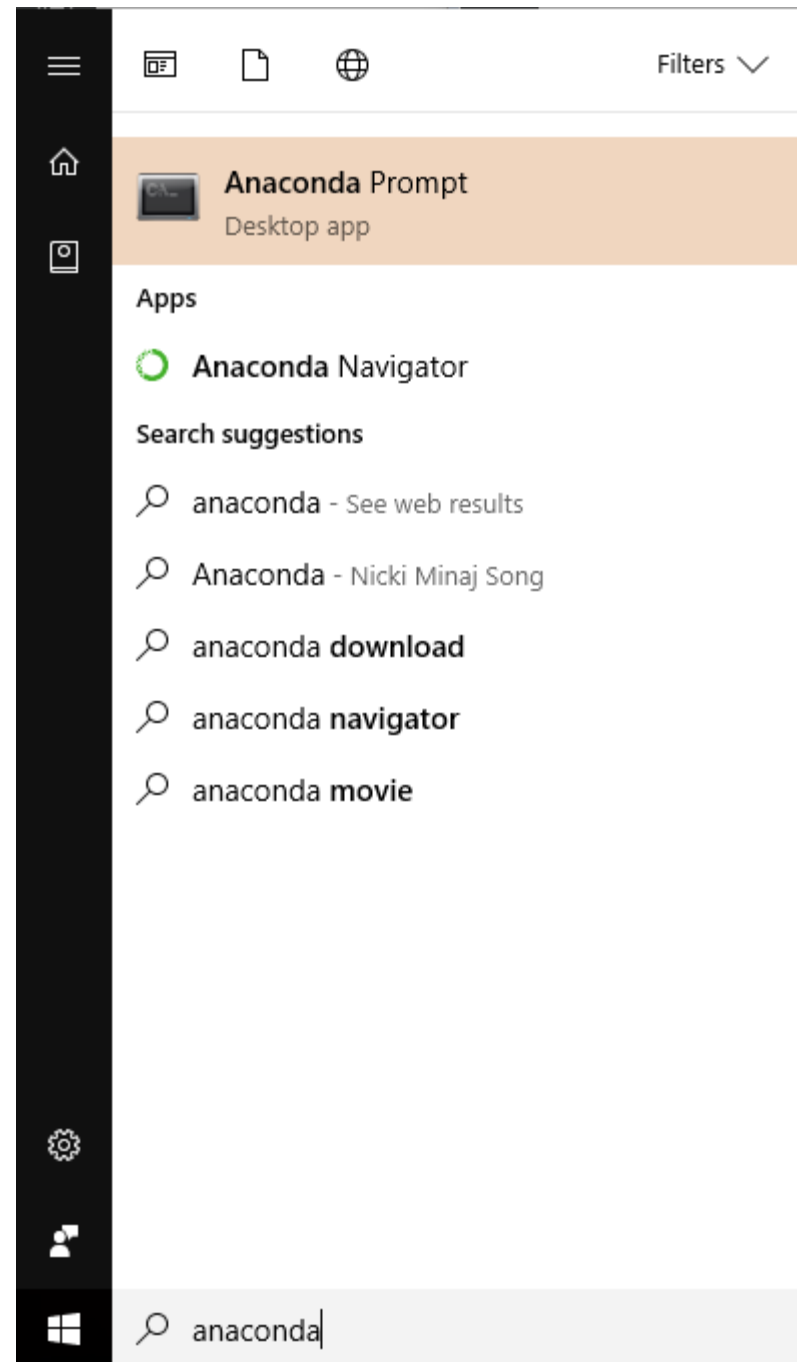
64-Bit (Power8 and Power9) Installer (290 MB)

Install OpenCV in Syder IDE


After Install Anaconda in your PC:

Step 1: Launch the Anaconda prompt from the start menu

You have to launch the prompt by Right-clicking and choosing *"Run as Administrator"* to execute with administrator privileges. This is critical.

