

ABSTRACT

Apart from being a person's identity, the face is also a supporting tool in socializing verbally and non-verbally. One of the non-verbal languages that humans often use to interact is facial expressions. Recognizing facial expressions is an important way to give the right response to the other person so that communication between two or more people becomes smooth and meaningful.

This final project designs a system for face recognition using the Convolutional Neural Network (CNN) method with the VGG-19 architecture. The classification system works through several stages starting with inputting the input image in the form of a face image. then use two different types of preprocessing, namely CLAHE and Gaussian Filter. Then the training stage uses three different optimizations, namely Stochastic Gradient Descent (SGD), Root Mean Square Propagation (RMSprop) and Adaptive moment (Adam) and the last stage is the classification of facial expression image data into 7 classes, namely angry, sad, disappointed, surprised, surprised and scared. The dataset used is Cohn Kanade (CK)+ obtained from the Kaggle website in the form of 981 images of facial expressions.

In this study, testing was carried out on preprocessing, the effect of optimization, the effect of the number of epoch variations, the effect of the amount of training data and test data and the comparison of system performance. The performance parameters to be analyzed are based on the level of accuracy and loss. The final result shows that the best model for facial expression classification is VGG-19 with Adam optimization and CLAHE preprocessing, at epoch 30 with 20% test data and 80% training data, which produces an accuracy value of 99.42%.

Keywords: *Facial expressions, Convolutional Neural Network (CNN), VGG-19, CLAHE, Gaussian Filtering, Cohn Kanade (CK+).*