DIP LAB-7

HOMOMORPHIC FILTERRING TECHNIQUE

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AIM:- DESIGN AND IMPLEMENT A HOMOMORPHIC FILTERRING 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
BRIGHTED IMAGES FOR DOING THE OPERATION OF HOMOMORPHIC

Key Considerations:

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

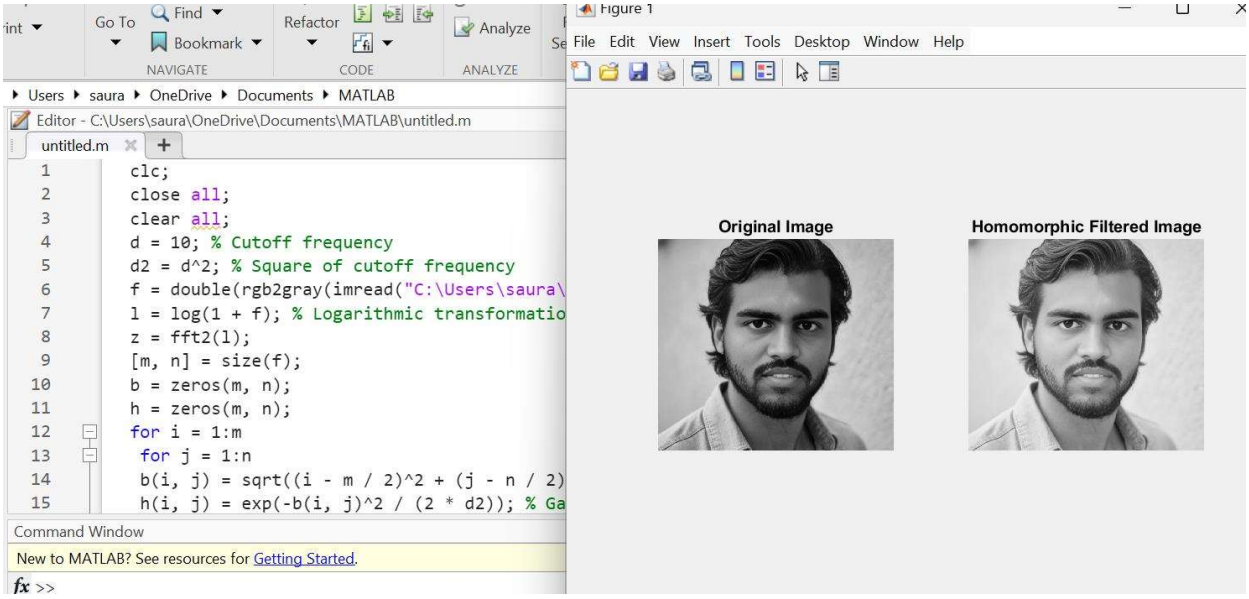
*Normalization: Ensure that the image intensity values are normalized to prevent overflow or underflow during logarithmic transformations.

*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("C:\Users\saura\Downloads\sadu3.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);%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:-


Go To
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CODE
Analyze
ANALYZE
Users ▸ saura ▸ OneDrive ▸ Documents ▸ MATLAB
Editor - C:\Users\saura\OneDrive\Documents\MATLAB\untitled.m
untitled.m
1 clc;
2 close all;
3 clear all;
4 d = 10; % Cutoff frequency
5 d2 = d^2; % Square of cutoff frequency
6 f = double(rgb2gray(imread("C:\Users\saura\
7 l = log(1 + f); % Logarithmic transformatio
8 z = fft2(l);
9 [m, n] = size(f);
10 b = zeros(m, n);
11 h = zeros(m, n);
12 for i = 1:m
13 for j = 1:n
14 b(i, j) = sqrt((i - m / 2)^2 + (j - n / 2)
15 h(i, j) = exp(-b(i, j)^2 / (2 * d2)); % Ga
Command Window
New to MATLAB? See resources for Getting Started.
fx >>
Figure 1
File Edit View Insert Tools Desktop Window Help
Original Image
Homomorphic Filtered Image

