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# Automated Pulmonary Nodule Detection in CT Images Using Deep Convolutional Neural Networks

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## Abstract

Lung cancer is one of the leading causes of cancer-related death worldwide. Early diagnosis can effectively reduce the mortality, and computer-aided diagnosis (CAD) as an important way to assist doctors has developed rapidly. In particular, automated pulmonary nodule detection in computed tomography (CT) images is crucial to CAD. It is a challenging task to quickly locate the exact positions of lung nodules. In this paper, a novel automated pulmonary nodule detection framework with 2D convolutional neural network (CNN) is proposed to assist the CT reading process. Firstly, we adjust the structure of Faster R-CNN with two region proposal networks and a deconvolutional layer to detect nodule candidates, and then three models are trained for three kinds of slices for later result fusion. Secondly, a boosting architecture based on 2D CNN is designed for false positive reduction, which is a classifier to distinguish true nodules from the candidates. The misclassified samples are still kept for retraining a model which boosts the sensitivity for pulmonary nodule detection. Finally, the results of these networks are fused to vote out the final classification

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