ABSTRACT

In the increasingly advanced era of digitalization, counterfeit banknotes have become a common issue faced by many countries. Manual classification of banknote authenticity often requires a significant amount of time and is prone to human error. Moreover, excessive exposure to ultraviolet light during inspection poses potential health risks. Therefore, a model capable of automatically classifying banknote authenticity with high accuracy is needed. This study develops a classification model using the MobileNetV2 architecture, which is a lightweight and efficient deep learning model. MobileNetV2 is chosen for its ability to perform well in image classification tasks while maintaining computational efficiency. This architecture is specifically designed to operate optimally on devices with limited resources, such as smartphones and embedded systems. The model development process includes collecting images of genuine and counterfeit banknotes, data preprocessing, and training the MobileNetV2 model using the Adam optimizer with 10, 20, and 30 epochs and learning rates of 0.1, 0.01, 0.001, and 0.0001. The results show that the model is capable of classifying banknote authenticity with high accuracy. The model without data augmentation achieved 100% accuracy, while the model with augmentation achieved 95.45% accuracy. Additionally, the model demonstrated fast inference speed, making it suitable for deployment on various resource-constrained devices. The implementation of this model is expected to serve as an effective and efficient solution to combat banknote counterfeiting.

Keywords: Banknote authenticity, Counterfeit classification model, Model training, MobileNetV2, Adam optimizer, Deep learning, Image classification.