

COMPUTER VISION

Assignment 2

1) Image equalisation

Submitted By:
Felix George
B160423EC

ii) HISTOGRAM

A histogram is an accurate representation of the distribution of numerical data. It is an estimate of the probability distribution of a continuous variable. It differs from a bar graph, in the sense that a bar graph relates two variables, but a histogram relates only one. Histograms provide a visual interpretation of numerical data by indicating the number of data points that lie within a range of values. These ranges of values are called classes or bins. The frequency of the data that falls in each class is depicted by the use of a bar. The higher that the bar is, the greater the frequency of data values in that bin.

1) Histogram and probability distributions

Discrete probability distributions can be represented with histograms. The heights of the bars of the histogram are the probabilities for each of the outcomes. With a histogram constructed in such a way, the areas of the bars are also probabilities. Since this sort of histogram gives us probabilities, it is subject to a couple of conditions. One stipulation is that only nonnegative numbers can be used for the scale that gives us the height of a given bar of the histogram. A second condition is that since the probability is equal to the area, all of the areas of the bars must add up to a total of one, equivalent to 100%.

2) Histogram in photography

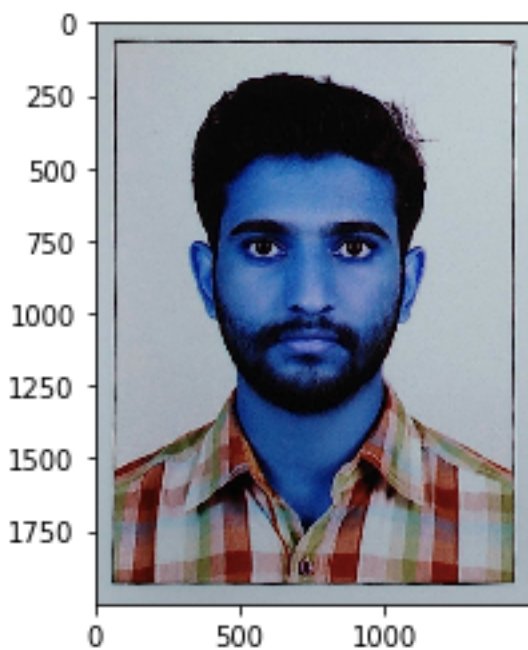
Histograms can be found in almost any modern image editing software. It is there in most current digital cameras, including some compacts, can display histograms as well, some even live as we shoot using our LCD screen. Histograms usually display information for three primary colors – red, green and blue – and are known as RGB histograms.

Underexposed image will have a histogram that will have a plotting shifted to left side and the same will be shifted to right side for an overexposed image. which can be interpreted as more light in the picture is represented by values nearer to 255 in an overexposed image and more dark regions of an underexposed image is represented by values closer to 0.

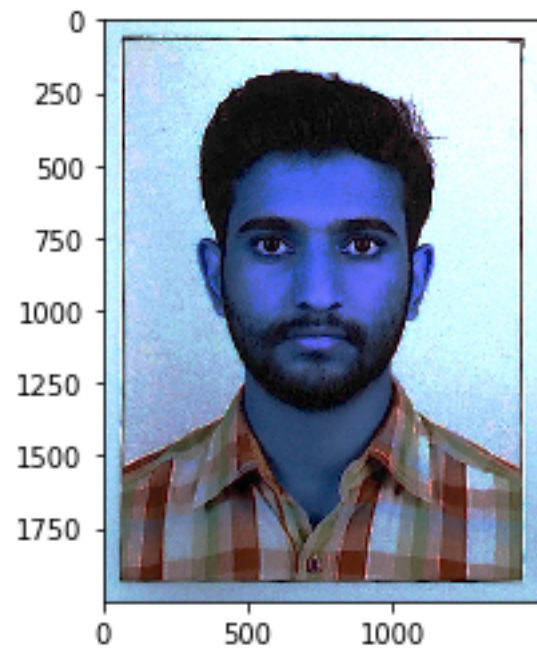
CONCLUSION

Flatter histograms enhances image quality, which can be true in most cases but sometimes it destroys beauty of image. It brings out details in the image.

Original image



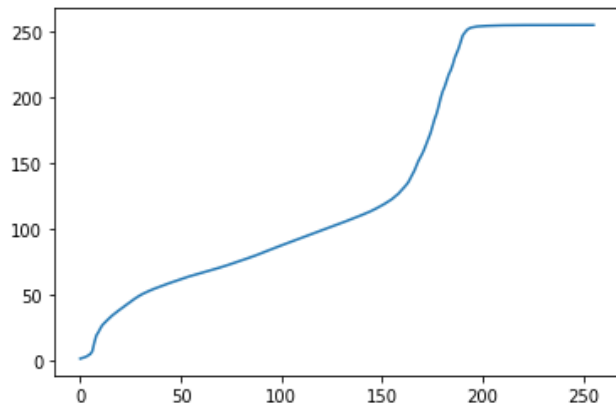
Equalised image



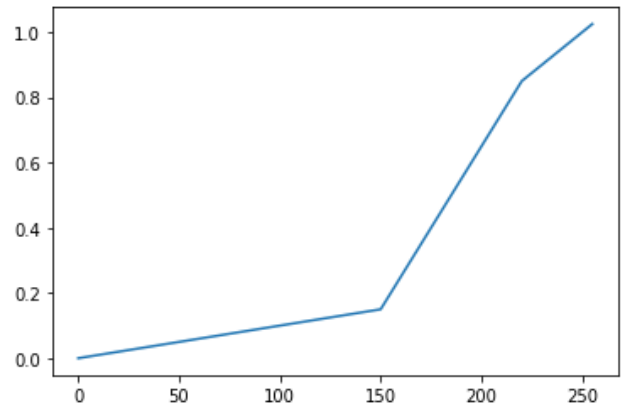
CDF of image

```
cdf_a=[i*255 for i in cdf_a]
cdf_b=[i*255 for i in cdf_b]
cdf_c=[i*255 for i in cdf_c]
plt.plot(cdf_a)
```

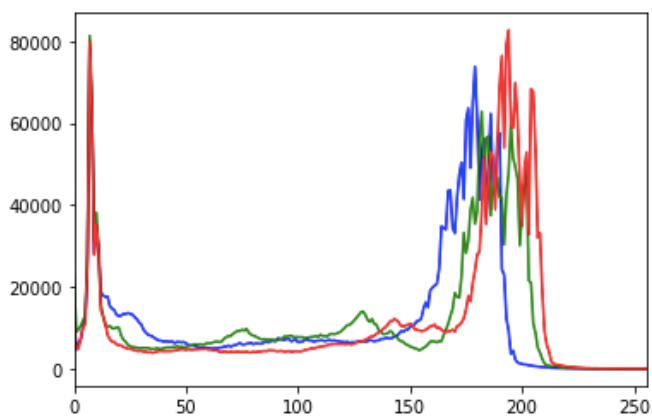
```
[<matplotlib.lines.Line2D at 0x10c14e898>]
```



Approximated CDF of image



Original Histogram



Equalised Histogram

```
In [30]: t=[i for i in range(256)]
plt.plot(t,a,'b',t,b,'g',t,c,'r')
plt.plot(b)
plt.show()
```

