BME 7112 PROCESSING OF MEDICAL IMAGES SPRING 2019

Term Project (20% of final grade) **Due Date: 9:30AM 04/25/2019**

In this project, you are to provide a solution to a practical image segmentation task. The training image files, "BME7112_Data_File_9.tif", "BME7112_Data_File_10.tif," and "BME7112_Data_File_11.tif," are available on Pilot.

You are to write, in MATLAB, a program to find a one-pixel wide contour outlining each metacarpal. Try to find as many metacarpals as possible (focusing on metacarpals 2-4). You may use some limited manual input to the program (e.g., providing seed points or a general bounding box). However, the routines should be appropriate for large-scale automatic analysis of hand radiographs. The final image should contain the contours overlaid on the original image. Your program should run successfully on other similar digitized hand radiographs. For this project, all images will be of the same (left) hand, acquired under the same orientation, but the subjects' ages will vary.

This assignment consists of several different steps, such as equalizing the image, finding contours, thinning the contours to a width of one pixel, getting rid of unwanted contours, etc. Provide intermediate images to show the results of each major step in your program.

Electronically submit to Pilot, by the due date, the following files:

Code: BME7112_TermProject_YLN.m
Report: BME7112_TermProject_YLN.docx (or .pdf)

The report format is: 11 pt font, with 1.25 line spacing and 1" margins; the maximum page length is 10 pages, including figures and references. Number your pages. Include properly captioned figures displaying your intermediate and final images. Callouts to each figure are to appear in the text.

Students will demonstrate their algorithm individually to the instructor. Submit a hard copy of your final report at that time. Append all .m files to your report. Submit the complete report to the Pilot dropbox by the due date.

Your program will be evaluated on images in the training set, as well as on new image files in the evaluation set. Term project evaluation criteria and the weight of each criterion are:

Evaluation Criterion	**Points Possible**
ALGORITHM	
Quality of results, training images	5
Quality of results, evaluation images	5
Automation of processing (not overly dependent on user input)	5
Demonstrated understanding of algorithms, process	15
Solution is generalized (not specific to the training set)	5
Originality and creativity of approach	15
REPORT	
Introduction: Project purpose and relevant background information	5
Approach: Appropriate steps, logical sequence	5
Results: Conveyance of important information	10
Discussion: Interpretation of results, connection to course content	15
Quality/professionalism of report (format, grammar, punctuation, format)	15