ABSTRACT

In the development of modern society, the interaction between humans and computers is becoming more frequent, so it is necessary to classify expressions to facilitate interaction between computers and humans. Several studies have discussed the classification of naming expressions with fewer types of classification and different datasets. In this study, classification improvements were made using seven different classes and datasets to improve the previous research. Based on this, this study will classify data using digital images divided into seven classes. The classes themselves are namely, happy, sadness, anger, disgust, contempt, fear, surprise using the Convolutional Neural Network (CNN) with the NNNS-Net architecture, consisting of three hidden-layer and AlexNet. The overall stages of the method used are data acquisition, pre-processing, classification with CNN, and analyzing results. This final project-designed model is generally divided into two main processes: training and testing. First, the model was trained using a combination of several hyperparameters, including input size, optimizer, learning rate, and different batch sizes to get the best model. Finally, the results will be analyzed with accuracy and loss parameters. The result of this study is showing the best performance from the model is using dataset with gaussiang pre-processing and AlexNet architecture. Tuned hyperparameter that giving best result are 128x128 pixels for the input size, Adam as the *optimizer*, *learning rate* with value 0.0001, and *batch size* with value 64, which has validation accuracy of 99,43%, loss validation of 0.0307 and testing accuracy of 97.21%

Keywords: Facial expression, Facial expression recognition, Convolutional Neural Network, AlexNet.