Digital Image Processing (1091) Homework #2

評分標準 Due: 2020/11/4

Note:

1. 上傳一個 zip 檔，檔名：學號_姓名_HW2.zip
2. 請將要執行的程式命名為 hw2.py
3. 沒寫註解者一律扣 10 分
4. Image 開啟請用「相對路徑」
5. 請註明額外使用的套件及安裝方法(可額外寫在 .txt 附上)
6. 請注意執行環境為 Linux 及 python3.5 以上

1. Gray-level slicing: display images from certain range of gray levels given by users. Requirements: (1) users can define the range of gray level to be displayed; (2) users can choose either preserve original values of unselected area or display them as black color.	16 分 Requirement 一項 6 分
2. Bit-Plane images: display the bit-plane images for the input image. Requirements: users should be able to select which bit-plane image to be displayed.	16 分 (Requirement: 6 分)
3. Smoothing and sharpening: providing smoothing and sharpening options for the input images by using spatial filters. Requirements: users should be able to decide the degree of smoothing/sharpening from GUI.	18 分 (Requirement: 8 分)
4. Display the Fourier Transformed images by taking "log|F(u,v)|". (Bonus: if you write the FFT function on your own instead of using built-in functions, you will get extra points.)	16 分 (Bonus: 5 分)
5. Amplitude and Phase images: Do 2D-FFT to obtain the amplitude and the phase of the image. Display its "amplitude-only image" and "phase-only image" by applying inverse 2D FFT.	amplitude-only: 8 分 phase-only: 8 分
6. Apply the homomorphic filter function modified from Gaussian high-pass filter function as shown in the textbook (e.q. 4-147) with γL = 0.4, γH = 3.0,	18 分 (Bonus: 5 分)

c = 5, and D_0 = 20 to the image “Fig0460a.tif” to see if you can get the identical result as shown in Figure 4.60(b). Bonus: design a GUI or integrate to the one you constructed earlier to display this function, and filter parameters (γL, γH, c and D_0) can be dynamically set by users	