EE 146 COMPUTER VISION

Department of Electrical & Computer Engineering
University of California at Riverside
Tues., Thurs. 3:30 - 4:50pm, Online Class, Winter Quarter 2022
Labs Wed 8:00 --10:50am, Online; Thurs. 11:00 -- 1:50pm, Online

EE 146 Lab 1, January 5 & 6, 2022
Lab Report Due 12 &13, 2022

Goal: Master Matlab preliminaries, learn about histogram computation, Book Chaps (1, 3)

Problem 1: Become familiar with image display related functions in matlab. Display a gray scale image, color image and binary image. Find the number of rows, columns and the number of bytes/pixel. Convert a color image to a gray scale image. What transformation is used here?

Problem 2: Histograms of images are commonly used in computer vision algorithms. In this problem, you select a couple of images of each kind - gray scale, binary and color.

(a) Compute and display histogram of a high contrast gray scale image and a low contrast gray scale image. What do you observe?
(b) Compute and display histogram of a binary image. What are your observations?
(c) (i) Compute and display the histogram of a color image by its individual color channels. (ii) Now display the combined histogram of a 24 bit color image by concatenating the values of R, G, B channels/images in a single histogram vector of length 256x3 rather than having three vectors, each of length 256. This can be useful in image matching. (iii) How will you obtain the 8 bit histogram of a color image? Display your histogram. Hint: Select 3 most significant bits from Red and Green and two most significant bits from Blue channel of a color image. Form a new 8 bit representation of a color image by obtaining new pixel values for all the pixels in an image. You can display this image as a gray scale 8 bit image. It is an approximation of a 24 bit color image that is useful for a comparison of two color images for efficient matching.
(d) Compute and display cumulative histogram of an image. Hint: Use normalized histogram to obtain cumulative histogram.
(e) Compute statistical properties of an image: Mean, Variance and Median. Report your results.