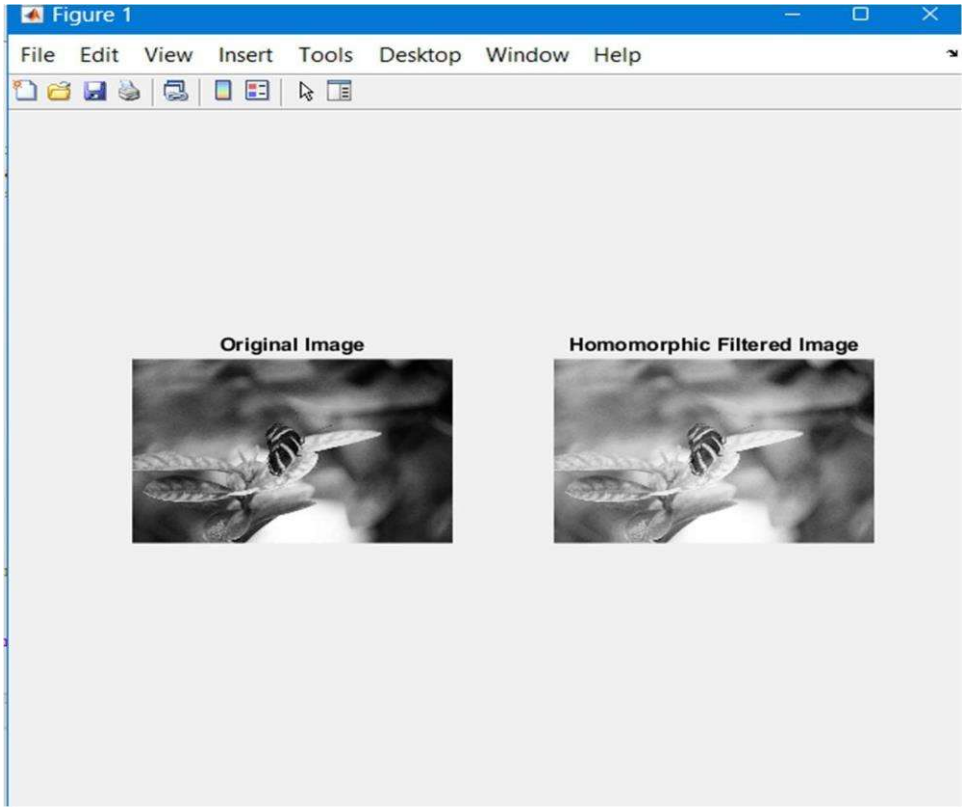
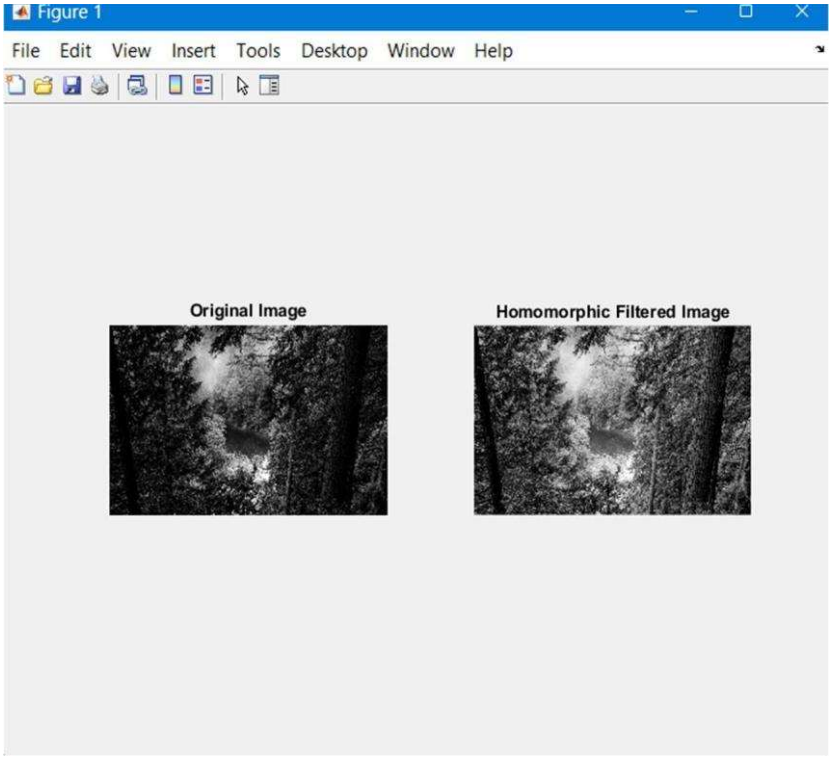


