**Guide to Opencv**

Tools: Python, Numpy, OpenCV

**Python**:

* High level language general-purpose programming language

**Numpy**:

* is a library in Python
* supports for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays

**OpenCV**:

* huge open-source library for computer vision, machine learning, and image processing.
* supports Python, C++, Java, and other programming languages
* purpose:
  + process images and videos
  + identify objects, faces, characters, handwritings

**Pip**: means Preferred Installer Program or Pip Installs Packages

Steps:

1. Install Python

\*install pip

1. Install numpy

-pip install numpy

1. Install OpenCV

-pip install opencv-python

**Codes in Python opencv**:

cv2.waitKey(0) – waits for a key press to close the window; 0 specifies indefinite loop

cv2.destroyAllWindows() – destroys all opened windows

cv2.imread(path, flag) – loads an image from the file (include the path); the file may be placed in the same folder of the code

Example: myImage = cv2.imread(‘myImage.jpg’)

flag – how the file is to be displayed; there are 3 choices and the default is c***v2.IMREAD\_COLOR or value=1***

**return value: displays the image based on the attribute/flag set**

3 Flags in opening an Image

1. ***cv2.IMREAD\_COLOR:* value= 1**
   * loads a color image
   * Neglects/disregard transparency of image
2. ***cv2.IMREAD\_GRAYSCALE:* value = 0**
   * loads a gray scale image
3. ***cv2.IMREAD\_UNCHANGED*:** value = -1
   * loads an image with alpha channel
   * load an image as such including alpha channel

Converting an image to black and white: simple binary thresholding operation

1. convert image to grayscale
2. define a threshold value
   * if the pixel value is less than the threshold, it will be set to 0 or black; otherwise the pixel value is set to white (255)

Example:

**grayImage = cv2.cvtColor(originalImage, cv2.COLOR\_BGR2GRAY)**

**(thresh, blackAndWhiteImage) = cv2.threshold(grayImage, 127, 255,** cv2.THRESH\_BINARY)

Note: OpenCV uses BGR not RGB. BGR was used in camera manufacturers and software providers.

Activities:

Activity1: Open Image and display its properties (place the image within the same directory or specify the path in your code)

* Open image
* Display the image using the different flags
* Convert image to grayscale
* Get the image value of a pixel
* Convert the image to black and white

Activity 2: Use any image.

* Get the size of the image
* Get the value of a pixel in the image (R,G,B)
* Show the 4 different edges of an image (using different parameters/method). It could also be a method with 2 different attributes (threshold))
* Show the RGB colors of the same image separately (separate Green, Blue and Red images of the same image)

imread()

imshow()

References:

[How to Install PIP For Python on Windows | phoenixNAP KB](https://phoenixnap.com/kb/install-pip-windows)

[How to Install NumPy {Windows, Linux and MacOS} (phoenixnap.com)](https://phoenixnap.com/kb/install-numpy)

[Reading an image in OpenCV using Python - GeeksforGeeks](https://www.geeksforgeeks.org/reading-image-opencv-using-python/)