ABSTRACT

Malaria detection is performed by finding the parasite in the blood which examined with a microscope test in a laboratory that has adequate infrastructure such as its building, laboratory equipment, etc. But in remote or rural areas which do not have such a laboratory, the detection of this disease requires a long time, so it is difficult for patients to receive treatment immediately and can increase the risk of death. Therefore, an integrated and portable system that can be used to diagnose malaria in situ is needed. M-Analyzer is an application that consists of several modules as a portable and smart malaria diagnostic test equipment, which performed malaria diagnosis fast and effective by using a digital microscope and computerization processing.

The design of this classification module was performed by processing images of red blood smears which had been segmented to separate the red blood cell form its background. Characteristic values like mean, standard deviation, skewness and kurtosis were extracted from histogram of the image, and entropy from co-occurrence matrix of the image, and then fed as input vector of Artificial Neural Network system with Multi Layer Perceptron (MLP) model to identify infected erythrocytes with non-infected, and classify malaria infection stage based on the life cycle of the plasmodium falciparum.

One hundred and sixty malaria images were used for training and forty malaria images were used for testing. From this classification module was obtained effectiveness of infected erythrocytes of 97.4%, trophozoite stage of 100%, schizont stage of 92.59% and gametocytes stage of 100% with a sensitivity of 100% and specificity of 80%.

Keywords: M-Analyzer, histogram, mean, standard deviation, skewness, kurtosis, entropy, co-occurrence matrix, Multi Layer Perceptron, plasmodium falciparum, infection stage, trophozoite, schizont, gametocytes.