Using Machine Learning's VGG-16 Module and CNN Algorithm Forecast Lung Disease

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Abstract

Lung Disease of uncontrolled cell growth in tissues of the lung. Discovery of carcinoma in its initial stage is that the key of its cure. All in all, a measure for earlier than schedule stage lung disease determination essentially incorporates those using X-beam midsection movies, CT, MRI so forth. In numerous parts of the planet far reaching screening by CT or MRI isn't yet pragmatic, in order that midsection radiology stays in starting and most elementary system. Firstly, we'll utilize some systems are key to image dataset of medicinal picture mining, Lung Field Segmentation, processing, Feature Extraction classification utilizing CNN and Vgg16. The routines utilized as part of this paper work states to group computerized X-beam midsection movies into two classes: ordinary and affects. Diverse learning examination were performed on two distinctive information sets, made by method for highlight choice and CNNs prepared with diverse parameter the outcomes are checked out and reported.

Introduction

Lung Disease may be a noteworthy reason for Mortality within the western world as exhibited by the striking factual numbers distributed consistently by the American Carcinoma Society. They demonstrate that the 5-year survival rate for patients with lung malignancy are often enhanced from a standard of 14% up to 49% if the ailment

is analyzed and treated at its initial stage. Medicinal pictures as a significant piece of therapeutic determination and treatment were specializing in these pictures permanently. These pictures incorporate success of concealed data that misused by doctors in selecting contemplated choices around a patient. Then again, removing this important shrouded data may be a basic first stride to their utilization. This reason inspires to utilize information digging systems abilities for productive learning extraction & find concealed lung. Mining Medical Pictures includes numerous procedures. Medicinal image processing may be a promising zone of computational insight connected to a consequently break down patient's records going for the disclosure of latest information valuable for restorative choice making. Affected information is anticipated not just to increment exact determination and effective infection treatment, additionally to enhance security by diminishing blunders. The systems during this paper arrange the advanced X-beam midsection movies in two classes: ordinary and strange. The normal ones are those portraying a solid patient. The irregular ones incorporate style of lung tumor; we'll utilize a typical arrangement technique specifically CNN systems.

Literature Survey

Authors : Lam Pham , Huy Phan , Ramaswamy Palaniappan , Alfred Mertin , Ian McLoughlin Year:2022

It aims to classify anomalies in respiratory cycles and detect diseases , from respiratory sound recordings.It carry out an extensive exploration of the effect of spectrogram types , spectral-time resolution, overlapping/non-overlapping windows , and data augmentation on final prediction accuracy.

Authors : Naresh Cherukuri , Naga Raju Bethapudi , Dr.Venkata Sai KrishnaThotakura , Dr.Raja Mani Mummidi

Year:2021

Evaluate the ability of deep learning systems to predict high and low death rate risk groups in patients with non-small cell lung cancer using processed magnetic resonance imaging. Compare the performance of deep learning systems to traditional models based on predefined tumor features such as tumor volume and maximum diameter**.**

Authors : M.Siddardha Kumar and Dr.K.Venkata Rao

Year:2021

To investigate the use of machine learning techniques for predicting and classifying lung cancer based on CT scans. To compare and evaluate different feature selection methods and machine learning algorithms for their effectiveness in predicting lung cancer.

System Design

The first step is to acquire images. To produce a classification model, the computer needs to learn by example. The computer needs to view many images to recognize an object. Other types of data, such as time series data, can also be used to train deep learning models. In the context of the work surveyed in this paper, the relevant data required to detect lung disease will be images. Images that could be used include chest X-ray, CT scan image. The output of this step is images that will later be used to train the model.

