**LAB 7 Image Filtering in Spatial Domain**

**Objectives:**

1. To get familiar with linear and non-linear filters
2. To get familiar with smoothing and sharpening filters
3. **Imfilter:** practice smoothing and sharpening filters

**f = imread(‘blurry\_moon.tif’);**

**w=[0 1 0; 1 -4 1;0 1 0]; //w is a filter**

**g1=imfilter(f, w, ‘replicate’);**

**imshow(g1, [])；**

Using unit8 format, because it is an unsigned type, negative values in the output were clipped to 0.

**f 2= tofloat(f);**

**g2=imfilter(f2, w, ‘replicate’);**

**imshow(g2, [])；//typical of the appearance of a Laplacian**

**g=f2-g2;**

**imshow(g); //sharpening result**

Replace **w** by

**w1=[1 1 1; 1 -8 1;1 1 1];**

What will be the difference?

1. **imnoise:** practice different parameters.

**g=imnoise(image, type, parameters);**

example:

**g=imnoise(image, ‘gaussian’, m, var);**

**g1=imnoise(image, ‘salt & pepper’, d);**

1. **medfilt2**

add salt and pepper noise using imnoise, remove noise using medfilt2.

**f=imnoise(image, ’salt & pepper‘, 0.2);**

**K=filter2(fspecial(.average.,3),image)/255; //average filter**

**L=medfil2(f); //media filter**

**Ls=medilt2(f, ‘symmetric’);**

1. **convolution**: using **imfilter** or **conv2**

**g=imfilter(f, w, ‘cov’, ‘replicate’);**

**I = imread(gray\_image);**

**J =double(gray\_image);**

[**h = fspecial('gaussian',hsize,sigma)**](https://fr.mathworks.com/help/images/ref/fspecial.html#d117e81237)**;**

**c=conv2(h, gray\_image);**

**figure, imshow(I); figure, imshow(J);**

**figure, imshow(c, []);**

**Exercise: Develop the program of the median filter.**