IMAGE PROCESSING LAB_1
PARMAR Hardiksinh

1. Power law Transforms :

Power Law transformation is an image enhancement technique widely used in digital image processing. It has the functionality of increasing contrast of an image by controlling the value of gamma.

If gamma < 1

The range of dark pixels in the image would be expanded and range of bright pixels would be compressed. It should be used on an image in which the region of your interest lies in the dark region or details are covered by dark regions.

If gamma > 1

The range of dark pixels in the image would be compressed and range of bright pixels would be expanded. It should be used on an image which has a washed-out look or overexposed image. Power law transformation is applied to image () and for increasing gamma values, contrast is enhanced.

Implementing the power low transforms in belows images ('spine.tif') and ('aerial.tif').
(see the file 'pow.m')   After putting the gamma value
Original img = input image
Final imag = output image

original img

final img

original img

final img

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2. Histograms Modification :

There are two methods of enhancing contrast. The first one is called Histogram stretching that increase contrast. The second one is called Histogram equalization that enhance contrast.

Contrast is the difference between maximum and minimum pixel intensity. Histograms stretching is all about increasing the difference between the maximum intensity value in an image and the minimum one. All the rest of the intensity values are spread out between this range.

Implementing the histogram Stretching :   (see the function ' histstretch.m')

For the ('spine.tif') image

Original img = input image('spine.tif')
histogramstretching image = output image
in the below image its also shows the histogram of the image.
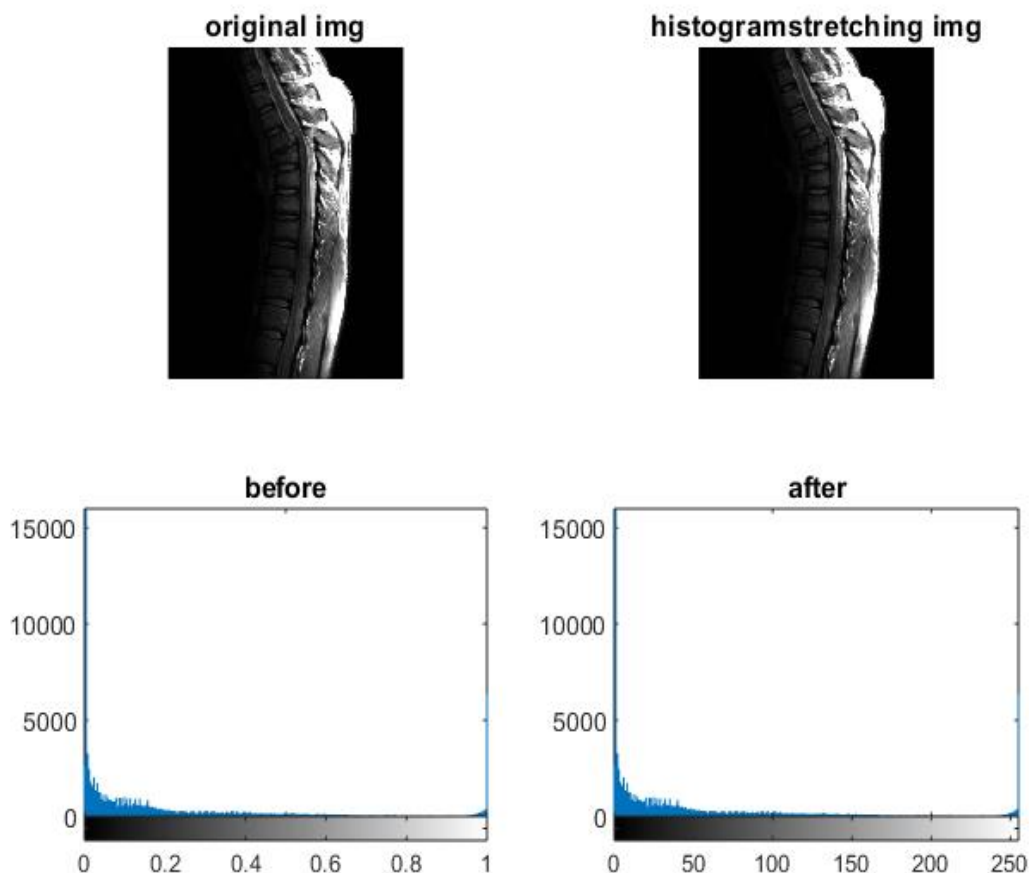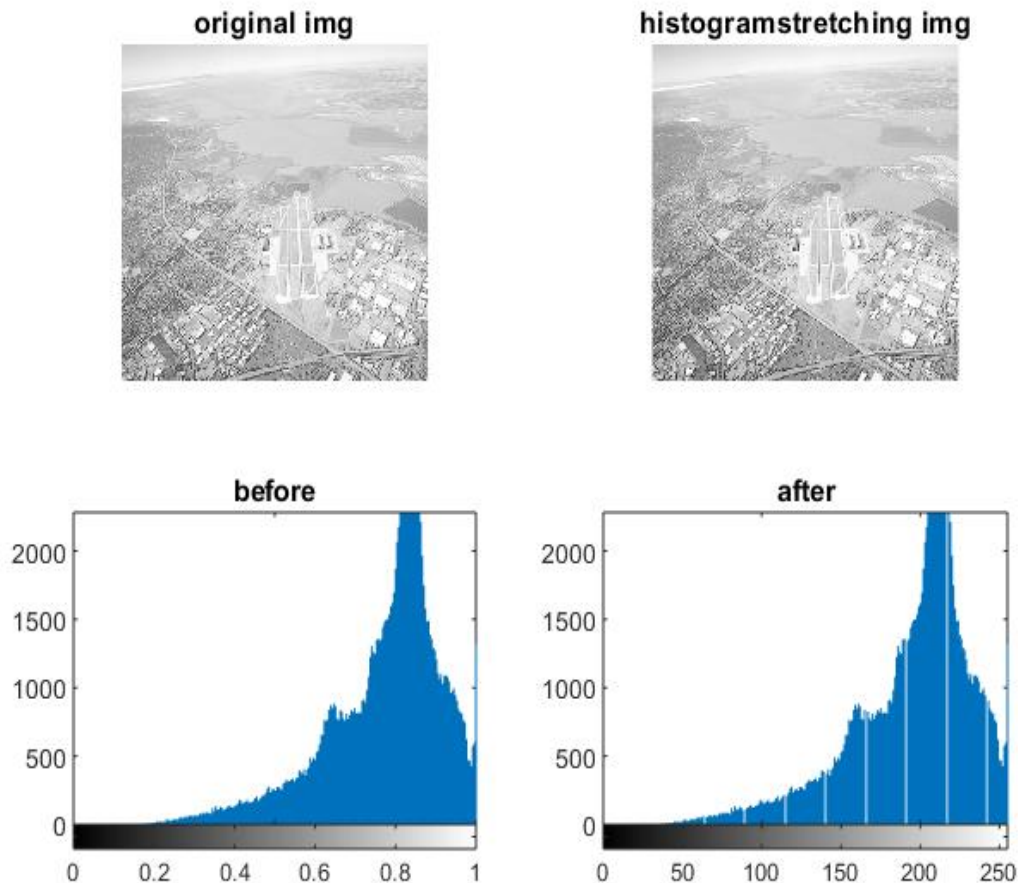
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PARMAR Hardiksinh

The below image is the ('aerial.tif') image.

Original img = input image ('aerial.tif')
Histogram stretching image = output image
in the below image its also shows the histogram of the image

3. Histograms Equalization :

Histogram equalization is used to enhance contrast. It is not necessary that contrast will always be increase.

Histogram equalization is about modifying the intensity values of all the pixels in the image such that the histogram is "flattened"

PMF

First we have to calculate the PMF (probability mass function) of all the pixels in this image.
If you donot know how to calculate PMF, please visit our tutorial of PMF calculation.

