Digital Image Processing-Assignment 04

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I. 實驗說明

Apply histogram equalization and homomorphic filter to “mars moon”. Discuss the difference of results.

II. 程式碼

```
im1 = imread('lena.tif');
im2 = imread('blurry_moon.tif');

histogram_equalization(im1);
homomorphic(im1);

histogram_equalization(im2);
homomorphic(im2);

function histogram_equalization(im)
    his = histeq(im);
    figure,imshow(im);
    figure,imhist(his,64);
end

function homomorphic(im)
    im = im2double(im);
    [m,n] = size(im);
    z = log(im+0.01);
    Z = fft2(z);
    H = ILPF(m,n,1.2);
    S = H.*Z;
    s = ifft2(S);
    g = exp(s);
    figure,imshow(g);
    figure,imhist(g,64);
end

function H = ILPF(m,n, D0)
    % Ideal Lowpass Filters [0.6,1.2]
    [f1,f2] = freqspace([m,n],'meshgrid')
        ;
    D = sqrt(f1.^2 + f2.^2);
    H = double(D<=D0);
    %figure, imshow(H);
end
```

III. 成果

A. *Lena*

Fig. 1. lena

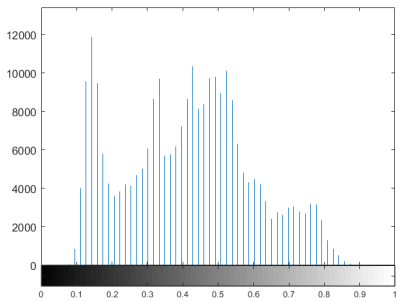

Fig. 2. lena histogram

Fig. 3. lena using histogram equalization

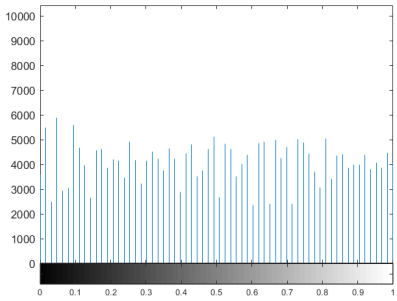

Fig. 4. lena using histogram histogram equalization

Fig. 5. lena using homomorphic filter

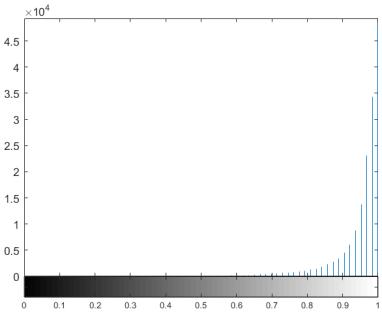

Fig. 6. lena histogram using homomorphic filter

B. Blurry-moon

Fig. 7. blurry-moon

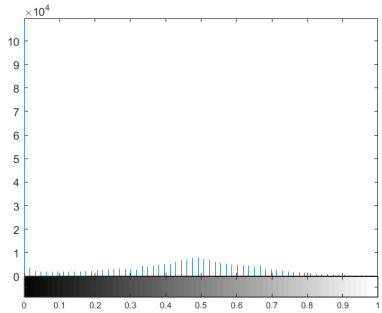

Fig. 8. blurry-moon histogram

Fig. 9. blurry-moon using histogram equalization

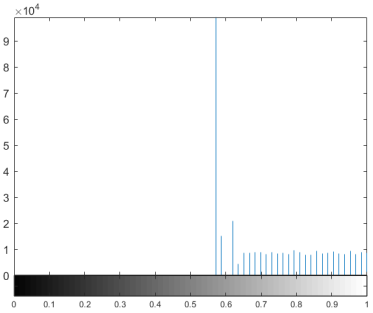

Fig. 10. blurry-moon histogram using histogram equalization

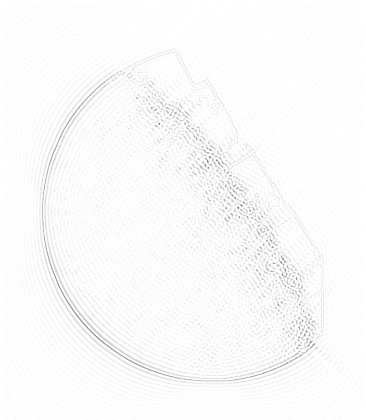

Fig. 11. blurry-moon using homomorphic filter

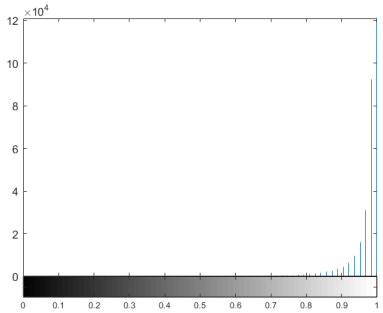

Fig. 12. blurry-moon histogram using homomorphic filter

IV. 比較

經過 histogram equalization 處理後的圖片，其 histogram 分布較為平均。經過 homomorphic filter 處理後的圖片，其 histogram 分布集中在高數值 (亮度高) 的地方。