An Adaptive Method for Fully Automatic Liver Segmentation in Medical MRI-Images

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Abstract

Despite the importance of the liver segmentation in the medical images for efficient noninvasive diagnosis, few studies found in the literatures for fully automated methods for liver segmentation in Magnetic Resonance Imaging (MRI) compared to that in Computed Tomography (CT) scans. Motivated by this, we propose an adaptive fully automatic liver segmentation method for MRI images based on thresholding and Bayesian classification. Bayesian classifications have proved to be highly robust to various image degradations. It only requires a small amount of training data to estimate the parameters necessary for classification, which is a huge advantage in medical applications. Furthermore, the Bayesian model is robust when large uncertainties are involved in medical image analysis problems. The proposed method is successfully tested on many MRI cases acquired from different patients, in various sizes. Experiments proved the robustness of the proposed liver automatic segmentation process even on data from different scanner types. The segmentation accuracy of the model has a mean Dice Similarity Coefficient (DSC) of 95.5% for MRI datasets.
General terms

Image processing, Computer Vision.

References

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Index Terms

Computer Science
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Keywords

Medical Image Analysis, Automatic Liver Segmentation, Bayesian Classifier.