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Development of Supervised and Unsupervised Machine Learning Algorithms for Diagnosis of Malaria Parasites in Thin Blood Smears Using Orange Software

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Highly sensitive malaria diagnosis methods that are satisfactory for point-of-care testing in high burden areas are essential for productive treatment of the disease. Microscopists often examine blood smears to diagnose disease and compute parasitemia. Hence, the need for highly trained experts to interpret the data. In this paper, machine learning algorithms for the detection of malaria parasite in thin blood smear images is developed to abolish the reliance on human proficiency. The datasets containing 27558 cell images were obtained from National Library of Medicine, NIH. For supervised learning, logistic regression and random forest classifiers were used for classification, in which logistic regression gave 93.5% accuracy for parasitized and 96.5% for uninfected and random forest gave 90.5% accuracy for parasitized and 90.4% for uninfected. For unsupervised learning, hierarchical clustering clustered parasitized images in one cluster and uninfected in another cluster and k-means discovered two clusters from the dataset. It is concluded that, although this method may not fully abolish the need for trained experts, the algorithms can be of great assistance in aiding the diagnostic decision-making process.

Abstract Category

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