

ABSTRAK

Penyakit paru-paru seperti pneumonia, tuberkulosis, dan COVID-19 merupakan ancaman kesehatan *Global* yang memerlukan diagnosis secara cepat untuk meningkatkan peluang kesembuhan pasien. Penggunaan citra *X-ray* dada sering kali menghadapi kendala dalam analisis manual yang membutuhkan waktu lama. Penelitian ini mengembangkan sistem deteksi otomatis berbasis CNN VGG16 untuk membandingkan efektivitas metode *Transfer learning* dan *Training*. Menggunakan *dataset* seimbang sebanyak 4.000 citra *X-ray*, *Transfer learning* diterapkan dengan bobot *ImageNet*, sedangkan *Training* melatih model dari awal. Hasil pengujian menunjukkan *Transfer learning* unggul signifikan dengan akurasi 95% dan efisiensi waktu 48 detik/*epoch*, dibandingkan *Training* yang mencapai akurasi 93% dengan waktu 70 detik/*epoch*. Disimpulkan bahwa *Transfer learning* adalah metode paling efektif untuk *dataset* terbatas. Hasil penelitian ini diimplementasikan dalam aplikasi web berbasis *Streamlit* untuk mendukung diagnosis medis.

Kata Kunci: Citra *X-ray*, *Deep learning*, *Training*, *Transfer learning*, VGG16

ABSTRACT

Lung diseases such as pneumonia, tuberculosis, and COVID-19 are global health threats that require rapid diagnosis to increase the chance of patient recovery. The use of chest X-ray images often faces obstacles in manual analysis that takes a long time. This study developed an automatic detection system based on CNN VGG16 to compare the effectiveness of Transfer learning and Training methods. Using a balanced dataset of 4,000 X-ray images, Transfer learning was applied with ImageNet weights, while Training trained the model from scratch. The test results showed that Transfer learning was significantly superior with 95% accuracy and a time efficiency of 48 seconds/epoch, compared to Training which achieved 93% accuracy with a time of 70 seconds/epoch. It was concluded that Transfer learning is the most effective method for limited datasets. The results of this study were implemented in a Streamlit-based web application to support medical diagnosis.

Keywords: *Citra X-ray, Deep learning, Training, Transfer learning, VGG16*