

ABSTRACT

Pneumonia is one of the lung infections that can be fatal if not diagnosed quickly and accurately. Deep learning technology, particularly Convolutional Neural Networks (CNN), has proven effective in classifying medical images such as chest X-rays and lung CT scans. However, complex CNN models such as ResNet-50 contain a large number of parameters, resulting in high computational costs and long inference times. This condition poses a challenge when deploying the model on resource-constrained devices such as edge computing systems or mobile devices.

In this study, model efficiency was improved by applying pruning compression techniques to ResNet-50. Structured pruning was used to remove less significant weights and filters in the network, producing a lighter model without significantly compromising performance. The model was trained using lung image datasets for pneumonia classification before and after pruning. Evaluation was carried out based on accuracy, model size, and inference time. The dataset used in this study was obtained from Kaggle, consisting of 5,856 labeled images divided into training and testing data. All images are chest X-rays of children aged one to five years from Guangzhou Women and Children's Medical Center, Guangzhou, China. The results show that applying structured pruning to ResNet-50 successfully reduced model complexity while maintaining classification accuracy. Therefore, the pruned CNN model has the potential to accelerate pneumonia diagnosis and support deployment on devices with limited computational resources.

Keywords: *Pneumonia, Deep Learning, Convolutional Neural Networks, ResNet-50, Pruning Compression, Medical Image Classification.*