**PRAKTIKUM 5**

**Image Smoothing**

**SISTEM PENGOLAHAN CITRA**

**PROGRAM STUDI SISTEM KOMPUTER**

**SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY**

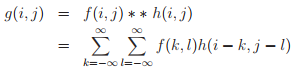
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**Image Smoothing (Average and Median)**

Smoothing operations are used primarily for diminishing spurious effects that may be  
present in a digital image, possibly as result of a poor sampling system or a noisy transmission channel. Lowpass filtering is a popular technique of image smoothing. Two common functions used in image smoothing are average and median filtering. 2D Filtering can be thought as convolution between the original image f(i,j) and the filter’s impulse response h(i,j).



One such example of mask for **mean/average filtering** can be seen below, where center element corresponds to h(0,0). Note that filter coefficients sum to 1. This prevents amplification of the DC component of the original image. Meanwhile, **median filtering**, as its name implies, is a nonlinear function that takes the **median** of the values in the mask area.



Tasks:

1. Write a Matlab/Octave function **A1=meanfilter(A)** to implement a 3x3 **mean filter** with mask function described above to image matrix A.
2. Write a Matlab/Octave function **A2=medianfilter(A)** to implement a 3x3 **median filter** with mask function described above to image matrix A.
3. Filter the provided **noise1.tif** and **noise2.tif** image with both mean and median filters (functions from tasks 1 & 2). Noise1 is an image corrupted by additive Gaussian Noise, and Noise2 is the same image corrupted by additive salt-and-pepper noise.
4. Comment on the quality of the result of using both filters on both images in your lab report.
5. Submit the **m-file of both functions**, and the **four filtered images** along with your lab report.
6. **HINT**: be careful with data types. Before **calculating the original image**, convert to **double**; before **displaying (and writing) the corrected image**, convert to **uint8**.

References:

* <https://www.gnu.org/software/octave/>
* GNU Octave Manual
* Class Materials, Slide Week 5
* Purdue ECE 438 Lab 10a: <https://engineering.purdue.edu/VISE/ee438L/lab10/pdf/lab10a.pdf>