

**Digital Image Processing (CSE-438)**

**Sec:03**

**Lab: 02**

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1. Use contrast stretching on the image.

Code:

image = imread('Picture1.jpg');

if size(image, 3) == 3

gray\_image = rgb2gray(image);

else

gray\_image = image;

end

contrast\_stretched\_image = imadjust(gray\_image, [50/255; 200/255], [0; 1]);

figure;

subplot(1, 2, 1);

imshow(gray\_image);

title('Original Grayscale Image');

subplot(1, 2, 2);

imshow(contrast\_stretched\_image);

title('Contrast Stretched Image');

Output:

A collage of penguins

AI-generated content may be incorrect.

1. Apply bit plane slicing on the image.

Code:

img = imread('Picture2.jpg');

if size(img, 3) == 3

grayImage = rgb2gray(img);

else

grayImage = img;

end

[rows, cols] = size(grayImage);

bitPlanes = zeros(rows, cols, 8);

for k = 1:8

bitPlanes(:, :, k) = bitget(grayImage, k);

end

figure;

for k = 1:8

subplot(2, 4, k);

imshow(logical(bitPlanes(:, :, k)));

title(['Bit Plane ', num2str(k)]);

end

Output:

A screenshot of a qr code

AI-generated content may be incorrect.

1. Change the contrast of the image using Logarithmic Transformation and Power-law Transformation.

Code:

img = imread('Picture3.jpg');

gray\_img = rgb2gray(img);

gray\_img = double(gray\_img) / 255;

c\_log = 1;

log\_transformed = c\_log \* log(1 + gray\_img);

gamma\_values = [0.4, 1, 2.5]; % Different gamma values

power\_transformed\_1 = gray\_img .^ gamma\_values(1);

power\_transformed\_2 = gray\_img .^ gamma\_values(2);

power\_transformed\_3 = gray\_img .^ gamma\_values(3);

figure;

subplot(2, 3, 1);

imshow(img);

title('Original Image');

subplot(2, 3, 2);

imshow(log\_transformed);

title('Log Transformation');

subplot(2, 3, 3);

imshow(power\_transformed\_1);

title(['Power-law (Gamma = ', num2str(gamma\_values(1)), ')']);

subplot(2, 3, 4);

imshow(power\_transformed\_2);

title(['Power-law (Gamma = ', num2str(gamma\_values(2)), ')']);

subplot(2, 3, 5);

imshow(power\_transformed\_3);

title(['Power-law (Gamma = ', num2str(gamma\_values(3)), ')']);

Output:

A group of black and white squares

AI-generated content may be incorrect.

1. Adjust the histogram of the following image to match the reference image using histogram matching. Show the histogram of original, reference, and output images.

Code:

input\_img = imread('Picture4\_1.jpg');

ref\_img = imread('Picture4\_2.jpg');

if size(input\_img, 3) == 3

input\_img = rgb2gray(input\_img);

end

if size(ref\_img, 3) == 3

ref\_img = rgb2gray(ref\_img);

end

input\_hist = imhist(input\_img);

ref\_hist = imhist(ref\_img);

matched\_img = imhistmatch(input\_img, ref\_img);

figure;

subplot(3, 3, 1);

imshow(input\_img);

title('Original Input Image');

% Display reference image

subplot(3, 3, 2);

imshow(ref\_img);

title('Reference Image');

subplot(3, 3, 3);

imshow(matched\_img);

title('Matched Output Image');

subplot(3, 3, 4);

bar(input\_hist);

title('Histogram: Original Input');

subplot(3, 3, 5);

bar(ref\_hist);

title('Histogram: Reference Image');

subplot(3, 3, 6);

bar(imhist(matched\_img));

title('Histogram: Matched Output');

Output:

A tree with a graph

AI-generated content may be incorrect.

1. Change the contrast of the image using histogram equalization. Show the histogram of both input and output images.

Code:

img = imread('Picture5.jpg');

if size(img, 3) == 3

gray\_img = rgb2gray(img);

else

gray\_img = img;

end

original\_hist = imhist(gray\_img);

equalized\_img = histeq(gray\_img);

equalized\_hist = imhist(equalized\_img);

figure;

subplot(2, 2, 1);

imshow(gray\_img);

title('Original Image');

subplot(2, 2, 2);

imshow(equalized\_img);

title('Equalized Image');

subplot(2, 2, 3);

bar(original\_hist);

title('Histogram of Original Image');

xlim([0 255]);

subplot(2, 2, 4);

bar(equalized\_hist);

title('Histogram of Equalized Image');

xlim([0 255]);

Output:

A collage of images of lungs

AI-generated content may be incorrect.