Figure 1
File Edit View Insert Tools Desktop Window Help
Original Image
Homomorphic Filtered Image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File Edit View Insert Tools Desktop Window Help
Original Image
Homomorphic Filtered Image

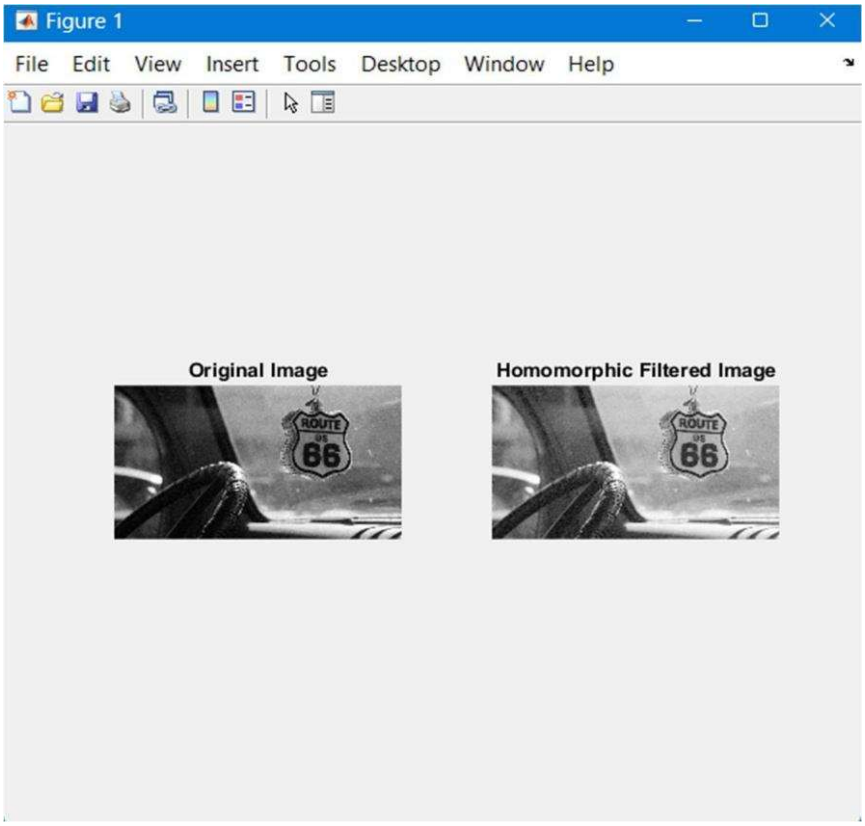
Figure 1
File Edit View Insert Tools Desktop Window Help
Original Image
Homomorphic Filtered Image
ROUTE
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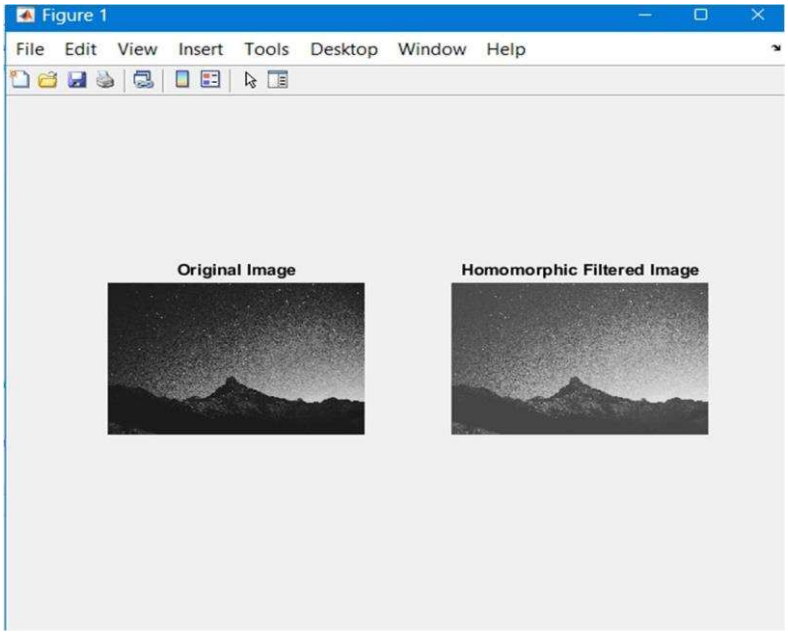

CONCLUSION:-This project successfully designed and implemented a homomorphic filtering technique using MATLAB.