# 0112551 Computer Vision Spring 2023
# Programming Assignment # 1

1. Write a function that convolves an image with a given convolution filter

*function [output_Image]= myImageFilter( Input_image, filter)*

Your function should output image of the same size as that of input Image (use padding).

Test your function (on attached images House1.jpg and House2.jpg) and show results on the following Kernels.

a. Gaussian Kernel ($\sigma$ =1,2, 3) Use ($2\sigma$ +1)×($2\sigma$ +1) as size of Kernel (You may write a separate function to generate Gaussian Kernels for different values of $\sigma$.)

b. Prewitt Edge Operators: $\begin{bmatrix} -1 & -1 & -1 \\ 0 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix}$ *and* $\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$

2. Attached 'Noisy image1' and 'Noisy image2' are corrupted by salt and paper noise. Apply 5 by 5 Averaging and Median filter and show your outputs. Why Median filter works better than averaging filter?

3. Implement high boost filtering using the following Masks with A=0, and 1 (on attached image Electron_Microscope.jpg) and comment on each simulation and compare the results.

| | | |
|---|---|---|
| 0 | −1 | 0 |
| −1 | $A + 4$ | −1 |
| 0 | −1 | 0 |

| | | |
|---|---|---|
| −1 | −1 | −1 |
| −1 | $A + 8$ | −1 |
| −1 | −1 | −1 |

4. Apply canny edge detector on the "Q_3.jpg" using Python function "Canny". Test two different values of Thresholds.

**Deliverables:**

1. Report including Input and Output images (Soft Copy)
2. Code (Soft copy)

## Submission Deadline: 15/04/2023 (23:59)