DIGITAL IMAGE PROCESSING

EXPERIMENT 7

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AIM: To apply homomorphic filtering to an image in the Fourier domain to correct non-uniform illumination in an image.

SOFTWARE USED: MATLAB

Code:

```matlab
clc;
close all;
clear all;
d = 10;  % Cutoff frequency
d2 = d^2;  % Square of cutoff frequency
f = double(rgb2gray(imread("DIP_IMAGE.jpeg")));
l = log(1 + f);  % Logarithmic transformation
z = fft2(l);
[m, n] = size(f);
b = zeros(m, n);
h = zeros(m, n);
for i = 1:m
    for j = 1:n
        b(i, j) = sqrt((i - m / 2)^2 + (j - n / 2)^2);%eucledian distance
        h(i, j) = exp(-b(i, j)^2 / (2 * d2)); % Gaussian filter
    end
end
L = 0.5;  % Gamma low value
H = 1.5; % Gamma high value
filter = L + (H - L) * h;
s = z .* filter;
g = abs(ifft2(s));%inverse fourier transformation
e = exp(g) - 1;%inverse the logarithmic transformation
subplot(1, 2, 1);
imshow(f, []);
title('Original Image');
subplot(1, 2, 2);
imshow(e, []);
title('Homomorphic Filtered Image');
```

OUTPUT :

Original Image

Homomorphic Filtered Image