EEE-6512 Image Processing and Computer Vision
Fall 2018 Homework #5
October 20, 2018

Due: November 3, 2018, 11:59 PM

This assignment should be completed individually by the student. Late submissions will not be accepted. Proper citation should be provided for any references used.

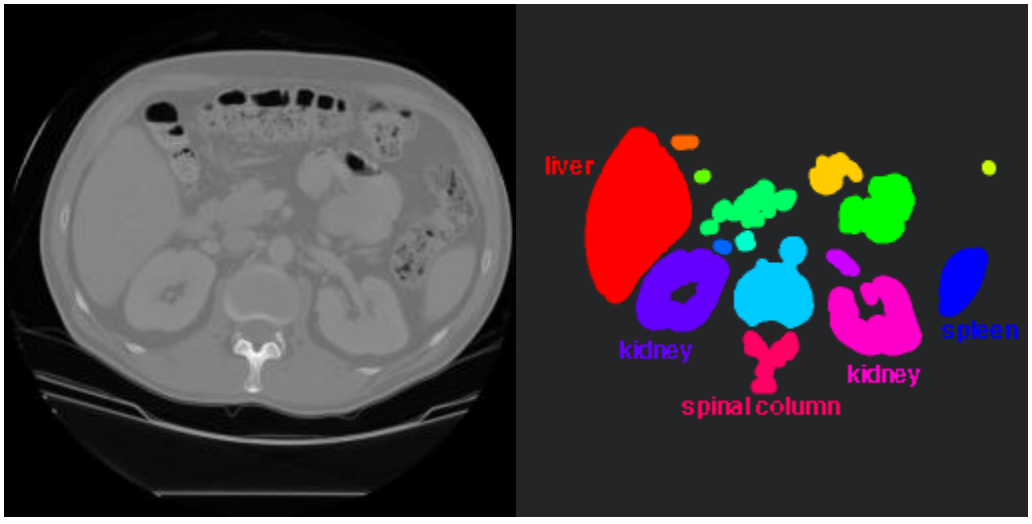
Part I: Programming [100 points]

You are to write a program based upon Otsu's algorithm to separate the foreground from the background and then extract the contours of the segmented output. You are two write your own implementations of Otsu's algorithm and contour extraction. Your implementations should be applied to the pic1.ppm file in the Homework #5 directory. Your output should be the original image with the contour of the foreground indicated by coloring the pixels white.

Part II Extra Credit [25 points]

Note: Completion of Part I is required to be awarded credit for the extra credit portion.

You are to write a program that automatically finds the organs of interest in the provided CT images. The organs of interests are the liver, kidney, and the spleen as shown below:



Original Image **Pseudo-color Image**

To accomplish this, you will have to perform the following:

- Threshold the image to produce a binary image
- Use binary operators of erosion and dilation to correct region detection
- Compute the connected regions on the image
- Produce a pseudo-color image where the three organs of interests are indicated using red, yellow, and green.

Your program should be applied to the two images in the Extra Credit directory. You are not allowed to use built-in functions for the thresholding, erosion, dilation, opening, closing, or connected components.

Your assignment write-up should include a detailed description of your programs/functions, input images, intermediate images, and output images.

To receive full credit for this assignment, you should submit the following files. 1.) Files containing the source code for your programs/functions 2.) A brief write-up which discusses the results of your programs/functions. Students should ensure that their M-files execute without warnings/errors to avoid receiving point deductions.