Detection of pulmonary tuberculosis manifestation in chest X-rays using different convolutional neural network (CNN) models

ABSTRACT

Tuberculosis (TB) is airborne infectious disease which has claimed many lives than any other infectious disease. Chest X-rays (CXRs) are often used in recognizing TB manifestation site in chest. Lately, CXRs are taken in digital formats, which has made a huge impact in rapid diagnosis using automated systems in medical field. In our current work, four simple Convolutional Neural Networks (CNN) models such as VGG-16, VGG-19, RestNet50, and GoogLenet are implemented in identification of TB manifested CXRs. Two public TB image datasets were utilized to conduct this research. This study was carried out to explore the limit of accuracies and AUCs acquired by simple and small-scale CNN with complex and large-scale CNN models. The results achieved from this work are compared with results of two previous studies. The results indicate that our proposed VGG-16 model has gained highest score overall compared to the models from other two previous studies.

Keyword: Tuberculosis; Artificial Neural Networks (ANNs); Convolutional Neural Networks (CNN); Deep Learning (DL)