Threshold

Fig. 1 Original

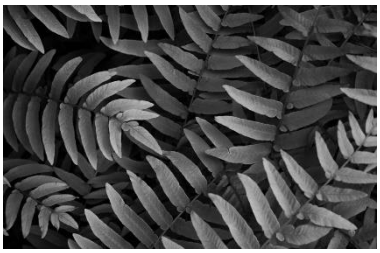

Fig. 2 Gray scale image

Fig. 3 Threshold image

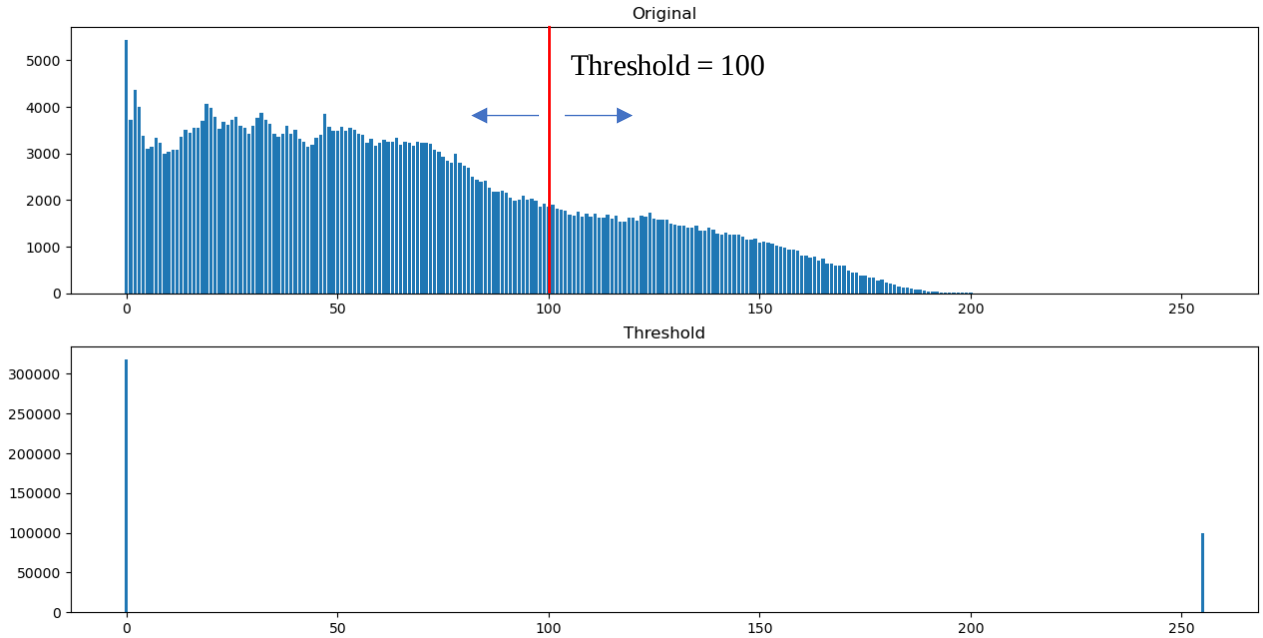

Fig. 4 Compare histogram of original image and threshold image

From Fig. 4, I chose threshold at 100. Histogram of threshold image have only 0 and 255 and threshold image have only white and black colors.

