

ABSTRAK

Retinopati Diabetik terjadi karena adanya pelebaran hingga kebocoran pada pembuluh darah di area retina mata. Hal ini disebabkan oleh peningkatan kadar gula darah sehingga kadar hormon *insulin* dalam tubuh berkurang. *International Diabetes Melitus Federation* (IDF) melaporkan bahwa Indonesia berada di urutan ketiga negara sebanyak 29,1 juta penduduk menderita Diabetes Melitus dalam rentang usia 20 - 79 tahun. Dalam penelitian ini, dilakukan pendeteksian terhadap tingkat keparahan retinopati diabetik yang terdiri dari normal, *mild*, *moderate*, *severe* dan *proliferative* berdasarkan gambar retina. Metode yang diusulkan merupakan salah satu metode dalam *deep learning*, yaitu *convolutional neural network* (CNN) dengan arsitektur *deep residual network* (ResNet). Penelitian dilakukan dengan melatih model ResNet-18, ResNet-34, ResNet-50, ResNet-101 dan ResNet-152. Hasil penelitian menunjukkan bahwa arsitektur dengan jumlah layer terbanyak merupakan model pembelajaran fitur terbaik. Sehingga dari model ResNet-152 yang dilatih, diperoleh tingkat akurasi sebesar 99,82% dengan waktu selama ± 13 detik dalam melakukan identifikasi tingkat keparahan retinopati diabetik pada gambar retina.

Kata Kunci: Retinopati Diabetik, *Deep Learning*, resnet

ABSTRACT

Diabetic Retinopathy occurs due to dilation to leakage of blood vessels in the retina area of the eye. This is caused by an increase in blood sugar levels so that insulin levels in the body decrease. The International Diabetes Melitus Federation (IDF) reports that Indonesia is in third place with 29.1 million people suffering from Diabetes Mellitus in the age range of 20 - 79 years. In this study, detection of the severity of diabetic retinopathy consisting of normal, mild, moderate, severe and proliferative was carried out based on retinal images. The method proposed is one of the methods in deep learning, namely convolutional neural network (CNN) with deep residual network architecture (ResNet). The research was conducted by training the ResNet-18, ResNet-34, ResNet-50, ResNet-101 and ResNet-152 models. The results showed that the architecture with the highest number of layers was the best feature learning model. So that the increased ResNet-152 model, obtained an accuracy rate of 99.82% with a time of ± 13 seconds to service the severity of diabetic retinopathy on retinal images.

Keywords: Diabetic Retinopathy, *Deep Learning*, ResNet