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SAN2020 Submission 36

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Submission 36

Title:	An Unsupervised Method for the Segmentation of Multiple Sclerosis Lesions Using MRI
Paper:	 (Feb 14, 14:18 GMT)
Author keywords:	MRI Segmentation multiple sclerosis K means
Topics:	Neuro/bio-feedback & Related Fields
Abstract:	<p>Multiple Sclerosis (MS) is an autoimmune inflammatory disease of Central Nervous System, characterized by widespread inflammation, focal demyelination and a variable degree of axonal loss. MRI is considered to be the most common and accurate method for MS lesion allowing diagnosis and progression monitoring of the disease. The aim of this work is the development of an automated method for the segmentation of MS lesions using FLAIR magnetic resonance images. The proposed method consists of four steps: (i) preprocessing where skull stripping is performed and the contrast of the image is enhanced, (ii) segmentation of the image using K-means clustering algorithm employing as a feature the intensity of the pixels, (iii) post processing, where false positives are removed, through the application of elimination rules incorporating information about the location and the morphology of the MS lesions and expressing the medical knowledge about the disease, and (iv) the delineation and the visualization of the MS lesions. The proposed method is evaluated using a dataset of 3D FLAIR image sequences obtained from 15 patients, each one consisting of 180 slices. The proposed method is applied in each slice separately. The obtained positive predictive value is quite high. However, further improvement of the elimination rules can be performed taking into account information provided by the neighborhood slices or other MRI sequences.</p>
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