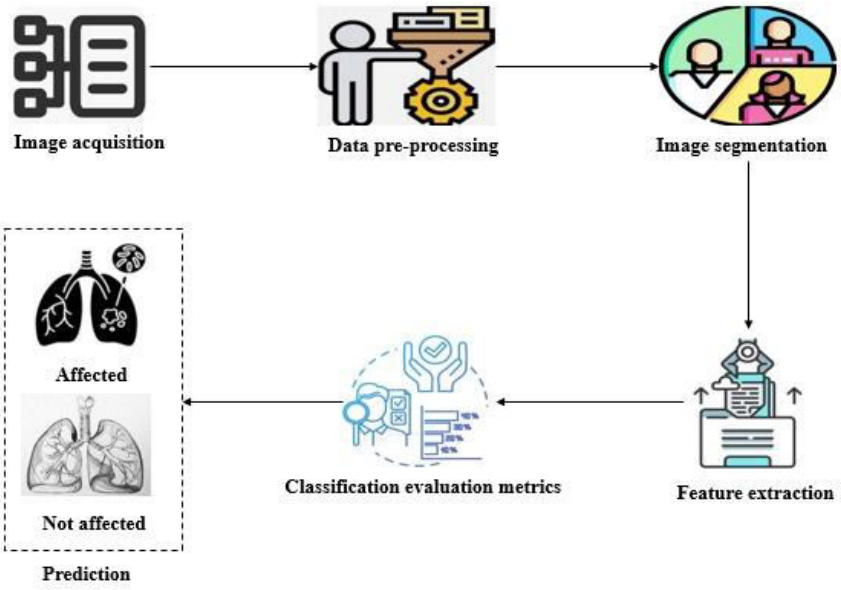
Image pre-processing is a very common and beneficial technique in the deep learning process and it not only could enlarge the quantity of the original dataset but also enrich the information implicit in the dataset. As previously mentioned, we utilized an effective image enhancement method named Dynamic Histogram Equalization (DHE) to improve the quality of images before they were inputted into the CNN model. Histogram Equalization (HE), which denotes mapping from the initial narrow pixel levels to a wider extent and improves image enhancement, has been widely used in image processing. The HE technique means to convert the gray levels of an image by using cumulative effort function globally, yet always brings about the problem that elaboration information in images is damaged, leading to awful image quality. This popular image contrast enhancement method could enhance image contrast effectively in many aspects, like X-ray.

Image Segmentation is an important step in domain of computer vision based on emerging applications including medical imaging. The image segmentation is a step of processing which is used threshold method to segment the MRI (Magnetic Resonance Images) image gray level to binary image. Segmentation means partitioning the digital images into multiple parts of segments or objects. Segmentation is a process of grouping the pixels that have similar attributes. Is used to locate the objects and boundaries in images. Basically, the segmentation process performed to extract important features from the image for further analysis.

In this module, we are performing some more operation on segmented image. In this module we will perform feature extraction operation to get all detailed information about lungs image. Feature Extraction and reduction has been playing a vital role for

disease region into their relevant categories in the field of computer vision and machine learning. The major issue behind feature extraction is to compute the most active or robust features for classification, which produced an efficient performance. The Feature extraction is used related to dimensionality reduction.

This dataset contains 5,856 validated Chest X-Ray images. The images are split into a training set and a testing set of independent patients. Images are labeled as (disease NORMAL/BACTERIA/VIRUS)-(randomized patient ID)-(image number of a patient). For details of the data collection and description.



In this subsection, several evaluation metrics, are described. According to the outputs of model, four indices Normal, Pneumonia, covid-19 and Tuberculosis, are used to analyze and identify the performance of model. The True Positive means that the chest X-ray images, which suffer from pneumonia or Tb or covid-19 are signed as pneumonia as well by the model. The True Negative means if the chest X-ray images do not show pneumonia or Tb or covid-19 as well as the model predicts. The always used to estimate how much the number of images that are truly pneumonia accounted for in the total number examples, which are classified as training for pneumonia or Tb or covid-19. That is, the pneumonia or Tb or covid-19 images must be identified in practical clinical diagnoses and it predicts the Pneumonia, Normal, Tuberculosis and Covid.-19.

IMPLEMENTATION

Step 1: Choose a Dataset:

Choose a dataset of your interest or you can also create your own image dataset for solving your own image classification problem.

Step 2: Prepare Dataset for Training:

Preparing our dataset for training will involve assigning paths and creating categories(labels), resizing our images.

Resizing images into 200 X 200

Step 3: Create Training Data:

Training is an array that will contain image pixel values and the index at which the image in the CATEGORIES list.

Step 4: Shuffle the Dataset

Step 5: Assigning Labels and Features:

This shape of both the lists will be used in Classification using the NEURAL NETWORKS.

Step 6: Normalizing X and converting labels to categorical data

Step 7: Split X and Y for use in CNN

Step 8: Define, compile and train the CNN Model.

