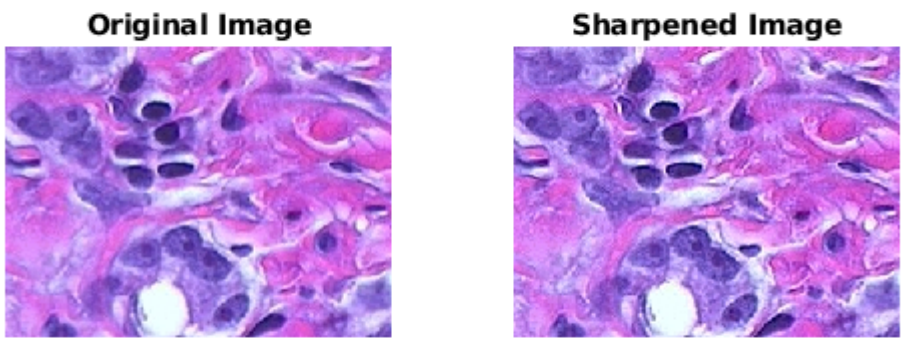
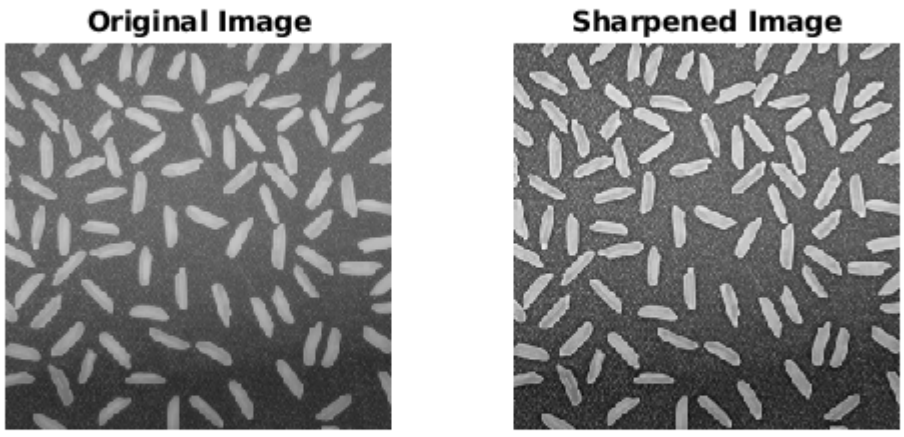
Demonstrate Image enhancement techniques

PREDEFINED METHOD

```
% B = imsharpen(A) sharpens the grayscale or truecolor (RGB) input image A by using the unsharp masking method.
Original = imread('hestain.png');
Sharpen = imsharpen(Original);

subplot(1,2,1),imshow(Original),title("Original Image");
subplot(1,2,2),imshow(Sharpen),title("Sharpened Image");
```




```
% B = imsharpen(A,Name,Value) uses name-value pairs to control aspects of the unsharp masking.
Original = imread('rice.png');
Sharpen = imsharpen(Original,'Radius',2,'Amount',1);

subplot(1,2,1),imshow(Original),title("Original Image");
subplot(1,2,2),imshow(Sharpen),title("Sharpened Image");
```



Demonstrate Image enhancement techniques Smoothing for the B&W Image.

Smoothing of the Image (USER DEFINED METHOD)

```
% Smoothing of the Image (USER DEFINED METHOD)

A = imread('coins.png');
Original = imread('coins.png');

%Preallocate the matrices with zeros
I1=A;
I=zeros(size(A));
I2=zeros(size(A));
```

```
%Filter Masks
F1=ones(3,3)/9;
F2=ones(5,5)/25;

%Padarray with zeros
A=padarray(A,[1,1]);
A=double(A);

for i=1:size(A,1)-2
    for j=1:size(A,2)-2
        I(i,j)=sum(sum(F1.*A(i:i+2,j:j+2)));
    end
end

I=uint8(I);

%Smoothed Image
B=I1-I;

subplot(1,3,1),imshow(Original),title("Original Image");
subplot(1,3,2),imshow(I),title("Filtered Image");
subplot(1,3,3),imshow(B),title("Smoothed Image");
```

Demonstrate Image enhancement techniques sharpening for the B&W Image.

Sharpening of the Image (USER DEFINED METHOD)

```
A=imread('coins.png');
Original = imread('coins.png');

%Preallocate the matrices with zeros
I1=A;
I=zeros(size(A));
I2=zeros(size(A));

%Filter Masks
F1=[0 1 0;1 -4 1; 0 1 0];
F2=[1 1 1;1 -8 1; 1 1 1];

%Padarray with zeros
A=padarray(A,[1,1]);
A=double(A);

%Implementation of the equation in Fig.D
for i=1:size(A,1)-2
    for j=1:size(A,2)-2
        I(i,j)=sum(sum(F1.*A(i:i+2,j:j+2)));
    end
end

I=uint8(I);

%Sharpenend Image
B=I1-I;

subplot(1,3,1),imshow(Original),title("Original Image");
subplot(1,3,2),imshow(I),title("Filtered Image");
subplot(1,3,3),imshow(B),title("Smoothed Image");
```

Demonstrate Image enhancement techniques Smoothing for the Color Image.

