

ABSTRACT

Facial expressions are a form of non-verbal communication that can convey one's feelings to the observer. Humans can tell a person's emotional state just by looking at facial expressions, while computers don't have this ability. Digital image processing allows computers to know a person's emotional condition with a facial expression recognition system. Facial recognition system technology can continue to develop over time with new research to create a more sophisticated and accurate system, one of the developments in this case is using the Deep Learning method. Deep Learning produces excellent performance on facial recognition systems that use large amounts of data. One of the Deep Learning algorithms, namely Convolutional Neural Network (CNN) is an algorithm that is suitable to be implemented in facial recognition systems with large amounts of data. In this final project design a face recognition system using the CNN algorithm which aims to find the best accuracy results obtained from the proposed model.

The system designed is a facial expression recognition system using the Python programming language, as well as several libraries for machine learning purposes that the main library is Tensorflow. The CNN algorithm is used in a system designed to classify the datasets used, the model used for CNN-based architecture is Visual Geometry Group 16 (VGG16). The dataset used in this system is FER2013, where this dataset has a large number of facial images, namely 35,887 images with 7 categories of emotions. The model proposed in this final project is a modified VGG16. The best performance results were obtained on the proposed model, namely the Modified VGG16 model with the parameters using augmentation data, epoch 100, and learning rate 0.001 which reached a test accuracy of 70.63%, this accuracy is much better than previous works using the VGG16 base model and the FER2013 dataset.

Keyword: *Facial Expression Recognition, Convolutional Neural Network, VGG16, FER2013, Deep Learning*