AUTOMATIC STATUS IDENTIFICATION OF MICROSCOPIC IMAGES OBTAINED FROM MALARIA THIN BLOOD SMEARS

By

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

Automatic Status Identification of Microscopic Images
Obtained from malaria Thin Blood Smears

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Development of an accurate laboratory diagnostic tool, as recommended by WHO, is the key step to overcome the serious global health burden caused by malaria. This study aims to explore the possibility of computerized diagnosis of malaria and to develop a novel image processing algorithm to reliably detect the presence of malaria parasite from *Plasmodium falciparum* species in thin smears of Giemsa stained peripheral blood sample. The algorithm was designed as an expert system based on the method used by medical practitioner performing microscopy diagnosis of malaria. Digital images were acquired using a digital camera connected to a light microscope. Prior to processing, the images were subjected to gray-scale conversion to decrease color variability. Global thresholding was implemented to obtain erythrocyte and other blood cell components in each image. The segmented images were further processed to obtain informative features that were further used in classification stage. Two-stage classification using selected features was built based on Bayesian Decision Theory. Malaria samples, prepared and provided by Eijkman Institute of Molecular Biology Indonesia, were used to build and test the proposed algorithm.

Keywords— malaria, thin blood smears, image segmentation, thresholding

DEDICATION

I dedicate this thesis to, first and foremost, Jesus Christ who makes my life amazing. In addition, to my life mentor Ir. Poerwanto Pratikno, my life coach Ms. Sanny Djohan, Irene "Jo" with whom I share similar ambition, and my family who sometimes do not understand me but always loves me unconditionally.

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