

TRANSFER LEARNING APPROCH FOR DETECTING COVID-19 USING CHEST X-RAY IMAGES

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works.

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Date:

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ABSTRACT

Due to the (COVOD-19 coronavirus, the entire world is undergoing a pandemic. Coronavirus 2 produces severe acute respiratory illness. This virus is discovered in December 2019 in China, Wuhan. As we are experiencing, the affected patients are expanding at a rapid rate. The World Health Organization (WHO) has recommended that testing be done as much as possible to recognize those who are affected and those who are carriers of this disease. However, the main issue here is the scarcity of COVID-19 testing kits and trained people to perform the testing in a pandemic situation. However, a lot of research was seeking workaround solutions for detecting the COVID-19. As a result of these projects, a few papers were polished for detecting the COVID-19 based on chest X-ray scan images. However, most of the research has used vanilla CNN, which makes the test more reliable and convenient. But we have some practical issues in the application of traditional CNN. Basically, CNN is a supervised learning method, and it takes more time for the learning process. And in general, CNN works well for larger datasets. However, the chest X-ray images are limited in practice, we propose combining transfer learning and ensemble learning techniques to achieve excellent accuracy while spending the least amount of time possible on the entire learning process. This study mainly focuses on the CNN based pre-trained models such as **DenseNet201**, **EfficientNetB7** and **VGG16** for increasing the accuracy level of the model, which makes the test reliable and more trustworthy.

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LIST OF ABBREVIATIONS

Abbreviation	Description
RNA	Ribonucleic Acid
PCR	Polymerase Chain Reaction
CT	Computerized Tomography
RT-PCR	Reverse Transcription Polymerase Chain Reaction
ARDS	Acute Respiratory Distress Syndrome
CO ₂	Carbon Dioxide
O ₂	Oxygen
VGG16	Visual Geometry Group
ANN	Artificial Neural Network
ReLU	Rectified Linear Unit
FC	Fully Connected Layer
RESNET	Residential Energy Services Network
ANOVA	Analysis of Variance
ML	Machine Learning
NLP	Natural Language Processing
CAM	Class Activation Map