

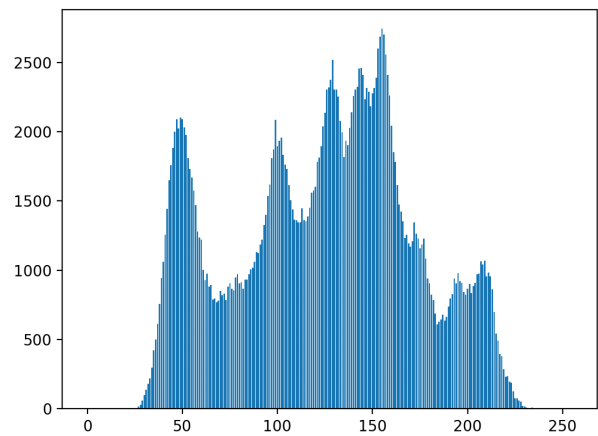
Homework Report for Computer Vision

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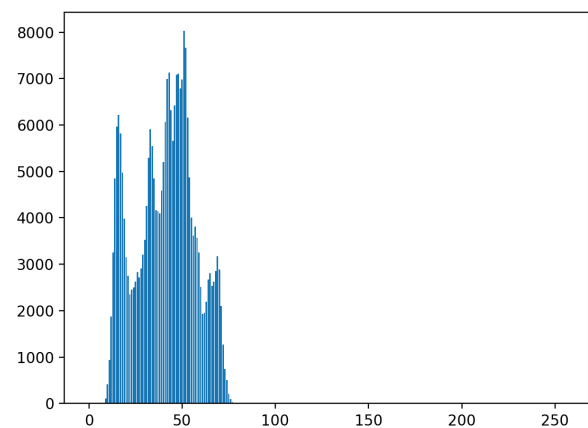
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[You can check this github for more information](#)

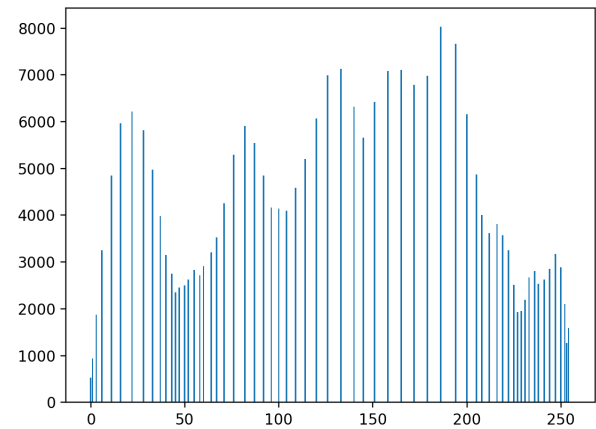
- Original Lena



- Intensity Divided by 3 Lena



- Rescale (Histogram Equalization) Lena



```

histogram_accumulator = np.copy(histogram)
for i in range(1, 256):
    histogram_accumulator[i] += histogram_accumulator[i - 1]

histogram_accumulator = histogram_accumulator * 255 / histogram_accumulator[-1]
img_rescale = np.copy(img)
for i in range(img.shape[0]):
    for j in range(img.shape[1]):
        img_rescale[i][j] = histogram_accumulator[img[i][j]]

```

FIGURE 3.19 Illustration of histogram equalization of a 3-bit (8 intensity levels) image. (a) Original histogram. (b) Transformation function. (c) Equalized histogram.

雖然用CDF的方法在數學上的的確確是可以把任意的 $f(x)$ 分佈 Transition 成一條水平線的樣子，但每個灰階值出現的機率都一樣，所以在實際上最終的結果並不會像理論那樣使得每個灰階值出現的機率都一樣。不過在應用上這樣的結果也算足夠了！

最後再拿 Lena 在做完 Histogram Equalization 的 Histogram Distributed :

Jason Chen

Additional coding details can be located within the **HW3.py** file. This snippet is responsible for calculating the cumulative distribution function (CDF) and reorganizing it in such a way that the resulting CDF approaches a linear progression.