COMP 411 Digital Image and Video Processing

Assignment II

Submission instructions:

1. Submission deadline: **22:00 Nov 4, 2022**
2. Submission method: **Canvas**.
3. Name your folder to be your student number\_your name. eg.P01234567\_Mike.
4. For programming assignments,
   1. **All the files** (including the input images and your source files**)** must be submitted in the same folder and are able to run without further settings.
   2. The marks are given based on the program correctness (60%), performance (20%) and efficiency (20%).
5. **No function except from *imread(), imwrite()* and *imshow()* from the IPCV toolbox of scilab or SIP toolbox of matlab is allowed for this assignment.**
6. **Zero mark will be given if you copy others’ work or let others copy your work!**
7. Use your own words to explain **step by step** how to spatial filter an image using a mask. (You can use diagram if it helps with your explanation.)

**(20 marks)**

1. Given the grayscale image named ‘tree.bmp’, write a function to perform **histogram stretching** on the image and display the following figures in one window:

**(Total: 30 marks)**

1. The original image. [5 marks]
2. The pdf and CDF curves of the original image. [5 marks]
3. The enhanced image. [10 marks]
4. The pdf and CDF curves of the stretched image. [10 marks]

Note: The stretching ranges should be selected properly to achieve a good high contrast effect.

(Paste your code and display results below)

1. Given the grayscale image with salt & pepper noise named ‘operahouse.tif’, write a program to perform noise reduction as below.

Note: zero padding should be used to deal with boundary pixels.

**(Total: 30 marks)**

1. Apply a 3\*3 median filter, display **and** store the denoised image in a file named ‘operahouse\_med’. [10 marks]
2. Apply a 3\*3 average filter, display **and** store the denoised image in a file named ‘operahouse\_avg’. [10 marks]
3. Which one gives a better noise reduction performance? **And** why? [10 marks]

(Paste your code and display results below)

1. Using the ‘operahouse\_med’ generated in Question 3, write a program in MATLAB/SCILAB to perform edge detection on this image, display the edge image and store it in a file named ‘operahouse \_edge’.

Note: you can choose to use any edge detection filter but make sure that it gives good performance.

**(20 marks)**

(Paste your code and display results below)