

EXP-7

DIP LAB-7

HOMOMORPHIC FILTERING TECHNIQUE

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AIM:- DESIGN AND IMPLEMENT A HOMOMORPHIC FILTERING TECHNIQUE USING MATLAB

OBJECTIVE:-

To enhance the contrast of low light image:

Evaluate the effectiveness of implementation by applying it to a variety of images with different lighting.

MAIN OBJECTIVE OF THIS EXP:-

FOR TESTING WE NEED TO TAKE TOTAL 5 IMAGES WITH DIFFERENT BRIGHTENED IMAGES FOR DOING THE OPERATION OF HOMOMORPHIC

Key Considerations:

***Filter Parameters:** Experiment with different filter parameters to achieve desired results.

***Normalization:** Ensure that the image intensity values are normalized to prevent overflow or underflow during logarithmic transformations.

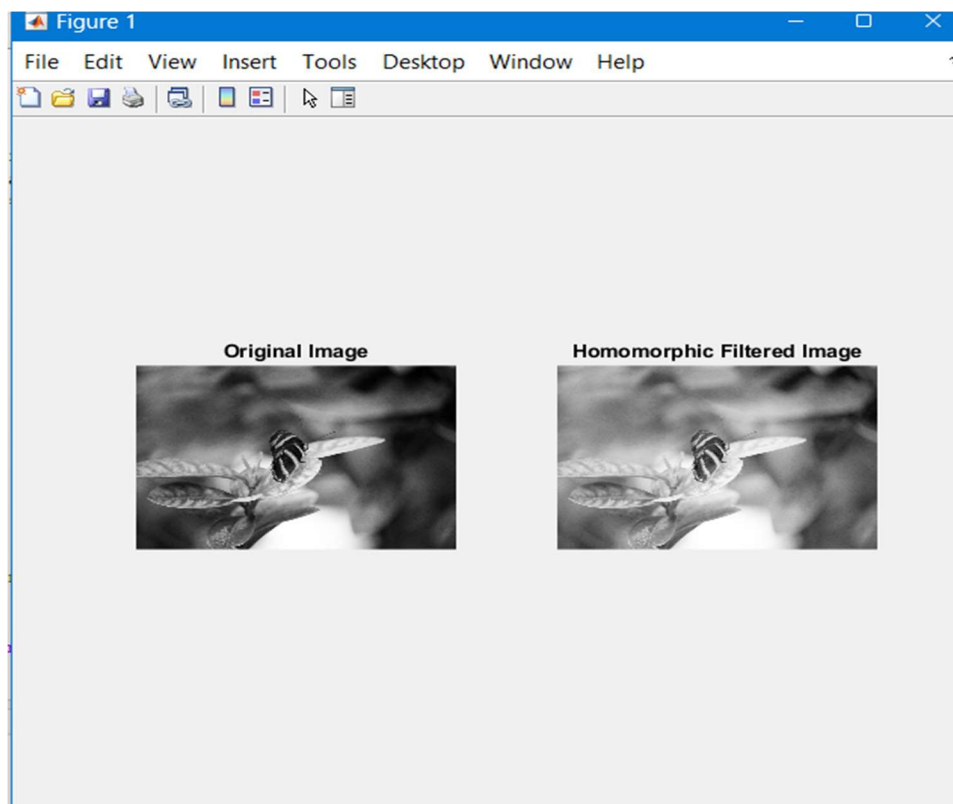
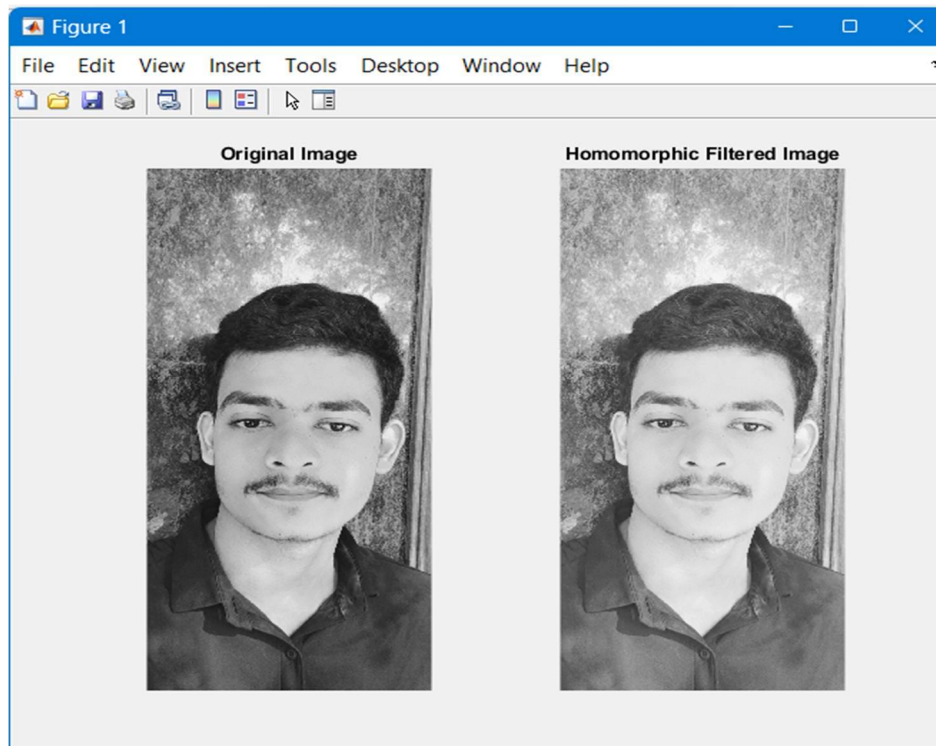
***Image Content:** The effectiveness of homomorphic filtering depends on the image content. It may not be suitable for all types of images.

