



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 4, April 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.165



9940 572 462



6381 907 438



ijircce@gmail.com



www.ijircce.com

Covid-19 Detection from Chest X-Ray Using CNN

Prof. S.B. Chaudhari, Hrishikesh Damakale, Nehal Chaudhari, Gayatri Gade, Amar Waghmare

Dept. Computer, JSCOE Pune, Maharashtra, India

ABSTRACT: Covid-19 is a infective disease caused by the virus called Severe Acute Respiratory Syndrome Coronavirus-2(SARS-CoV2).Covid-19 has badly affected india as well as many other countries,hence spread worldwide.The most common symptoms of Covid-19 are fever,tiredness,Cough,loss of taste or smell,sore,throat,etc. still affects different people in different ways as X-Ray are easily available in every hospital and cheap way to detect infection in chest jupyter Notebook is used. Technologies used are Deep Learning and CNN.Total 400 images are taken from Kaggle website.200 images of Covid-19 +ve patients and 200 images of Covid-19 patients have been divided into training.The accuracy of our project is over 96%.This application can be used on any computer by any medical authority to detect Covid-19 +ve patients using chest X-Ray images.

I. INTRODUCTION

Covid-19 is most spreading caused by newly confirmed coronavirus at the December 2019,found human infected body for the first time with coronavirus (SARS-CoV2)infection.

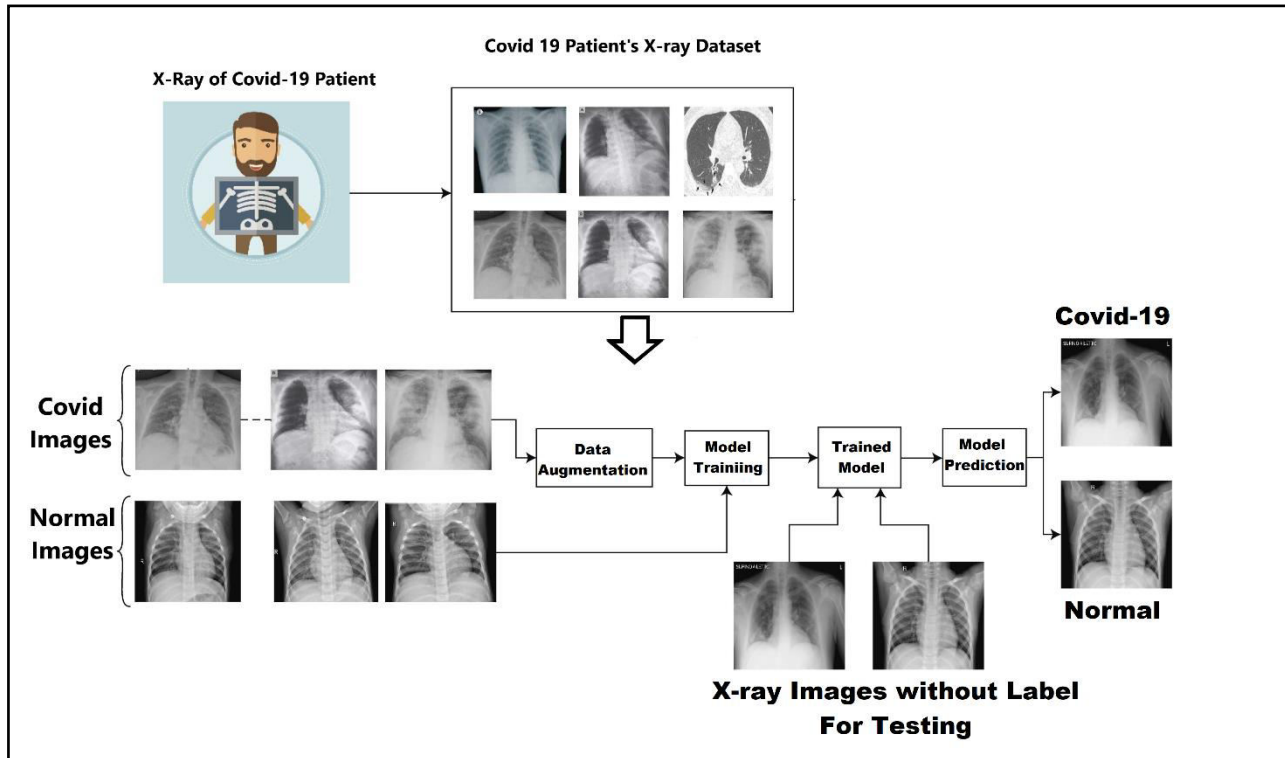
The covid-19 started in wuhan china was first confirmed by WHO.This epidemic which has badly affected health welfase of global population.

Coronavirus come from a large family of viruses which causes diseases such as middle east respiratory syndrome (MERS—COV) & SARS-COV.Meanwhile,this coronavirus is more virelent & aggressive nature. This is contagious as the droplets are heavy to travel, the travel from person to person . Covid-19 attacks the lungs & damages the tissues of an infected person. At very early stage some people even may not find any symptoms where some people had fever & cough, currently Covid-19 disease is increasing daily due to lack of detection methods which are accwas while the RT_PCR test wese widely used for diagnosing, it had limiting aspects with certain features that made it difficult to diagnose the disease.

