Foundation of Computer Vision
Programming Assignment 1

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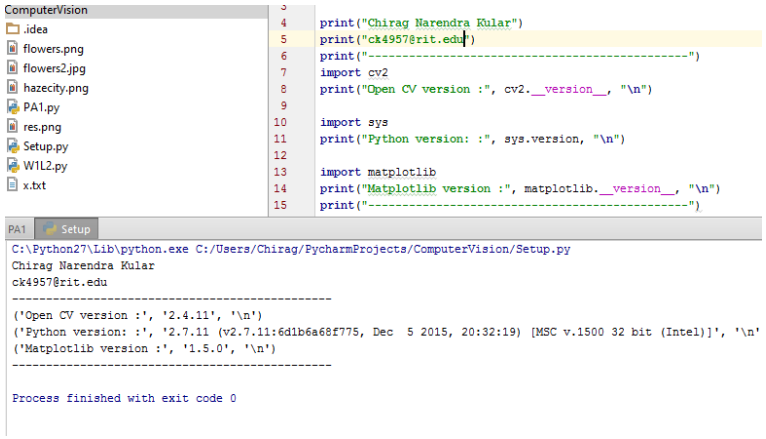
1. Open CV- Python Setup

For assignments, i have setup'd Open CV Python environment and installed OpenCV, Numpy and Matplotlib version as per requirement of the course.



2. Image Operations

For different image operations, I have created corresponding functions and calling them by asking an option number from the user.

2.1 Read, Display and Write to another Format

For reading a input image,
Function : cv2.imread()
1st Parameter : Name of the image(String)
Note : Image has to be placed in the same working directory.
For displaying the image,
Function : cv2.imshow()
1st Parameter : Window name(string)
2nd Parameter :Input image
For converting image to another format,
Function: cv2.imwrite().

Figura 1: Left Image in PNG and Right Image in JPG

1st Parameter: Input image name appended with desired format name. This will save the image in the target format in the same working directory.
2nd parameter: Input image

2.2 Display Gray-scale of the input image

Using cv2.imread() function, the second parameter can be given as zero or CV2.IMREAD_GRAYSCALE for converting image to the gray scale.

Figura 2: Input image is converted to Gray Scale image

2.3 Red, Blue and Green Channel of Image

The image is an array of Red, Green and Blue channels.We can access these individual channels by changing the third column of the image array. By using subplot, I have plotted the Red, Green and Blue channels of the input image by passing the values as 2,1, and 0 respectively.

2.4 Convert Gray scale image to binary

To convert image to binary image we will use cv2.threshold() function. The first parameter is input image which is read in gray scale mode using imread, second parameter is aribtrary threshold value which i have selected as 100 which helps in classifying the pixel values. Third parameter is 255 which is maximum

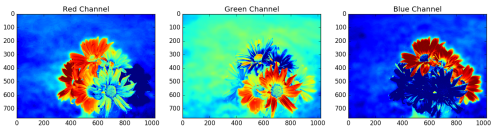


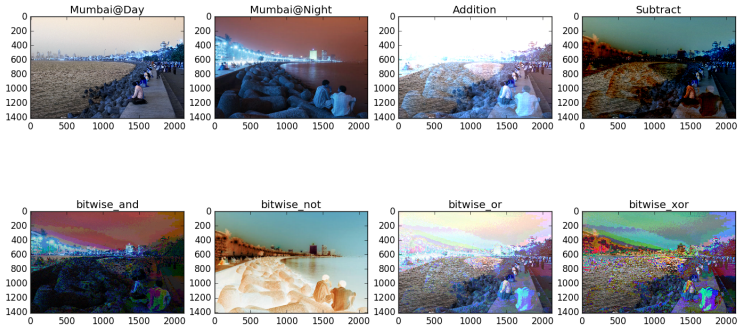
Figura 3: RGB Channels

pixel value of the input image. Fourth parameter specifies the type of threshold we want for our image. In this case, it will be cv2.THRESH_BINARY

Figura 4: Gray scale image is converted to Binary image

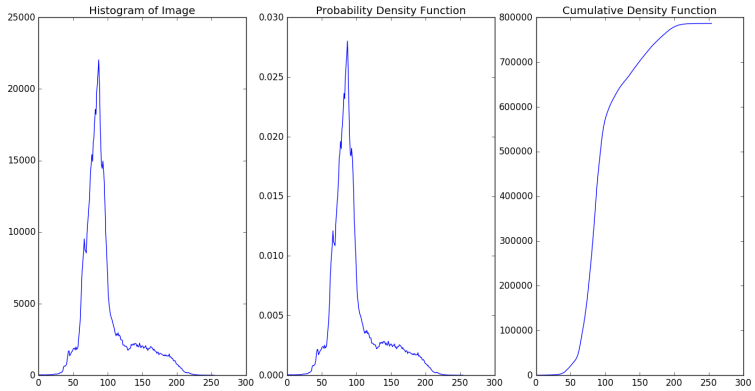
2.5 Arithmetic Operations

Performing arithmetic operations like addition, subtraction, bitwise AND,OR,NOT & XOR on two input image of Mumbai@day and Mubai@night and obtained the following results :



3. Histogram of Image

Generated the histogram of a image by implementing the following steps :
1.Read the image and get it's height & width
2.Initialize bins with all zeros
3.Traverse the image and when bins is equal to the pixel value, increment the bin's index value by one. Also, the PDF and CDF is calculated using their formula's and subplot all of them.



3.1 Histogram Equalization

I had tried but was not able to implemented the Histogram equalization function of my own. Histogram equalisation is done by using in built function of cv2.equalizeHist().It actually makes the image clearer by stretching the intensity over the image.