Fig. 5 Original

Fig. 6 Gray scale image

Fig. 7 Threshold image

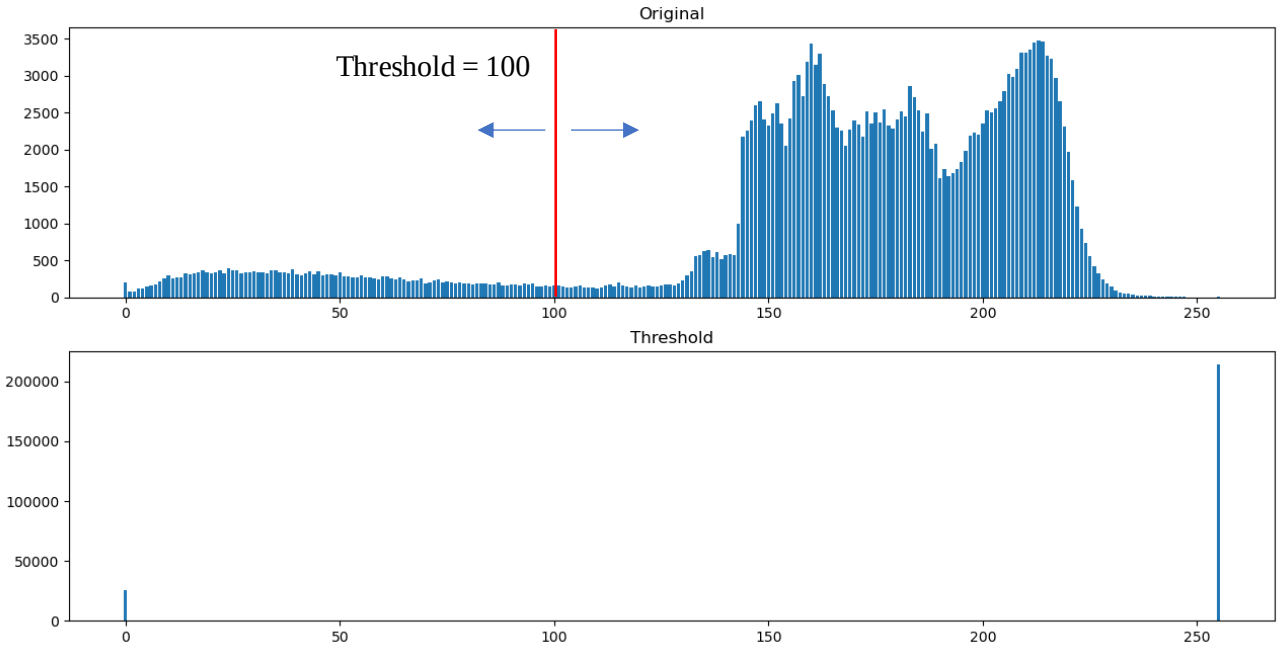

Fig. 8 Compare histogram of original image and threshold image

From Fig. 8, I chose threshold at 100. Histogram of threshold image have only 0 and 255 and threshold image have only white and black colors.

