DETECTION OF COVID 19 USING CONVOLUTIONAL NEURAL NETWORKS FROM A CHEST X-RAY PICTURE

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1.ABSTRACT

Chest radiographs may show the coronavirus disease 2019 (etiologic COVID-19) virus, and this finding offers a small danger to patients or medical staff. In countries where obtaining lab test kits is challenging, this is essential. In this study, we sought to show how deep learning might be used in conjunction with chest radiograph images to diagnose COVID-19 with accuracy. With the X-ray images, the study constructed the deep learning and the machine learning classifiers (1,583 healthy, 4,292 with pneumonia, and 225 with verified COVID-19). 38 tests used convolutional neural networks, 10 used five machine learning models, and 14 used the most sophisticated previously trained networks, for transfer learning. Eight-fold cross-validation was used in trials to evaluate the models' performance while separately considering the photographs and statistical data. A convolutional neural network with few layers and no pre-processing is able to recognise COVID-19 in a small sample of mismatched chest X-ray images. In this project, we'll use a lot of CNN models to attain the highest degree of accuracy (VGG-16, VGG-19, MOBILENET, MOBILENETV2, XCEPTION).

2. INTRODUCTION

Respiratory condition that is quite serious Before the end of 2019, the coronavirus disease 2019 (COVID-19), also known as SARS CoV-2 pneumonia, struck. It caught the human race off guard. Although the covid 19 pandemic originated in the China, the vast global spread of the disease has left medical personnel without the tools they need to treat the condition successfully. Over 875,000 confirmed fatalities and about 27,000,000 verified cases had been reported at the time this story was written (September 8, 2020). The cost of the laboratory equipment needed for diagnosis is one of the largest obstacles in the fight against the illness, particularly for developing and underdeveloped countries. Clinical teams eventually decide which imaging modality to use at the moment of therapy after carefully assessing the numerous advantages and disadvantages of chest radiography and CT scans as well as the available resources and knowledge. In this case, a chest CT scan is recommended over a chest X-ray since the latter can provide a diagnosis more rapidly. The time spent with people who may or may not have COVID-19 rises because chest CT scans take much longer than chest X-rays.

3. LITERATURE SURVEY

HybridSN: Investigating CNN's 3-D - 2-D hierarchy of functions to categorise hyperspectral images using HybridSN: In the examination of remote sensing images, hyperspectral imaging (HSI) classification is frequently utilised. There are several picture bands in hyperspectral photographs. One of the most widely used deep learning-based techniques for processing visual input is the convolutional neural network (CNN). In more recent papers, CNN is also used for HSI categorization. The majority of these approaches are based on 2-D CNN. However, the efficiency of HSI categorization largely depends on spectral and spatial information. Because of CNN's increasing three-dimensional computational cost, few approaches have fully used it.

Only 68Ga-PSMA positive prostate cancer nodes are predicted using deep learning and CT images: The treatment options are impacted by the lymphatic dissemination of prostate cancer (PCa) in males. Executing 68Ga-PSMA-PET/CT is feasible, however the price and availability are still rather high. Computed tomography (CT) is still the most popular staging method for PCa because of this.

Three CNNs were built on top of PET. Balanced training sets were used for lymph node localization, infiltration status, and extra-masked images. The effectiveness of CNNs was evaluated using a new set of tests, and the results were contrasted with those of random forest classifiers and radiologist classifications. It's noteworthy to notice that in order to perform better, CNNs "learned" the anatomical area inflation probability. In conclusion, CNNs could be able to develop a CT-based biomarker for lymph node metastases in CP. The various class balancing tactics employed by CNN have a significant impact on its success.

Advances in Intelligent Systems and Computing: Our main concern is how to include human cognition into dynamical system models, which poses a number of significant challenges. Information processing methods and how they are applied in general computing. The major focus is on people's mental processes. For our purposes, it would be helpful to distinguish between "external" cognitive computing—which relates specifically to what happens—and "internal" cognitive computing, which is concerned with what happens "internally" in the brain. As opposed to this, we defend a technique in our work that takes cognitive computing, which focuses on brain functions, as its premise. Seven quality of life parameters that take into account economic, social, environmental, and other factors are used to characterise the location. These indicators change throughout the course of a planning horizon as a result of the investments made, frequently by local or governmental organisations. The investment opportunities in the planning horizon consist of the monies allocated for the development of certain quality-of-life indices and the target levels established for these indices, which can be either objectively determined by the government or subjectively judged by the local community. Based on a specific investment scenario, authorities and residents monitor the rise of quality of life indicators across the planned horizon.

