

DIP ASSIGNMENT 2

Rahul Boipai, MTech (CSA), 21514

1 Image Display:

The image ECE.png is not displayed as original image in `plt.imshow()`, `cmap= 'gray'` try to cover intensity range only between `[79,166]`, 79 being minimum intensity value and 166 being the maximum intensity value of the image. By explicitly setting it to cover full range `[0,255]`, using `vmin = 0`, `vmax = 255`, true grayscale image is obtained.

average intensity : 194.909

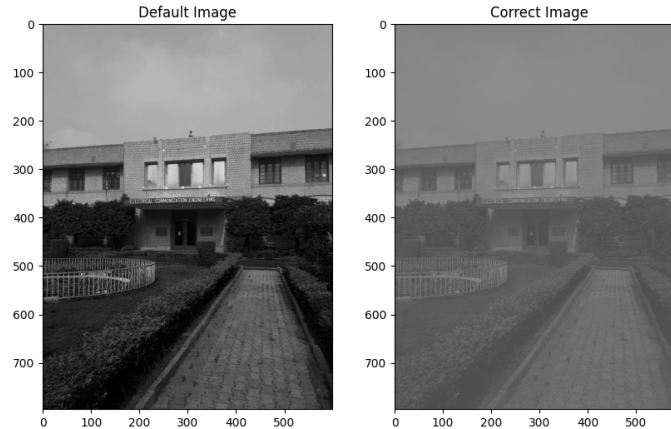


Figure 1: comparison between corrected and default image

2 Contrast Stretching:

After using histogram equalization, best gamma value was obtain by using mean squared error(mse) between histogram equalized image and gamma corrected image. Gamma value that has minimum mse is 3.07. Original image intensity values where concentrated at higher values but after histogram equalization instensity are well spread across all value. In case of gamma corrected image intensity are spread out but mostly toward low value. Hence one can see in figure 6 that histogram equalized image is slightly darker than gamma corrected image.

