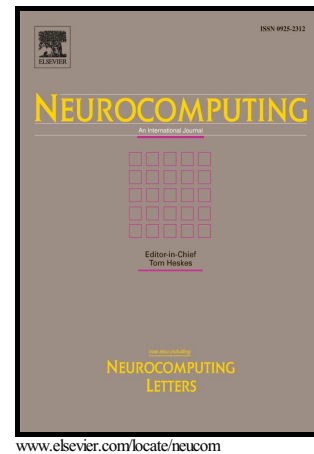


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Correntropy-Based Level Set Method for Medical Image Segmentation and Bias Correction

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Abstract

This paper presents a novel correntropy-based level set method (CLSM) for medical image segmentation and bias field correction. Firstly, we build a local bias-field-corrected fitting image (LBFI) model in the level set formulation by simultaneously using the bias field information and the local intensity information. Then, a local bias-field-corrected image fitting (LBIF) energy is introduced by minimizing the difference between the LBFI and the input image in a neighborhood, which makes it effective in segmenting images with intensity inhomogeneity. Finally, by incorporating the correntropy criterion into the LBIF energy, the proposed CLSM can decrease the weights of the samples that are away from the intensity means, which is more robust to the effects of noise. The CLSM is then integrated with respect to the neighborhood center to give a global property of image segmentation and bias field correction. Extensive experiments on both synthetic images and real medical images are provided to evaluate our method, shown significant improvements on both efficiency and accuracy, as compared with the state-of-the-art methods.

Keywords: Medical image segmentation, Level set method, Bias field correction, Intensity inhomogeneity, Active contour model

1. Introduction

Image segmentation is a fundamental problem and complex task in the field of image processing and computer vision, because the segmentation result will

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