Step 9: Accuracy and Score of model

function XCOMPRESSCU(*pCurCU)

M □ FastCUMope(PO,QP)

if M 4 SPLIT then

C2n □CHECKINTRA(pCurCU)

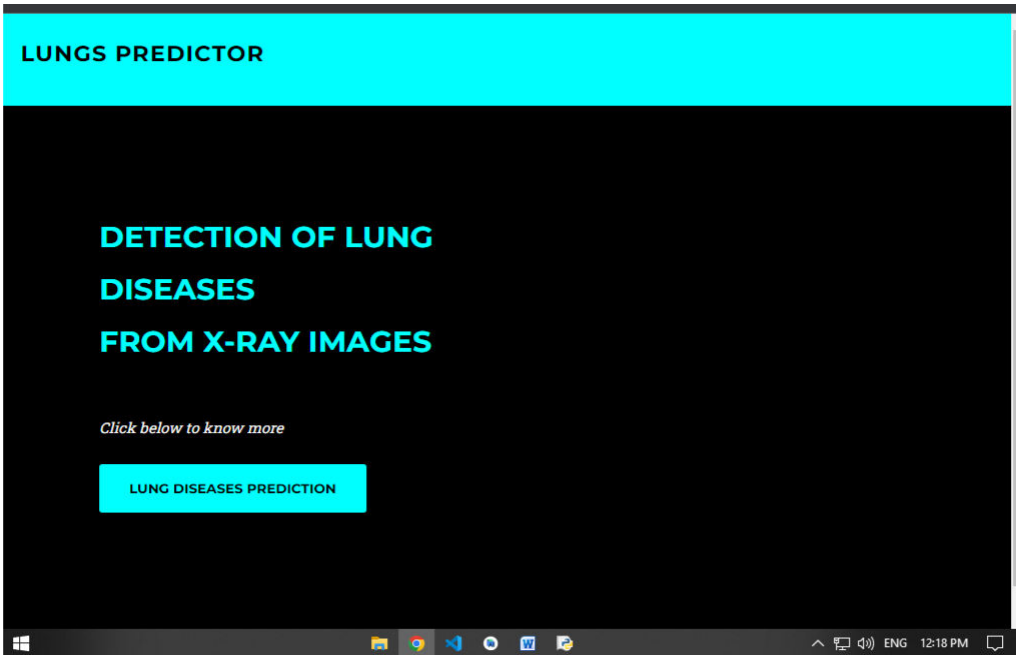
else

C2n □ ∞

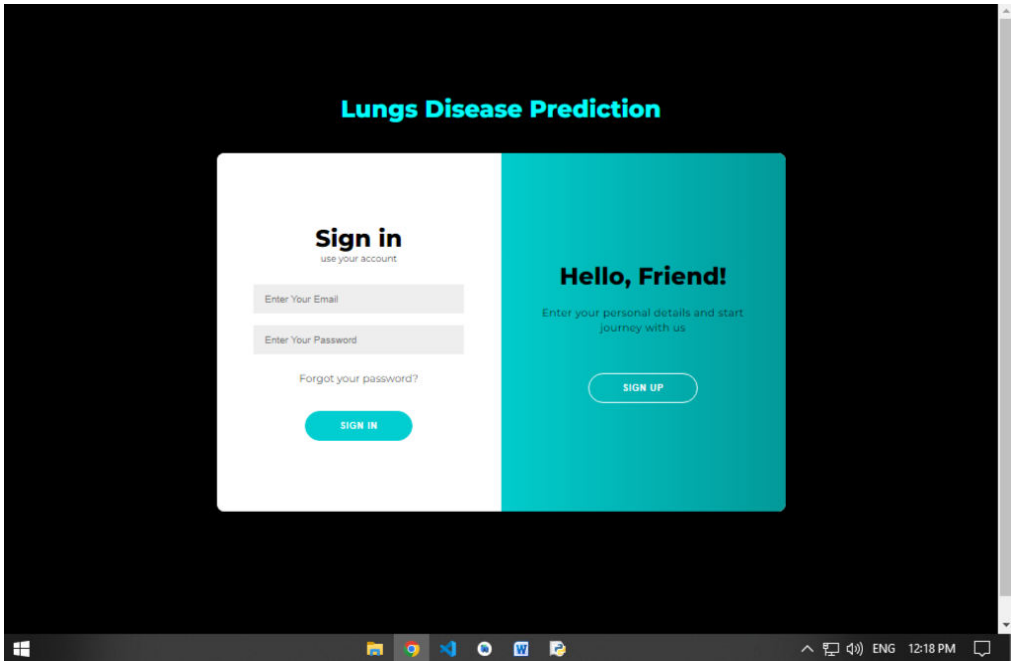
```
        end if
        if M != HOMO and Dcur < Dmax then
                Cn □ 0
            for i = 0 to 3 do
                pSubCUi □ pointer to SubCUi
                CN □ CN+ XCompressCU(pSubCUi)
                end for
        else
                CN □ ∞
        end if
    CHECKBESTMODE(C2N, CN)
    end function
```

