

Detection of COVID-19 Infection from Chest X-Ray Images Using Deep Learning

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The 2019 novel coronavirus (COVID-19) is a new species discovered in December 2019 in Wuhan, China, and has not been previously identified. This has now become a health problem that causes millions of deaths. Implementation of an automatic detection system as an expeditious alternative diagnosis option to diagnose COVID-19 is required. Many machine learning algorithms such as SVM, Naive Bayes, Random Forest were used in the recent past for the detection of COVID-19 infection from chest X-ray images. Among the other machine learning techniques, convolutional neural network (CNN)-based models have shown higher accuracy. Most researchers use CNN architectures such as COVIDX-Net, DenseNet to identify COVID-19. However, there is still a need for a more accurate, time-efficient method to replace humanly involved, time-consuming diagnosis of Covid-19 infection. Our study uses a convolutional neural network-based model to detect coronavirus pneumonia infected patients using their chest X-ray images. In this study, the CNN architectures are generated using chest X-rays as input images and we selected the best model that gives the best result. Considering the performance measures obtained in our model, it shows 92.45% validation accuracy for the dataset used (dataset 1: “<https://data.mendeley.com/datasets/rsbjbr9sj/3>” and dataset 2: “[https://www.kaggle.com/alifrahman /chestxraydataset](https://www.kaggle.com/alifrahman/chestxraydataset)”). The proposed CNN architecture consists of 7 convolutional layers, 2 dense layers, 1 average pooling layer, and 3 max-pooling layers. The model shows an accuracy of 87.5% for an independent dataset in acceptable time duration. The system achieved desired results on the currently available dataset, which can be further improved with the availability of a larger set of COVID-19 chest X-Ray images.

Keywords: Coronavirus pneumonia, COVID-19, X-ray image analysis, Deep learning