

Optimizing Pneumonia Identification in Chest X-Rays Using Deep Learning Pre-Trained Architecture for Image Reconstruction in Medical Imaging

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Abstract: *The rapid accumulation of fluid in the lungs is the hallmark of the fatal illness known as pneumonia. Therefore, it is crucial to get a diagnosis and medication as soon as possible in order to stop the condition from getting worse. In order to diagnose pneumonia, chest X-rays (CXR) are typically used. This study assesses the efficacy of ResNet50 and other pre-trained DL models in classifying chest X-ray images as evidence of pneumonia. The proposed ResNet50 model achieves an accuracy of 93.06%, precision of 88.97%, recall of 96.78%, and an F1-score of 92.71%, surpassing MobileNet, EfficientNetB0, and Xception across all performance metrics. The model has been further tested and shown to be reliable and effective in differentiating between normal and pneumonia patients utilizing ROC curve analysis, accuracy-loss trends, and a confusion matrix. The study highlights the superiority of ResNet50 in automated pneumonia detection, offering a promising tool for early diagnosis and clinical decision support. The results highlight how deep learning-based methods have the ability to improve radiological evaluations, which in turn can decrease diagnostic mistakes and increase patient outcomes. This research contributes to developing AI-driven medical imaging solutions, facilitating more accurate and scalable pneumonia detection in real-world healthcare settings.*

Keywords: Healthcare, Pneumonia detection, medical imaging, Image Reconstruction, Chest X-ray, Deep Learning, Chest X-ray images dataset.

