ABSTRACT

Macula is the main area for sensing which is positioned in the middle of the retina. The damage of macula in retina can result in permanent visual loss in people the world. Disease diagnosis in macular retinal pathology is still done manually by experts, but it takes a long time, as it involves examining and evaluating pathological images of the macula on the human retina. As a result, the final project involves the creation of an automated system that can detecting and classifying macular retinal pathology.

In this Final Project, we design an automatic system to classify pathological conditions of the macula retina based on Convolutional Neural Network (CNN) using MobileNet architecture. The design of the system is divided into several stages starting from inputting OCT image data, the next stage is preprocessing, in this study using three preprocessing, namely CLAHE, Gaussian filter, and Gabor filter, then from the results of preprocessing image augmentation is carried out. After going through the image augmentation stage, the training stage is carried out with two different types of optimizers, namely Stochastic Gradient Descent (SGD), and Adaptive moment (Adam). The last stage is to classify image data into four classes, namely Choroidal Neovascularization (CNV), Diabetic Macular Edema (DME), Drusen, and normal.

The final results of this study show the best results for the classification of macular pathology on the retina based on retinal OCT images, resulting in a test accuracy value of 92.04%, and a test loss of 0.299. In addition, for the results of the system performance test, the average value generated is recall, precision and F1-score. yields a percentage of 92.04% for recall, 91.75% for precision and 92.25% for F1-score. These results are obtained by using the best optimizer, namely the Adam optimizer with the best preprocessing, namely the Gaussian filter.

Keywords: *macula, retinal pathology, CNN, Mobilenet, retinal image OCT* CNV, *Drusen,* DME, SGD.