

**THE UNIVERSITY OF TEXAS AT ARLINGTON, TEXAS  
DEPARTMENT OF ELECTRICAL ENGINEERING**

**EE 5356**

**DIGITAL IMAGE PROCESSING**

**PROJECT # 7**

**by**

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**Presented to**

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**Histogram Equalization and Specification**

***MATLAB Code for the first image:***

%% Reading and displaying the first image

img = imread('elaine.512.tiff');

figure;

subplot(1,2,1);

imshow(uint8(img));

title('Original Image');

subplot(1,2,2);

%% Applying histogram equalization and displaying original image and it's histogram

imhist(img);

title('Oiginal Image Histogram');

saveas(gca,'origin\_hist.jpg');

%% Performing Global Histogram Equalization

g\_hist\_img = histeq(img);

figure;

subplot(1,2,1)

imshow(uint8(g\_hist\_img));

title('Globally Equalized Histogram Image')

subplot(1,2,2)

imhist(g\_hist\_img);

title('Globally Equalized Histogram');

saveas(gca,'g\_hist.jpg');

%% Performing Local Histogram Equalization

l\_hist\_img = adapthisteq(img,'clipLimit',0.01,'Distribution','rayleigh');

figure;

subplot(1,2,1)

imshow(uint8(l\_hist\_img));

title('Locally Equalized Histogram Image');

subplot(1,2,2)

imhist(l\_hist\_img);

title('Locally Equalized Histogram');

saveas(gca,'l\_hist.jpg');

%% Direct Histogram (Straight Line)

st\_l = linspace(0,1,512);

d\_hist\_img = histeq(img,st\_l);

figure;

subplot(1,2,1)

imshow(d\_hist\_img);

title('Direct Histogram Image');

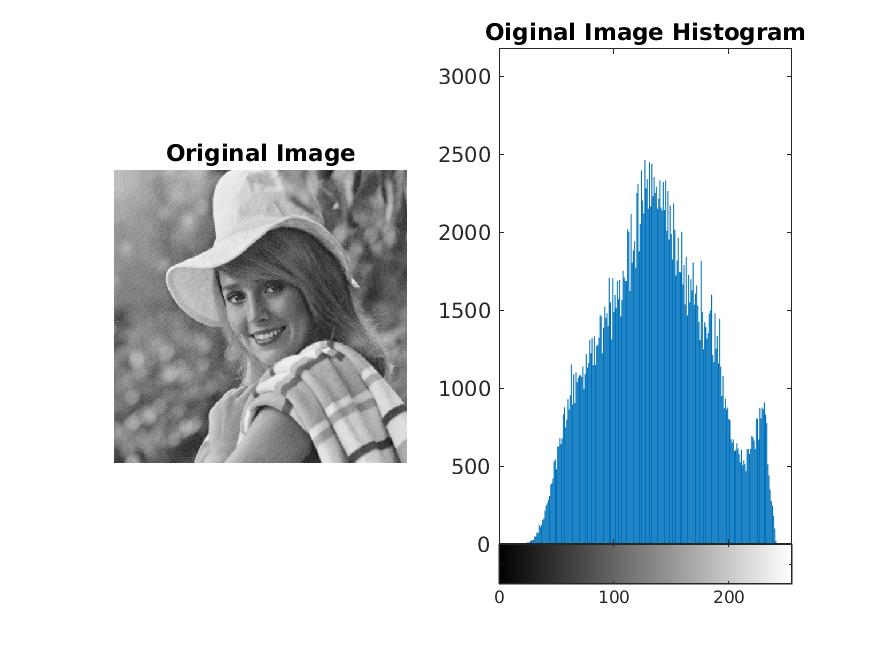
subplot(1,2,2)

