A WEB MANAGEMENT PLATFORM FOR X-RAY CHEST IMAGE CORONA VIRUS DETECTION, COVID-XR

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ABSTRACT

Making decisions about disease containment and treatment may be aided by early detection of COVID-19. In this work, we employ pictures from the three most used medical imaging modes—X-ray, ultrasound, and CT scan—to show how transfer learning from deep learning models may be used to conduct COVID-19 identification. The goal is to use sophisticated deep learning image categorization algorithms to give overworked medical personnel a second set of eyes. Through an initial comparison analysis of various well-known CNN models, we choose a Convolutional Neural Network (CNN) model that is appropriate. In order to demonstrate how the models may be applied to the extremely difficult and sparse COVID-19 datasets, we then optimize the chosen VGG19 model for the picture modalities. We highlight the challenges (including dataset size and quality) in utilizing current publicly available COVID-19 datasets for developinguseful deep learning models and how it adversely impacts thetrainability of complex models. We also propose an image pre-processing stage to create a trustworthy image dataset fordeveloping and testing the deep learning models. The new approach is aimed to reduce unwanted noise from the imagesso that deep learning models can focus on detecting diseaseswith specific features from them. Our results indicate that Ultrasound images provide superior detection accuracy compared to X-Ray and CT scans. The experimental results highlight that with limited data, most of the deeper networksstruggle to train well and provides less consistency over the three imaging modes we are using. The selected VGG19 model, which is then extensively tuned with appropriate parameters, performs in considerable levels of COVID-19 detection against pneumonia or normal for all three lung image modes with the precision of up to 86% for X-Ray, 100% for Ultrasound and 84% for CT scans.

INTRODUCTION

Even after augmentation, the X-Ray pictures of the lungs in patients with COVID-19 were rare, thus we used two strategies. End-to-end trained just for CNN With the use of a large collection of historical (not COVID-19) pulmonary X-rays from CheXpert, a Machine Learning (ML) CNN model was created and trained to distinguish between healthy and unhealthy lungs. 80% of the data set was used for training, while 20% was used for testing. There were 20% of the training data left over for validation. Adaptive learning several machine learning models and their optimal weights are available in the programming environment Keras. We used ResNet50 and VGG16, two of the most popular deep models used in competitions, for the current study and were successful in achieving the feature extractions and fine- tuning.

SYSTEM DESIGN

UML diagram is designed to let developers and customers view a software system from a different perspective and in varying degrees of abstraction. UML diagrams commonly created in visual modelling tools include.

The goals of UML are:

a. To model systems using object-oriented concepts
b. To establish an explicit coupling between conceptualas well as executable
c. To address the issue of scale inherent in complex,mission critical system

d. To create a modelling language usable by bothhumans and machines

BASIC BUILDING BLOCKS OF UML

As UML describes the real-time systems, it is very important to make a conceptual model and then proceed gradually. Theconceptual model of UML can be mastered by learning the following three major elements

GOALS:

- UML building blocks
- Rules to connect the building blocks
- Common mechanisms of UML

SYSTEM ARCHITECTURE

The primary goals in the design of the UML are as follows

1. Provide users with a ready-to-use, expressive visual modelling language so they can develop and exchange meaningful models.
2. Provide extensibility and specialization mechanismsto extend the core concepts.
3. Be independent of particular programming languages and development processes.
4. Provide a formal basis for understanding the modelling language.
5. Encourage the growth of the OO tools market.
6. Support higher-level development concepts such as collaborations, frameworks, patterns and components.

USE CASEDIAGRAM:

In Unified Modeling Language (UML) terms, a use case diagram is a type of behavioral diagram that starts with a use case analysis. Its goalis to describe the functionality of a system in terms of actors, goals, and dependencies using a visual representation. The use case diagram serves two purposes: It reveals which actor is the primary user of the system, and which system features they rely on. There are ways to illustrate the actors' roles in the system.

