

ABSTRACT

Diabetic Retinopathy is an eye disease caused by Diabetes Mellitus. Diabetic Retinopathy is a common and specific microvascular complication of diabetes and remains the leading cause of preventable blindness in people of working age. Research conducted by Soewondo et al (2010), as many as 42% of 1785 people with diabetes mellitus in Indonesia experienced complications of Diabetic Retinopathy. So Diabetic Retinopathy becomes a serious problem in Indonesia.

We designed an Android application, namely DR-Check, using *Machine Learning* which has a basis for detecting eye examination results with a fundus photo tool to instantly detect fundus image results for *Diabetic Retinopathy* based on the five levels of the disease, namely No_DR (without Diabetic Retinopathy), Mild_DR (mild.), Moderate_DR (moderate), Severe_DR (severe), and Proliferate_DR (very severe). We have two main features, namely directly scanning a fundus image photo using a smartphone camera and uploading a fundus image photo through the gallery from the smartphone. This research aims to help medical personnel more quickly and accurately detect the symptoms of Diabetic Retinopathy.

This research uses the Convolutional Neural Network (CNN) method with the EfficientNetV2s architecture. All datasets used are secondary datasets obtained from Aravind Eye Hospital in India and the GNU Lesser General Public License which can be downloaded via the website www.kaggle.com. We compare hyperparameter combinations to get the best results. We got the best results using the Adamax optimizer, learning rate 0.001, batch size 32, and epoch 100 with an accuracy of 80%. The DR-Check test is carried out in two ways, namely taking pictures directly and uploading pictures from the user's smartphone gallery. From 5 trials of each method, we get 0 predictions correct for the first method and 2 predictions correct for the second method.

Keywords: Android, *Convolutional Neural Network (CNN)*, *Diabetic Retinopathy*