A liver level set (LLS) algorithm for extracting liver's volume containing disconnected regions automatically

ABSTRACT

In this paper a specified method is presented to facilitate segmentation of liver volume from CT images that contain disconnected regions automatically. The disconnected region appears because the physic of the liver containing multi-lobe structure, thus different lobe make different region in a single slice image. Most of the available liver segmentation algorithms that are based on gray level operation such as thresholding and active contour fail to extract the liver volume from these images automatically. Thus the core of the algorithm is a level set function that has the availability to manage separating and joining liver boundary routinely. The liver level set (LLS) is separated into two stages which a pre-processing stage and a level set with a hybrid energy minimization algorithm. The current slice is initialized by previous segmented liver boundary allowing changes in liver boundary topological changes to be inherited. The result show a respective segmentation with average 85% DCS when comparing with manual segmentation.

Keyword: Image processing; Liver segmentation; Disconnected region; Level set algorithm