Module - 1
Image Processing

01- Create Virtual environment
&
Installations

Creating Virtual environment

Virtual Environment

For Windows:

```
# enter in your anaconda prompt for windows
pip install --user virtualenv
```

For Linux:

```
# python3
Python3 -m pip install --user virtualenv
# python2
Python3 -m pip install --user virtualenv
```

Reference: https://packaging.python.org/guides/installing-using-pip-and-virtual-environments/

Create Virtual Environment

For Windows:

```
# enter in your anaconda prompt for windows
python -m venv freeai
```

For Linux or mac:

```
# python3
python3 -m venv freeai
# python2
python -m venv freeai
```

Create Virtual Environment

For Windows:

```
# enter in your anaconda prompt for windows
.\freeai\Scripts\activate
```

For Linux or mac:

```
# python3
source freeai/bin/activate
# python2
source freeai/bin/activate
```

02 - Installing OpenCV

Dependencies of OpenCV

Dependencies

1. NUMPY :- Numerical Python
2. SCIPY :- Scientific Python
3. MATPLOTLIB :- Mathematics Plotting Library

Others:

1. PANDAS :- Panel Datasets
2. SKLEARN : Scikit-Learn

IDE:

1. Jupyter Notebook

Install OpenCV in Python

For Windows:

```
# enter in your anaconda prompt for windows
pip install opencv-python
```

For Linux:

```
# python3
pip3 install opencv-python

# python2
pip install opencv-python
```

Reading Image

First **OpenCV** command

03 - I M A G E

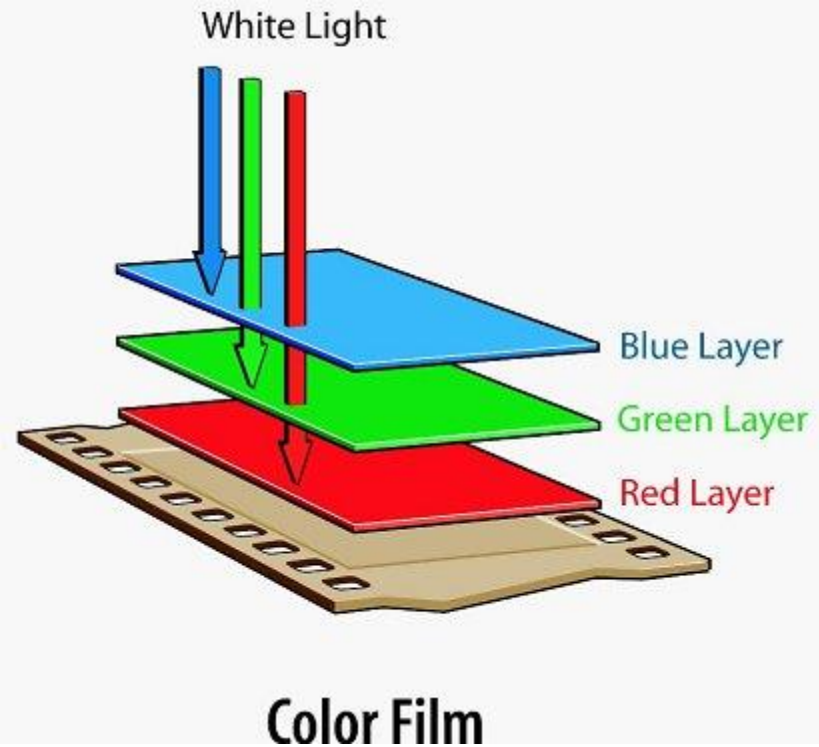
What is Image

- An image is a picture that has been created by combination of *vectors* or *values*.
- An image can be described in terms of *vector graphics* or *raster graphics*.
- An image stored in raster form is sometimes called a **bitmap.**

