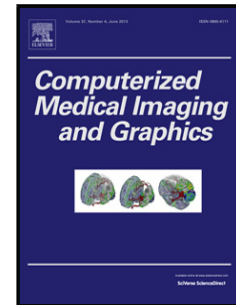


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Segmentation of Cell Nuclei in Heterogeneous Microscopy Images: A Reshapable Templates Approach

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Abstract

Histological tissue images typically exhibit very sophisticated spatial color patterns. It is of great clinical importance to extract qualitative and quantitative information from these images. As an *ad-hoc* solution, various unsupervised approaches address the object detection and segmentation problem which are suitable for limited classes of histology images. In this paper, we propose a general purpose localization and segmentation method which utilizes reshapable templates. The method combines both pixel- and object-level features for detecting regions of interest. Segmentation is carried out in two levels including both the coarse and fine ones. A set of simple-shaped templates are used for coarse segmentation. A content based template reshaping algorithm is proposed for fine segmentation of target objects. Experimentation was done using a publicly available image data set which contains 7931 manually-labeled cells of heterogeneous histology images. The experiments have demonstrated acceptable level of detection and segmentation results for the proposed approach (precision=0.904, recall=0.870 and Zijdenbos similarity index=73%). Thus, the prototype software developed based on proposed method can be considered as a potential tool for pathologists in clinical process.

Keywords:

Heterogeneous microscopy images, object detection, nuclei segmentation, reshaping

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