Improvement to Automated *Plasmodium vivax* Detection System toward Accurate diagnosis and prompt Treatment of Malaria cases Using Classifier Fusion

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Introduction and Objectives: Visual recognition is Common way to diagnose malaria that is very time consuming, difficult and low accuracy so the automatic detection of the disease increases the accuracy and speed of treatment. With automatic detection of the malaria parasite life stage, stage and severity of the disease can be identified. In this research, first parasite and then stages of plasmodium vivax are detected.

Materials and Methods: 400 images of malaria parasites have been used in this section. MATLAB software are used. At first, red blood cells and other stained elements of blood such as parasites, white blood cells, and platelets were extracted; then, red blood cell mask was located and features were extracted and used as classifier inputs. Using Adaboost classifier based on Decision tree with 150 repeat increased accuracy. In the next section 120 images of p.vivax used to detect stages of that.
Number of vacuoles, gradient and flat-texture features are combined and used as QD and Fisher classifier fusion input.

Result: The accuracy of detecting malaria parasite using Adaboost method was 95.5% and the accuracy of detecting p.vivax stages was 98.33%.

Conclusion: The priority of designing a fast acting system to detect and prompt treatment of discovered malaria cases in the community is obvious to protect the whole community from occurring indigenous Malaria transmission.

Keywords: classifier, Adaboost, Plasmodium, vivax, Fisher, QD, Decision-tree, fusion classifier, Malaria