What is Image

Color image is combination of three channel

- Red Channel
- Green Channel
- Blue Channel



04 – Display images & Depths

05 – Values or Pixels

Pixels

For an Image we have pixel

- Pixels are also called values
  - Range from **0 – $(2^n$ - 1)**

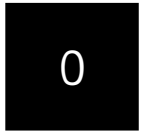
Eg: for 8 bit image : n = 8

range of pixel values is **0 – 255**

PIXELS

- Lower the value *darker* the color

Eg: black color for gray scale image



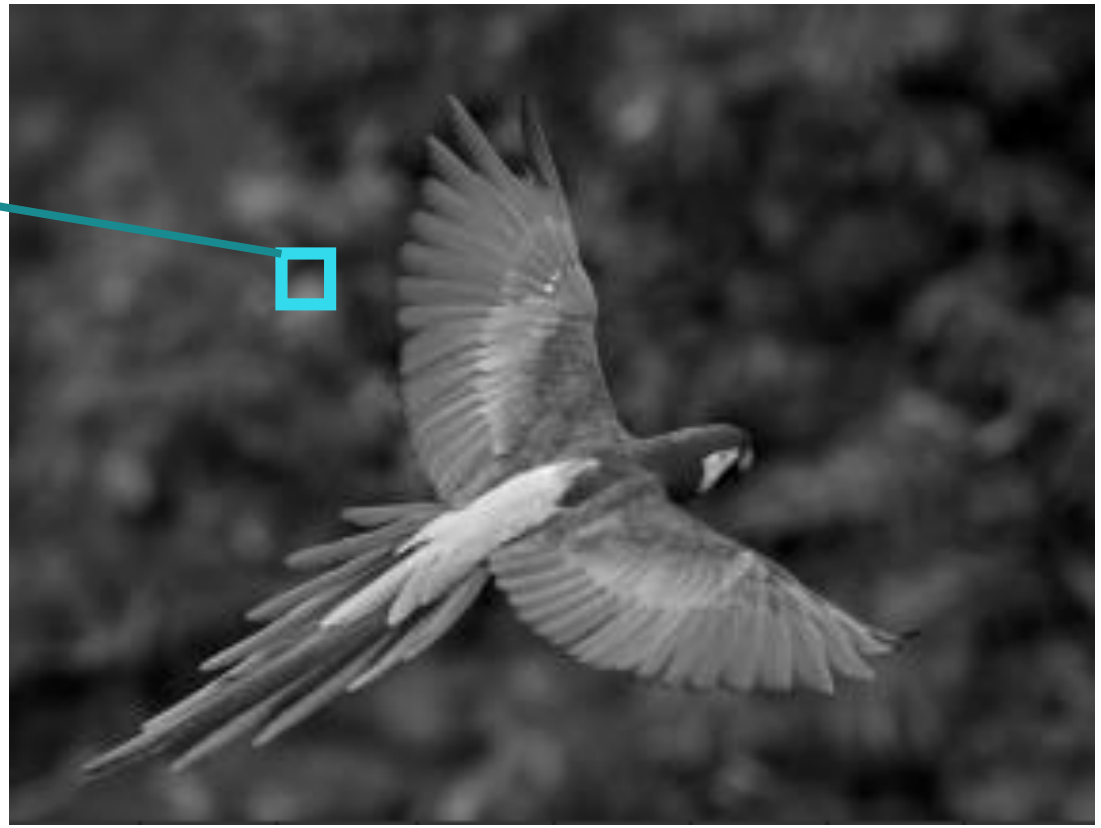
- Higher the value *lighter* the color

Eg: White color for gray scale image

Array in graphical representation

- Image is matrix and representation in graphical manner

0	230	142	53	235
10	20	240	255	0
210	70	255	100	120



06 – Resize

Resize

- Shrink
  - cv2.INTERAREA
- Enlarge
  - cv2.INTERCUBIC
  - cv2.INTERLINEAR

07 – Object Detection using Haar Cascade

Face Detection

08 – Videos

Face Detection