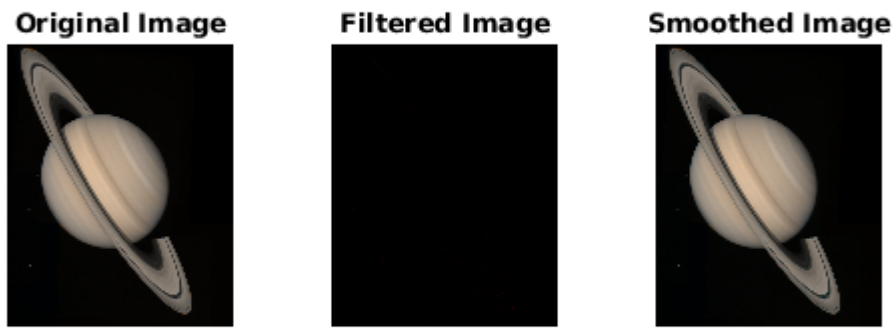
Smoothing of the Image (USER DEFINED METHOD)

```
A=imread('saturn.png');
Original = imread('saturn.png');

%Preallocate the matrices with zeros
I1=A;
I=zeros(size(A));
I2=zeros(size(A));

%Filter Masks
F1=ones(3,3)/9;
F2=ones(5,5)/25;

%Padarray with zeros
A=padarray(A,[1,1]);
A=double(A);

for i=1:size(A,1)-2
    for j=1:size(A,2)-2

        I(i,j)=sum(sum(F1.*A(i:i+2,j:j+2)));

    end
end

I=uint8(I);

%Smoothed Image
B=I1-I;


subplot(1,3,1),imshow(Original),title("Original Image");
subplot(1,3,2),imshow(I),title("Filtered Image");
subplot(1,3,3),imshow(B),title("Smoothed Image");
```

Demonstrate Image enhancement techniques sharpening for the Color Image.

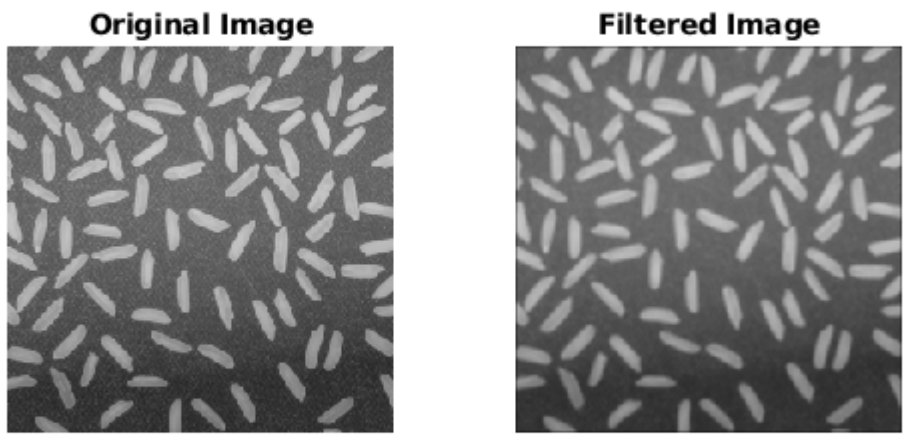
Sharpening of the Image (USER DEFINED METHOD)

```
A=imread('saturn.png');
Original = imread('saturn.png');

%Preallocate the matrices with zeros
I1=A;
I=zeros(size(A));
I2=zeros(size(A));

%Filter Masks
F1=[0 1 0;1 -4 1; 0 1 0];
F2=[1 1 1;1 -8 1; 1 1 1];

%Padarray with zeros
A=padarray(A,[1,1]);
A=double(A);

%Implementation of the equation in Fig.D
for i=1:size(A,1)-2
    for j=1:size(A,2)-2
        I(i,j)=sum(sum(F1.*A(i:i+2,j:j+2)));
    end
end

I=uint8(I);

%Sharpenend Image
B=I1-I;

subplot(1,3,1),imshow(Original),title("Original Image");
subplot(1,3,2),imshow(I),title("Filtered Image");
subplot(1,3,3),imshow(B),title("Smoothed Image");
```



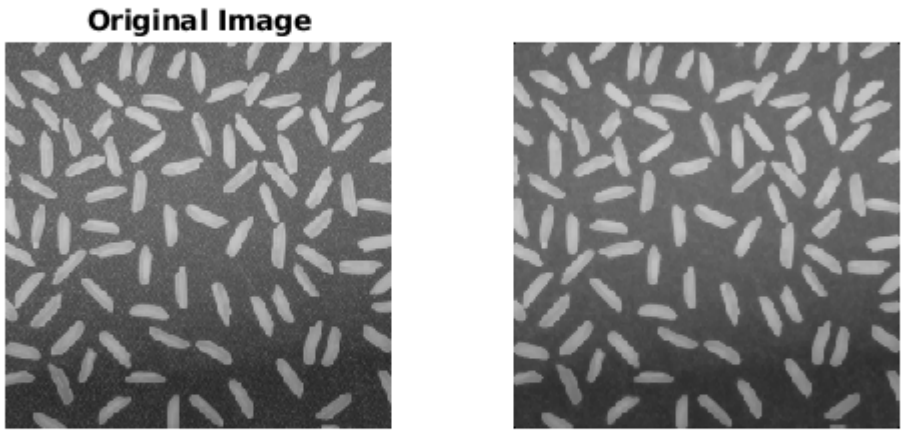
Mean Filter in MATLAB

```
I = imread('rice.png');
H = fspecial('average', 3);
I2 = imfilter( I, H );
subplot(1,2,1),imshow(I),title("Original Image");
subplot(1,2,2),imshow(I2),title("Filtered Image");
```



Median Filter in MATLAB

```
img = imread('rice.png');
imSmoothed = medfilt2(img, [3 3]);
imshow(imSmoothed)
```



Edge Detection in MATLAB

```
I = imread('coins.png');
imshow(I)
```

```
BW1 = edge(I,'sobel');
BW2 = edge(I,'canny');
figure;
imshowpair(BW1,BW2,'montage')
title('Sobel Filter                                    Canny Filter');
```

Sobel Filter

Canny Filter