

ELEN 640, COEN 340: Image Processing I

Fall 2020

Homework 1

Due Date/Time: Wed Oct 7, 2020. 7:00 PM Pacific

Notes:

1. You can program in any language or package. Matlab or Python is preferable.
2. You have to submit the homework in the following manner.
 - a. Input and output images in a standard format – TIFF/JPEG/PNG.
 - b. Source of your implementation. This should be executable by running it in the environment – Matlab or Python.
 - c. If your program is in C/C++, you have to submit the executable along with the source code so I can execute.
 - d. A PDF file containing any required analysis or conclusions.
 - e. You are not allowed to use any built in functions for image processing operations.
3. You have to upload the files to Camino under the appropriate homework.

Problems:

1. Load the grayscale image called “circuit.tif”.
 - a. If it is in 3-channel format, convert it to single-channel uint8 format.
 - b. Quantize it to 4 bits by dividing the gray scale values into sections in the 8-bit range and mapping the values to 1 of 16 values. Show results.
 - c. Quantize it to 4 bit by knocking off the 4 lower bits. Show results.
2. Use the image “coins.tif” for this exercise. Convert it to single channel 8-bit image first.
 - a. Subsample the image by 2 in X and Y and display the results.
 - b. Perform a 3x3 averaging on the image and subsample the image in X and Y by 2 and display results.
 - c. Subsample the image by 4 in X and Y and display the results.
 - d. Perform b. twice on the original image and display the results.
3. Using the single channel 8-bit grayscale images from circuit.tif and coins.tif from #2 above, perform a point-wise gamma enhancement by using a look-up-table. Use the following gammas: 0.5, 0.8, 1.5, 2.0. Display results.
4. Using the single channel 8-bit grayscale images from circuit.tif and coins.tif from #2 above, calculate and display the histograms of the two images.