ABSTRACT

Brain tumors is a dangerous disease that can affect brain performance. This disease can be detected by performing a Magnetic Resonance Imaging (MRI) Scan. Currently, radiologists diagnose brain tumors manually by reading the MRI image of patient's brain. However, this method can reduce the accuracy of diagnosis due to the limitations of the human eye which is prone to errors.

In this final project, a deep learning-based system is designed, the Convolutional Neural Network (CNN) with AlexNet architecture. The number of *dataset*s used in this study were 6484 MRI images with four classes, that are glioma, meningioma, pituitary, and no tumor sourced from Kaggle.com. In this classification system, several parameters were tested to reach optimal results.

The parameters that were tested are image size, data ratio, type of optimizer, learning rate, batch size and number of epochs. These parameters are then analyzed based on accuracy, loss, recall, precision, dan f1-score. According to the results, the optimal parameters are obtained with a 224x224 pixels of image size, 80% of training data, 10% of validation data, 10% testing data, using Adam optimizer, 0.0001 of learning rate, 8 of batch size and 50 number of epochs. The results obtained 98,84% of accuracy, 0,1616 of loss, with 97,65% of precision, 97,65% of recall, and 97,6% of f1-score.

Keywords: Brain tumor, Classification, Convolutional Neural Network, Alexnet