CE7491 Graded Lab 3, AY2008-09 Semester 1

1. Changing Colors

Consider the image "*flowers.jpg*" and "*mask.tif*". The "*mask.tif*" image is a binary mask of the flowers in the "*flowers.jpg*" image. Write a Matlab program that changes the color of the flowers in the following manner:

(i) Swap the R and B values for the pixels in the mask and generate a new image.

(ii) Convert the RGB values into HSV and "rotate" the H values. Convert the modified HSV back to RGB to produce a new image. Do this only for the masked pixels in the flower image.

What "rotation" of H gives the most similar result to (i)?

2. Histogram Equalization in Different Color Spaces

Write a function that takes a color image and equalizes its histogram in the following three manners:

(i) Equalize the 3 RGB channels individually and combine the results.
(ii) Convert to HSV and equalize only V, convert back to RGB.
(iii) Convert to L*a*b* and equalize only L*, convert back to RGB.

Your function should show all the results side by side.

3. Edge Detection and Hough Transform

Write a script to process an image in two steps:

(i) Edge detection using the standard Canny implementation in Matlab, assuming that the region outside image boundaries are symmetrically reflected versions of the image, and
(ii) Hough transform to find the most prominent edge in the image. Your code should draw an unbroken line onto the original image.

You code should also allow for a user to interactively input different values of sigma for Gaussian smoothing in the Canny edge detector, and also different bin sizes for ρ and θ in the Hough transform.

You should test your code on the image "*sniper.jpg*".

If you use any of the higher level functions available in the image processing toolbox, you are expected to be aware not just of their functionality, but also be familiar with the *internal algorithms used*, as you will be questioned on these.