Computer Vision 404B

Assignment 1: Image filtering, processing, edge detection, hybrid images

Due time: March 7th, 2016, 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- Local and global thresholding.

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

9- Frequency domain filters (high pass and low pass).

10- Hybrid images.

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

Notes:

1. To make your submission:
   1.1. create zip folder that contains:
      1.1.1. m.File for you code.
      1.1.2. Pdf Report (see note 3).
      1.1.3. Any images or necessary attachments to make your m.file work.
   1.2. Rename your compressed Folder by your group name and the task number like : *Group#1Task#1*
   1.3. Upload your zip folder on : submission Link

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**.
   For least one time make manual functions for example:
   - convolution using for loops
   - adding the noise manually without using the imnoise function
   - Use convolution for edge detection and smoothing filters.
   - Do the histogram equalization manually

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