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CDF

Our next step involves calculation of CDF (cumulative distributive function). Again if you donot know how to calculate CDF , please visit our tutorial of CDF calculation.

Implementing the histogram Equalization :   (see the function ' histequa.m')

For the ('spine.tif') image

Original img = input image('spine.tif')
Histogram equalization = output image
in the below image its also shows the histogram of the **Histogram equalization** image.
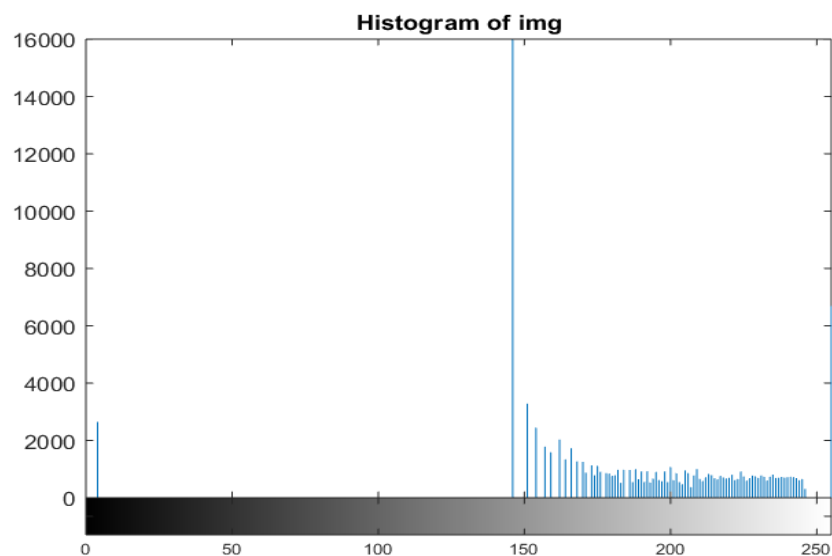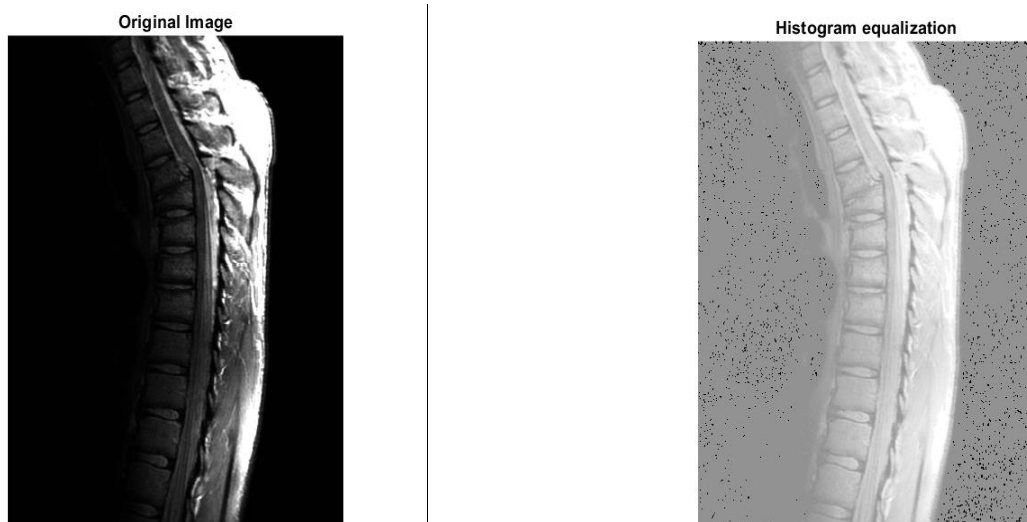

Original Image

Histogram equalization

Histogram of img

IMAGE PROCESSING LAB_1

PARMAR Hardiksinh

For the **('aerial.tif')** image

Original img = input image**('aerial.tif')**
Histogram equalization = output image
in the below image its also shows the histogram of the **Histogram equalization** image.

Original Image

Histogram equalization

Histogram of img