Automatic Contrast Adjustment

Fig. 9 Original

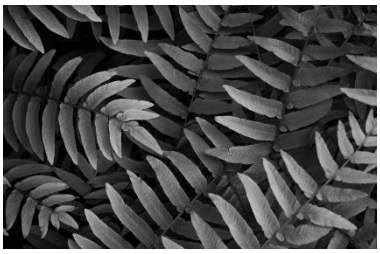

Fig. 10 Gray scale image

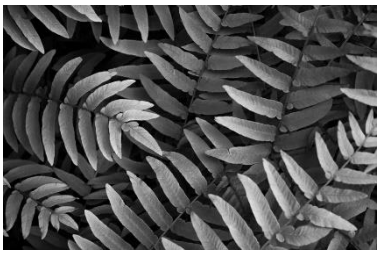

Fig. 11 Auto-contrast image

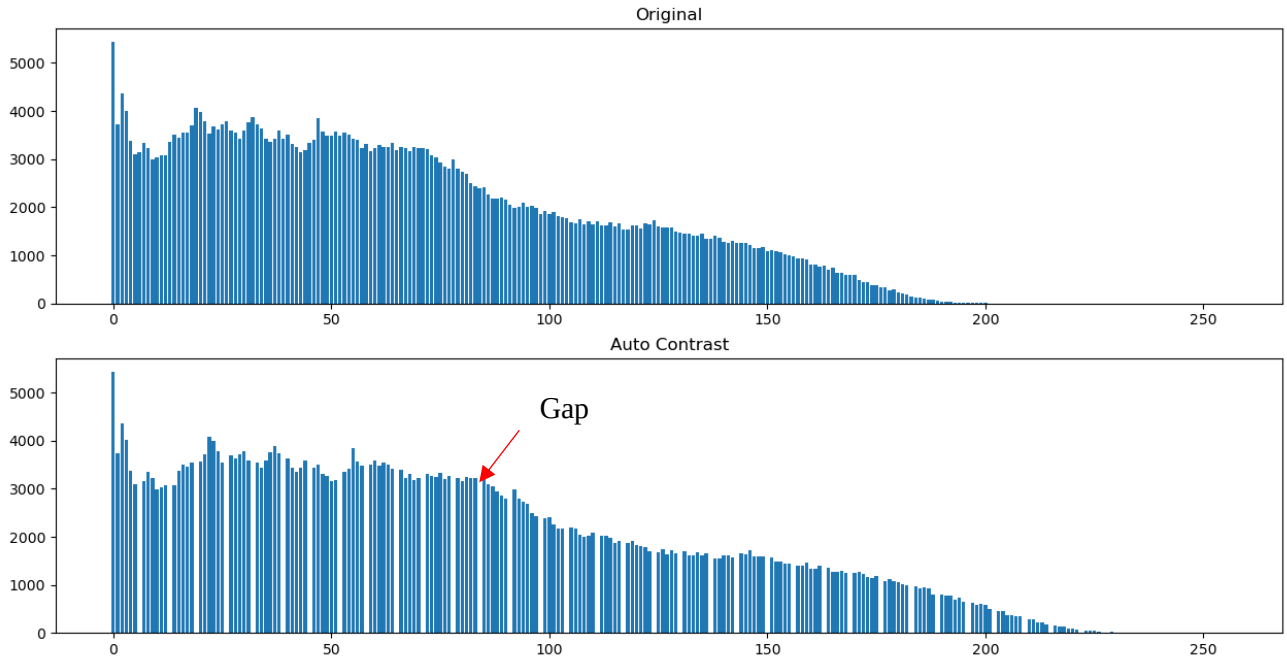

Fig. 12 Compare histogram of original image and auto-contrast image

From Fig. 12, I chose $a_{min} = 0$ and $a_{max} = 255$. Histogram of auto-contrast image have gap and auto-contrast image has high contrast

