2020 IEEE 10th International Conference on System Engineering and Technology, ICSET 2020 - Proceedings Pages 267 - 272 9 November 2020 Article number 09265380 10th IEEE International Conference on System Engineering and Technology, ICSET 2020 Shah Alam 9 November 2020 Code 165464

Fast k-means clustering algorithm for malaria detection in thick blood smear

Abstract

Lots of people all over the world is threaten by a popular blood infection illness that is called as malaria. According to this fact, immediate diagnosis tests are essential to avoid the malaria parasites from expanding in every part of the body. Malaria detection is based on parasitic count process on thick blood smear samples. Anyhow, this mechanism consist the chances of misinterpretation of parasites on behalf to human flaws. Thus, this research objective is to investigate the segmentation performance for improving malaria detection in thick blood smear images through fast k-means clustering algorithm on various color models. In this research, fast kmeans clustering is used because of its advantage which is no need to retrain cluster center that causes time taken to train the image cluster centers is reduce. Meanwhile, different color models have been utilized in order to identify the most relevant color model that obviously highlight the parasites. Five varied color models namely RGB, XYZ, HSV, YUV and CMY are selected and 15 color components namely R, G, B, X, Y, Z, H, S, V, Y, U, V, C, M and Y component have been derived with the aim to discover which color component is the topnotch for malaria parasites detection. In general, around 100 thick blood smear images have been tested in this study and the outcomes reveal that the best segmentation performance is segmentation through R component of RGB with 99.81% accuracy.

Keywords

Color models; Fast k-means; Image segmentation; Malaria thick blood smear; Modified global contrast stretching