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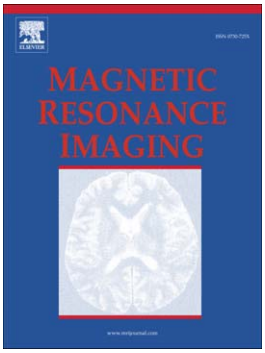

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A Level Set Method for Multiple Sclerosis Lesion Segmentation

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Abstract

In this paper, we present a level set method for multiple sclerosis (MS) lesion segmentation from FLAIR Images in the presence of intensity inhomogeneities. We use a three-phase level set formulation of segmentation and bias field estimation to segment MS lesions and normal tissue region (including GM and WM) and CSF and the background from FLAIR images. To save computational load, we derive a two-phase formulation from the original multi-phase level set formulation to segment the MS lesions and normal tissue regions. The derived method inherits the desirable ability to precisely locate object boundaries of the original level set method, which simultaneously performs segmentation and estimation of the bias field to deal with intensity inhomogeneity. Experimental results demonstrate the advantages of our method over other state-of-the-art methods in terms of segmentation accuracy.

Keywords: level set, lesion segmentation, intensity inhomogeneity, MRI.

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