



Lab Report 2

Advanced Image Processing Operations

Digital Image Processing CSE438

Section: 03

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Submitted To:

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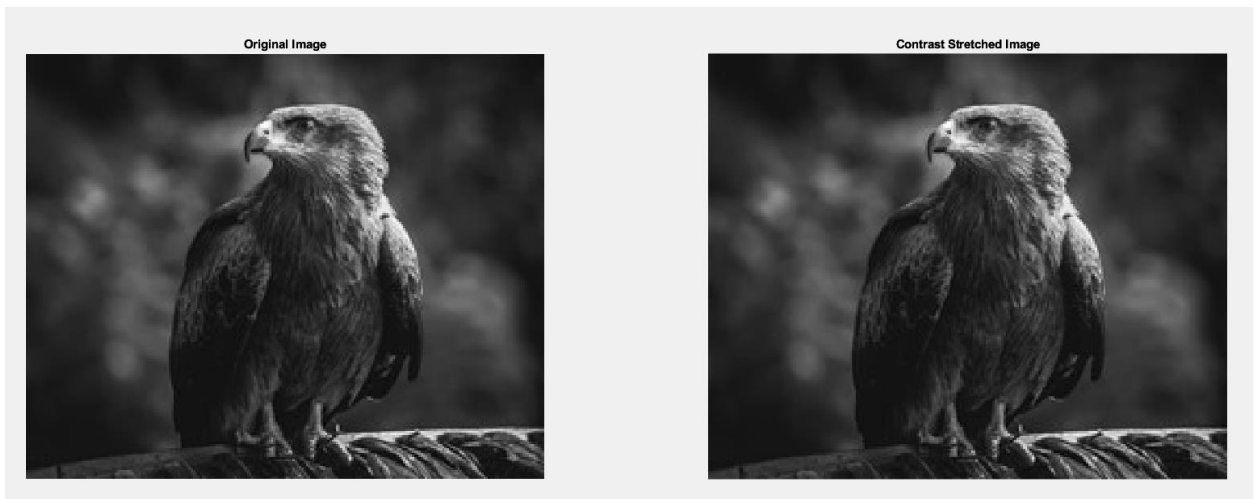
Suddip Paul Arnab

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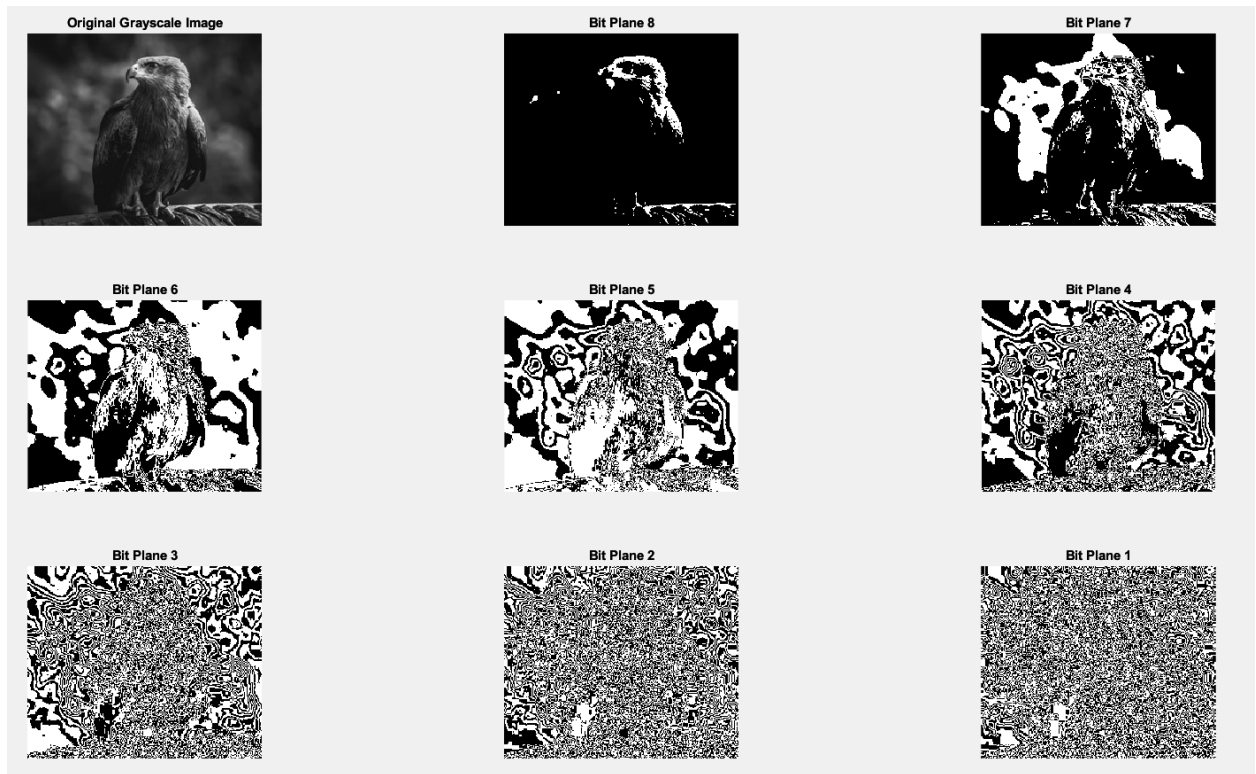
1. Use contrast stretching on the image.

```
img = imread('Picture1.jpg');
gray_img = rgb2gray(img);
min_intensity = min(gray_img(:));
max_intensity = max(gray_img(:));
contrast_stretched_img = imadjust(gray_img, [min_intensity / 255,
max_intensity / 255], [0 1]);
figure;
subplot(1, 2, 1);
imshow(gray_img);
title('Original Image');
subplot(1, 2, 2);
imshow(contrast_stretched_img);
title('Contrast Stretched Image');
```



