Facial Expression Recognition Application Using a Deep Learning Approach with Convolutional Neural Network (CNN) Algorithm
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ABSTRACT

Facial expressions are a very important form of non-verbal communication, especially for children with special needs such as autism and the blind, who often have difficulty in recognizing or conveying emotions. This study aims to develop an Android-based application as an assistive technology that is able to detect and classify facial expressions in real-time using the Convolutional Neural Network (CNN) algorithm. The CNN model was trained using the FER2013 dataset with 48x48 pixel grayscale images, then converted to TensorFlow Lite (TFLite) format to be compatible and lightweight to run on Android devices. This application provides two main features, namely direct facial expression scanning through the camera and educational games designed to train the ability to recognize expressions. Testing was carried out through case studies at YPAC Jember and SLBN Jember by involving teachers as evaluators. The results showed that the model achieved a training accuracy of 71.98% and a validation of 65.62%, while user satisfaction testing (UAT) produced an average value of 73.93%, indicating that the application has the potential to continue to be developed and refined.

Key words*: Facial Expression, Deep Learning, Convolutional Neural Network, Autism, Visual Impairment.*