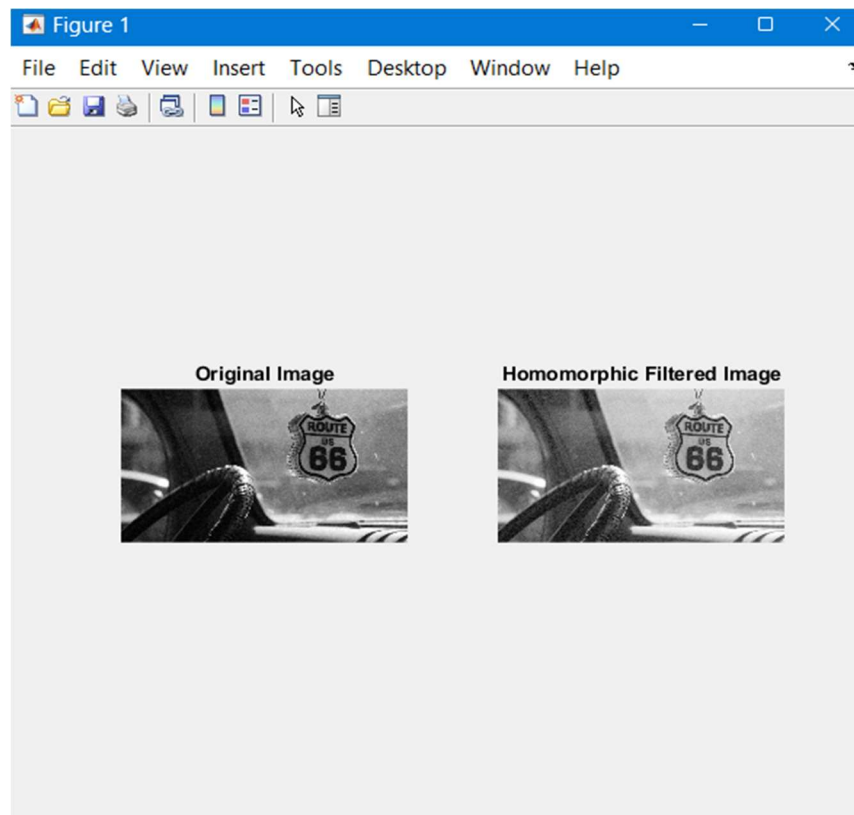
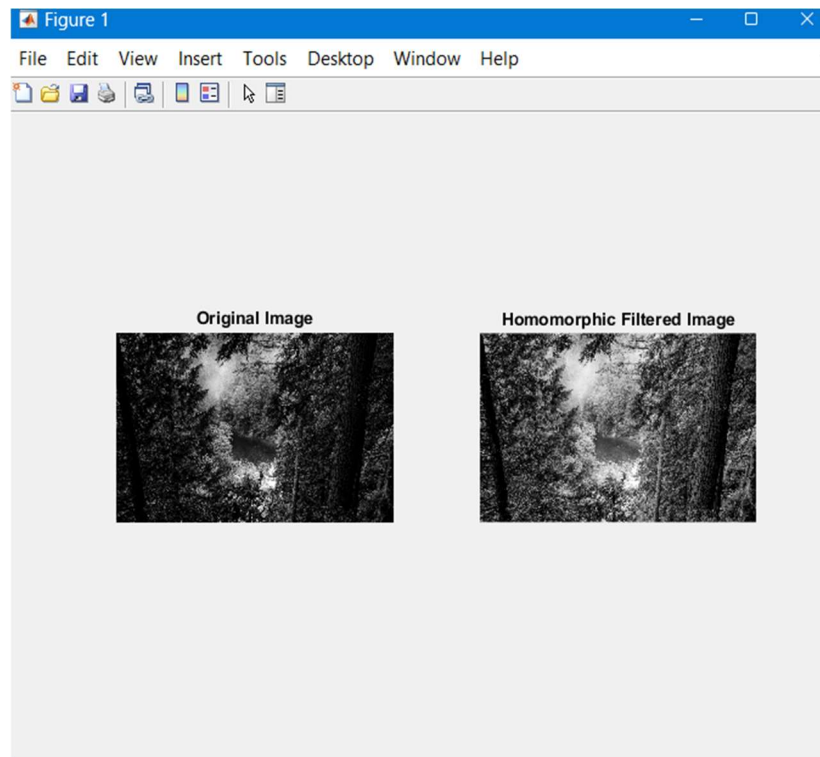
***Computational Efficiency:** For large images, consider using more efficient filtering methods or hardware acceleration.

