Homework 6

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April 25, 2018

1 First Answer

Matlab Code

```
clc;
close all;
clear all;
fidcamera99 = fopen('camera99.bin','r');
[camera99,junk] = fread(fidcamera99,[256,256],'uchar');
camera99 = camera99' ;% for trasnpose of the image
figure(1);colormap(gray(256));
image(camera99);
title('Original camera99 Image');
axis off;
axis ('image');
print (figure(1),'1aa','-dpng');%writing out image for LaTeX
    purpose
I=camera99;

%Selecting the size for window
size=256;
windowsize=3;

%windowsize2=floor(windowsize/2);
Window=zeros(windowsize);
Median=zeros(size);
Erode=zeros(size);
Dilate=zeros(size);
Open=zeros(size);
Close=zeros(size);

%Performing Erode, Medain and Dilate
for i=2:255
```

```
29      for j=2:255
30          Window=I(i-1:i+1,j-1:j+1);
31          Median(i,j)=median(median(Window));
32          Erode(i,j)=min(min(Window));
33          Dilate(i,j)=max(max(Window));
34      end
35  end
36
37  %Performing Open and Close
38  for i=3:254
39      for j=3:254
40          Window=Erode(i-1:i+1,j-1:j+1);
41          Open(i,j)=max(max(Window));
42          Window=Dilate(i-1:i+1,j-1:j+1);
43          Close(i,j)=min(min(Window));
44      end
45  end
46
47  %Displaying the Results
48  figure(2);
49  colormap(gray(256));
50  image(Median);
51  title('Median filtered Camera 99 Image');
52  axis off;
53  axis('image');
54  print(figure(2),'1ab','-dpng');%writing out image for LaTeX
        purpose
55
56  figure(3);
57  colormap(gray(256));
58  image(Open);
59  title('Open Camera 99 Image');
60  axis off;
61  axis('image');
62  print(figure(3),'1ac','-dpng');%writing out image for LaTeX
        purpose
63
64  figure(4);
65  colormap(gray(256));
66  image(Close);
67  title('Close Camera 99 Image');
68  axis off;
69  axis('image');
```

```
70 print (figure(4),'1ad','-dpng');%writing out image for LaTeX
    purpose
```

Discussion:

Results: The Camera99.bin Image contains salt and pepper noise.

Median Filter: After applying the median filter we can see that the salt and pepper noise is removed from the image but the image appears to be little bit noisy i.e. the image is not as clear and lost some details. Although, there is some loss in details of the image, the image is acceptable as the salt and pepper noise is removed completely.

Open: The result of applying the open operation to camera99.bin can be seen. After applying the open operation we can see that white spots are removed from the image, but still there are black spots on the image.

Close: The result of applying the close operation to camera99.bin can be seen. After applying the operation we can see that the result is complementary as to that of Open. In close operation the white spots are preserved and the black spots are removed from the image.

Original camera99 Image

Median filtered Camera 99 Image

Open Camera 99 Image

Close Camera 99 Image

2 Second Answer

Matlab Code

```
clc;
close all;
clear all;
fidcamera9 = fopen('camera9.bin','r');
[camera9,junk] = fread(fidcamera9,[256,256],'uchar');
camera9 = camera9' ;% for trasnpose of the image
figure(1);colormap(gray(256));
image(camera9);
title('Original camera9 Image');
axis off;
axis ('image');
print (figure(1),'2aa','-dpng');%writing out image for LaTeX
    purpose
I=camera9;

%Selecting the size for window
size=256;
windowsize=3;

%windowsize2=floor(windowsize/2);
Window=zeros(windowsize);
Median=zeros(size);
Erode=zeros(size);
Dilate=zeros(size);
Open=zeros(size);
Close=zeros(size);

%Performing Erode, Medain and Dilate
for i=2:255
    for j=2:255
        Window=I(i-1:i+1,j-1:j+1);
        Median(i,j)=median(median(Window));
        Erode(i,j)=min(min(Window));
        Dilate(i,j)=max(max(Window));
    end
end

%Performing Open and Close
for i=3:254
    for j=3:254
```

```
            Window=Erode(i-1:i+1,j-1:j+1);
            Open(i,j)=max(max(Window));
            Window=Dilate(i-1:i+1,j-1:j+1);
            Close(i,j)=min(min(Window));
        end
end

%Displaying the Results
figure(2);
colormap(gray(256));
image(Median);
title('Median filtered Camera 9 Image');
axis off;
axis('image');
print(figure(2),'2ab','-dpng');%writing out image for LaTeX
    purpose

figure(3);
colormap(gray(256));
image(Open);
title('Open Camera 9 Image');
axis off;
axis('image');
print(figure(3),'2ac','-dpng');%writing out image for LaTeX
    purpose

figure(4);
colormap(gray(256));
image(Close);
title('Close Camera 9 Image');
axis off;
axis('image');
print(figure(4),'2ad','-dpng');%writing out image for LaTeX
    purpose
```

Discussion:

Results: The Camera9.bin Image contains salt and pepper noise

Median Filter: After applying the median filter we can see that the salt and pepper noise is removed from the image but the image appears to be little bit noisy i.e. the image is not as clear and lost some details. Although, there is some loss in details of the image, the image is acceptable as the salt and pepper noise is removed completely.

Open: The result of applying the open operation to camera9.bin can be seen. After applying the open operation we can see that white spots (positive spikes) are removed from the image, but still there are black spots on the image.

Close: The result of applying the close operation to camera9.bin can be seen. After applying the operation we can see that the result is complementary as to that of Open. In close operation the white spots are preserved and the black spots (negative spikes) are removed from the image.

Original camera9 Image

Median filtered Camera 9 Image

Open Camera 9 Image

Close Camera 9 Image