Computer Vision 2018Fall
HW03
電信所碩一 謝硯澤 R07942115

使用環境說明：

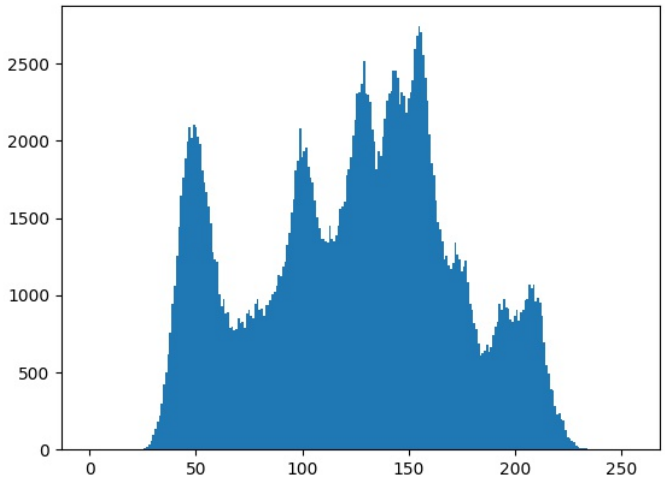
```
#macOS Majave 10.14
#Python 3.7.0
#openCV 3.4.2
#matplotlib 3.0.0
```

(a)write a program to do histogram equalization

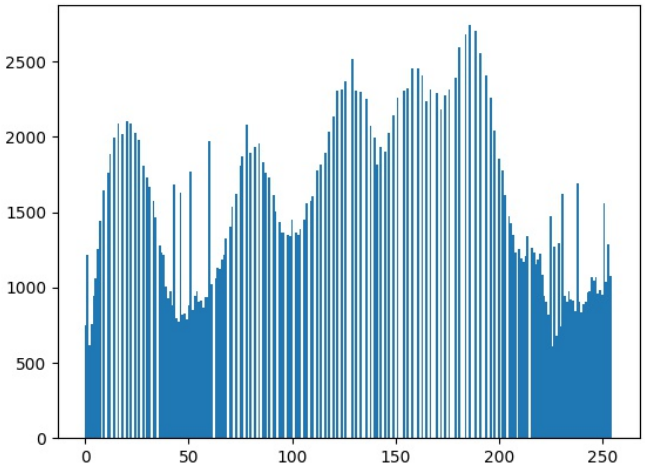
```
#principal code
hist_img = histogram(img)
for i in range(len(hist_img)):
        sum += hist_img[i]/size
        hist_img[i] = int(255 * sum)

for row in range(img.shape[0]):
        for col in range(img.shape[1]):
                img[row][col] = hist_img[img[row][col]]
```

Original Image

Image after histogram equalization



Histogram of original image



Histogram of image after histogram equalization

說明：

1.先從作業2的histogram function得到lena.bmp的統計資訊=hist_img

2.並根據histgram equalization的公式去計算出每個灰階度所對應到的新灰階度值。

- histogram equalization histogram linearization

$$s_k = 255 \sum_{j=0}^{k} \frac{n_j}{n}$$

- $k = 0, 1, ..., 255$, n_j: number of pixels with intensity *j*
- *n*: total number of pixels
- for every pixel if $I(im, i, j) = k$ then $I(imhe, i, j) = s_k$

3.輸出經過histgram equalization運算後的照片，可以發現新的照片明顯看比較亮，對比度也比較高。在histogram上，灰階度的分布也較為平均。