

Application of deep learning technology in supporting pneumonia diagnosis

Nguyen Van Phu

Abstract: This study explores the application of deep learning technology to support the diagnosis of pneumonia using chest X-ray images. Pneumonia remains a leading cause of morbidity and mortality worldwide, particularly in low-resource settings where access to expert radiologists is limited. To address this challenge, we developed and evaluated convolutional neural network (CNN) architectures, including pre-trained models such as VGG16, ResNet50, and InceptionV3, on a publicly available dataset of chest radiographs. The models were trained to classify images into normal and pneumonia-affected categories. Performance was assessed using accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve. Experimental results demonstrate that the proposed deep learning models achieve high diagnostic accuracy, with the best-performing model attaining over 96% accuracy and a sensitivity exceeding 97%. These findings indicate that deep learning-based systems can serve as effective decision-support tools for clinicians, potentially reducing diagnostic delays and improving patient outcomes, especially in under-resourced healthcare environments.

Keywords: Deep learning, pneumonia diagnosis, medical imaging, computer-aided diagnosis