ABSTRACT

Lung disorders such as pneumonia, tuberculosis and Covid-19 are quite serious disorders which can attack the human respiratory system and can be fatal if not treated seriously. Symptoms that appear are sore throat, cough, fever and difficulty breathing. Paramedics observe the condition of the patient's lungs through X-rays (Chest X-rays). However, the quality of x-ray images is sometimes less than optimal, so a CAD-based automation system was developed.

Therefore, this final project designs a system to improve image performance in deep learning. Especially in comparing system performance before preprocessing and after preprocessing. This research aims to develop an automation system to detect and classify lung disease in x-ray images using a Convolutional Neural Network (CNN) with the Inception V3 architecture. A multi-class dataset including Normal, Pneumonia, Tuberculosis (TB), and Covid-19 was used to train and test the model. System performance evaluation was carried out before and after image preprocessing using the Unsharp Masking (UM) and High-Frequency Emphasis Filtering (HEF) methods.

Research results: On training data without preprocessing, the model achieved an accuracy of around 86.11%, with a fairly balanced level of precision, recall and F1-Score. Meanwhile, the training data after preprocessing the model achieved an accuracy of around 99.31%, and precision, recall and F1-Score were close to 99.32%.

Keywords: *chest X-Ray, image enhancement, convolutional neural network (CNN), Inception V3, Tuberculosis, Pneumonia, COVID-19.*