

ABSTRACT

Facial expressions are crucial in helping people to communicate both verbally and non-verbally. Recognizing the facial expressions of the person we are speaking with is the best method to comprehend their intentions to achieve effective communication. Recognizing the other person's facial expressions is an important way to find out what is really going on with the person and makes it easier for us to communicate, but this is difficult for people with autism because of their inability to catch and define changes in the other person's facial expressions.

This Final Task was conducted to design a classification system for facial expression recognition using the Convolutional Neural Network (CNN) method. The architecture used in this is Residual Network 34 (ResNet-34). This Final Task uses the Cohn Kanade (CK+) dataset, where the CK+ dataset has image data as many as 981 facial expressions with seven (7) kinds of expressions, including anger, disgust, fear, happy, sadness, surprise, and contempt. To optimize the system's accuracy, the preprocessing process was done on the image in the form of Contrast Limited Adaptive Histogram Equalization (CLAHE) and Gaussian Filter inputs. The next step is the data training process which uses three (3) optimizers: Adaptive Moment (Adam), Stochastic Gradient Descent (SGD), and Root Mean Square Propagation (RMSProp).

The test scenario in this Final Task is to compare the system performance based on testing the amount of training and test data, preprocessing testing, optimizer testing, the influence of learning rate values, and batch size. The findings show that the best model for facial expression classification is the RMSProp optimizer using the original image without preprocessing which has an accuracy of 99.49%.

Keywords: *Facial Expressions, Convolutional Neural Network (CNN), Residual Network 34*