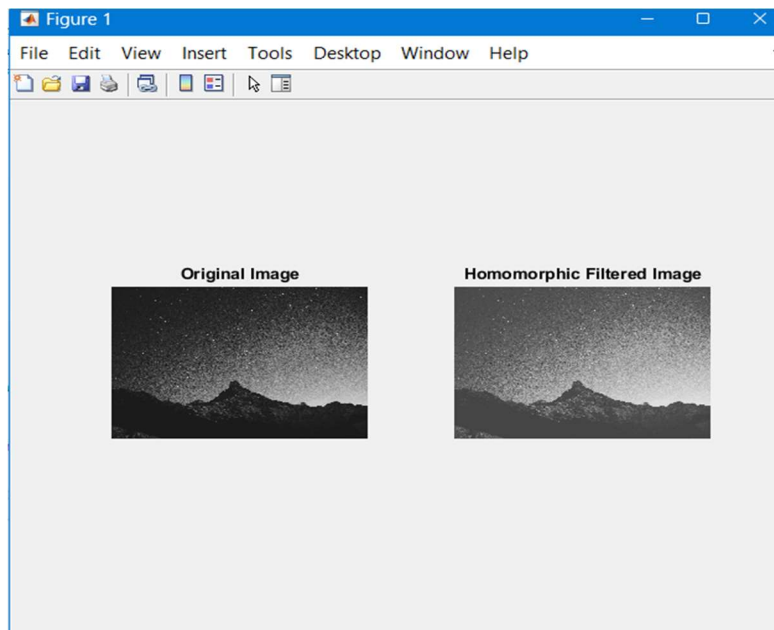
Code : -

```
clc;
close all;
clear all;
d = 10; % Cutoff frequency
d2 = d^2; % Square of cutoff frequency
f = double(rgb2gray(imread("D:\21BEC1835\karthik.jpg")));
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); %euclidian 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:-







CONCLUSION:-This project successfully designed and implemented a homomorphic filtering technique using MATLAB.