RT-PCR is very time consuming,complex & needs manual process. One of the most important ways to diagnose Covid-19 is to use radiological images, including CT-SCAN & X-Ray images.X-Ray is widespread easily available & cost effective currently, deep learning with CNN has been employed in disease diagnosis. Most recently CNN has been found to be useful & effective in identifying covid-19 via image classification . CNN consist of multilayer neural networks which are highly capable of recognizing the image patterns therefore this automass tool can serve as a guide for these in the forefront of this analysis.

II. WORK LOW

The workflow of this study starts with Data Collection. We have taken large set of Covid-19 and non-covid-19 radiography images such as X-Ray images. It is required to take Both Classes images of Positive Class and Non-Positive class in the equal quantity because the ML model must be perfectly fit and should not meet the Overfit or Underfit condition. Next stage includes cleaning the data and removing such images that offers less features which were not clear in terms of quality and diagnostic parameters. Hence, the resulted dataset was very clean, as each X-ray image was of good quality as well as clear in terms of significant diagnostic parameters according to their expertise. In the third phase, the dataset was augmented using standard augmentation techniques to increase its size. The resulted dataset was used to train the model in the next phase. After training, the model was tested for its performance in the disease detection. The testing of proposed CNN model has been done using test dataset held from the primary dataset as well as using the independent validation dataset. Table 1 contains the details of datasets including the total number of X-ray images in training set, testing set, validation set, and the proportion of X-ray images in the two prediction classes.



III. METHODS AND PREPARATION

Dataset -

400 X-ray images has been used as a base dataset of 400 images, 200 X-ray images belonged to confirmed COVID-19 patients and other 200 images belonged to normal or people with other diseases like pneumonia. The dataset used is available on Kaggle site. The basic dataset consists of two classes of COVID-19 with 200 samples and others with 200 samples.

Balancing Dataset Classes

To balance the given dataset, in order to improve the performance of the proposed CNN models in the detection of COVID-19, 200 normal non-Covid cases X-Ray images are been used. These images are taken from Kaggle website repository.

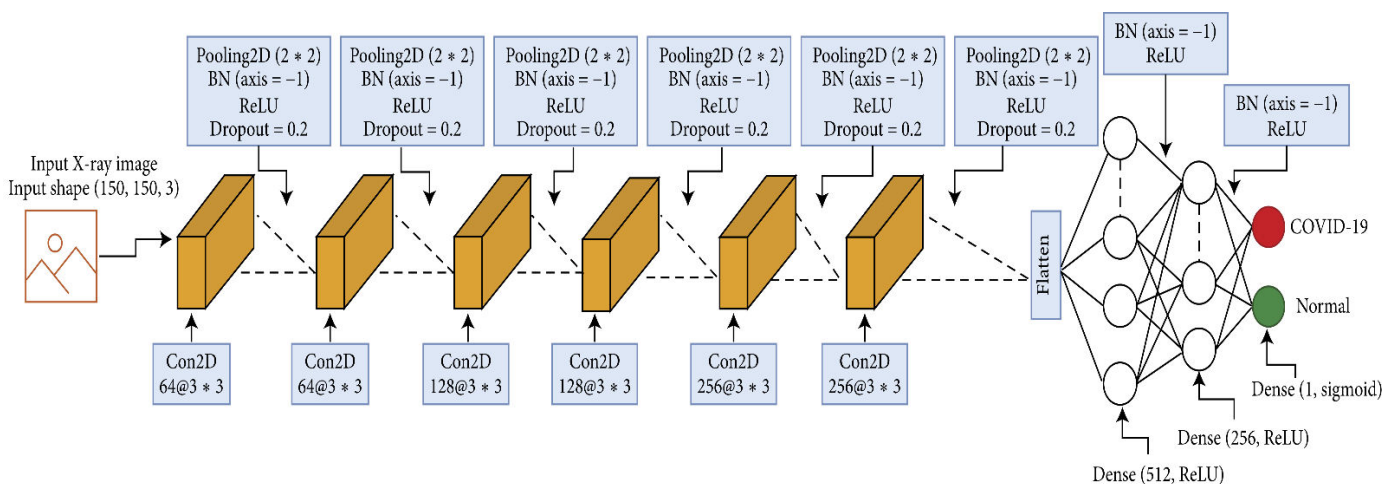
Data Augmentation –

Data augmentation is a technique that can significantly increase the data instances of a dataset to train a model. In the case of image datasets, the technique uses the basic image processing operations, such as flipping, rotating, cropping, or padding for augmentation. The dataset is then extended by these transformed images resulted from the existing image set, which increases the size of dataset to train the neural networks., the data augmentation method has been used in this study. This technique increased the size of the dataset; in addition, it provides more learning features to the learning model. Two image processing operations, flipping and rotation, have been used in this study for data augmentation. In the first phase of data augmentation, the 90 X-ray images have been flipped to get extra 90 images. The resulted dataset was increased to contain 180 images after applying this operation. In the second phase, the original 90 images have further been rotated by 90°angle to get 90 more images and then rotated by 180°angle to get 90 more images, and finally, the original 90 images were further rotated by 270°angle to get more 90 images. These operations resulted in a dataset containing more COVID-19 X-ray images.

