week7_hw

Graded

Student

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Total Points

100 / 100 pts

Question 1

image blur

40 / 40 pts

+ 40 pts Point adjustment

Question 2

histogram equalization

40 / 40 pts

+ 40 pts Point adjustment

Question 3

correct errors

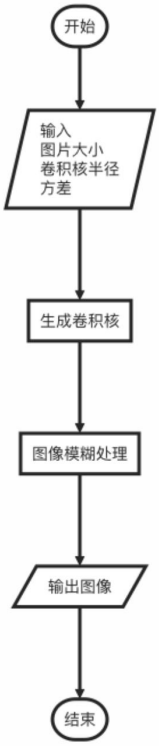
20 / 20 pts

+ 20 pts Point adjustment

Question assigned to the following page: 1

Task 1 Image Blurring.

a. Flowchart

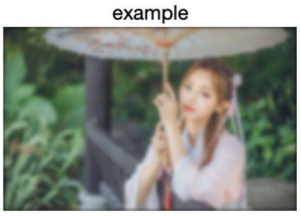


b. code

```
% input image, radius and variance
img = imread("Image1.jpg");
figure
imshow(img);
```

Questions assigned to the following page: 1 and 2

```
double(img);
radius = input("Please enter the radius: "); %5
variance = input("please enter the raius: "); %2
% implement the kernel
G = zeros([radius*2+1,radius*2+1],"double");
for x = 1:radius*2+1
    for y = 1:radius*2+1
        G(x,y) = (1/(2*pi*variance^2))*exp( ...
            -((x-radius-1)^2+(y-radius-1)^2)/ ...
            (2*variance^2));
    end
end
G = G/(sum(sum(G)));
imgans = double(img);
for color = 1:3
    imgans(:,:,color) = imfilter(imgans(:,:,color),G,"same","conv");
end
imgans = uint8(imgans);
% example when radius and variance are both set to 5 and 2 respectively.
figure
imshow(imgans);
title("example")
```



Task 2 Histogram equlization

```
% read in and count the value of grey.
origin_img = imread("Image2.jpg");
origin_img = rgb2gray(origin_img);
origin_nk = zeros([1,256]);
proceeded_sk = zeros([1,256]);
```

Question assigned to the following page: 2

```
imgsize = size(origin_img);
proceeded_img = zeros(imgsize);
% calculate n_k
for i = 1:imgsize(1)
    for j = 1:imgsize(2)
        origin_nk(1,origin_img(i,j)) = origin_nk(1,origin_img(i,j))+1;
    end
end
total_nk = sum(origin_nk);
% claculate s_k
add_up_p = 0;
for i = 1:256
    add_up_p = add_up_p +  origin_nk(i)/total_nk;
    proceeded_sk(i) = round(add_up_p*255);
end
% mapping to new grey degree
for i = 1:imgsize(1)
    for j = 1:imgsize(2)
        proceeded_img(i,j) = proceeded_sk(origin_img(i,j));
    end
end
proceeded_img = uint8(proceeded_img);
% diplay the picture before and after equalization in a 1*2 subplot
figure
subplot(1,2,1);
imshow(origin_img);
title("before");
subplot(1,2,2);
imshow(proceeded_img);
title("after");
```

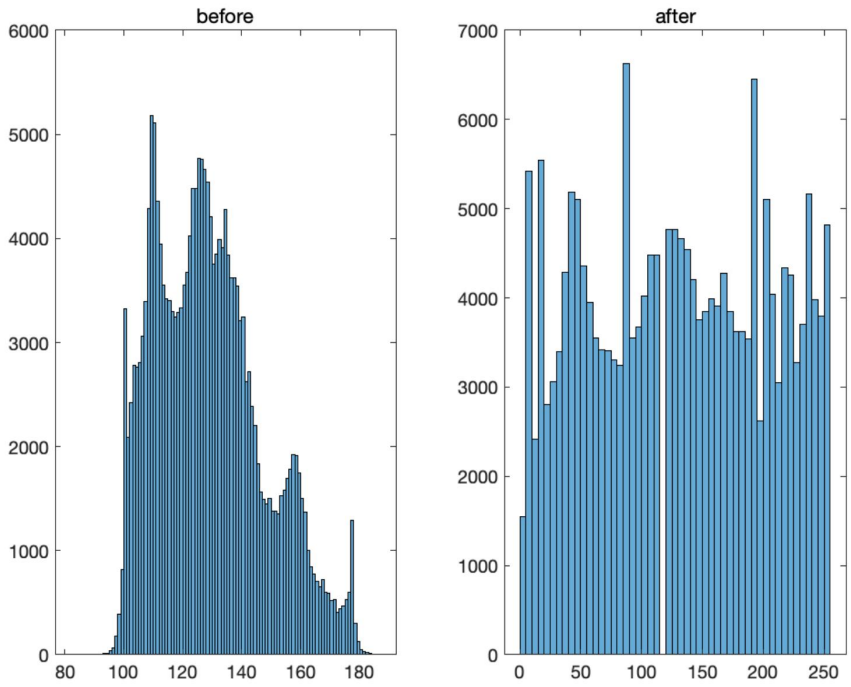
Question assigned to the following page: 2

before

after

```
% draw the histogram of brightness before and after equalization in a 1*2
% subplot
figure
subplot(1,2,1);
histogram(origin_img);
title("before");
subplot(1,2,2);
histogram(proceeded_img);
title("after");
```

Questions assigned to the following page: 2 and 3



Task 3 Correction

```
clc;clear all;close all;
I = double(imread('Image3.jpeg'));
[M,N,L] = size(I);

R = I(:,:,1);
G = I(:,:,2);
B = I(:,:,3);

J(1:2:M,1:2:N) = R(1:2:M,1:2:N);
J(2:2:M,2:2:N) = B(2:2:M,2:2:N);
J(1:2:M,2:2:N) = G(1:2:M,2:2:N);
J(2:2:M,1:2:N) = G(2:2:M,1:2:N);



figure,imshow(uint8(J),[]);
```

Question assigned to the following page: 3

```
T = zeros(M,N,3);
for i = 2:M-1
    for j = 2:N-1
        % odd green
        if mod(i,2) == 1 && mod(j,2) == 0
            T(i,j,1)=round((J(i,j-1)+J(i,j+1))/2);
            T(i,j,2)=round(J(i,j));
            T(i,j,3)=round((J(i-1,j)+J(i+1,j))/2);
        % red
        elseif mod(i,2) == 1 && mod(j,2) == 1
            T(i,j,1)=round(J(i,j));
            T(i,j,2)=round((J(i-1,j)+J(i+1,j)+J(i,j-1)+J(i,j+1))/4);
            T(i,j,3)=round((J(i-1,j-1)+J(i-1,j+1)+J(i+1,j-1)+J(i+1,j+1))/4);
        % even green
        elseif mod(i,2) == 0 && mod(j,2) == 1
            T(i,j,1)=round((J(i+1,j)+J(i-1,j))/2);
            T(i,j,2)=round(J(i,j));
            T(i,j,3)=round((J(i,j+1)+J(i,j-1))/2);
        % blue
        else
            T(i,j,1)=round((J(i-1,j-1)+J(i-1,j+1)+J(i+1,j-1)+J(i+1,j+1))/4);
            T(i,j,2)=round((J(i-1,j)+J(i+1,j)+J(i,j-1)+J(i,j+1))/4);
            T(i,j,3)=round(J(i,j));
        end
    end
```

Question assigned to the following page: 3

```
end
figure,imshow(uint8(T),[]);
```