DIP Project2

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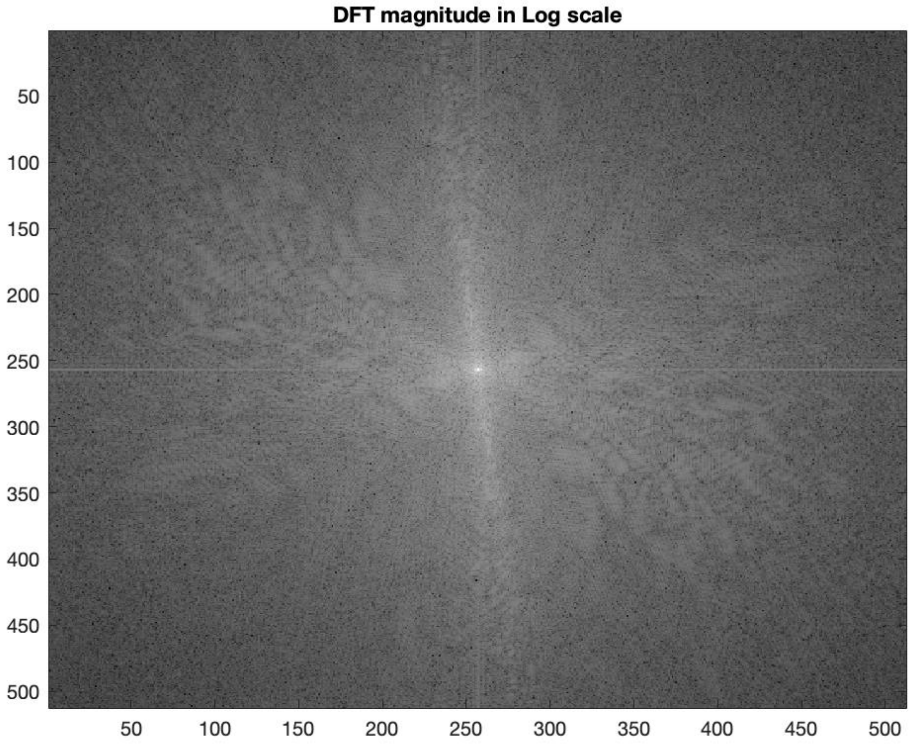
1. Source code

```
image  = imread('Bird 2.tif');

%DFT
F_img = fftshift(fft2(image));
S_img = abs(F_img);
figure, imagesc(((log(abs(F_img)))));
title("DFT magnitude in Log scale");
colormap gray;

%construct mask_inside and mask_outside
for i = 1:512
    for j = 1:512
        radius = ((i-256)^2+(j-256)^2)^0.5;
        if (radius<30)
            mask_inside(i,j) = 1;
        else
            mask_inside(i,j) = 0;
        end
    end
end
mask_outside = 1-mask_inside;

%generate input image to output image
F_output_inside = F_img.*mask_inside;
F_output_outside = F_img.*mask_outside;

F_output_inside = uint8(abs(ifft2(ifftshift(F_output_inside))));
F_output_outside = uint8(abs(ifft2(ifftshift(F_output_outside))));

figure, imshow(uint8(F_output_inside)),title("Image constructed by DFT coefficients inside the circular region");

figure, imshow(uint8(F_output_outside)), title("Image constructed by DFT coefficients outside the circular region");

```

```
%generate top 25 frequency
frequency = S_img(:,1:256);
[top_frequency,index_temp] = sort(frequency(:), 1,'descend');
[ind_row,ind_col] = ind2sub(size(frequency),index_temp(1:25));

file = fopen('project2.xls', 'w');
fprintf(file, 'magnitude| (u, v)\n');
for i = 1:25
    fprintf(file, '%f| (%d; %d)\n', [top_frequency(i); ind_row(i)-1; ind_col(i)-1])
end
fclose(file);
```

2. Plot of DFT magnitude in Log scale



3.

Image constructed by DFT coefficients inside the circular region

4.

Image constructed by DFT coefficients outside the circular region

5.

magnitude | (u, v)
3353201.026467 | (256; 254)
3153898.623519 | (256; 255)
1911080.227144 | (255; 255)
1763699.344797 | (257; 255)
1389293.496565 | (257; 254)
1295463.995486 | (253; 255)
1126762.521342 | (259; 254)
965729.916640 | (258; 255)
810353.144458 | (259; 255)
685227.770241 | (253; 254)
680877.275464 | (256; 253)
646195.720664 | (258; 252)
633484.345235 | (254; 254)
616688.108608 | (258; 253)
592982.049759 | (252; 253)
579739.473801 | (248; 255)
544777.894049 | (254; 255)
540892.332654 | (254; 252)
524469.411627 | (260; 254)
523638.811559 | (262; 255)
507827.764565 | (254; 253)
484987.833445 | (255; 252)
477167.099535 | (255; 254)
459230.015923 | (252; 255)
448247.705128 | (261; 254)