

ABSTRACT

The lungs are part of the respiratory system that functions as a place for the exchange of carbon dioxide and oxygen in the blood. Lung disorders are quite serious disorders which can attack the human respiratory system and can be fatal if not treated seriously. At this time the detection of disease in the lungs is still done manually by expert doctors, but the manual process takes a long time, namely through examination and evaluation of lung photos based on x-ray images of the lungs.

Therefore, in this final project, a system that can detect and classify lung disease automatically is made. In this final project, we design an automatic system to classify lung conditions based on x-ray images of the lungs based on Convolutional Neural Network (CNN) using the MobileNet architecture. The design of the system is divided into several stages starting from inputting lung x-ray image data, the next stage is preprocessing, in this study will use two types of preprocessing, namely Contrast Limited Adaptive Histogram Equalization (CLAHE), and Gaussian filters, then from the results of preprocessing, the training phase is carried out with two types of optimizers that are different, namely Stochastic Gradient Descent (SGD), and Adaptive moment (Adam). The last stage is to classify image data into four classes, which are viral pneumonia, coronavirus disease-19 (covid-19), normal and tuberculosis.

In this study, a comparison of system performance was carried out based on testing the effect of preprocessing, the effect of the optimizer, the effect of learning rate, the effect of epoch variations, and comparisons to system performance. The final result of this study shows that the best optimizer is Adam using CLAHE preprocessing on epoch 50 and produces an accuracy value of 95,400%.

Keywords: *CNN, MobileNet, lung x-ray images, viral pneumonia, coronavirus disease-19 (covid-19), normal, tuberculosis.*