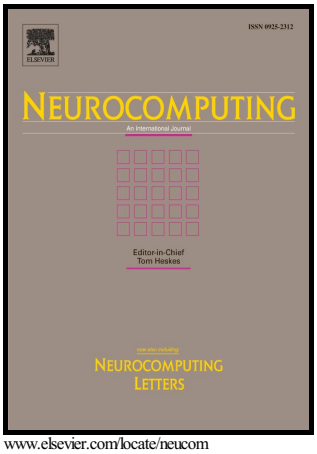

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Automatic Segmentation of Overlapping Cervical Smear Cells based on Local Distinctive Features and Guided Shape Deformation

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Abstract

Automated segmentation of cells from cervical smears poses great challenge to biomedical image analysis because of the noisy and complex background, poor cytoplasmic contrast and the presence of fuzzy and overlapping cells. In this paper, we propose an automated segmentation method for the nucleus and cytoplasm in a cluster of cervical cells based on distinctive local features and guided sparse shape deformation. Our proposed approach is performed in two stages: segmentation of nuclei and cellular clusters, and segmentation of overlapping cytoplasm. In the first stage, a set of local discriminative shape and appearance cues of image superpixels is incorporated and classified by the Support Vector Machine (SVM) to segment the image into nuclei, cellular clusters, and background. In the second stage, a robust shape deformation framework is proposed, based on Sparse Coding (SC) theory and guided by representative shape features, to construct the cytoplasmic shape of each overlapping cell. Then, the obtained shape is refined by the Distance Regularized Level Set Evolution

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