Assignment-1

Digital Image Processing (ELL715)

1. Image denoted as f(x, y), is transformed to image g(x,y). g(x,y) is 3 times larger along y-axis and 2 times larger along x-axis than f(x, y). Also g(x,y) is at 6 units horizontal and 7 units vertical distance from f(x,y).
   Write a code to do this. Show f(x,y) and g(x,y).
   Compute h(x,y) third image by rotating pixels of image 2 g(x,y) by 75∘ degrees counter clockwise.
   Write a code to do this. Show f(x,y), g(x,y) and h(x,y).

2. Take an 8-bit gray scale image and perform the following operations using MATLAB,
   a. –ve of the image, log and antilog of the image.
   b. Apply Gamma correction for gamma = 0.4, 2.5, 10, 25 and 100.
   c. 2, 3, 4 power of image.
   d. Plot Bit-planes of image (show all the 8-plane images).
   e. Plot the histogram of original image and apply Histogram equalization and plot the resulted image.
   f. Apply a transformation that highlights range [120,200] but preserves all other levels.

3. Use the test image available on the below link.
   a. Create a function to calculate the histogram and then implement histogram equalization on the test image without using inbuilt MATLAB functions.
   b. Use the built-in function on the same image and compare with the histogram from step 1. Check mean squared error of both matrices.
   c. Apply adaptive histogram equalization (CLAHE) and compare with other mapped images.

Results (3):

- Subplot the original image with the other 3 mapped images.
- Plot the 3 histograms as well, keeping the axes same on each figure.
- Mention the MSE from 2.

The test image (3) is available here: -

https://drive.google.com/drive/folders/1kQgo9J9bgqCe3DOU3eB3G8MWpYYokhrJ?usp=sharing

General instructions:

1. Submit in report format with just 3 sections: Code, Results and Conclusion.
2. Unnecessarily long codes and without explanatory comments would be considered plagiarized.