Fig. 13 Original

Fig. 14 Gray scale image

Fig. 15 Auto-contrast image

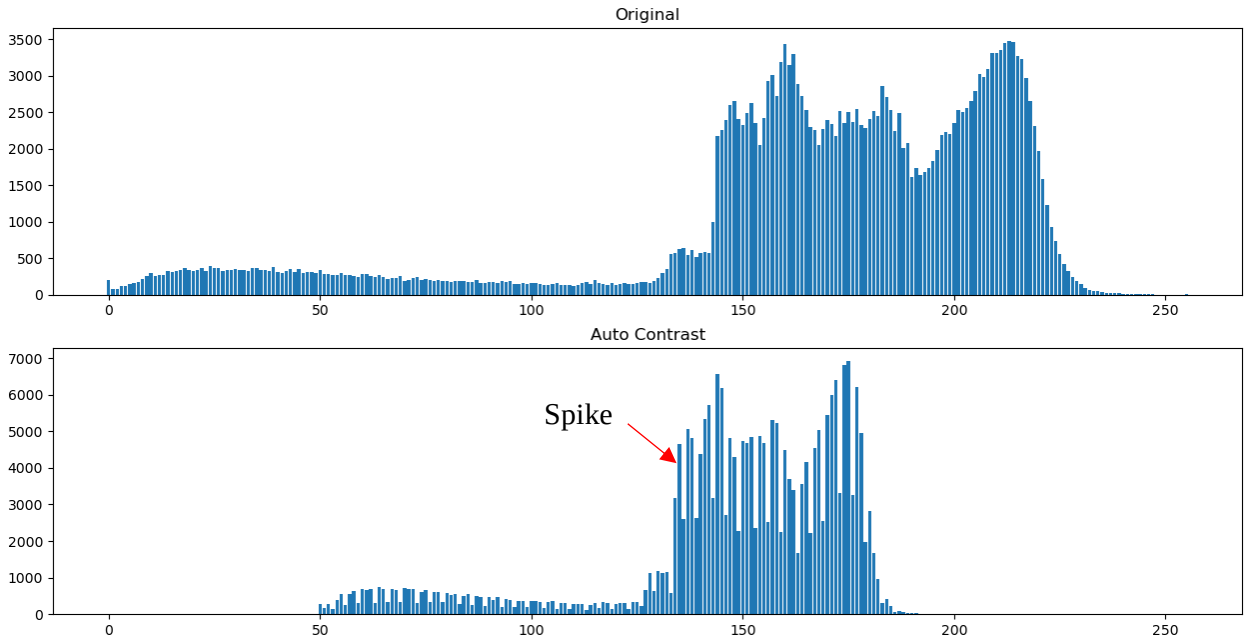

Fig. 16 Compare histogram of original image and auto-contrast image

From Fig. 16, I chose $a_{min} = 50$ and $a_{max} = 200$. Histogram of auto-contrast image have range of intensity between 50 and 200, it has spike and auto-contrast image has low contrast