SCENARIO OF CUSTOMER DIAGRAM

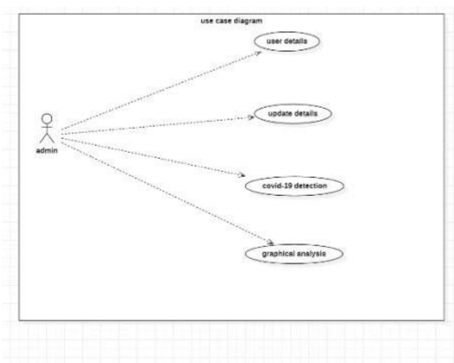
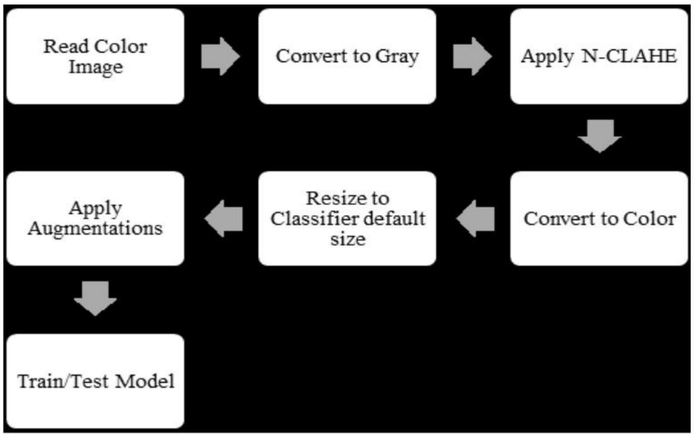
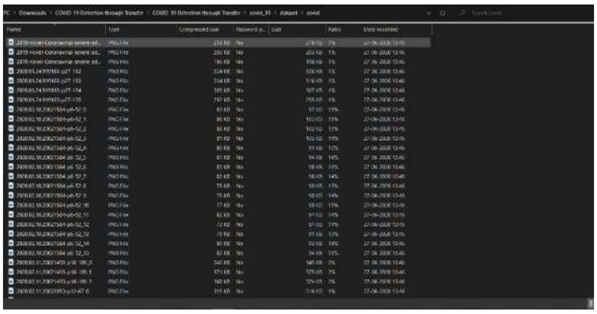


Fig.1.SCENARIO OF CUSTOMER DIAGRAM



II. OUTPUT SCREEN SHOTS

we are training CNN on covid detection by utilizing images like the one in the screen shots below.



Within this screen, we can see that we have a wide variety of covid images, and you can view them in any folder.

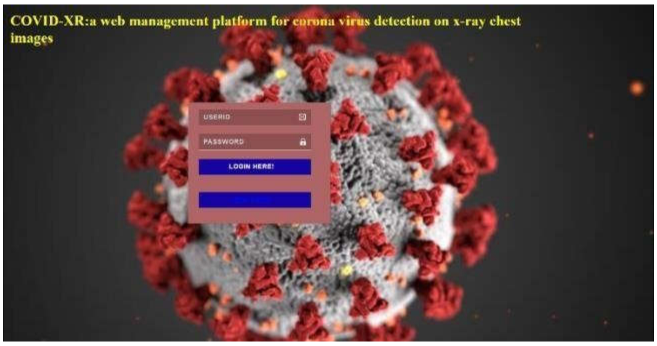


Fig.4 .login page

In above screen click we have to login the page

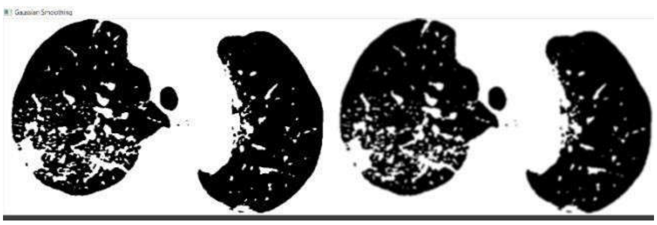


Fig. 5. Updated page

In above screen the updated data will be shown

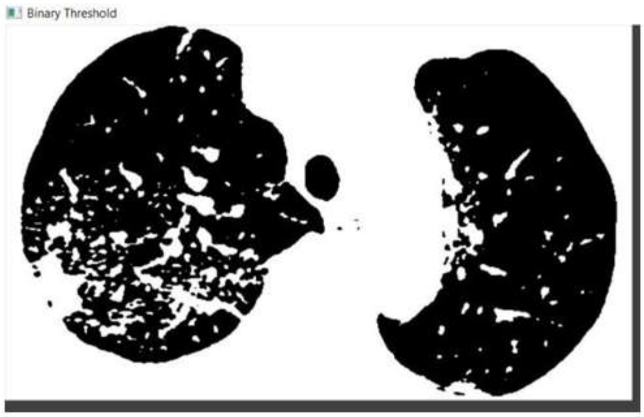


Fig.6 Binary Threshold

In above screen dataset loaded and Train CNN withcovid Images and shows binary layer