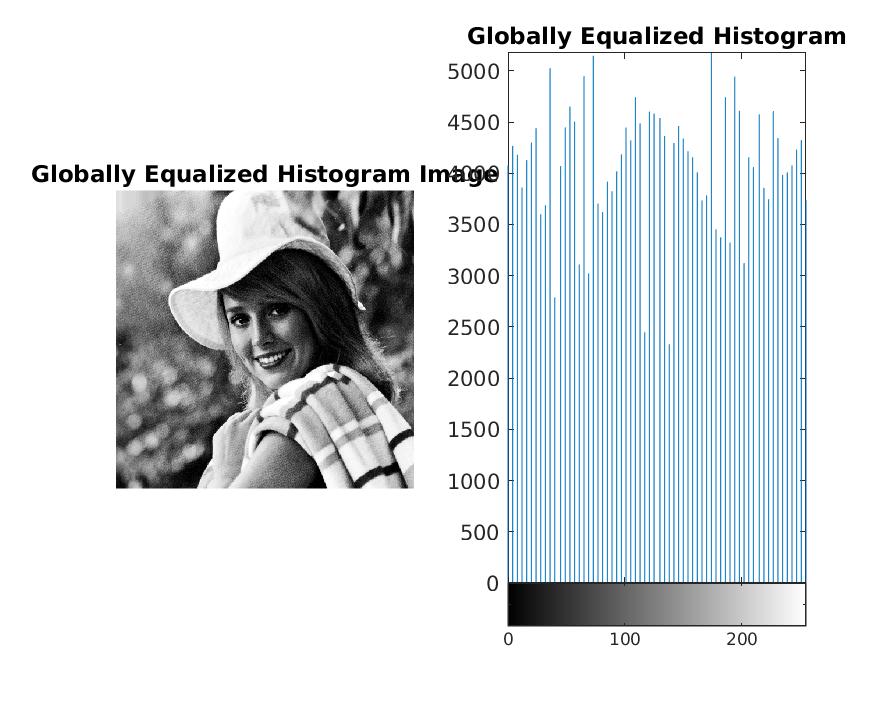
imhist(d\_hist\_img);

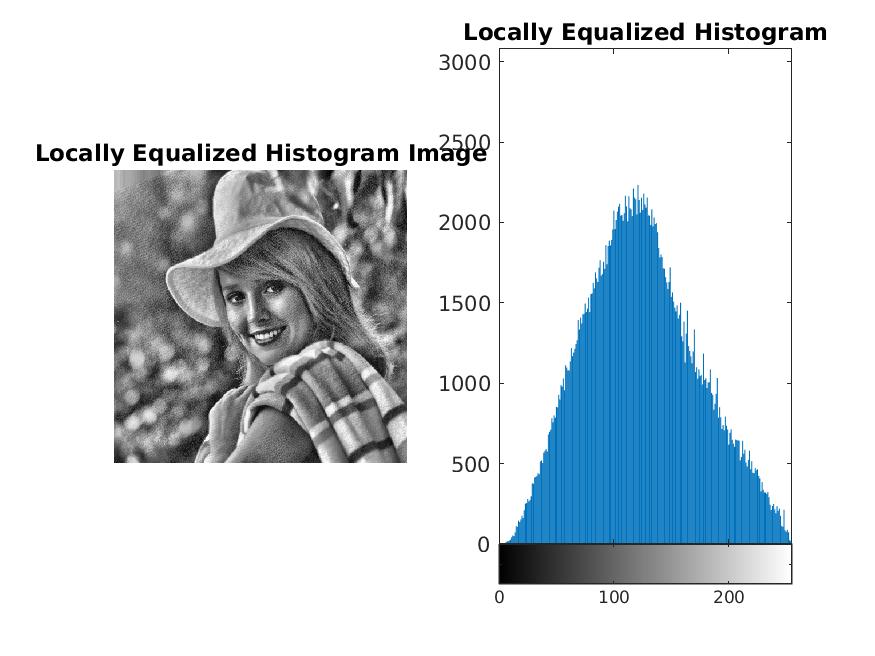
title('Direct Histogram (Straight Line)');

