

Automatic Classification of Lung Diseases from CT Images

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Abstract : Pneumonia is a kind of lung disease that creates congestion in the chest. Such pneumonic conditions lead to loss of life of the severity of high congestion. Pneumonic lung disease is caused by viral pneumonia, bacterial pneumonia, or Covid-19 induced pneumonia. The early prediction and classification of such lung diseases help to reduce the mortality rate. We propose the automatic Computer-Aided Diagnosis (CAD) system in this paper using the deep learning approach. The proposed CAD system takes input from raw computerized tomography (CT) scans of the patient's chest and automatically predicts disease classification. We designed the Hybrid Deep Learning Algorithm (HDLA) to improve accuracy and reduce processing requirements. The raw CT scans have pre-processed first to enhance their quality for further analysis. We then applied a hybrid model that consists of automatic feature extraction and classification. We propose the robust 2D Convolutional Neural Network (CNN) model to extract the automatic features from the pre-processed CT image. This CNN model assures feature learning with extremely effective 1D feature extraction for each input CT image. The outcome of the 2D CNN model is then normalized using the Min-Max technique. The second step of the proposed hybrid model is related to training and classification using different classifiers. The simulation outcomes using the publically available dataset prove the robustness and efficiency of the proposed model compared to state-of-art algorithms.

Keywords : CT scan, Covid-19, deep learning, image processing, lung disease classification

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