4. EXISTING SYSTEM

Applications that make use of various sorts of data, such as image-based data, have regularly gotten trustworthy results from AI systems. One of the earliest COVID-19 detection investigations using an X-ray picture was carried out by Apostolopoulos and Mpesiana. In the previous investigations, they have addressed about transfer learning using pre-trained networks like VGG19 and mobileNet V2. Two distinct data sets were analysed using a variety of assessment measures. “mobileNet” V2 and “VGG19” have achieved the accuracy of “89.40%” and “88.75%”, respectively for “covid -19/ Normal” and “covid 19/ Pneumonia” dual class investigations, and accuracies are of “82.85%” and “83.48” for “covid 19 normal/pneumonia” of three experimental classes. The authors' final assessment was based on the creation of confusion matrices rather than accuracy results because the data were inconsistent.

5. PROPOSED SYSTEM

In this paper, we show how deep learning can be used to identify COVID-19 with incredibly high accuracy from chest X-ray pictures. Using publicly available X-ray images, the study constructed deep learning and machine learning classifiers (1,583 healthy, 4,292 with pneumonia, and 225 COVID-19 verified). In investigations, model performance was evaluated by separately examining photos and statistical data using eight-fold cross-validation. A convolutional neural network can recognize COVID-19 in pictures of the three classes “COVID-19” or “Pneumonia” or “Normal” with the second-lightest architecture while also being able to do so with fewer and unbalanced chest X-ray images without the preprocessing and with the fewest layers.

6. DESIGN OF EXPERIMENTS

By the basic methos of statistical characteristics of the pictures, that may give information for classification, the performance of convNet on the image bank under examination was assessed and convNet was compared with other models. convNet surveys, statistical measurement tests, and transfer of learning tests made up the three components of the study. Attempt convNet. In order to prevent lowering the amount of features obtained from the Conv layers, the clustering was carried out as 11 in the last Conv layer of each structure. Tables 1 and 2 display the four convNets under investigation's

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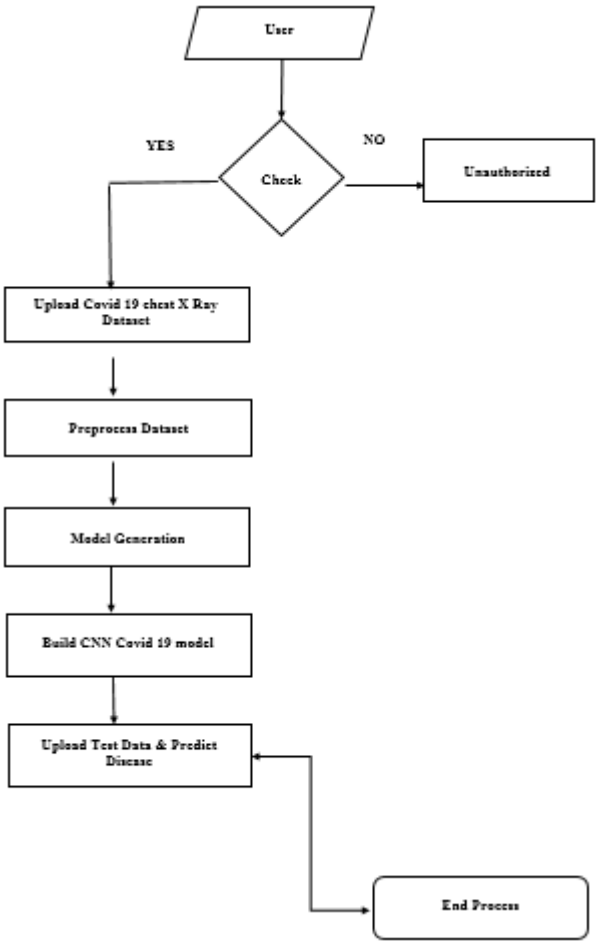
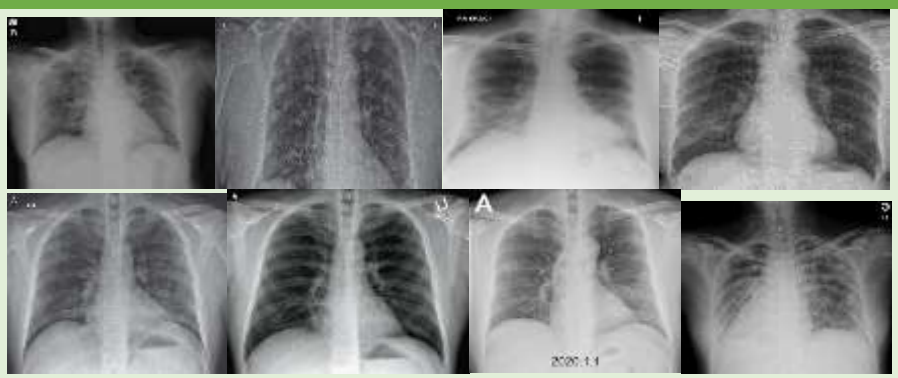
architectural features. In order to get the best COVID-19 photo rating, the efficiency of the convNet was examined in 34 tests in this category, of which 17 were 'covid 19' or 'normal' and 17 were 'covid 19' or 'pneumonia'. For the 'covid19' or 'pneumonia' 'normal' survey, four studies were carried out, and the best findings from the other two groups were used. Because the total size of the convolutional layer filters and group operations was more than the size of the input image, 4th convNet was not applied to pictures.



