ABSTRACT

Sign language is the primary mode of communication for individuals with hearing and speech impairments. However, the general public's limited understanding of sign language hinders effective social interaction. Currently, researchers are employing a variety of methods to address this issue by leveraging computer vision technology and utilizing Convolutional Neural Network (CNN) algorithms to detect motion in sign language. However, challenges remain, such as vulnerability to vanishing gradient and overfitting within the model. This study aims to develop a sign language detection model based on deep learning using Convolutional Neural Network (CNN) and ResNet-34 architectures, along with image augmentation techniques to address vanishing gradient and overfitting issues. The resulting model was tested using the Sistem Isyarat Bahasa Indonesia (SIBI) dataset. The test results indicate that the model with image augmentation, trained over 50 epochs, achieved a precision of 99.5%, recall of 99.5%, F1-score of 99.5%, and accuracy of 99.5%. Meanwhile, the model without image augmentation yielded a precision of 99.4%, recall of 99.3%, F1-score of 99.3%, and accuracy of 99.3%. Therefore, using the ResNet-34 architecture successfully mitigated the vanishing gradient problem, and the image augmentation technique effectively prevented overfitting and enhanced model accuracy. Further testing in real-world scenarios also holds significant potential for this system to be adopted as an assistive communication tool for the general public, particularly for individuals with hearing and speech impairments.

Keywords: *Augmentation, Computer Vision, Convolutional Neural Network (CNN), Overfitting, ResNet-34, Vanishing Gradient*