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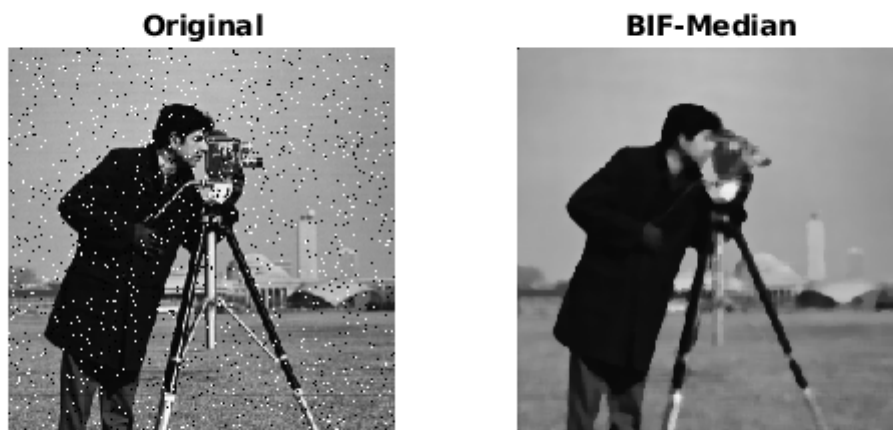
Reg_number:2048057

Write a Matlab program to implement Non- linear Spatial Filtering using Built-in and user defined functions (Eg: Median, Max, Min, Mid point filters).

```
img = imread('cameraman.tif');  
img1 = imnoise(img, 'salt & pepper', 0.04);  
[m,n]=size(img1);  
new=zeros(m,n);
```

Median Filter

```
% Built-In Function  
H = medfilt2(img1,[6 6]);  
subplot(1,2,1);imshow(img1);title('Original');  
subplot(1,2,2);imshow(uint8(H));title('BIF-Median');
```



```
% User Defined Function  
new_median=new;  
for i=2:m-1  
    for j=2:n-1  
        C=img1(i-1:i+1,j-1:j+1);  
        C1=reshape(C,1,[]);  
        new_median(i,j)=median(C1);  
    end  
end  
subplot(1,2,1);imshow(img1);title('Original');  
subplot(1,2,2);imshow(uint8(new_median));title('UDF-Median');
```

Original



UDF-Median



Max Filter

```
% Built-In Function
MaxImage = imdilate(img1, true(3));
subplot(1,2,1);imshow(img1);title('Original');
subplot(1,2,2);imshow(uint8(MaxImage));title('BIF-Max');
```

Original



BIF-Max



```

% User Defined Function
new_max=new;
for i=2:m-1
    for j=2:m-1
        C=img1(i-1:i+1,j-1:j+1);
        C1=reshape(C,1,[]);
        new_max(i,j)=max(C1);
    end
end
subplot(1,2,1);imshow(img1);title('Original');
subplot(1,2,2);imshow(uint8(new_max));title('UDF-Max');

```

Original



UDF-Max



Min Filter

```

% Built-In Function
MinImage = imerode(img1, true(3));
subplot(1,2,1);imshow(img1);title('Original');
subplot(1,2,2);imshow(uint8(MinImage));title('BIF-Min');

```

Original



BIF-Min



```
% User Defined Function
```

```
new_min=new;
```

```
for i=2:m-1
```

```
    for j=2:m-1
```

```
        C=img1(i-1:i+1,j-1:j+1);
```

```
        C1=reshape(C,1,[]);
```

```
        new_min(i,j)=min(C1);
```

```
    end
```

```
end
```

```
subplot(1,2,1);imshow(img1);title('Original');
```

```
subplot(1,2,2);imshow(uint8(new_min));title('UDF-Min');
```

Original



UDF-Min



Mid Point Filter

```
% Built-In
J = ordfilt2(img1,5,true(3));
subplot(1,2,1);imshow(img1);title('Original');
subplot(1,2,2);imshow(uint8(J));title('BIF-Midpoint');
```

Original



BIF-Midpoint



```
% User defined function
```

```
new_midpoint=new;
```

```
for i=2:m-1
```

```
    for j=2:m-1
```

```
        C=img1(i-1:i+1,j-1:j+1);
```

```
        C1=reshape(C,1,[]);
```

```
        new_midpoint(i,j)=(min(C1)+max(C1))/2;
```

```
    end
```

```
end
```

```
subplot(1,2,1);imshow(img1);title('Original');
```

```
subplot(1,2,2);imshow(uint8(new_midpoint));title('UDF-Midpoint');
```

Original



UDF-Midpoint

