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Deep CNN based MR image denoising for tumor segmentation using watershed transform
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Abstract
Magnetic Resonance Imaging (MRI) is considered one of the most effective imaging techniques used in the medical field for both clinical investigation and diagnosis. This is due to the fact that MRI provides many critical features of the tissue including both physiological and chemical information. Rician noise affects MR images during acquisition thereby reducing the quality of the image and complicating the accurate diagnosis. In this paper, we propose a novel technique for MR image denoising using Deep Convolutional Neural Network (Deep CNN) and anisotropic diffusion (AD) which we will refer to as Deep CNN-AD. Watershed transform is then used to segment the tumorous portion of the denoised image. The proposed method is tested on the BraTS MRI datasets. The proposed denoising method produced better results compared to previous methods. As denoising process affect the segmentation process therefore better denoised images by proposed technique produced more accurate segmentation with an average Specificity of 99.85% and dice coefficient of 90.46% thus indicating better performance of proposed technique. © 2018 Authors.

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