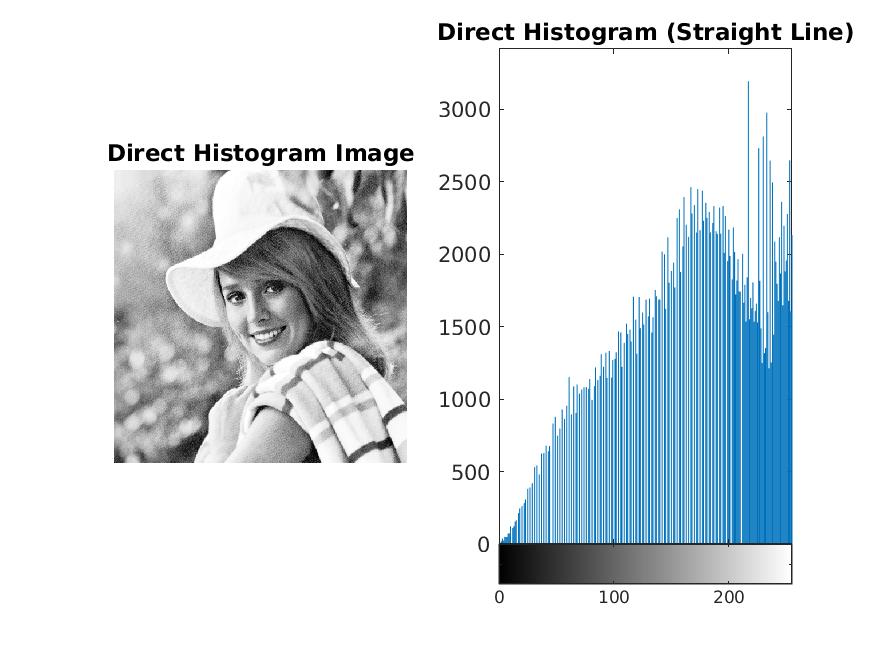
saveas(gca,'d\_hist.jpg');

*Results:*









***MATLAB Code for the second image:***

%% Performing the same operations for the Second Image

img2 = imread('pout.tif');

figure;

subplot(1,2,1)

imshow(uint8(img2));

title('Orignal Image');

subplot(1,2,2)

imhist(img2);

title('Orignal Image Histogram');

saveas(gca,'origin\_hist\_2.jpg');

%% Global Hisogram Equalization

g\_hist\_img2 = histeq(img2);

figure;

subplot(1,2,1)

imshow(uint8(g\_hist\_img2));

title('Globally Equalized Histogram Image');

subplot(1,2,2)

imhist(g\_hist\_img2);

title('Globally Equalized Histogram');

saveas(gca,'g\_hist\_2.jpg');

%% Local Histogram Equalization

l\_hist\_img2 = adapthisteq(img2,'clipLimit',0.01,'Distribution','rayleigh');

figure;

subplot(1,2,1)

imshow(uint8(l\_hist\_img2));

title('Locally Equalized Histogram Image');

subplot(1,2,2)

imhist(l\_hist\_img2);

title('Locally Equalized Histogram');

saveas(gca,'l\_hist\_2.jpg');

%% Direct Histogram (Straight Line)

st\_l = linspace(0,1,512);

d\_hist\_img2 = histeq(img2,st\_l);

figure;

subplot(1,2,1)

imshow(d\_hist\_img2);

title('Direct Histogram Image');