Convolutional Neural Networks (CNNs) –

The CNNs are inspired by visual system of human brain. The idea behind the CNNs thus is to make the computers capable of viewing the world as humans view it. This way CNNs can be used in the fields of image recognition and analysis, image classification, and natural language processing [25]. CNN is a type of deep neural networks which

contain the convolutional, max pooling, and nonlinear activation layers. The convolutional layer, considered as a main layer of a CNN, performs the operation called “convolution” that gives CNN its name. Kernels in the convolutional layer are applied to the layer inputs. All the outputs of the convolutional layers are convolved as a feature map. In this study, the Rectified Linear Unit (ReLU) has been used in the activation function with a convolutional layer which is helpful to increase the nonlinearity in input image, as the images are fundamentally nonlinear in nature. Thus, CNN with ReLU in the current scenario is easier and faster. Since the ReLU is zero for all negative inputs, it can be defined as Here, the function implies that the output z is zero for all negative value and positive value remains the constant The proposed CNN model consists of 38 layers in which 6 are convolutional (Conv2D), 6 max pooling layers, 6 dropout layers, 8 activation function layers, 8 batch normalization layers, 1 flatten layer, and 3 fully connected layers; CNN model input image shape is (150, 150, 3), i.e., 150-by-150 RGB image. In all Con2D layers, a 3×3 size kernel has been used but the filter size after every two Con2D layers increases. At the 1st and 2nd layers of Con2D, 64 filters have been used to learn from input and the 3rd and 4th layers of Con2D use 128 filters, and at the 5th and 6th layers, 256 filters have been used. After each Con2D layer, the max pooling layer with 2×2 pooling size has been used, the batch normalization layer has been used with the axis = -1 argument, the activation layer has been used with the ReLU function, and the dropout layer has been used with 20% dropout rate. The output of 256 output neurons of the final Con2D layer is followed by max pooling, batch normalization, activation, and dropout layer. Since the final pooling and convolutional layer gives a three-dimensional matrix as output, to flatten the matrix, a flattening layer has been used which converts them into a vector that will be input for 3 dense layers.



V. LITERATURE SURVEY

This section of literature survey reveals some facts based on thoughts analysis of many autho approach as follows Wang[1], the first cases were found using the Covid-19 pandemic at 2019-2020; which probably tasted around the end of December 2019 in the city of Wahan the capital of the Chinese province of hubes and subsequently spread to various countries of the world.

Abroug[2], Coronavirus represents an extended family of respiratory viruses that can cause mild to moderate diseases from cold to respiratory syndromes such as MERS & SARS . These kind of viruses are common in many animal species but in some cases through rasely , they can evolve & infect humans & then spread to the population.

Abbas A; Abdelsamea , M.M; Kabir, M.A PDCOVIDNES. “A parallel dilated convolutral neural network architecture for image employing machine learning , learning approaches”

NarinA, Kaya,(pamuk, Z,(2020),. “Automate detection of coronavirus disease using X-Ray images & Deep convolutional neural networks.

VI. CONCLUSION & FUTURSCOPE

Detection of Covid-19 from chest X-Ray images is of vital importance for both doctors & patients . When the number at images in the database and the detection time as Covid-19 patients images to predict Covid-19 in short period of time our experiment, can be helpful in easily detection of Covid-19 cases and prevent further transmission & infection.



REFERENCES

1. Wang,C, Horby,P.W, Hayden, F.G,Gan, G.F,2020 “A novel coronavirus outbreak of global health concern the lancet 395, 470-473.
2. Abroug,F,Slim,A,Dachraoui,f,ouones,I,Lu,X,Tao,Y,poden,C,Caidl,H,al,2014.”Family clusters of middle east respiratory syndsome coronavirus infections tunisla ,2013 “Emerging infections tunista , 2013 “ Emerging infectious diseases 20, 1527.
3. Li and Shen [4], have proposed two fully convulational residual network to produce segmentation featus extraction & classification result from images.
4. Ahammed et al [5] proposed a deep neusal network based system where CNN provided high accuracy (94.03%). The authors trained the system with neural , preumonia& Covid-19 patients chest X-Ray images.
5. Abbas al[6], proposal and validated a deep convoluntional neural networks called decompose , transfiles & compose to detect Covid-19 patients fro their chest X-Ray images.
6. Als et al[7] have used a dataset of nearly 100 subject ,among them so X-Ray images subjects wise tested +ve with Covid-19 & so X-Ray of norms subjects.



INNO  SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

 **doi**[®]
cross **ref**

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details