Abstract

Image segmentation is a fundamental task in image analysis responsible for partitioning an image into multiple sub-regions based on a desired feature. Active contours have been widely used as attractive image segmentation methods because they always produce sub-regions with continuous boundaries, while the kernel-based edge detection methods, e.g. Sobel edge detectors, often produce discontinuous boundaries. The objective of the present study is to develop an automatic tool to identify and classify the different types of spiral bacterial cells in digital microscopic cell images using active contour method. Geometric features are used to identify the arrangement of spiral bacterial cells, namely, vibrio, spirillum and spirochete. The current methods rely on the subjective reading of profiles by a human expert based on the various manual staining methods. In this paper, we propose a method for bacterial classification by segmenting digital spiral bacterial cell images and extracting only three geometric features for cell classification using different classifiers, namely, 3s classifier, K-NN classifier, Neural Network classifier and Neuro Fuzzy classifiers. The experimental results are compared with the manual results obtained by the microbiology expert and demonstrate the efficacy of the proposed method.
Spiral Bacterial Cell Image Analysis using Active Contour Method

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Jersey.

Index Terms

Computer Science  Image Processing

Keywords

Cell segmentation; bacterial image analysis; vibrio; spirillum  spirochete; 3s classifier; K-NN classifier; Neural Network classifier; Neuro Fuzzy classifier; Active Contour Method