

## Computer Vision 404

### Project 1: Image filtering and processing

Due time: March 4, 11:59 pm

#### Given standard images (grayscale and color)

##### A) Tasks to implement

1- Add additive noise to the image.

- For example: Uniform, Gaussian and salt & pepper noise.

2- Filter the noisy image using the following low-pass filters.

-Average, Gaussian and median filters.

3- Detect edges in the image using the following masks

-Sobel ,Roberts ,prewitt and canny edge detectors.

4- Draw histogram and distribution curve.

5- Equalize the image.

6- Normalize the image.

7- Apply local and global thresholding.

8- Transform color image to gray scale image and plot of R, G, and B histograms with its distribution curve (cumulative curve that you use it for mapping and histogram equalization).

9- Implement Butterworth frequency domain filters (high-pass and low-pass, apply these filters on an image and show the effect of changing  $D_0$  and  $n$ ).

10- Form a hybrid image.

B) Report all of the above to TA's (One Zip file including report, codes, results, etc).

**Notes:**

To make your submission:

- 1) Create account per group on dropBox, create zip folder that contains mFile (containing all tasks) and report and share it with Eng. Eman Marzban emanmarzban@gmail.com and Eng. Aya Fawzy aya\_fawzy90@yahoo.com.
- 2) The report should contain the details of how functions work (even if they were built-in) , screen shots of the output at different images ,how histogram is plotted, how to calculate the distribution function, histogram equalization ,also discuss the effect of different edge detectors on same image and explain why they behave differently. Also, discuss parameters affecting edge detectors (Threshold and sigma in Canny and threshold in other detectors)
- 3) You can use built-in functions /or build your own functions with clear explanation in the report.

Functions created by students will be appreciated.

- 4) In cases of copying: both reports will be deducted in marks. In case of exact project and/or report: Both will be cancelled.