Digital Image Processing, Assignment No.5 1399.10.9, **Submission deadline: 1399.10.15**

1- (35) Download an image suitable for applying Momomorphic filter.

a) Write a function to design a filter as given in Eq.4.9-29. As parameters to this function, pass ʎH, ʎL and the image.
b) Apply homomorphic filter by following the steps given in Fig.4.60. Display the input and output images in one window, next to each other with appropriate heading messages. In the messages, write the values of ʎH, ʎL.

Note: you should not call Matlab function to perform this filter. But you can only call FFT and inverse FFT of Matlab.

2-(25) Download a standard image.

a) Add periodic noise (by calling a Matlab function) different from that of Ex.2, such that the noisy image looks like Fig.4.64.a. Show the original, noisy and the spectrum images.
b) Manually design a notch filter appropriate for your example (i.e. as shown in Fig.4.64.b). To design this filter you can use Photoshop or Microsoft Paint. Apply the filter on image, and display the final noise removed (filtered) image.

3- (40) Draw a binary pattern of an airplane (using Paint or Ph0toshop).

a) Write a function to extract the (x,y) coordinate of all pixels belonging to the object.
b) Perform PCA by calculating the mean and covariance matrices as described in section 11.4.
c) Compute eigenvalues, eigenvectors, etc, and show the 4 images similar to those shown in Fig.11.43.

Note: In (a) you should write a function to read the graphical image you designed, and extract its vectors. These vectors are the input to the next functions, to compute mean, covariance, eigenvalues and eigenvectors you can call Matlab function, but you are not allowed to call PCA of Matlab.

Additional Notes:

a) 1-(15) means the 1st question has 15 marks from 100.

b) About comments in the program:

Each question should be written as one function in Matlab, if the question has more than one independent part, each of those parts should be written as a function.

In a function, the input and output should be specified.

Bellow each function, a short description of function should be given, also you should describe the input and output parameters or variables as follows:

Description: Here you should give a brief description on what the function is supposed to do.

Input: name each input and its description. For example if the input is an image to this function you can write: Input: img1: color input image, or monochrome input image.

Output: same as described for Input.

The main part of the code, calls each function in an order. You can have "waite(0)" in the main between two function calls, to wait for pressing a key, to start executing the next function.

Deadline Monday Dey 15.

In case of delay (until 48 hours (2 days) after the dead line), your grade will be multiplied by 0.7.

From the 3rd day to end of 5th day after the initial deadline dead line, your grade will be multiplied by 0.3.

After the 5th day, I am sorry to say that you will lose the grade for this assignment.