

Segmentation of Ischemic Stroke Lesion using Random Forests in Multi-modal MRI Images

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Multi-modal magnetic resonance imaging (MRI) can be used for detecting the ischemic stroke lesion and can provide quantitative assessment of lesion area. It can be established as an essential paraclinical tool for diagnosing stroke. For a quantitative analysis of stroke lesion in MRI images, clinical expert manual segmentation is still a common approach and has been employed to compute the size, shape and volume of the stroke lesions. However, it is time-consuming, tedious, and labor-intensive task. Moreover, manual segmentation is prone to intra-and inter-observer variabilities. Herein, we present an automated segmentation method for ischemic stroke lesion segmentation in multi-modal MRI images. The method is based on an ensemble learning technique called random forest (RF), which generates several classifiers and combines their results in order to make decisions. In RF, we employ several meaningful features such as intensities, entropy, gradient etc. to classify the voxels in multi-modal MRI images. The segmentation method is validated on training data, obtained from MICCAI ISLES-2016 challenge dataset. The performance of the method is evaluated relative to the manual segmentation, done by the clinical experts. The experimental results show the robustness of the segmentation method, and that it achieves reasonable segmentation accuracy for segmenting the ischemic stroke lesion in multi-modal MRI images.