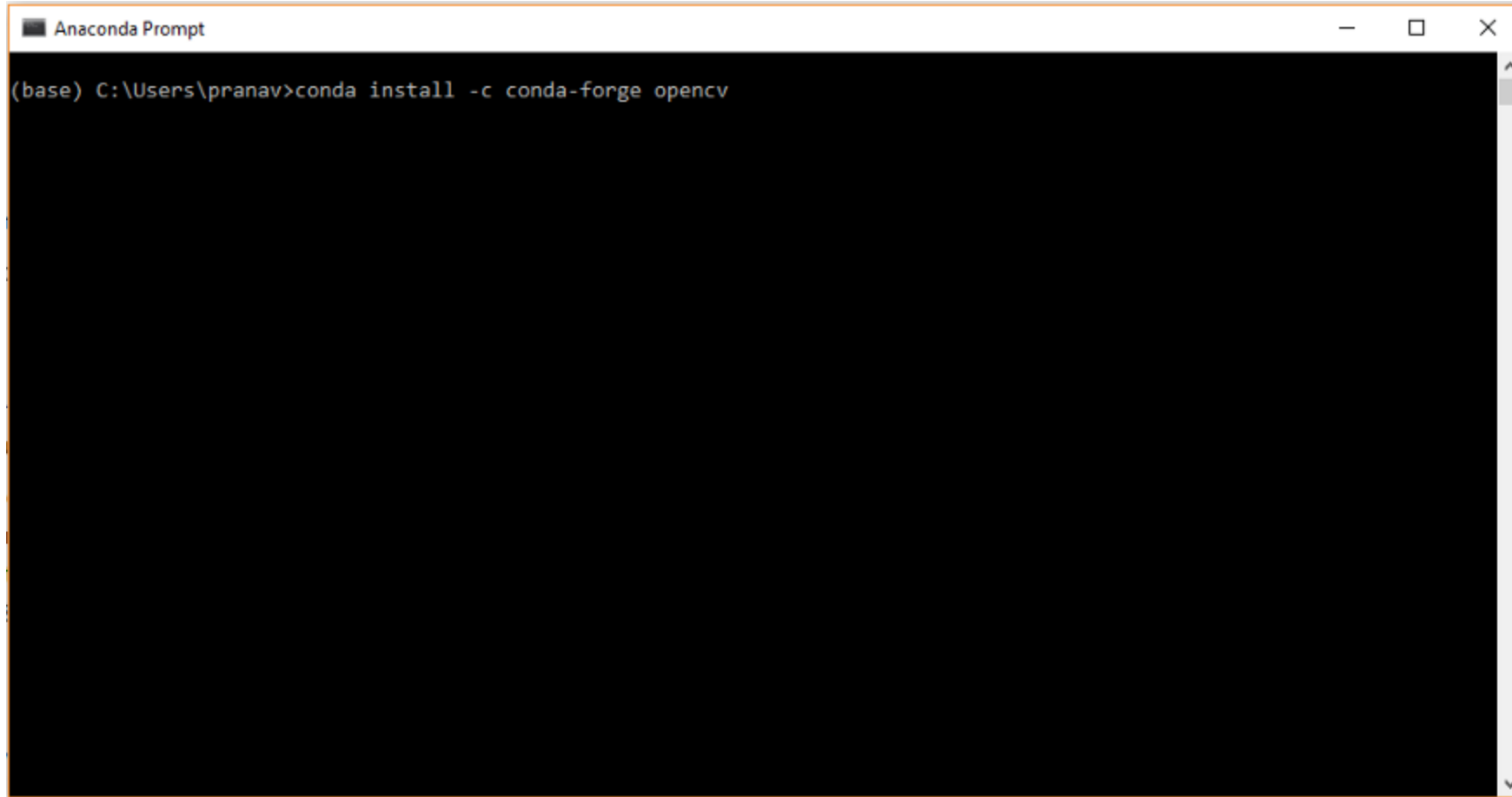


You will see similar prompt

A screenshot of an Anaconda Prompt window. The window has a title bar with the text "Anaconda Prompt" and standard Windows window controls (minimize, maximize, close). The main area is a black terminal with white text. The prompt is "(base) C:\Users\pranav>".

