Biomedical Image Investigation: Fall 2024

Homework 7

Due: **11/18 PM 2:10**

Please use the provided *.mat file (*HW7_T1brain*) for this assignment. Consider a T1-weighted magnetic resonance image of the human brain, which is usually used for WM/GM segmentation (WM: white matter; GM: gray matter), try to separately perform two approaches of image segmentation mentioned in class.

(a) In discontinuity-based methods, the Canny edge detector was designed for a lower error rate and single edge point response. You have constructed your own function of Canny edge detector in HW6; nevertheless, in this exercise, please use the Matlab function "*edge*" to implement Canny's method and find the optimal parameters, such as sensitivity thresholds and standard deviation of Gaussian filter, for better segmentation of WM and GM.

(b) Compare the edge image estimated from the built-in function "*edge*" and that from your homemade "canny." Comment on the possible reasons causing differences.

(c) Given that the optimum global thresholding (Otsu's method) can be performed by using "*graythresh*" in MATLAB, can you achieve satisfactory WM/GM segmentation by using this function? Comment on it.