

ABSTRACT

Alzheimer's disease can permanently destroy brain cells that are involved in memory and thinking ability. Alzheimer's disease is a neurodegenerative disease with a significant impact on the lives of patients. Early detection and treatment of patients with Alzheimer's disease is very important because it can help delay the development of the disease and its symptoms. Detection and classification of Alzheimer's disease using MRI images is still done manually by doctors, so a system is needed as another alternative to doing this.

In this study, a classification system for Alzheimer's disease was designed with four classes, namely Mild Demented, Very Mild Demented, Non Demented, and Moderate Demented. The system is designed using a CNN (Convolutional Neural Network) model with an EfficientNet architecture based on brain MRI images as input. The dataset that will be used in this research is taken from Kaggle with the name Alzheimer's Dataset (4 Class of Images). The dataset is divided into 75% as training data and 25% as test data.

The experiment was carried out using two datasets, namely the original image and the augmented image. The best Hyperparameter obtained in the test using the original image are 200×200 pixel image resize, Adam optimizer, learning rate of 0.001, epoch 50, and batch size 16. The system performance from the test results gets an accuracy value of 0.93, a precision value of 0.95, the recall value is 0.92 and the f1-score is 0.93. While the best Hyperparameter obtained using augmented images are image resize measuring 100×100 pixels, Nadam optimizer, learning rate 0.001, epoch 50, and batch size 16. The system performance from the test results gets the values of accuracy, precision, recall and f1-score which is 0.97.

Keywords: *Alzheimer, Convolutional Neural Network, EfficientNet.*