ABSTRACT

The high mortality rate due to brain tumors causes this disease to be detected early. However, the detection of brain tumors is still done by reading the MRI results manually by the medical team, which poses a risk of errors when reading the data. Therefore, research is required to develop an automated brain tumor detection system, especially to identify the types of brain tumors that patients suffer from.

In this final project, a system has been created to classify brain tumor types into four classes: no tumor, glioma, meningioma, and pituitary. Convolutional neural network (CNN) with AlexNet architecture will be used to develop the system. The dataset utilized in this research is comprised of 3,264 datasets measuring 224 pixels in jpg format and was acquired online via Kaggle. This research will also add an augmentation method to the training process to obtain more varied data.

The objective of this research project is to create a CNN-based system for classifying brain tumor types, then analyze the parameters that affect system performance based on the influence of the optimizer, learning rate and batch size. Parameters that used to evaluate system performance are accuracy, precision, recall, f-1 score, and loss function. Based on the results of system testing, the best model was obtained with the AdaMax optimizer, learning rate of 0.001, iteration of 55 epochs with early stopping, and batch size of 32. The relust of the two types datasets were not much different, however the best results were shown in the augmented dataset with an accuracy of 94, 00%, the precision of 94.00%, the recall of 94.50%, and the f1-score of 94.25%.

***Key words**: Brain Tumors, Convolutional Neural Network (CNN), AlexNet.*