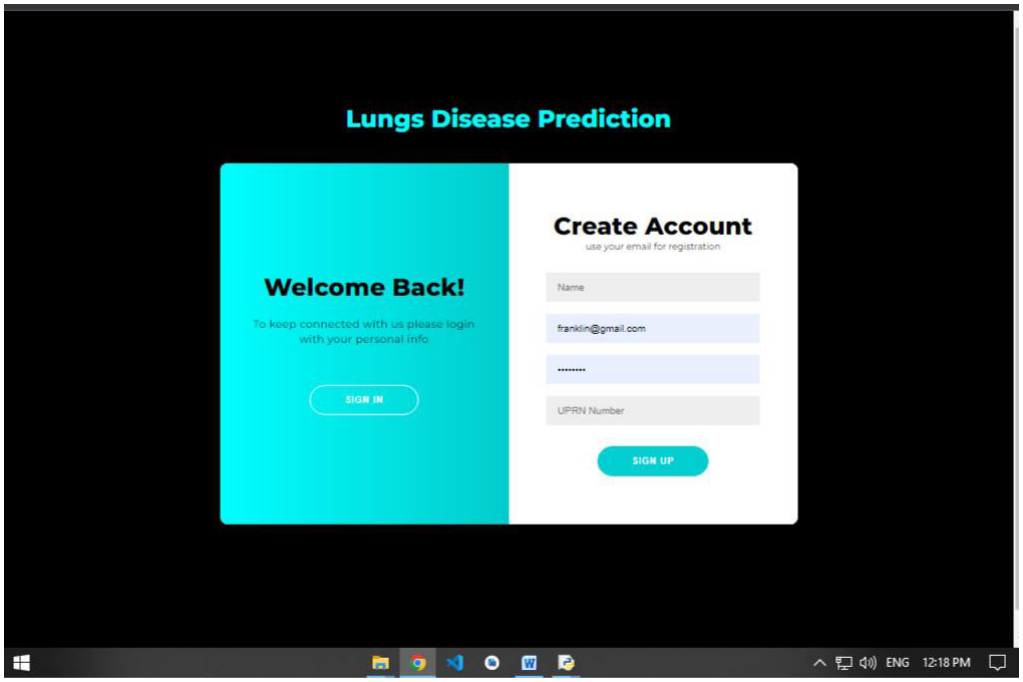
SNAPSHOT

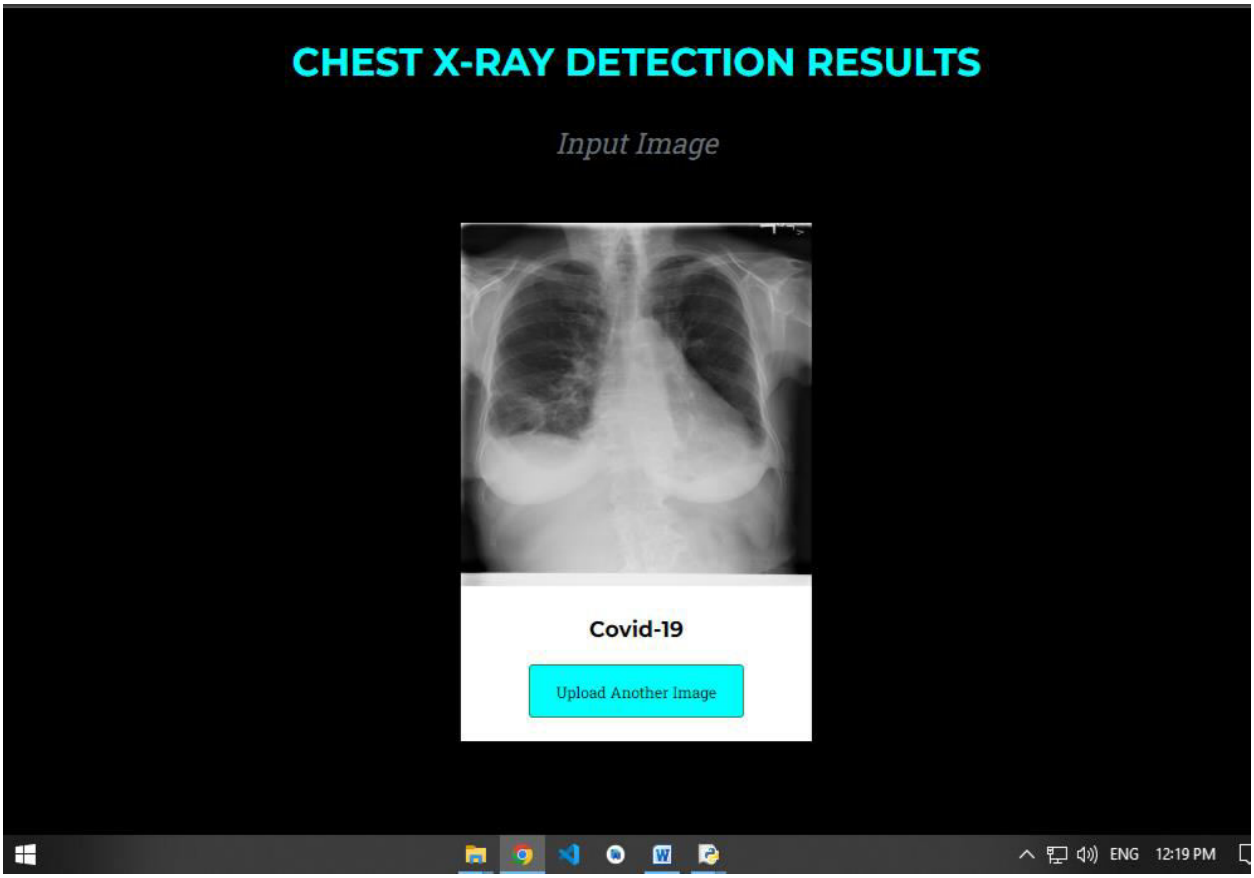
HOME PAGE:



SIGN PAGE:


Lungs Disease Prediction
Sign in
use your account
Enter Your Email
Enter Your Password
Forgot your password?
SIGN IN
Hello, Friend!
Enter your personal details and start journey with us
SIGN UP
ENG
12:18 PM


Lungs Disease Prediction
Welcome Back!
To keep connected with us please login with your personal info
SIGN IN
Create Account
use your email for registration
Name
franklin@gmail.com
UPRN Number
SIGN UP
ENG
12:18 PM



CONCLUSION

It discusses about the different image processing techniques on lung modules to detect pulmonary diseases from chest X-Ray images.

The proposed system uses deep Convolutional Neural Networks and transfer learning approach to classify lung diseases with small volume datasets and achieves comparable accuracy with simpler classifiers and fewer trainable parameters.

The results show that the proposed system can be an effective tool for detecting pulmonary diseases from chest X-Ray images with high accuracy.

FUTURE ENHANCEMENTS

Prevention of lung diseases is low in India, especially in rural, did not notice at early stage, because of lack of awareness.

In our project the proposing system which can predict the diseases based on the input symptoms provided by the user and help them to analyze their health status so people can take some precautions as per the result.

