

# **OpenCV** with Python

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### Required software packages

- Python 2.7 or 3.5
  - https://www.python.org/downloads/
  - Frequently used Libraries: Numpy, Matplotlib, Scipy
  - http://www.scipy.org/.
- OpenCV 3. X
  - http://opencv.org/downloads.html
- Scikit-learn 0.20.3
  - https://pypi.org/project/scikit-learn/
- Anaconda (Python + popular libraries)
  - https://www.anaconda.com/
- In this course: Jupyter notebook that requires no setup
  - https://colab.research.google.com/

### History and features of Python

- founded in the year 1991 by developer Guido Van Rossum
- Python 2.0 introduced in the year 2000
- Python 3.0 introduced in the year 2008
- Features:
  - Interactive
  - Interpreter
  - Modular
  - Dynamic
  - Object-oriented
  - Portable
  - High level
  - Extensible in C++ and C

### Intro to OpenCV

- OpenCV is an image processing library created by Intel and later supported by Willow Garage and now mained by Itseez.
- Available on Mac, Windows, Linux.
- Works in C, C++, and Python.
- Open Source and free
- Easy to use and install

### Image vs Matrix

- Digital images are typically stored in a matrix.
- There are many different file formats (IplImage & Matin C/C++)



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62	79	23	119	120	105	4	0	
10	10	9	62	12	78	34	0	
10	58	197	46	46	0	0	48	
176	135	5	188	191	68	0	49	
2	1	1	29	26	37	0	77	
0	89	144	147	187	102	62	208	

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### What is Numpy

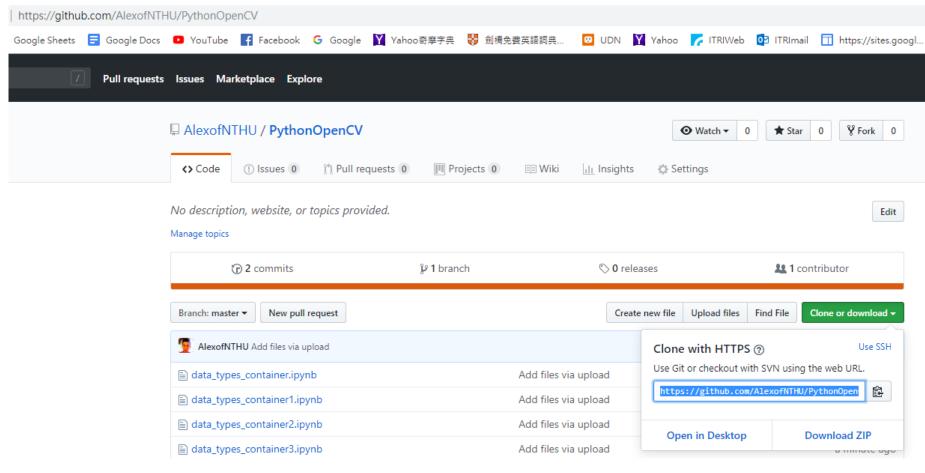
- Numpy is highly optimized library for numerical operations.
- Array structure is important because digital images are 2D array of pixels
- All the OpenCV array structures are converted to-andfrom Numpy arrays.
- You can use more convenient indexing system rather than using for loops

# 1st example: Hello World

```
import cv2 as cv
from google. colab import files
from google. colab. patches import cv2_imshow
print('Hello World')
uploaded = files.upload()
imgl_rgb = cv. imread('Lenna. jpg')
cv2_imshow(img1_rgb)
```

## Download the rest jupyter notebook files

#### https://github.com/AlexofNTHU/PythonOpenCV





• Python for Everybody https://www.coursera.org/specializations/python

• Learn Computer Vision with OpenCV Library using Python

https://www.udemy.com/pythoncv/