Dataset:

- The Dataset sample contains 3 attributes

NO	ATTRIBUTE	TYPE	DATASET
1.	COVID	Image	

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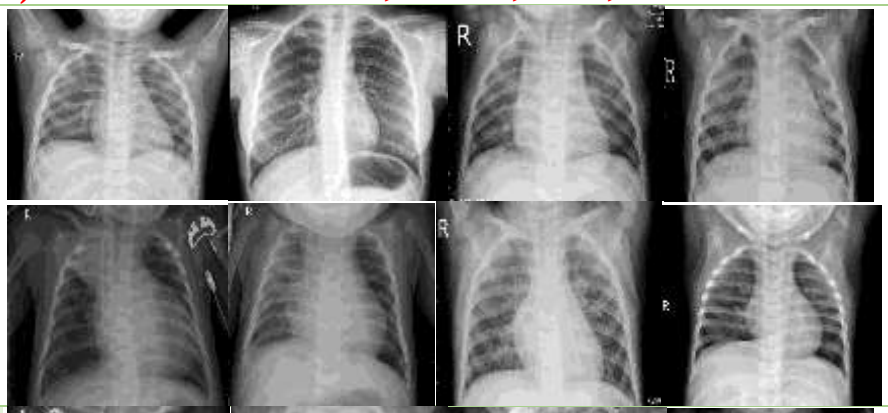
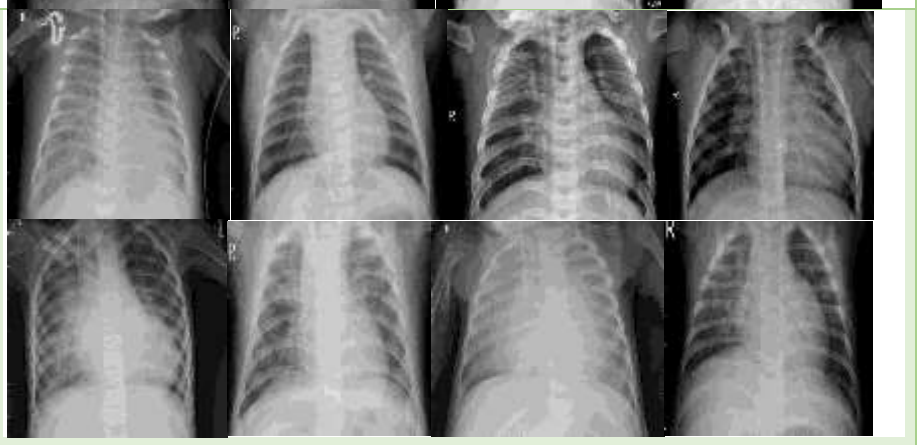
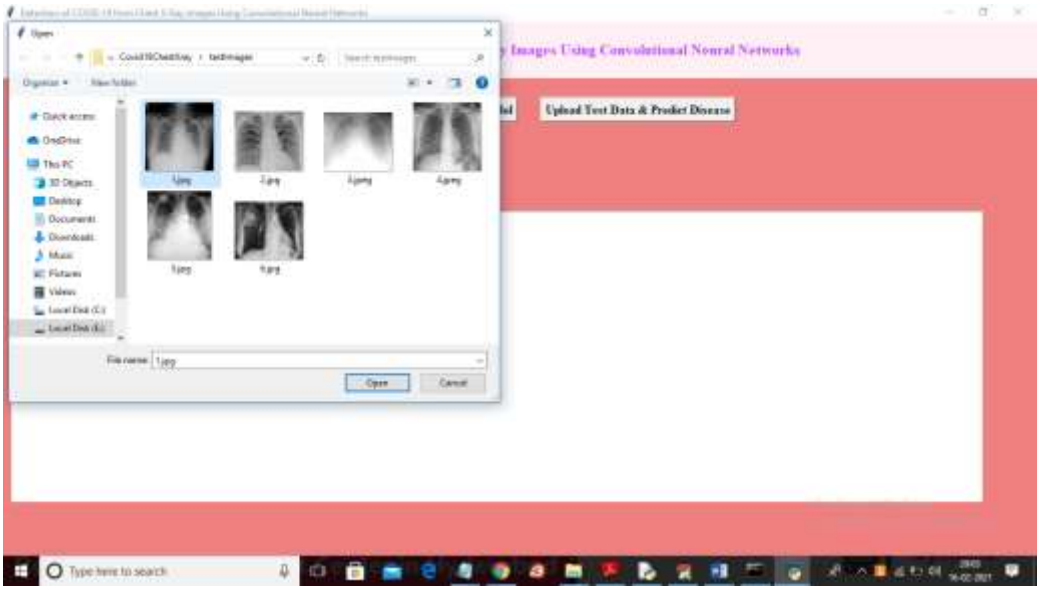
2.	Normal	Image	
3.	Pneumonia	Image	