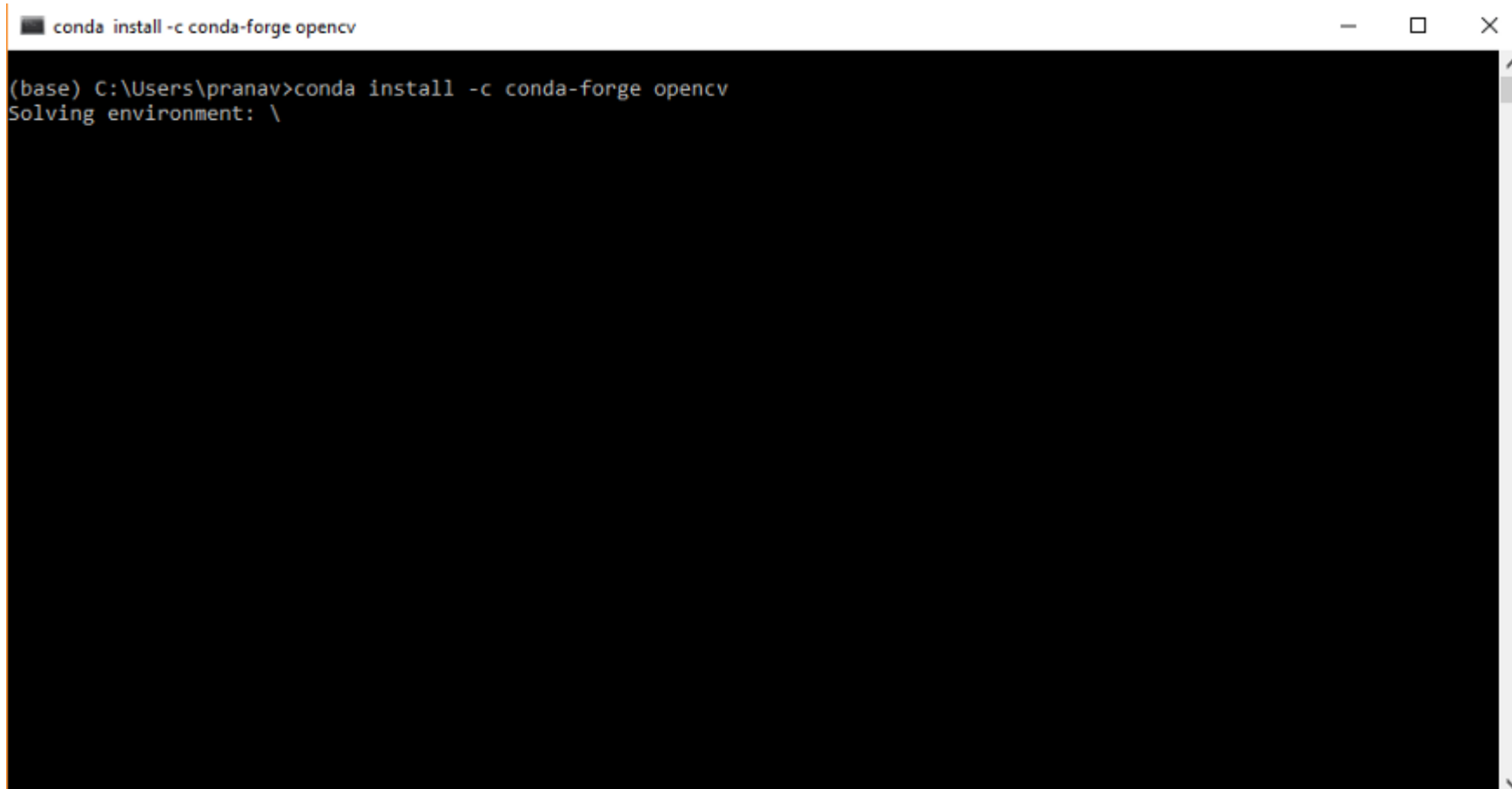
```
Anaconda Prompt
(base) C:\Users\pranav>
```

