ABSTRACT

Pneumonia and COVID-19 are types of diseases that can infect the lungs and even cause death. The two types of disease are different even though they have almost similar symptoms so that it becomes difficult to distinguish. The causes of pneumonia are bacteria, viruses and fungi, while COVID-19 is caused by the SARS-CoV-2 virus. Based on data from the United States Centers for Disease Control and Prevention in 2017, about one million people suffer from pneumonia. In Indonesia, as of March 2021, more than four million people have been confirmed positive for COVID-19. So, there are various methods for diagnosing pneumonia and COVID-19. One of the most common ways to identify lung disease is by looking at the X-Ray images. In this process, an automatic and accurate system is needed so that it can accelerate the process of identifying pneumonia and COVID-19 diseases. In this research, deep learning with a residual network architecture model is implemented into a system that can classify X-Ray image data into three classes, namely: Normal, Pneumonia, and COVID-19. The three data are preprocessed resize to change the image size to be optimal and CLAHE to improve the quality of the X-Ray image. The total dataset used for training and validation is 3097 X-Ray images. Consisting of 1032 X-Ray images of pneumonia, 1032 X-Ray images positive for COVID-19, and 1033 normal X-Ray images. Meanwhile, for pneumonia, COVID-19, and Normal test data, there are 233 X-Ray images. The research was conducted by training the ResNet-34, ResNet-50, and ResNet-101 models. By using optimizer Adam, Adamax, Nadam, and SGD. Of all the tests, the best results were obtained by the ResNet-101 model using the Adam optimizer. With the results of the validation accuracy obtained is 91.2%. The proposed method was evaluated using precision, recall, and f1-score, with the respective results of 0.81 for precision, 0.79 for recall, and 0.79 for f1-score, with the best test accuracy of 79.91%.

Keywords: pneumonia, COVID-19, X-Ray image, deep learning, ResNet