Modified Auto-Contrast

Fig. 17 Original

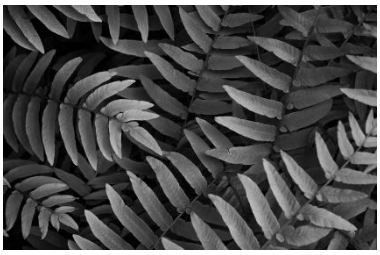

Fig. 18 Gray scale image

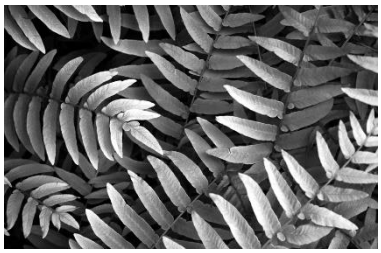

Fig. 19 Modified Auto-Contrast

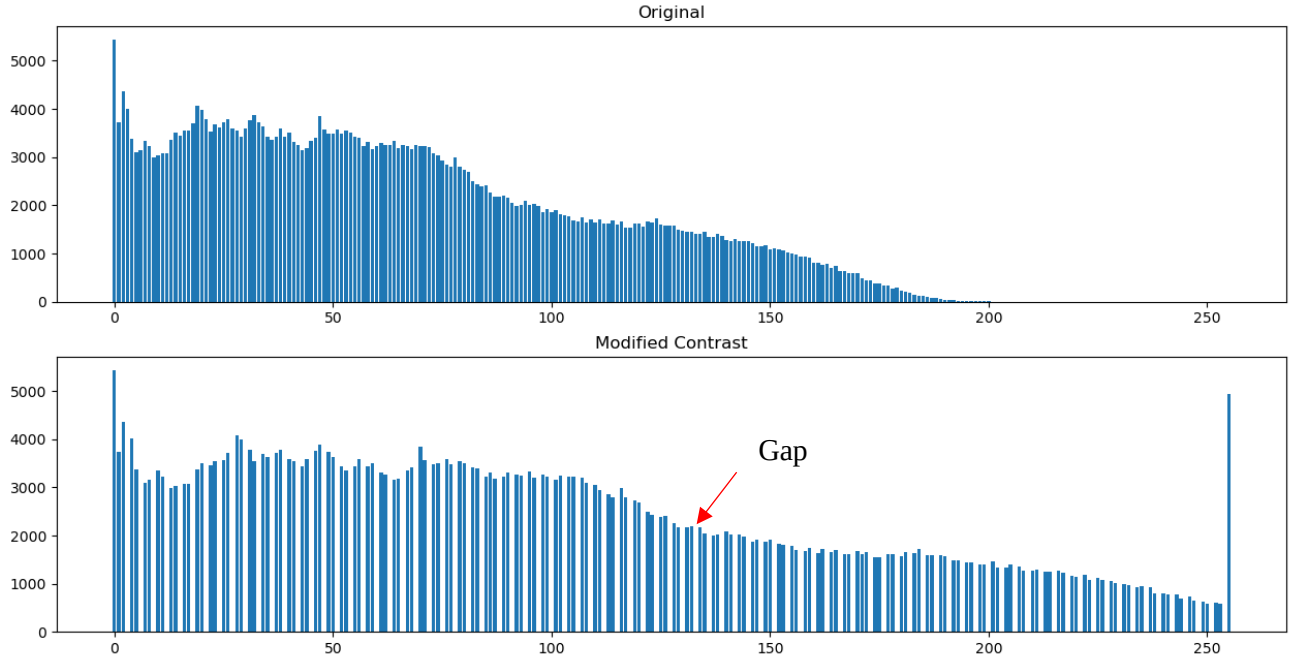

Fig. 20 Compare histogram of original image and modified auto-contrast image

From Fig. 20, I chose $q_{low} = 0.01$, $q_{max} = 0.01$, $a_{min} = 0$ and $a_{max} = 255$. Histogram of modified auto-contrast image have range of intensity between 0 and 255, it has gap and modified auto-contrast image has high contrast