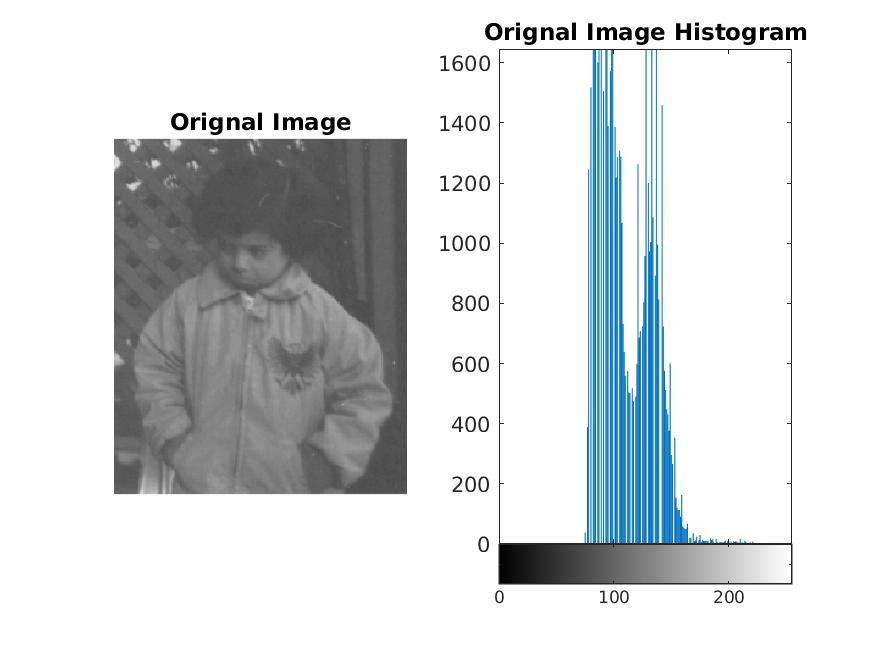
subplot(1,2,2)

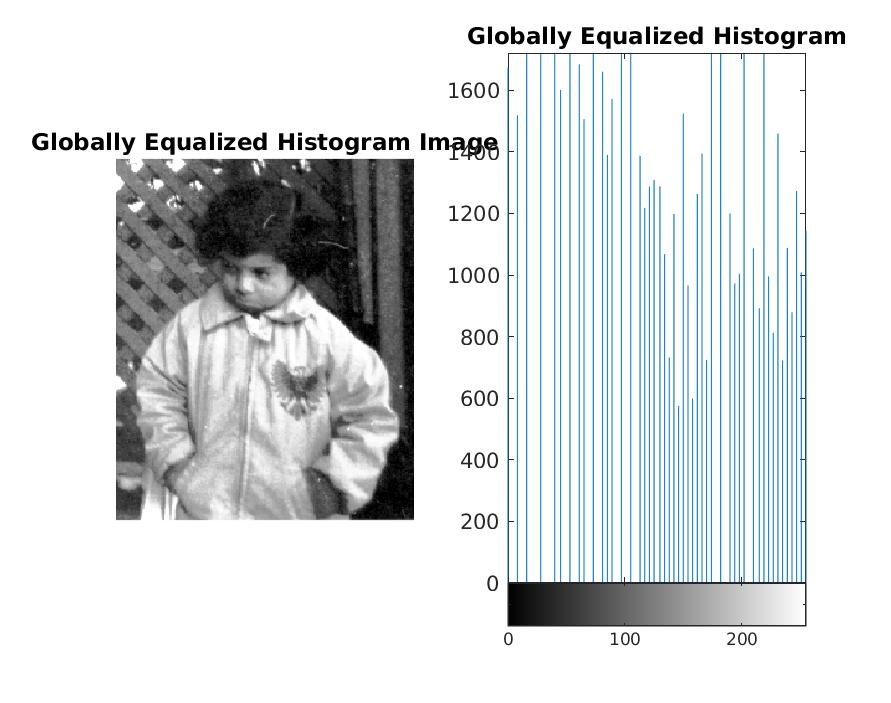
imhist(d\_hist\_img2);

