Assignment 1 —Image Filtering and Enhancement

Purpose

- Familiar with programing for image processing
- Understand the image filtering and enhancement algorithms

Data:
Take or download two images, with one underexposure and one overexposure.

Work to do:
1. Perform a power-law transformation on the images with r=0.3 and r=3. Show the results and analyze the results.
2. Compute the histogram of the images, and then apply the histogram equalization on them. Show the histograms before and after equalization and the equalized images.
3. Add Gaussian noise to the images and use average filter and gaussian filter to remove the noise. Show and analyze your results under two different noise levels and filter sizes.
4. Enhance the original images using the Laplacian enhancement technique.

Suggested report format:
- Cover page, with title, course number, name, student ID, date, and abstract,
- Technical discussion. Present the techniques you used for each tasks.
- Results. Show the original images and the results you obtained from each task.
- Analysis. A discussion of your results, your expectation of each operation, did you obtain the results expected? why?
- Appendix. Program list for each task with necessary comments.

Requirements:

- The assignment is due on October 25th 23:59pm local time.
- Submit your report in PDF format to ghwang@ku.edu with the subject "EECS 740 Assignment 1"
- You can use any program language you are familiar with, although Matlab is preferred.
- You can use available functions for these tasks, but you have to write at least one function by yourself.

Available resources

- Chapter 3 of the textbook
- Matlab Image Processing Toolbox