Fig. 21 Original

Fig. 22 Gray scale image

Fig. 23 Modified Auto-Contrast

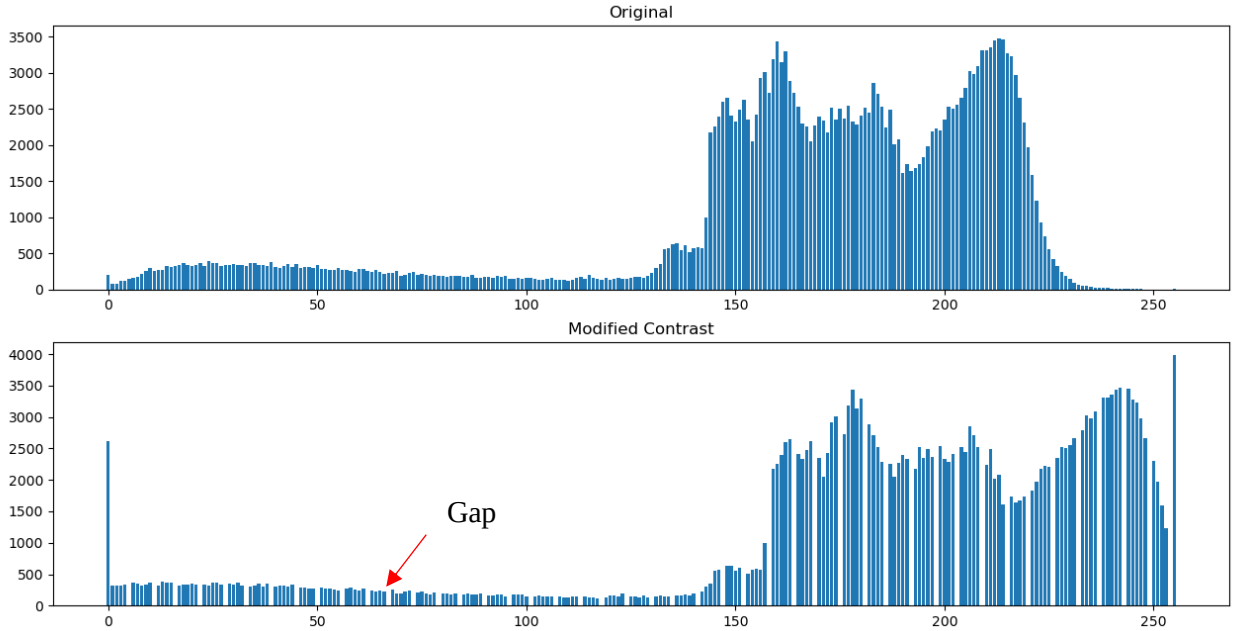

Fig. 24 Compare histogram of original image and modified auto-contrast image

From Fig. 24, I chose $q_{low} = 0.01$, $q_{max} = 0.01$, $a_{min} = 0$ and $a_{max} = 255$. Histogram of modified auto-contrast image have range of intensity between 0 and 255, it has gap and modified auto-contrast image has high contrast

