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Title

AUTOMATIC DETECTION OF COVID19 INFECTION IN X-RAY IMAGES USING DEEP CONVOLUTIONAL NEURAL NETWORKS

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Abstract

The 2019 novel coronavirus (COVID-19), with a starting point in China, has spread rapidly among people living in other countries and is approaching approximately 12,245,417 cases worldwide according to the statistics of the European Centre for Disease Prevention and Control. There are a limited number of COVID-19 test kits available in hospitals due to the increasing number of cases daily. Therefore, it is necessary to implement an automatic detection system as a quick alternative diagnosis option to prevent COVID-19 from spreading among people. In this study, three different convolutional neural network-based models (ResNet50, InceptionV3, and InceptionResNetV2) have been proposed for the detection of coronavirus pneumonia-infected patients using chest X-ray images. ROC analyses and confusion matrices by these three models are given and analyzed using 5-fold cross-validation. Considering the performance results obtained, it is seen that the pre-trained ResNet50 model provides the highest classification performance with 98% accuracy among the other two proposed models (97% accuracy for InceptionV3 and 87% accuracy for Inception-ResNetV2).

Key Words

Coronavirus; Pneumonia; Chest X-ray images; Convolutional Neural Network; Deep Transfer Learning.

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