

EEE 178: Homework 1

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Note: MATLAB code is attached at the end of this document.

1. Read Image
 - See matlab code (attached)
2. Display Image
 - See matlab code (attached)
3. Transform the color to gray level
 - See matlab figure (attached)
4. Display Histogram of the image
 - See matlab code and figure (attached)
5. Resize the image to 200x200 pixels
 - See matlab code and figure (attached)
6. Transform the image to binary using two different threshold values
 - See matlab code and figures (attached) Standard threshold of 0.5 was used and the second binary image used a 0.1 threshold
7. How many bytes are needed to represent a color image of 200 by 200 pixels with 16 levels of gray?
 - $200 * 200 = 40000$
 - $16 = 2^x$
 - $x = 4$
 - 1 byte = 8 bits
 - $40000 * 4 * \frac{1}{2} = 80000$ bytes or $8KB$ (uncompressed)
8. Do you think that image difference provides a good tool for image comparison? explain.
 - It depends on the two images. If the two images are visibly different, subtracting them from one another doesn't necessarily tell us a lot visually; for example taking an image and subtracting a very dark image will produce nearly the same first image. It can help show things like error after an image is quantized. This error has uses in other applications such as predictive compression algorithms.
9. Perform addition and subtraction of two images.
 - See matlab code and figures (attached)
10. Discuss some of the advantages and applications of binary images.
 - Binary images are important because they can be used to encode data for a computer to read. Such encoders can be seen in barcodes, QR codes, fingerprints, etc. Binary images are easily compressible, and even uncompressed consume very little data as they only store 1 bit per pixel.