This paper consists of following modules:

- Upload Covid-19 Chest X-ray Dataset
- Pre-process Dataset
- Model Generation
- Build CNN Covid-19 Model
- Upload Test Data & Predict Disease
- Accuracy Comparison Graph

7. RESULTS



In above screen selecting and uploading '1.jpg' and then click on 'Open' button to load image and to get below prediction result.

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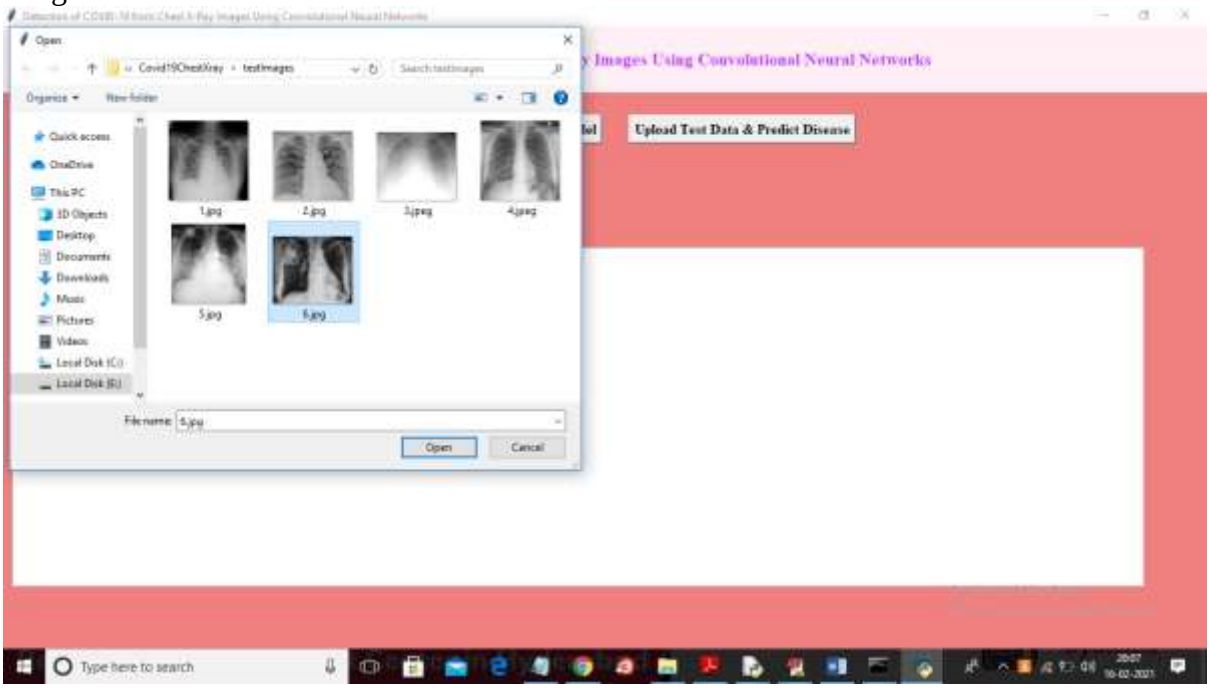
In above screen in blue colour text printing detected disease in uploaded image and now upload another image and test



