ABSTRACT

Pneumonia is a lung infection that can lead to fatal outcomes if not diagnosed and treated early. In recent decades, the development of Artificial Neural Networks (ANN) has enabled significant advancements in pattern recognition and visual data analysis. One application of ANN is the Convolutional Neural Network (CNN), which has been further developed into methods such as Depthwise Separable Convolution (DSC) and Transfer Learning to enhance efficiency. This study aims to classify pneumonia in chest X-ray images using DSC and Transfer Learning methods. The dataset was divided with a ratio of 70:20:10 for training, validation, and testing. Two models were applied in this study: a DSC-based model and a Transfer Learning model using the MobileNet architecture. The DSC-based model achieved an F1-Score of 96.888%, while the Transfer Learning model using MobileNet demonstrated superior performance with an F1-Score of 98.293%. Based on this evaluation, the Transfer Learning model was selected as the best model and further validated. The validation results of the Transfer Learning model showed an accuracy of 96.934%, precision of 98.349%, recall of 97.430%, and an F1-Score of 97.887%.

Keywords: Pneumonia Classification; Lung X-ray Images; Depthwise Separable Convolution; Transfer Learning; MobileNet Architecture.