Image Processing – HW3 (05/28/2020)

Instructions – Follow these carefully:

1. Please upload your work as a zip file attachment to Moodle. In the zip file, it must have the source code and a PDF report where you explain and display the outputs for each problem.
2. You can use either Python or Matlab to do the work.
3. Please feel free to read related materials available in the official Matlab/Python documentation.
4. The due date is 6/9 before 11:55pm. No late submission is allowed.

Assignment:

1. Smooth filter
    a. (20%) Write a routine that performs two-dimensional 5x5 median filtering to try to clean up the noise of 'bab_noise.bmp' and 'peppers_noise.' Please exclude the noise pixels before applying median filtering.

    b. (30%) Following the previous question, use two-dimensional 5x5 Gaussian filtering with its kernel as below:

0.0232	0.0338	0.0383	0.0338	0.0232
0.0338	0.0492	0.0558	0.0492	0.0338
0.0383	0.0558	0.0632	0.0558	0.0383
0.0338	0.0492	0.0558	0.0492	0.0338
0.0232	0.0338	0.0383	0.0338	0.0232

2. Edge Detection
    a. (25%) Write a routine that performs Sobel filtering to find the edge map for 'pepper.bmp.' The result should look like https://www.mathworks.com/discovery/edge-detection.html (please implement the Sobel filter by yourself)
    b. (25%) Following the previous question, please use 5x5 Marr-Hildreth operator (shown below) to find the edge map.

0	0	-1	0	0
0	-1	-2	-1	0
-1	-2	16	-2	-1
0	-1	-2	-1	0
0	0	-1	0	0