Histogram Equalization

Fig. 25 Original

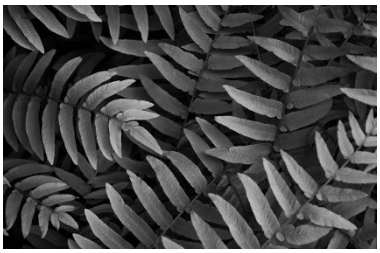

Fig. 26 Gray scale image

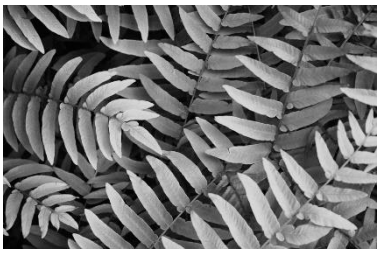

Fig. 27 Histogram Equalization

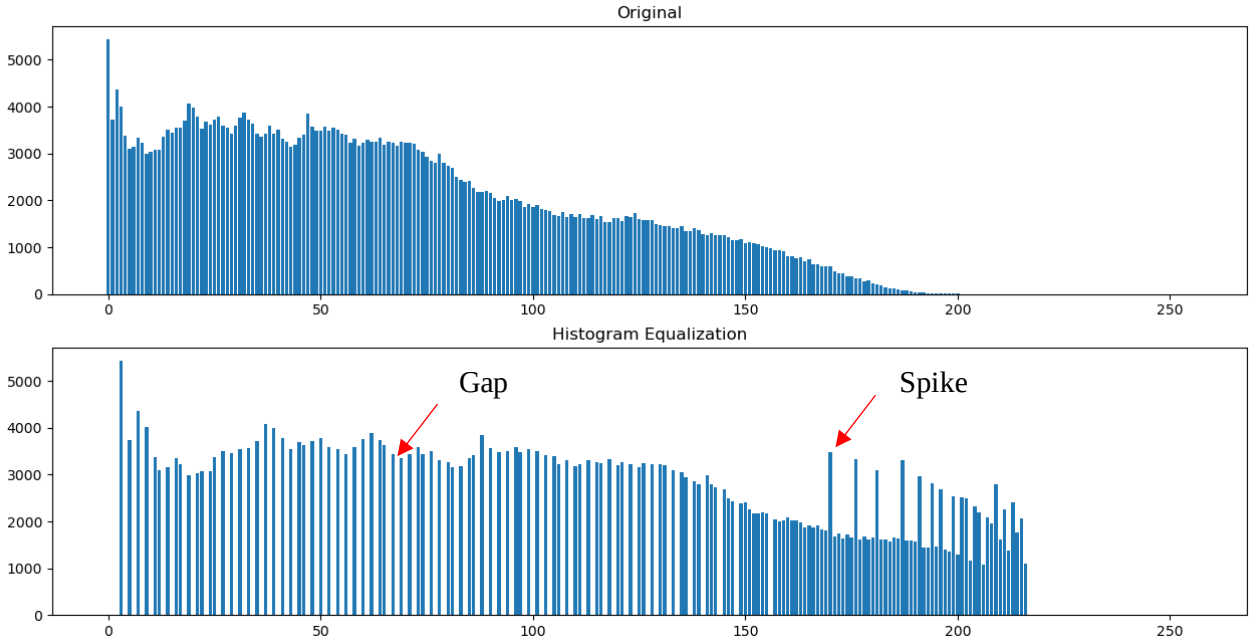

Fig. 28 Compare histogram of original image and histogram equalization image

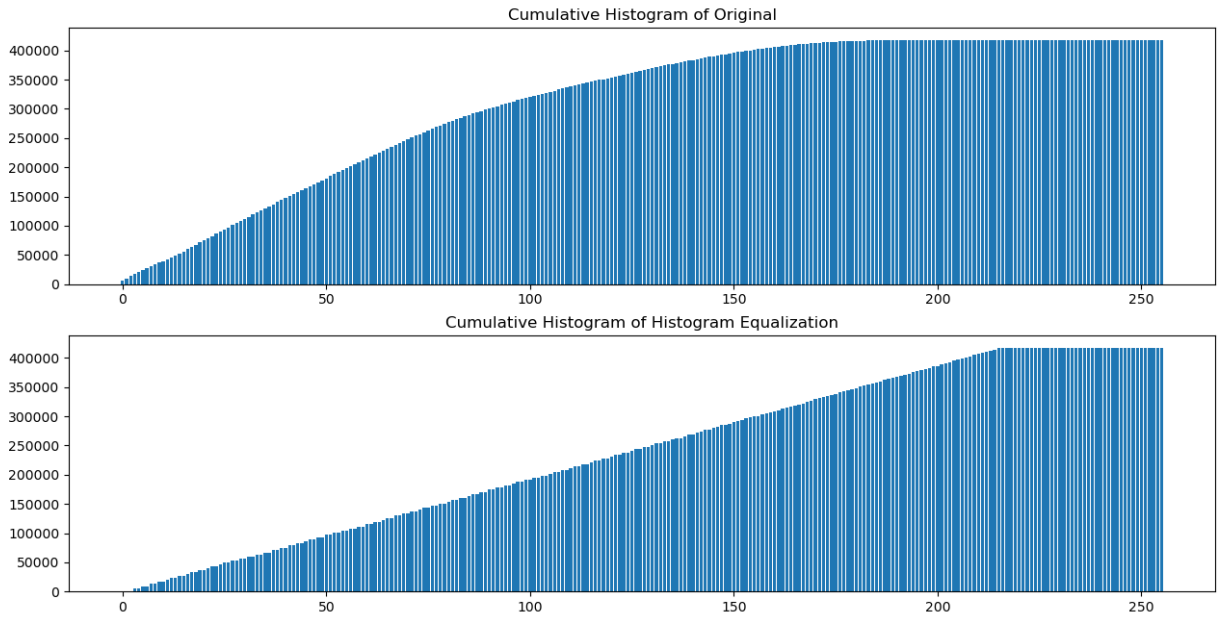

Fig. 29 Compare cumulative histogram of original image and histogram equalization image

From Fig. 28, histogram of histogram equalization image has gap and spike and range of intensity is same range of original. And from Fig. 29, cumulative histogram of histogram equalization image is uniform

