LAB 6

AIM: Analysis of effect of applying different filters on the image to give it a blur effect (Smoothing Filters).

1. Take any of your grey scale photo and blur it with standard box filter of size 3x3, 5x5, 7x7 and 9x9.

  a. Perform the blurring process without using inbuilt functions.

  b. Compare the results with the results obtained using in built functions like imfilter and conv2.

```matlab
lab61.m ×   Smoothning.m ×   +
1        clear all;
2
3
4        img = imread("tiger.jpg");
5        img=rgb2gray(img);
6        figure, imshow(img), title("Original"), figure;
7
8        for i = 3 : 2 : 10
9            mask = (1/i/i)*ones(i, i);
10           res=Smoothning(img,mask);
11           subplot(2, 4, i - 2), imshow(res, []), title(sprintf("%dx%d",i,i));
12           res2 = conv2(img, mask, 'same');
13           subplot(2, 4, i - 1), imshow(res2, []), title('inbuilt Function');
14       end
```

```matlab
lab61.m ×   Smoothning.m ×   +
1        function [res] = Smoothning(img,mask)
2            [M,N]=size(img);
3            [m,n]=size(mask);
4            a=(m-1)/2;
5            b=(n-1)/2;
6            new=zeros(M+2*a,N+2*b);
7            new(1+a:M+a,1+b:N+b)=img;
8            res=zeros(M,N);
9            for i=1+a:M+a
10               for j=1+b:N+b
11                   img1=new(i-a:i+b,j-a:j+b)*mask;
12                   res(i-a,j-b)=sum(sum(img1));
13               end
14           end
15       end
```

Figure 1 × Figure 2 × +

Original

3x3

inbuilt Function

5x5

inbuilt Function

7x7

inbuilt Function

9x9

inbuilt Function

2. Take any of your gray scale photo and blur it with weighted average filter.

Compare amount of blurring with the standard box filter of the same size.


```matlab
1    clear all;
2    img=imread("tiger.jpg");
3    img=rgb2gray(img);
4
5    subplot(1,3,1),imshow(img),title("original");
6
7    mask=[1,2,1; 2,4,2; 1,2,1];
8    result=Smoothning(img,  mask);
9    subplot(1,3,2),imshow(result,[]),title("function");
10
11   result2=conv2(img,mask,'same');
12   subplot(1,3,3),imshow(result2,[]),title("inbuilt function");
```

3. Show the impact of multiple passes of the smoothing filter of same size. Derive your conclusion on image quality and maximum number of passes of filter? What happens if infinite number of passes are applied? Will it change image quality?

```
lab61.m ×   Smoothning.m ×   lab62.m ×   lab63.m ×   +
1        clear all;
2        img=imread("tiger.jpg");
3        img=rgb2gray(img);
4
5        subplot(1,3,1),imshow(img),title("original image");
6        mask=[1,2,1;2,4,2;1,2,1];
7
8        res=img;
9        res2=img;
10
11   ⊟   for i=1:10
12           res=Smoothning(res,mask);
13           subplot(1,3,2),imshow(res,[]),title(sprintf("%dx%d",i,i));
14
15           res2=conv2(res2,mask,'same');
16           subplot(1,3,3),imshow(res2,[]),title("inbuilt function");
17       end
```


original image   10x10   inbuilt function