It could help doctors to know the health state of the patient and based on that manual diagnosis of the disease can also be easily possible.

In Future work, have planned to conduct experiments on real time large health datasets to predict all the diseases and compare algorithm with other data mining algorithm.

REFERENCES:

National Institutes of Health. Conditions & Diseases. Available online: https://www.niehs.nih.gov/health/topics/conditions/index.cfm (accessed on 12 September 2020)

Sahlol A.T.; Abd Elaziz , M.; Tariq Jamal, A.; Damasevi cius, R.; Farouk Hassan, O. A Novel Method for Detection of Tuberculosis in Chest Radiographs Using Artificial Ecosystem-Based Optimization of Deep Neural Network Features. Symmetry 2020, 12, 1146.

Hu, H.; Li, Q.; Zhao, Y.; Zhang, Y. Parallel Deep Learning Algorithms with Hybrid Attention Mechanism for Image Segmentation of Lung Tumors. IEEE Trans. Ind. Inform. 2021, 17, 2880–2889.

Xiang, Q.; Wang, X.; Li, R.; Zhang, G.; Lai, J.; Hu, Q. Fruit Image Classification Based on MobileNetV2 with Transfer Learning Technique. In Proceedings of the 3rd International Conference on Computer Science and Application Engineering (CSAE 2019), Sanya, China, 22–24 October 2019; Association for Computing Machinery: New York, NY, USA, 2019; Article 121, pp. 1–7

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