

# Automated Segmentation of White Matter Hyperintensities in Multi-modal MRI Images Using Random Forests

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We proposed an automated segmentation framework for segmenting the white matter hyperintensities (WMH) in multi-modal MRI images. The framework is based on a machine learning technique called random forests (RF). The novelty lies in the framework is employing a set of meaningful features to segment the WMH in MRI images. These features include MRI scans intensities, MRI scans smooth intensities, MRI scans super-voxels intensities, gradient and magnitude of the gradient, Hessian features etc. The schematic procedure of the proposed framework is shown in Fig.1.

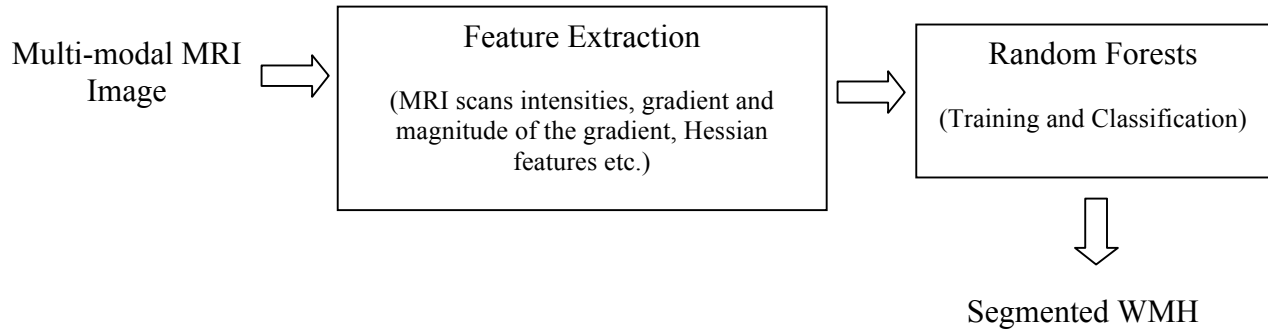


Figure 1. Schematic procedure of the proposed framework.

The Proposed framework is validated on the training data, obtained from the MICCAI WHM segmentation challenge 2017 organizers. The performance of the framework is evaluated relative to the manual segmentation, done by the clinical experts. The experimental results show the robustness of the segmentation framework, and that it achieves reasonable accuracy for the WMH segmentation in multi-modal MRI images.

The overall execution time of our segmentation framework is about half an hour for segmenting the WMH from each data set using the MATLAB R2016b on a MacBook Pro with an Intel processor (i5, 2.5 GHz) and 4 GB RAM.

Keywords: Segmentation, Automated, MRI, White Matter Lesion, Random forests