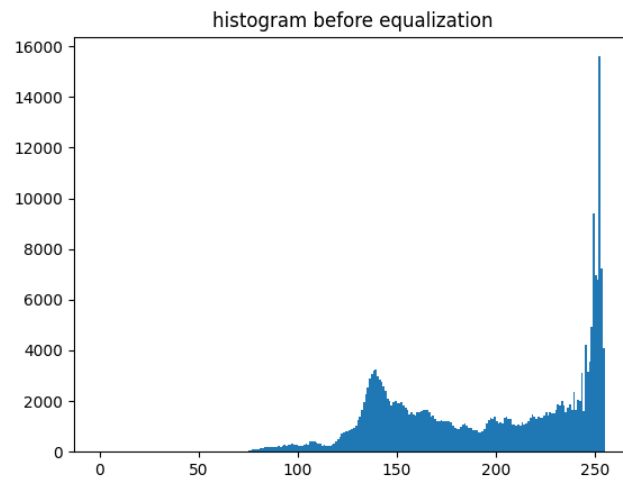


Figure 2: image before histogram equalization

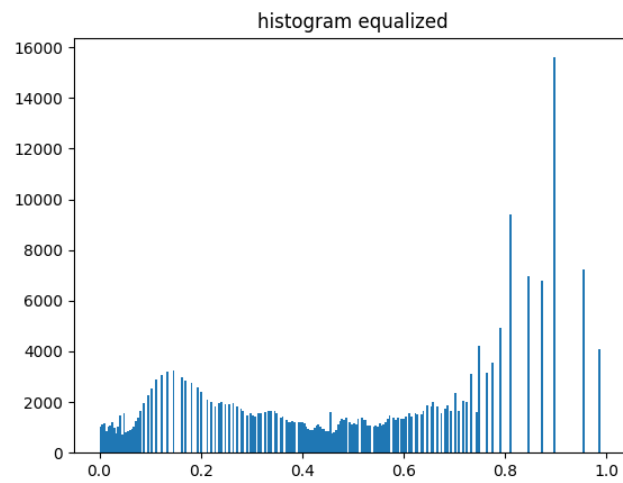


Figure 3: histogram after equalization

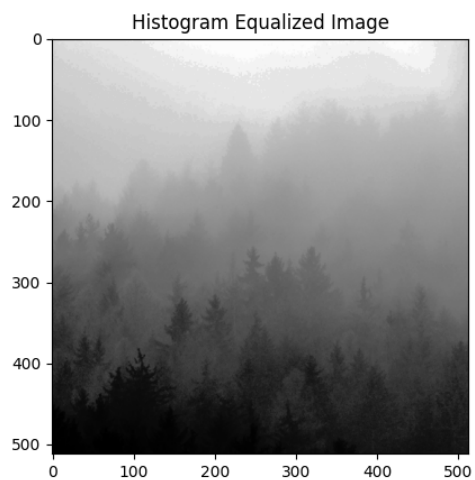


Figure 4: Histogram equalized image

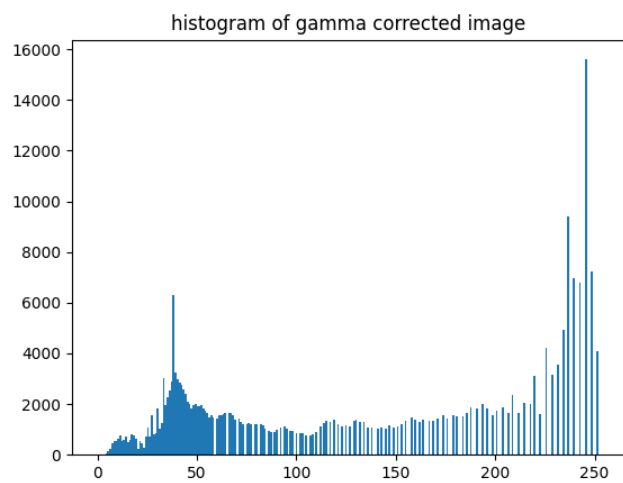


Figure 5: Histogram of gamma corrected image



Figure 6: Comparison of contrast stretch a) original image b) histogram equalized image c) gamma corrected image

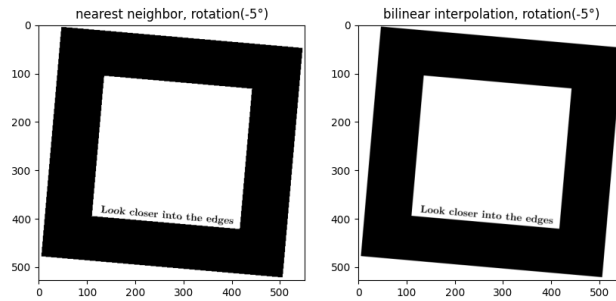


Figure 7: Comparison of image using a) nearest neighbor b) bilinear interpolation with rotation of -5°

3 Image rotation:

After rotating image using both nearest neighbor and bilinear interpolation following figure 7 and 8 was obtained. In both these figures one can carefully observe that nearest neighbor image is not smooth around edges but bilinear interpolation has smoother edges. This confirms that interpolation is better technique to finding middle pixel values that are not integer rather just rounding off values to nearest integer place.

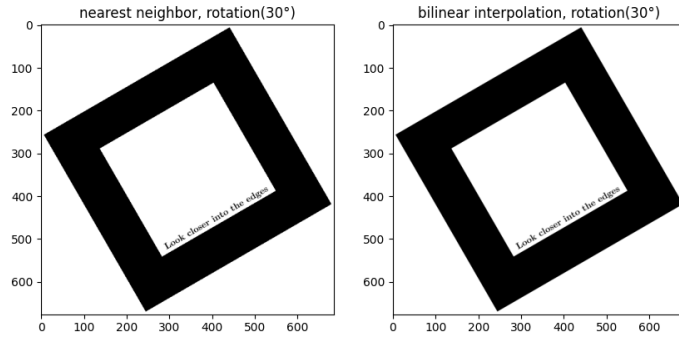


Figure 8: Comparison of image using a) nearest neighbor b) bilinear interpolation with rotation of 30°

4 Spatial Filtering:

Using different filter size caused different level of boosting of image. When small filter of 3×3 was used high boost image formed was not clear but using large filter size of 5×5 the high boost image formed clear sharpened edges.

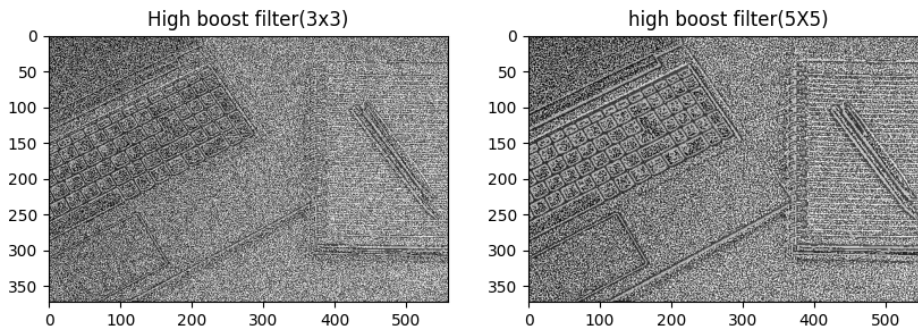


Figure 9: High boost image, sharpening