ABSTRACT

Pneumonia is a disease that causes inflammation of the lungs from bacterial, viral, or fungal infections, which can be detected by X-Ray of the lungs. The causes of pneumonia can be identified with the X-Ray images of the lungs. However, manual identification can result a misdiagnosis because of limitations of the human eye.

In this study, a system for classifying pneumonia based on X-Ray images of the lungs was designed using the Convolutional Neural Network (CNN) method with ResNet-50 architecture. The purpose of the system design is to minimize misdiagnosis in classifying causes of pneumonia. In this study, the data of X-Ray images were used, which is divided into three classes, that are normal, viral pneumonia, and bacterial pneumonia. Several processes of the study are provided an input image to the system, then pre-processing is done as resizing on the image which continues with model training. Once the model training is finished, tests are conducted on image size, data ratio, type of optimizer, learning rate, and epoch to obtain the best classification model. Several performance parameters such as value of accuracy, precision, recall, F1-Score, and loss were calculated when testing.

In this study, the best performance from the system was produced by using the chest X-ray images with size 224×224 pixels, data ratio 80:10:10, SGD optimizer, learning rate 0.0001, and epoch 100. The test results of the classification system are reached accuracy value 88,88%, precision 83,34%, recall 83,33%, F1-Score 83,16%, and loss 0,4597.

Keywords: Pneumonia, Convolutional Neural Network, ResNet-50