



ABSTRACT FORM

NEW APPROACHES TO SCENE SEGMENTATION OF CELL IMAGES

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Scene segmentation is the most difficult and error-prone process in automated cell image analysis. Since errors in the cell scene decomposition may cause cell misclassifications we have put much emphasis into the development of improved and more reliable techniques for this purpose.

Grey level thresholding can be regarded as the most simple and fastest segmentation technique and has successfully been applied by numerous authors. We have tried to improve this approach by the introduction of a hierarchical decision tree on one side and by the evaluation of cooccurrence matrices on the other. It turns out that this augmentation results in a significantly higher reliability of the derived segmentation levels.

In order to arrive at an accurate cell scene decomposition with the use of as much spatial information as available, we have applied region extraction and region growing methods to cell image analysis. Areas in the image which appear uniform in some pixel related features like e.g. colour or texture are detected with the help of modified splitting and merging schemes. In an iterative procedure the so called blobs are successively identified with the help of a likelihood model which describes the compatibility of a particular blob with a given set of interpretations. This labeling operation results in an unambiguous identification and cellular masks can be assembled from blobs of identical interpretation.

The developed algorithms are demonstrated with a given set of digitized peripheral blood smears.

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