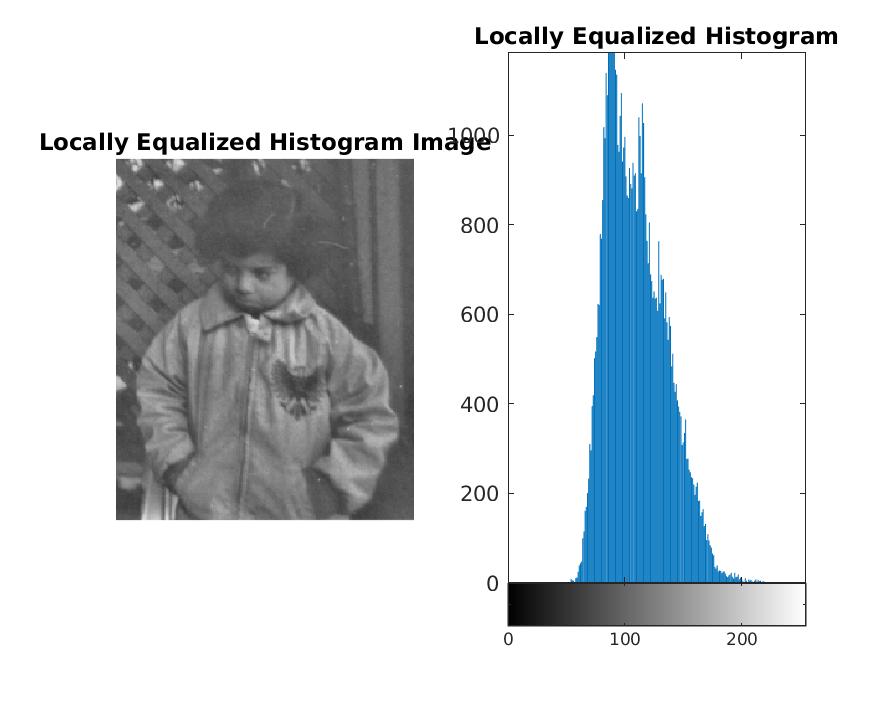
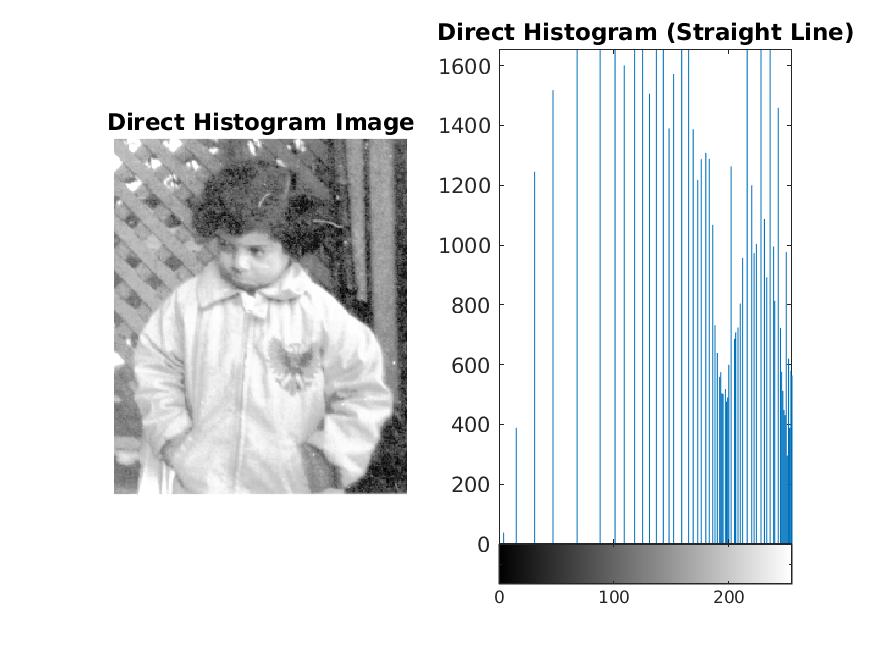
title('Direct Histogram (Straight Line)');

saveas(gca,'d\_hist\_2.jpg');

***Results:***

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***Conclusion:***

* *Global histogram uses full range and brings up the contrast of the image by intensifying the pixels.*
* *The histogram is shaped according to the distribution (Rayleigh in our case, the Local histogram is distributed according to the Rayleigh curve)*
* *Pixel intensities are distributed according to a straight line in Direct Histogram Equalization.*
* *Histogram equalization is used to change the contrast of the image by spreading out the most frequent intensities.*