ABSTRACT

Brain tumors are malignant tumors that develop as a result of uncontrolled cell division, hence the need for early detection. Because the detection of brain tumors is still done manually by reading the MRI results by the medical team, there is a risk of errors when reading the data. Therefore, further research is needed to develop an automatic brain tumor detection system, especially to determine the type of brain tumor suffered by patients using deep learning.

This final project will provide a system to identify brain tumors into four categories: no tumor, glioma, meningioma, and pituitary. The Convolutional Neural Network (CNN) with *ResNet*-18 architecture will be used to build the system used in this paper. This study uses public data on brain tumors collected online through Kaggle, which has 7,043 jpg format datasets. This information will be used to train and test the best model.

This study aims to design a system to classify brain tumor diseases using CNN with *ResNet* architecture and analyze the parameters that affect system performance based on the influence of preprocessing, optimizer, learning rate, and mini batch size. From the results of system testing that has been carried out, the best results are obtained using the Adam optimizer, learning rate 0.0001, and mini batch size 32 using the original dataset. Of the four types of datasets, the results obtained are not too significant differences, but the best model is obtained using the original dataset with 96.49% accuracy, 96.18% precision, 96.49% recall, and 96.33% f1-score.

Keywords: Brain tumor, Convolutional Neural Network (CNN), *ResNet*.