

## Lab 2 Practice Work: Spatial Digital Filtering

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### Task 2.1

Download any gray-scale image or any RGB image and convert it to grayscale.

- 1) Determine the type of noise in the image.
- 2) If the image is noisy enough, you can skip this. Else try adding gaussian noise to the image.
- 3) Apply a 3x3 median filtering to the noise grayscale image.
- 4) Apply a 3x3 smoothing filtering to the noisy grayscale image.
- 5) Give your interpretation between the (3) and (4).
- 6) Apply a 3x3 Laplacian filtering to a grayscale image.

Try to construct the kernels for (3) and (4) and compare your results with the MATLAB inbuilt functions.

### Task 2.2

Download any image from the internet.

- 1) Apply a 3x3 averaging kernel to the image.
- 2) Increase the kernel size and convolve the image. Keep increasing the kernel size and interpret the results. Also plot the time it takes to execute the convolution as a function of the kernel size.
- 3) Repeat 1) and 2) using a kernel of your choice which you think better enhance or remove the noise as compared to the averaging kernel. Compare the execution time as a function of kernel size as well.

### Task 2.3

Use any image of your choice and

- 1) Apply 'prewitt' and 'sobel' filter to the image. Compare the two outputs.
- 2) Flip the kernel by 90 degrees by transposition and apply the filter again.

### Task 2.4

Read an image using 'imread'.

- 1) Add Gaussian noise with zero mean and 0.1 variance to the image.
- 2) Write a loop that iteratively generated a noisy image, adds it to the original image and creates a sum image. Use 10 iterations. Calculate the average image and display it.
- 3) Repeat 2) for 50, 100, 1000 iterations and compare the images.