2. Apply bit plane slicing on the image.

```
img = imread("Picture2.jpg");
gray_img = im2gray(img);
[r, c] = size(gray_img);
bit_planes = zeros(r, c, 8);
for i = 1:8
    bit_planes(:, :, i) = bitget(gray_img, 9-i);
end
figure;
subplot(3,3,1), imshow(gray_img), title('Original Grayscale Image');
for i = 1:8
    subplot(3,3,i+1), imshow(bit_planes(:, :, i)), title(['Bit Plane ',
num2str(9-i)]);
end
```



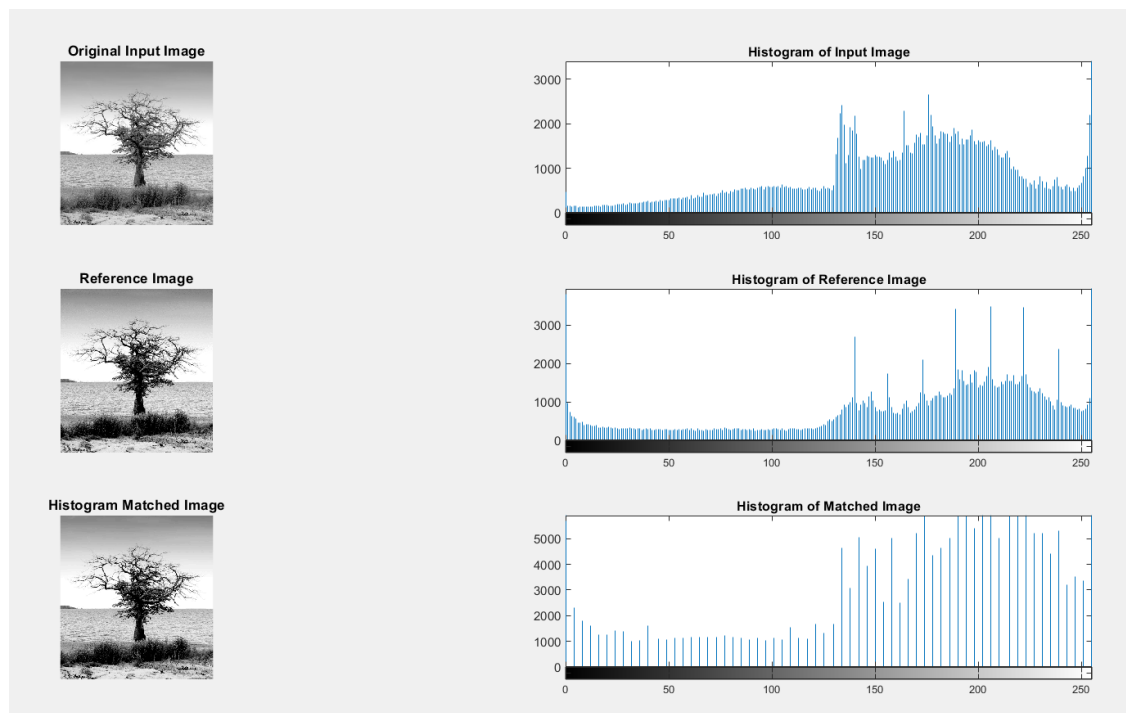
3. Change the contrast of the image using Logarithmic Transformation and Power-law Transformation.

```
img = imread("Picture3.png");
gray_img = rgb2gray(img);
normalized_image = double(gray_img) / 255;
c = 1;
gamma = 2;
log_transformed_image = c * log(1 + normalized_image);
gamma_transformed_image = c * (normalized_image .^ gamma);
figure;
subplot(1, 3, 1);
imshow(gray_img);
title('Original GrayScale Image');
subplot(1, 3, 2);
imshow(log_transformed_image, []);
title('Logarithmic Transformation');
subplot(1, 3, 3);
imshow(gamma_transformed_image, []);
title('Power-Law Transformation');
```



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

```
input_img = imread("Picture4.jpg");
reference_img = imread("Picture5.png");
input_gray = im2gray(input_img);
reference_gray = im2gray(reference_img);
matched_img = imhistmatch(input_gray, reference_gray);
figure;
subplot(3,2,1), imshow(input_gray), title('Original Input Image');
subplot(3,2,2), imhist(input_gray), title('Histogram of Input Image');
subplot(3,2,3), imshow(reference_gray), title('Reference Image');
subplot(3,2,4), imhist(reference_gray), title('Histogram of Reference Image');
subplot(3,2,5), imshow(matched_img), title('Histogram Matched Image');
subplot(3,2,6), imhist(matched_img), title('Histogram of Matched Image');
```



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

```
img = imread('Picture6.jpg');  
img = rgb2gray(img);  
figure;  
subplot(2, 2, 1);  
imshow(img);  
title('Original Image');  
subplot(2, 2, 2);  
imhist(img);  
title('Histogram of Original Image');  
equalized_img = histeq(img);  
subplot(2, 2, 3);  
imshow(equalized_img);  
title('Equalized Image');  
subplot(2, 2, 4);  
imhist(equalized_img);  
title('Histogram of Equalized Image');
```

