COVID-19 Detection through Transfer Learning using Multimodal Imaging Data

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Abstract: In 2019 COVID-19 virus has spread to the various parts of the world including Indonesia.This pandemic becomes a lethal outbreak since there is no vaccine to treat or prevent transmission of the virus. Rapid Test is selected as an essential method to detect Covid-19 in Indonesia because the price is fairly cheap comparedto the SWAB test. The increase in Covid-19 patients tends to lead to limited capacity for the Covid-19 test available at the hospital sothat the latest technology to detect and overcome this pandemic is- sue is needed. Thus, the present research aims to examine the total of 100 X-Ray chest images of the Covid-19 patients and 100 X-ray normal chest images. The application of Contrast Limited Adap- tive Histogram Equalization (CLAHE) and Convolutional Neural Networks (CNN) methods are implemented to analyze the dataset with two scenarios in obtaining the detection results. The results ofthis research reveal that the application of CLAHE is likely to affectCovid-19 detection accuracy using CNN. Also, the application of theCNN basic model shows significant results compared to the applica-tion of VGG16 transfer learning.

Keywords: COVID-19, Multimodal Imaging, Machine Learning, CNN, Neural Network.

I. INTRODUCTION

As the novel Corona virus is declared as global emergency by World Health Organ- isation (WHO) were most of the cases it is affecting the lungs, Radiologic work is extremely crucial for diagnosing the patients . In most of the Countries due to expo- nential rise in cases precautionary measures like hygiene, social distancing and iso- lation is the solution . The COVID-19 is Severe Acute Respiratory Syndrome cause fever, cough, and illness in respiratory system lead to infection or inflammation of air sacs in lungs plays an important role in oxygen exchange may be responsible to Pneumonia is highly in transmissibility.

In the Current situation covid -19 is spreading all Over The World. So we want to Detect Covid-19 Patient To early stage. Main Motivation of The System Is To Detect Covid-19 To early Phase And Save The Human life. Coronavirus is spread All over world .We Detect covid 19 at early stage. The Main Scope Of Our System is that we can Bring the covid-19 situation under control As soon as possible thats why we use our system to detect covid-19.

II. LITERATURE SURVEY

1. An**Author:**Buyut Khoirul Umri ,Muhammad Wafa Akhyari
Abstract ::- In 2019, the COVID-19 virus has spread to various parts of the world including Indonesia. This global pandemic becomes a lethal outbreak since there isno vaccine to treat or prevent transmission of the virus. Rapid Test is selected as anessential method to detect Covid-19 in Indonesia because the price is fairly cheap compared to the SWAB test. The increase in Covid-19 patients tends to lead to lim-ited capacity for the Covid-19 test available at the hospital so that the latest technol-ogy to detect and overcome this pandemic issue is needed. Thus, the present researchaims to examine the total of 100 X-Ray chest images of the Covid-19 patients and 100 X-ray normal chest images. The application of Contrast Limited Adaptive His-togram Equalization (CLAHE) and Convolutional Neural Networks (CNN) methodsare implemented to analyze the dataset with two scenarios in obtaining the detectionresults. The results of this research reveal that the application of CLAHE is likely to affect Covid-19 detection accuracy using CNN. Also, the application of the CNNbasic model shows significant results compared to the application of VGG16 transfer learning

2. **Author:**Fian Yulio Santoso
Abstract : COVID-19 pandemic caused vast impact worldwide. Many efforts have been made to tackle the pandemic, including in the deep learning community. In this research, a modification of deep neural network based on Xception model is proposed. The model is used for COVID-19 detection based on the chest X-ray images. The proposed model

implements two stacks of two dense layers and batch normalization. The layers addition is used to avoid overfitting of the proposed model. The performance of the proposed model is compared to Resnet50, InceptionV3 and Xception. The experiment result shows that the proposed model has better perfor- mance than the other models used in the research. However, its computational time is higher than the other models used in the research

III. EXISTING SYSTEM

The current COVID-19 pandemic has impacted the world with over 18.35 million infections and over 6,96,147 deaths so far (as of 5th August 2020) [1]. Early identifying, isolation and care for patients is a key strategy for a better man- agement of this pandemic. Our study aims to provide a conceptual transfer learning framework to support COVID-19 detection with the use of image classification us- ing deep learning models for multiple imaging modes including X-Ray, Ultrasound, and CT scan. The acquisition of a sufficiently large, publicly available corpus of medical image sample data for fully training deep learning models is challenging for novel medical conditions such as COVID-19 since collection and labelling of images requires significant time and resources to compile. An alternative method of train- ing deep learning models is "transfer learning" whereby a deep learning network is preweighted with the results of a previous training cycle from a different domain. This technique is commonly used as a basis for initializing deep learning models which are then fine-tuned using the limited available medical sample data

IV. PROPOSED SYSTEM

Early detection of Covid-19 patients The System's main motivation is to de- tect Covid-19 in its early stages and save human lives. Machine Learning is used in the suggested system. We employ the CNN algorithm for training and testing. Deep Learning algorithm Convolutional Neural Network (ConvNet/CNN) It can accept an image as input and rank it (learnable weights and biases) to distinct aspects/objects in the image and be able to distinguish between them Problem formulation and res- olution The Covid 19 is the major problem to solve the current situation We make numerous attempts to save human life

Fig 1. Over view of model below
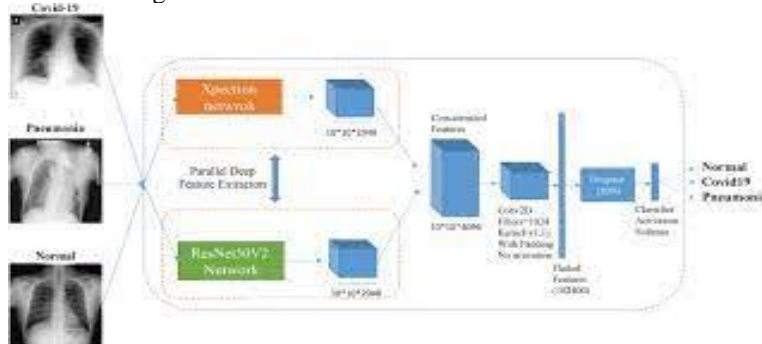
V. CONCLUSION

We have successfully implemented CNN algorithm for the detection of COVID 19 using x-ray image of chest using this we were able to predict the infected patients with 95-98% accuracy within a few second. Compared to the conventional method of RT-PCR which takes 4 to 8 hours for getting the report while Rapid antigen test takes 15-30 mins for the result in best situation but in case of pendamic and high volume of COVID cases the time taken by conventional method can take a 24-48 hours. Also conventional methods costly and labour intensive compared to our solution

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