

A survey of deep learning for lung disease detection on medical images: state-of-the-art, taxonomy, issues and future directions

ABSTRACT

The recent developments of deep learning support the identification and classification of lung diseases in medical images. Hence, numerous work on the detection of lung disease using deep learning can be found in the literature. This paper presents a survey of deep learning for lung disease detection in medical images. There has only been one survey paper published in the last five years regarding deep learning directed at lung diseases detection. However, their survey is lacking in the presentation of taxonomy and analysis of the trend of recent work. The objectives of this paper are to present a taxonomy of the state-of-the-art deep learning based lung disease detection systems, visualise the trends of recent work on the domain and identify the remaining issues and potential future directions in this domain. Ninety-eight articles published from 2016 to 2020 were considered in this survey. The taxonomy consists of seven attributes that are common in the surveyed articles: image types, features, data augmentation, types of deep learning algorithms, transfer learning, the ensemble of classifiers and types of lung diseases. The presented taxonomy could be used by other researchers to plan their research contributions and activities. The potential future direction suggested could further improve the efficiency and increase the number of deep learning aided lung disease detection applications.