

Deteksi Penyakit Mata pada Fundus Image Menggunakan Metode CO-ResNet Convolution Neural Network (CNN) = Detection of Eye Disease on Fundus Image Using CO-ResNet Convolution Neural Network (CNN) Method

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Abstrak

Penyakit mata perlu pendeteksian dan diagnosis yang tepat mengingat peran organ mata yang penting dalam kehidupan. Salah satu cara mendeteksi penyakit mata yang menyebabkan kebutaan adalah melalui ophthalmoscopy, dengan hasil pemeriksaan berupa citra fundus. Penelitian ini menggunakan metode Convolution Neural Network (CNN) dengan arsitektur CO-ResNet. Data yang digunakan dalam penelitian ini diambil dari online database yang berisi data multi-kelas penyakit mata. *Preprocessing crop center* dan *resize* digunakan dalam penelitian ini agar ukuran data citra dapat dijadikan input model. Fungsi optimasi untuk meminimalkan loss function ketika melatih model yang digunakan dalam penelitian ini adalah fungsi Adam dengan setting hyperparameter learning rate, epoch, $\delta^{1/2}_1$, dan $\delta^{1/2}_2$. Fungsi loss yang digunakan untuk masalah pengklasifikasian multikelas dalam penelitian ini adalah categorical cross entropy. Hasil penelitian menunjukkan nilai yang diperoleh dengan training loss terkecil sebesar 0,4066 dan validation loss terkecil sebesar 0,4950. Sementara itu, nilai training accuracy terbaik sebesar 87% dan validation accuracy terbaik sebesar 79%. Setelah melalui proses training, dilakukan proses testing untuk mengevaluasi kinerja model. Hasil testing terbaik yang didapat dengan nilai testing accuracy sebesar 75,25%, precision sebesar 75,6%, recall sebesar 75,4%, dan F1-score sebesar 75,4%. Secara keseluruhan, metode CO- ResNet bekerja dengan cukup baik dalam mengklasifikasi dan mendeteksi penyakit mata.

.....Eye diseases need proper detection and diagnosis considering the important role of eye organs in life. One way to detect eye diseases that cause blindness is through ophthalmoscopy, with the results of the examination being an image of the fundus. This research uses the Convolution Neural Network (CNN) method with CO-ResNet architecture. The data used in this study were taken from an online database containing data on multi-class eye diseases. Preprocessing crop center and resize are used in this study so that the size of the image data can be used as model input. The optimization function to minimize the loss function when training the model used in this study is the Adam function with the hyperparameters setting are learning rate, epoch, $\delta^{1/2}_1$, and $\delta^{1/2}_2$. The loss function used for the multiclass classification problem in this study is categorical cross entropy. The results showed that the value obtained with the smallest training loss was 0.4066 and the smallest validation loss was 0.4950. Meanwhile, the best training accuracy value is 87% and the best validation accuracy is 79%. After going through the training process, a testing process is carried out to evaluate the performance of the model. The best testing results were obtained with testing accuracy values of 75.25%, precision of 75.6%, recall of 75.4%, and F1-score of 75.4%. Overall, the CO-ResNet method works quite well in classifying and detecting eye diseases.