Exercise 4 – Filters (27.November.2017 16h-17h)

Filters

A small part of the image was selected and it is represented by the following matrix A:

1	1	5	6
2	3	5	7
4	5	7	1
8	5	1	2

1. Using a 3x3 kernel, represent the following filters (if possible) and show their results when applied to the above image:

a) Average Filter

b) Median Filter

c) Sobel Filter (horizontal)

d) Laplace Filter (without diagonals)

2. Apply a average filter h1=[1/3 1/3 1/3] followed by h2=$[1/3\ 1/3\ 1/3]^T$. What is the resulting filter? How many operations did you perform for a given pixel?

3. Perform these operations in Matlab using the functions fspecial/imfilter, medfilt2 (if you have the image processing toolbox), otherwise apply using conv2(A,h1,'same') and confirm the results with the ones obtained in the previous exercise.

1. Create matrix A

2. Create a 3x3 kernel representing the following filters:
a) h1 Average Filter
b) h2 Sobel Filter (horizontal)
c) h3 Laplace Filter (without diagonals)
d) h4=[1/3 1/3 1/3] followed by h5=$[1/3\ 1/3\ 1/3]^T$

3. Load a gray scale image e.g. Rose.tiff and apply the filters above.