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Paper Title:	Comparative Analysis of Deep Learning Networks for COVID-19 and Pneumonia Identification: Grad-CAM Visualization of Chest X-Ray Images
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#### Abstract

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This study evaluates deep learning networks for diagnosing COVID-19 and pneumonia from chest X-rays (CXR). 22 convolutional neural network (CNN) models were trained on a dataset of 10,530 CXR images from Kaggle, categorized as normal, pneumonia, or COVID-19. There were 9 CNN models removed from our investigation as they had poor performance in disease classification. The top 10 performing models were tested on a separate dataset. DenseNet201 achieved the highest F1-score of 97.57% and balanced accuracy of 97.98%, but required highest computational time. In contrast, ResNet18 demonstrated the fastest computational time while maintaining 89.54% F1-score and 91.52% balanced accuracy. Gradient-weighted Class Activation Mapping (Grad-CAM) visualization was employed to enhance model interpretability and validate predictions. The study highlights the trade-off between model performance and computational efficiency in AI-driven diagnostic tools for respiratory diseases. While these models show promise for clinical applications like disease monitoring and treatment planning, limitations such as potential overdiagnosis were noted. Future research should focus on validating model performance in real-world clinical settings and assessing impact on patient outcomes.

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