

ABSTRACT

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THE CLASSIFICATION OF LUNGS X-RAY IMAGES WITH COVID-19 INFECTION USING DENSENET169, VGG19, RESNET50V2, AND XCEPTION DEEP CONVOLUTIONAL NEURAL NETWORK ARCHITECTURE

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(xiv + 100 + Attachment)

Fast and accurate diagnosis is the primary way to limit the spread of COVID-19, but the currently used method, reverse transcription polymerase chain reaction (RT-PCR) is expensive and requires special equipment. This research develops an alternative method for diagnosing COVID-19 using machine learning and x-ray image. The Convolutional Neural Network (CNN) algorithm is implemented to classify normal, COVID-19, Lung Opacity and Viral Pneumonia patients and draw bounding boxes. The used x-ray image comes from the Covid-19 Radiography Database dataset which contains 21,165 x-ray images of 299×299 pixels. All images go through a pre-processing process so they can be used to train machine learning models. A total of 4 pre-trained models were used to create 4 machine learning models, namely DenseNet169, VGG19, ResNet50V2 and Xception. Each model is trained using training data and validation data, then evaluated with test data. The evaluation results show the DenseNet169 model as the best model with the highest accuracy of 95.5%, followed by the Xception's accuracy of 95.3%, ResNet50V2's accuracy of 95.2% and VGG19's accuracy of 94.6%. The AUC score obtained by all models was ≥ 0.9 which indicated that the classification results reached the excellent category.

Bibliography (2006-2023)