

# Attention-Guided Convolutional Pneumonia

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**Abstract—** Pneumonia is a common infectious disease in the world. Its main diagnostic method is chest X-ray (CXR) examination. However, the high visual similarity between a large number of pathologies in CXR makes the interpretation and differentiation of pneumonia a challenge. In this paper, we propose an improved convolutional neural network (CNN) model for pneumonia detection. In order to guide the CNN to focus on disease-specific attended region, the pneumonia area in the image is erased and marked as a non-pneumonia sample. In addition, transfer learning is used to segment the interest region of lungs to suppress background interference. The experimental results show that the proposed method is superior to the state-of-the-art object detection model in terms of accuracy and false positive rate.

## I. INTRODUCTION

Pneumonia is a major cause of global morbidity and mortality. In the United States, pneumonia accounts for over 500,000 visits to emergency departments [1] and over 50,000 deaths in 2015, keeping the ailment on the list of top 10 causes of death in the country [2].

Chest X-ray (CXR) is the most suitable imaging modality to diagnose pneumonia. Usually, pneumonia manifests as one or more areas of increased opacity [3] on CXR. However, the imaging reviews on CXR are complicated because a number