ABSTRACT

Diabetic Retinopathy (DR) is a disease that damages the retina of the eye due to the rupture of blood vessels in the retina. The cause of DR is the inability of blood to circulate oxygen in the blood vessels around the retina, which over time will rupture and form connon-wall spots. Early inspection is one way to avoid fatal damage. If not treated quickly, the patient will experience permanent blindness. So we need a system that can detect and classify DR automatically.

The research that will be conducted aims to create a DR classification system according to its severity using fundus images. The classification of DR is divided into five classes, namely No DR, Mild, Moderate, Severe, and Proliferative DR. The dataset used in making the system is the APTOS 2019 Blindness Detection dataset with a total of 3662 fundus images. Furthermore, the dataset will be augmented to 800 in each class. The dataset will go through a preprocessing process and dataset distribution. During the model training process, the system will use K-fold cross-validation to select the most optimal model.

This research uses Convolutional Neural Network (CNN) with the MobileNetV2 architecture. From the results of research conducted based on the scenarios tested, the best model in this study is a model that uses parameters batch size of 64, learning rate of 0.001, optimizer RMSprop, and epoch 100 with an accuracy of 91.25% and a loss value of 0.349. The best model has a system performance with a precision value of 91.60%, a recall value of 91.40%, and f1-score value of 91.20%.

Keywords: *Diabetes Retinopathy, Convolutional Neural Network (CNN), MobileNetV2*