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Enhancing Chest X-ray Classification Performance Through Contrast Stretching and MobileNetV2

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Abstract

Chest X-ray imaging is widely used for diagnosing pulmonary diseases. However, suboptimal contrast and image noise can degrade image quality and limit deep learning models' ability to extract discriminative features. This paper proposes the integration of contrast stretching as an image enhancement technique to improve the performance of a MobileNetV2-based chest X-ray classification system. Experiments were conducted on 854 chest X-ray images collected from Dr. Zainoel Abidin Regional General Hospital, Banda Aceh, Indonesia, comprising three classes: Normal, Pneumonia, and COVID-19. The experimental results show that the proposed approach improves classification accuracy from 91% to 95%, with consistent gains in precision, recall, and F1 Score. The findings suggest that contrast stretching improves image quality and supports more effective feature learning in the lightweight MobileNetV2 architecture, contributing to better classification performance while maintaining low computational complexity. © 2026 IEEE.

Author keywords

chest x-ray; contrast stretching; image enhancement; MobileNetV2; SDG 3: Good Health and Well-Being

Indexed keywords

Engineering controlled terms

Deep learning; Diagnosis; Image quality; Medical imaging; Pulmonary diseases

Engineering uncontrolled terms

Chest x-rays; Classification performance; Contrast stretching; Discriminative features; Image noise; Learning models; Mobilenetv2; Modeling abilities; SDG 3: good health and well-being; Well being

Engineering main heading

Image enhancement

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