In above screen selecting and uploading '6.jpg' and then click on 'Open' button to get below prediction result

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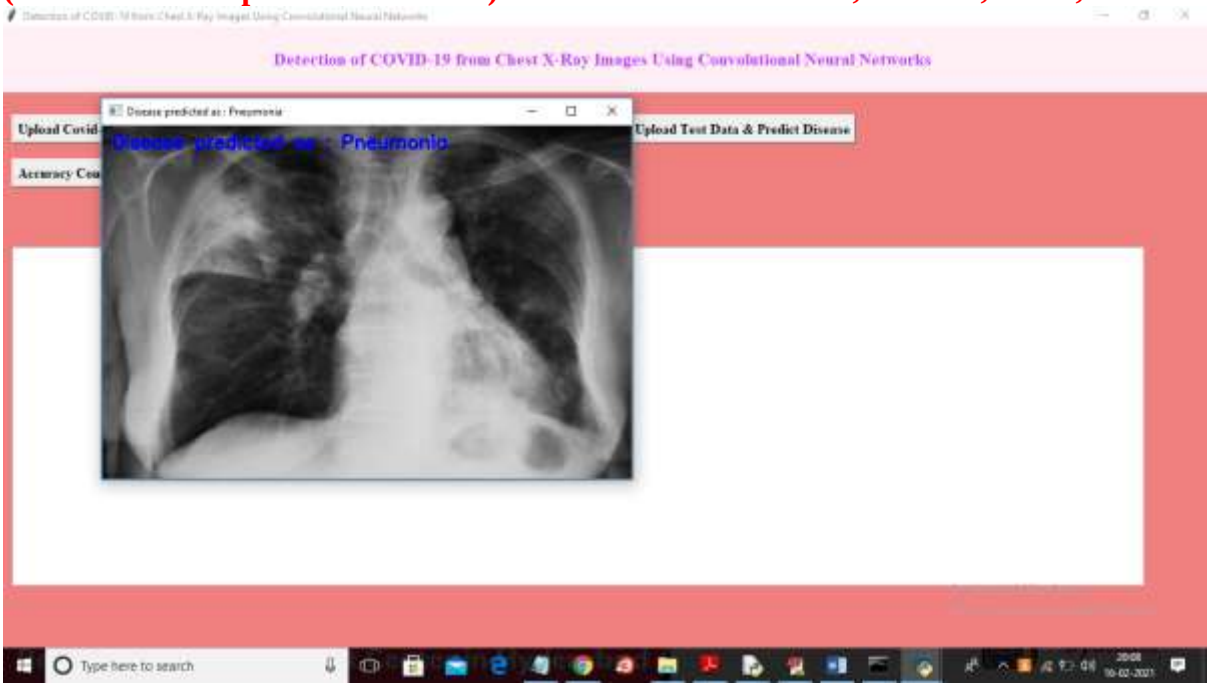

8. CONCLUSION AND FUTURE ENHANCEMENTS

There are major advantages of detecting COVID-19 from chest X-rays which plays an important role for both doctors as well as the patients such as low consumption of time and cost. For the task at hand, deep learning and artificial intelligence are capable of recognising photos. ConvNets were used in this work to recognise COVID-19 chest X-rays. Consideration was given to the COVID-19 categories "Normal," "Pneumonia," and "Pneumonia or Normal."

9. BIBLIOGRAPHY

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