Histogram and Histogram Equalization of an image

Aim

To obtain a histogram for finding the frequency of pixels in an Image with pixel values ranging from 0 to 255. Also write the code using OpenCV to perform histogram equalization.

Software Required:

Anaconda - Python 3.7

Algorithm:

Step1:

Read the gray and color image using imread()

Step2:

Print the image using imshow().

Step3:

Use calcHist() function to mark the image in graph frequency for gray and color image.

Step4:

cv2.equalize() is used to transform the gray image to equalized form.

Step5:

The Histogram of gray scale image and color image is shown.

Program:

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a) Write your code to find the histogram of gray scale image and color image channels.

```
import cv2
import matplotlib.pyplot as plt

# Gray Scale Image
im = cv2.imread("mikasa_c.png",0)
cv2.imshow("Mikasa",im)

hist = cv2.calcHist([im],[0],None,[256],[0,255])

# Colour Image
im_c = cv2.imread("mikasa_c.png",1)
cv2.imshow("Mikasa",im_c)

hist_c = cv2.calcHist([im_c],[1],None,[256],[0,255])
```

b) Display the histogram of gray scale image and any one channel histogram from color image

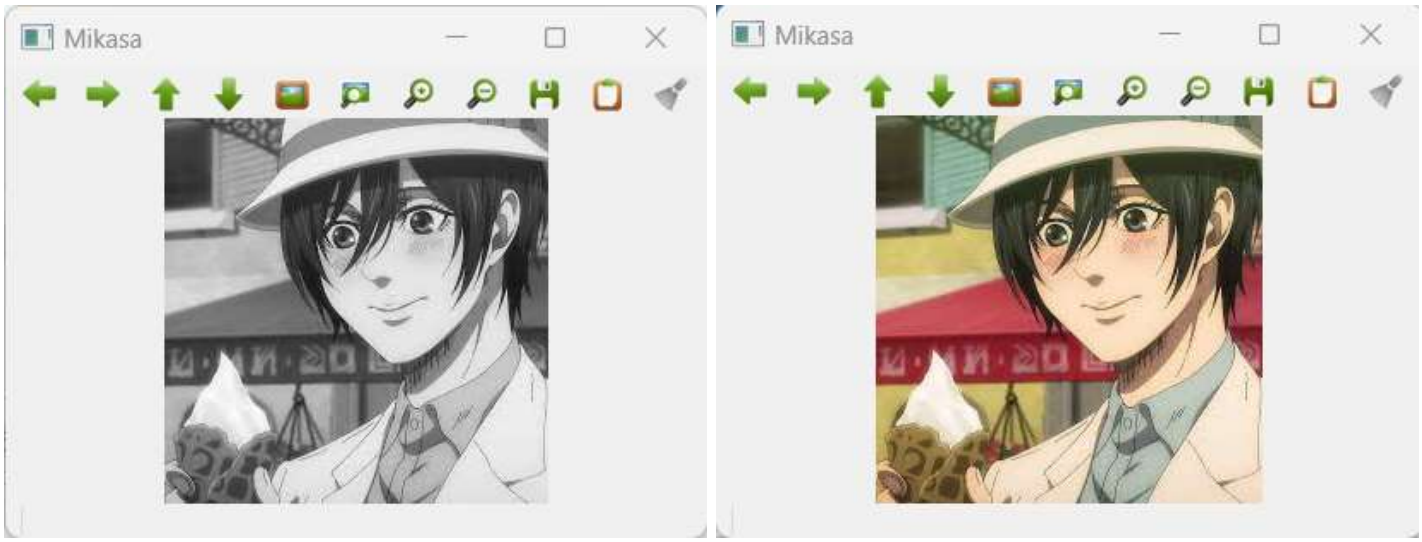
```
plt.figure()
plt.title("Histogram of B/W Image")
plt.xlabel("GrayScale Values")
plt.ylabel("Pixel Count")
plt.stem(hist)
plt.show()

plt.figure()
plt.title("Histogram of B/W Image")
plt.xlabel("GrayScale Values")
plt.ylabel("Pixel Count")
plt.stem(hist_c)
plt.show()
```

c) Write the code to perform histogram equalization of the image.

