

An Improved Transfer Learning-Based Model for Malaria Detection using Blood Smear of Microscopic Cell Images

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Abstract— Because of insufficient medical specialists in some parts of the African and Asian continents, malaria patients' mortality rates have increased over the years. Since the people of regions generally suffer from malaria diseases, computer-aided detection (CAD) technology is required to decrease the number of casualties and reduce the waiting time for consulting by a Malaria specialist. This study shows the potential of transfer learning, a method of Deep Learning (DL) to classify the smeared blood of microscopic malaria cell images to determine whether it is parasitized or uninfected. This classification of malaria cell images will enhance the workflow of health practitioners at the frontline, especially microscopists, and provides them with a valuable alternative for malaria detection based on microscopic cell images. Although many technological advancements and evaluation techniques for identifying the infection exist, a microscopist at regions with limited resources faces challenges in improving diagnostic accuracy. We compared and evaluated a type of pre-trained CNN models, such as ResNet-50 and our appended Resnet-50+KNN. The experiment shows that our new model has the excellent capability and can perform better on malarial microscopic cell image classification with a higher accuracy rate of 98%.

Keywords—*malaria, deep learning, transfer learning, resnet50, microscopic cell image*