Fig. 7. image segmentation

In above screen dataset loaded and train CNN with covidImages and shows image segment layer

Fig. 8 Gaussian Smoothing

In above screen dataset loaded and Train CNN with covidImages and shows gaussian layer

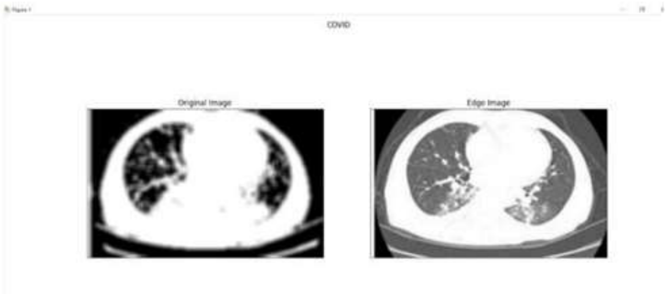


Fig.9 final report

In above screen dataset loaded and shows the results

Fig.10 confusion matrix

In the above screenshot it will shows the predicted value ofthe dataset

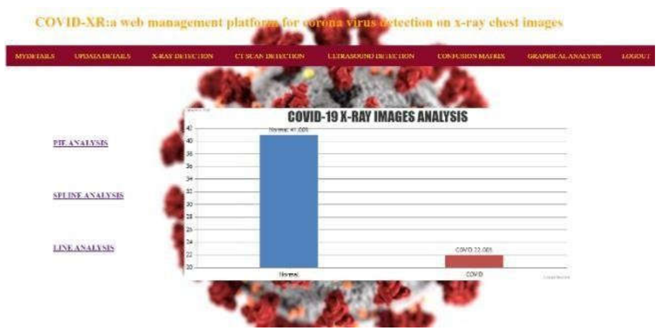


Fig .11 line analysis

In the above screenshot it will shows the predicted value in the form of line graphical representation of the dataset

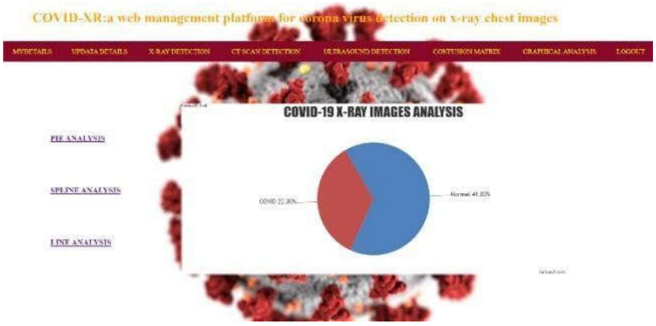


Fig .12 pie analysis

In the above screenshot it will shows the predicted value in the form of pie graphical representation of the dataset

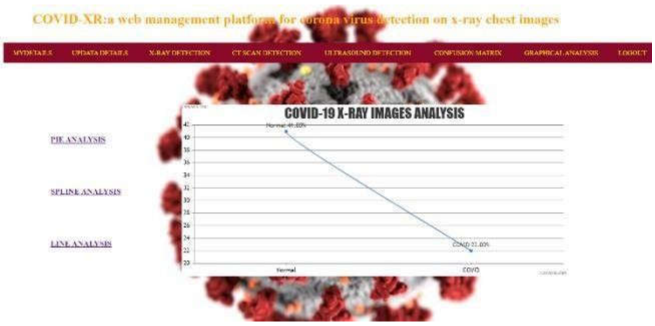


Fig .13 spline analysis

In the above screenshot it will shows the predicted value in the form of spline graphical representation of the dataset.

CONCLUSION

We have shown that the VGG19 model may be utilized to create appropriate deep learning-based tools for COVID-19 identification using the restricted and difficult COVID-19 datasets that are currently available. The model can distinguish between COVID-19 vs. Pneumonia and Pneumonia vs. Normal conditions for a variety of imaging modalities, including X-ray, ultrasound, and CT scan. We produced significant classification results using VGG19 from all imaging modalities with very minimal data curation. The pertained models calibrated quite well for the ultrasound picture samples, which to the untrained eye were noisy and challenging to understand, which maybe the most fascinating discovery is. Both the confusion matrix and training curves for the two ultrasound trials are nearly perfect. Although VGG19 performed well during training on the X-Ray picture corpus, we discovered that the proportion of false negatives was concerning but not unexpected given data quality challenges.

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