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Clasification of Malaria Images in Thropozoid Stages Using Deep Learning Models

Abstract

The risk of malaria infection is very high, especially for people living in eastern Indonesia, such as Papua, Maluku, and Nusa Tenggara. In Indonesia there are several types of malaria parasite infected, Plasmodium Falciparum, Plasmodium Vivax, and Plasmodium Malaria. Identifying malaria at an early stage is an important to reduce the risk of death and find suitable treatment. However, identifying and diagnosing malaria is time consuming. Therefore, it is necessary to apply technology in detecting the class of malaria parasites. This study classified images of malaria parasites Plasmodium Falciparum, Plasmodium Vivax, and Plasmodium Malarie at the trophozoite stage using the deep learning pre-trained models AlexNet and Inception-V3. According to accuracy of training, Inception-V3 is the best deep learning model. The performance analysis result of inception is accuracy 98.98% ± 0.71%, precision 98.83% ± 1.44%, recall 98.83% ± 1.38%, specificity 99.11% ± 1.09%, and F-score 98.82% ± 0.83%. However, despite having lower accuracy and performance AlexNet have faster in computational training time.

Keywords

AlexNet; Inception-V3; Malaria parasite