Fig. 30 Original

Fig. 31 Gray scale image

Fig. 32 Histogram Equalization

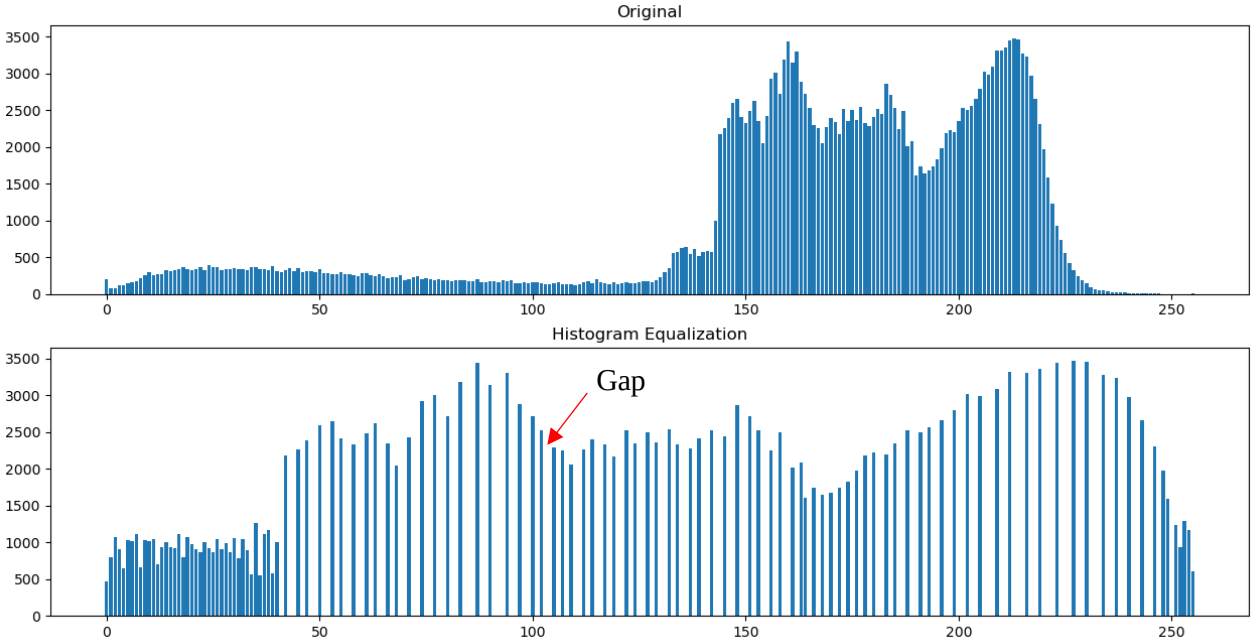

Fig. 33 Compare histogram of original image and histogram equalization image

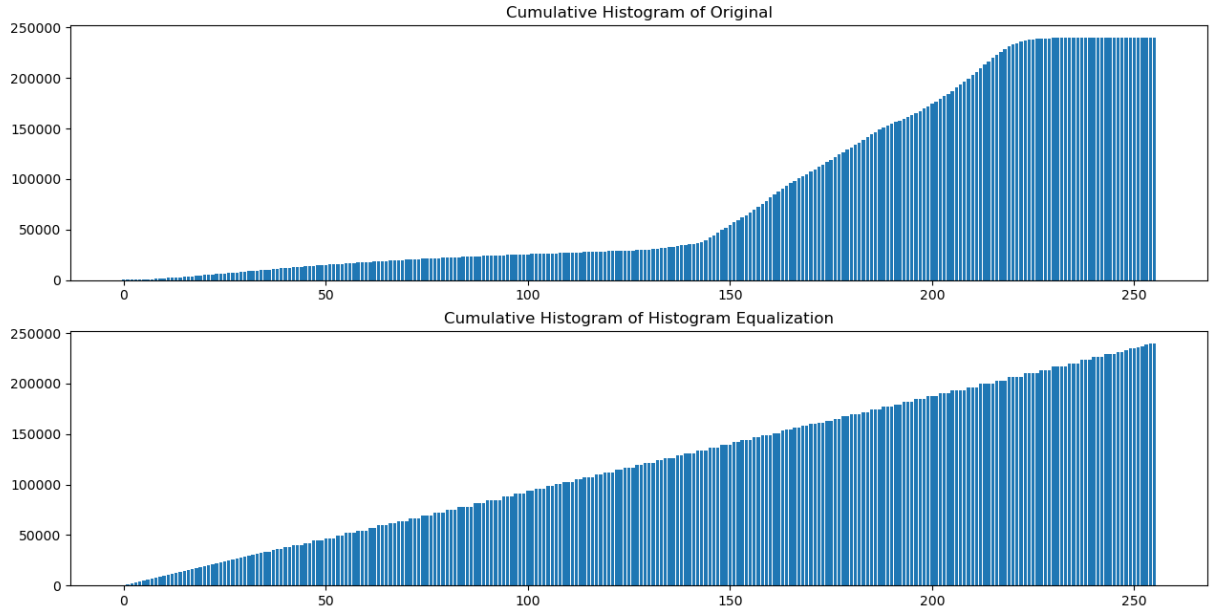

Fig. 34 Compare cumulative histogram of original image and histogram equalization image

From Fig. 33, histogram of histogram equalization image has gap and range of intensity is same range of original. And from Fig. 34, cumulative histogram of histogram equalization image is uniform