Programming Assignment-2 on course CSL506_IVP_S24

Solve any five questions out of six. Each question reserved 3 marks.

Q1. In the image **line.bmp** shown below, count only the circular objects by assigning a different label to a disconnected circular object. Use appropriate morphological operations and show the corresponding output image with a brief description of your algorithm.

Q2. Implement a **Myrgb2hsi** function to convert red-green-blue (RGB) color to hue saturation intensity (HSI). The function prototype should be:

function [H, S, I] = Myrgb2hsi(Im)

where Im is the original color image, and H, S, and I are the normalized hue value, saturation-value, and intensity value in the HSI color space, respectively. That is, H, S, and I should be in the range of [0, 1]. Load and convert **ball.bmp** to HSI color space by calling the **Myrgb2hsi** function. Display the three images in figures 1 to 3 with the appropriate titles. Call an appropriate OpenCV/Matlab function to do the similar conversion and display the three images (i.e., Hue, Saturation, and Intensity) in figures 4 to 6 with appropriate titles. Display the difference images between your results and the Matlab's results in figures 7 to 9 with appropriate titles. Explain the reason for these differences and the visual differences between your results and the Matlab's results.

Q3. Implement your own program to detect number of circles in the image **disks.png** using the circle Hough transforms method and compare the obtained output with built-in function output.

Q4. Write a program to match the given two images based of Feature Matching technique. Use SIFT algorithm for feature detection and use brute-force approach for feature matching. Use **query.jpg** and **train.jpg** to test the program. NOTE: install "pip install opencv-contribpython" to use builtin SIFT descriptor.

Q5. Implement a program to detect moving vehicles by using mean and median differencing background subtraction techniques and mention your observations and comparisons on the result. Use **traffic.3gp** video clip to test your code.

Q6. You are given an image '**city.jpg**' depicting a city block. Apply superpixel based threshodling to perform segmentation of the buildings.