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Screening of bone marrow slide images for leukemia using multilayer perceptron (MLP)

Abstract

The ability to screen between normal and abnormal bone marrow slide images with high accuracy rate is very much needed before going for the classification of the types and subtypes of Leukemia. Beforehand, the bone marrow slide images will be implemented with digital image processing techniques which include image enhancement, image segmentation and feature extraction. They are 13 features that have been extracted from every white blood cell on both normal and abnormal bone marrow slide images. These extracted features include area, perimeter, radius, circularity, mean value for red, blue and green respectively, standard deviation and variance also from red, blue and green respectively. In this paper, the neural network based classifier, Multilayer Perceptron (MLP) is used for screening task. The MLP network is trained using the Levenberg Marquardt (LM) training algorithm. The extracted features were assigned as data input to the network and the result of the screening has been proven to have high accuracy rate which is 98.667% for training dataset and 94.5% for testing dataset.

Keywords — Bone marrow, Levenberg Marquardt, MLP, leukemia.