Contents

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% Session ODD 2024-25
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```

Experiment 3 : Perform Intensity Transformation

```
clc;
clear;
close all;
```

Excercise 1 : Perform Image Negative

```
I = imread('Images3/mammogram.tif');
L = max(max(I));
I1 = L - I;
figure,
subplot(1, 2, 1), imshow(I), title("Input Image");
subplot(1, 2, 2), imshow(I1), title("Negative Image");

% Conclusion : The image negative transformation was successfully applied,
% resulting in an output image where the intensity values are inverted compared to
% the original (input) image. This process darkens the light pixels and
% lightens the dark pixels of the original (input) image.
```

Input Image   **Negative Image**
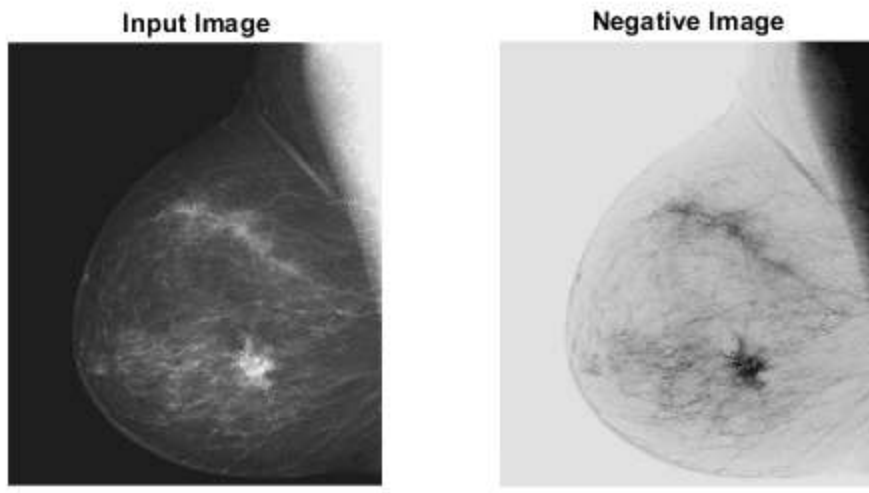
Excercise 2 : Perform Log Transformation

```matlab
I = im2double(imread('Images3/particle.tif'));
C = 5;
I1 = C * log(1 + I);
figure,
subplot(1, 2, 1), imshow(I), title("Input Image");
subplot(1, 2, 2), imshow(I1), title("Log Transformed Image");

% Conclusion : The log transformation was successfully applied to the input
% image. The output image has wider intensity range compared to the input image.
% Log transformation broadens the narrow intensity range in the input image
% resulting in broad intensity range in the output image, enhancing overall
% visibility and details.
```

Input Image   Log Transformed Image
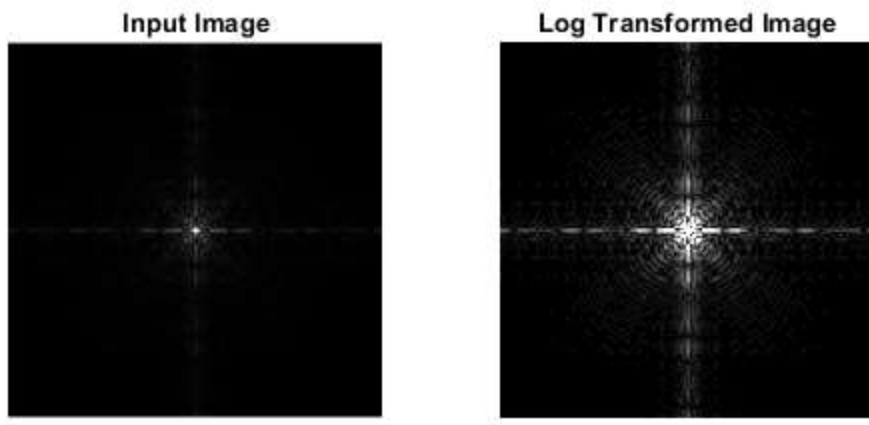
Exercise 3A : Perform nth power transformation i.e power > 1

```
I = im2double(imread('Images3/aerial.tif'));
C = 1;
y1 = 2.0;
y2 = 2.5;
y3 = 3.0;
R1 = C * I.^y1;
R2 = C * I.^y2;
R3 = C * I.^y3;
figure,
subplot(2, 2, 1), imshow(I), title("Input Image");
subplot(2, 2, 2), imshow(R1), title("Power Transformed Gamma = 2.0");
subplot(2, 2, 3), imshow(R2), title("Power Transformed Gamma = 2.5");
subplot(2, 2, 4), imshow(R3), title("Power Transformed Gamma = 3.0");

% Conclusion : nth Power Transformation was successfully appliead for three
% different values of gamma (2.0, 2.5 and 3.0). The output image is
% relatively darker than the input image. The washed-out or overexposed
% input image was enhanced.
```

Input Image

Power Transformed Gamma = 2.0

Power Transformed Gamma = 2.5

Power Transformed Gamma = 3.0

Exercise 3B : Perform nth root transformation i.e power < 1

```matlab
I = im2double(imread('Images3/spine.tif'));
C = 1;
y1 = 0.75;
y2 = 0.5;
y3 = 0.25;
R1 = C * I.^y1;
R2 = C * I.^y2;
R3 = C * I.^y3;
figure,
subplot(2, 2, 1), imshow(I), title("Input Image");
subplot(2, 2, 2), imshow(R1), title("Root Transformed Gamma = 0.75");
subplot(2, 2, 3), imshow(R2), title("Root Transformed Gamma = 0.5");
subplot(2, 2, 4), imshow(R3), title("Root Transformed Gamma = 0.25");

% Conclusion : nth Root Transformation was successfully appliead for three
% different values of gamma (0.75, 0.5 and 0.25). The output image is
% relatively lighter than the input image. The underexposed input image was
% enhanced improving visibility and fine details
```

Input Image

Root Transformed Gamma = 0.75

Root Transformed Gamma = 0.5

Root Transformed Gamma = 0.25