Type the following command in prompt:
`conda install -c conda-forge opencv`

A screenshot of the Anaconda Prompt window. The window title bar reads "Anaconda Prompt" and includes standard Windows window controls (minimize, maximize, close). The command prompt shows the current directory as "C:\Users\pranav" and the active environment as "(base)". The command "conda install -c conda-forge opencv" has been entered and is ready to be executed. The prompt is a black box with white text, and the window has a light gray border.

```
(base) C:\Users\pranav>conda install -c conda-forge opencv
```

The prompt will show that..."solving environment". It will take quite a bit of time....



```
conda install -c conda-forge opencv

(base) C:\Users\pranav>conda install -c conda-forge opencv
Solving environment: \
```


Once the environment is resolved by conda...it will list the packages (opencv, libopencv, py-opencv) that will be installed in your system....

Enter 'y' to proceed the installation....

```
conda install -c conda-forge opencv

## Package Plan ##

environment location: C:\ProgramData\Anaconda3

added / updated specs:
- opencv

The following packages will be downloaded:

package                        | build                | size
-----|-----|-----
opencv-3.4.1                   | py37h6fd60c2_3      | 9 KB
py-opencv-3.4.1                | py37h1b0d24d_3      | 1.5 MB
libopencv-3.4.1                | h875b8b8_3          | 37.0 MB
conda-4.6.8                    | py37_0               | 897 KB conda-forge
-----|-----|-----
Total:                          |                      | 39.4 MB

The following NEW packages will be INSTALLED:

libopencv: 3.4.1-h875b8b8_3
opencv:    3.4.1-py37h6fd60c2_3
py-opencv: 3.4.1-py37h1b0d24d_3

The following packages will be UPDATED:

conda: 4.5.12-py37_0 --> 4.6.8-py37_0 conda-forge

Proceed ([y]/n)? y
```

Wait for a while..(conda install required package)

After the installation, your computer is ready to use in class..

```
conda install -c conda-forge opencv

py-opencv-3.4.1      | py37h1b0d24d_3      1.5 MB
libopencv-3.4.1     | h875b8b8_3          37.0 MB
conda-4.6.8         | py37_0              897 KB  conda-forge
-----
Total:              39.4 MB

The following NEW packages will be INSTALLED:

libopencv: 3.4.1-h875b8b8_3
opencv:    3.4.1-py37h6fd60c2_3
py-opencv: 3.4.1-py37h1b0d24d_3

The following packages will be UPDATED:

conda:      4.5.12-py37_0      --> 4.6.8-py37_0  conda-forge

Proceed ([y]/n)? y

Downloading and Extracting Packages
opencv-3.4.1      | 9 KB      | ##### | 100%
py-opencv-3.4.1   | 1.5 MB    | ##### | 100%
libopencv-3.4.1   | 37.0 MB   | ##### | 100%
conda-4.6.8       | 897 KB    | ##### | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: \
```

Wait for a while..(conda install required package)

After the installation, your computer is ready to use in class..

```
conda install -c conda-forge opencv

py-opencv-3.4.1      | py37h1b0d24d_3      1.5 MB
libopencv-3.4.1     | h875b8b8_3          37.0 MB
conda-4.6.8         | py37_0              897 KB  conda-forge
-----
Total:              39.4 MB

The following NEW packages will be INSTALLED:

libopencv: 3.4.1-h875b8b8_3
opencv:    3.4.1-py37h6fd60c2_3
py-opencv: 3.4.1-py37h1b0d24d_3

The following packages will be UPDATED:

conda:      4.5.12-py37_0      --> 4.6.8-py37_0  conda-forge

Proceed ([y]/n)? y

Downloading and Extracting Packages
opencv-3.4.1      | 9 KB      | ##### | 100%
py-opencv-3.4.1   | 1.5 MB    | ##### | 100%
libopencv-3.4.1   | 37.0 MB   | ##### | 100%
conda-4.6.8       | 897 KB    | ##### | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: \
```

Thank you for your attention!!!