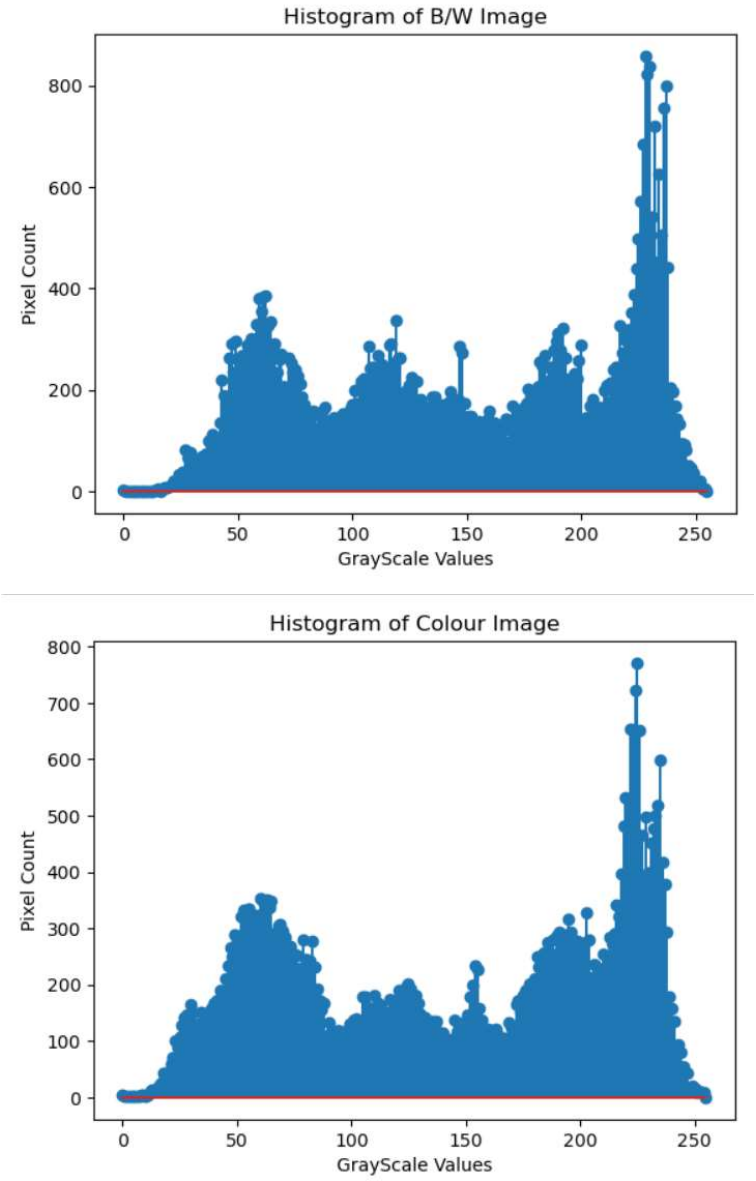
```
equ = cv2.equalizeHist(im)
cv2.imshow("Mikasa",equ)
hist1 = cv2.calcHist([equ],[0],None,[256],[0,255])
plt.figure()
plt.title("Histogram of B/W Image")
plt.xlabel("GrayScale Values")
plt.ylabel("Pixel Count")
plt.stem(hist1)
plt.show()
```

Output:

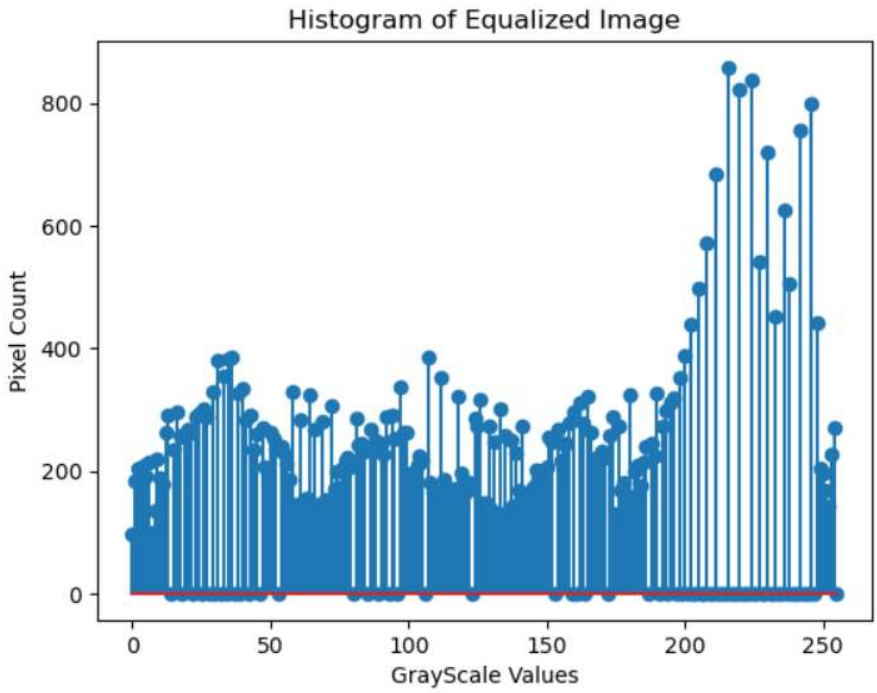
Input Grayscale Image and Color Image



Histogram of Grayscale Image and any channel of Color Image



Histogram Equalization of Grayscale Image



Result:

Thus the histogram for finding the frequency of pixels in an image with pixel values ranging from 0 to 255 is obtained. Also,histogram equalization is done for the gray scale image using OpenCV.