IOT Based Covid Or Normal Classification

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Abstract- *The presence of symptoms of COVID-19 may be similar to other types of Virals. Because of this, it can be difficult to tell what's causing your condition without being tested for COVID-19 or other respiratory infections to determine how COVID-19 differs from other types of viral fever. Information from these studies can potentially help in diagnosis and in furthering our understanding of how SARS-CoV-2 affects the lungs. We present a Neural Network in TensorFlow and keras based Covid-19 classification. The proposed system based on CNN using images to classifying, Covid-19 or Normal in this system using CNN model. It is predicted that the success of the obtained results will increase if the CNN method is supported by adding extra feature extraction methods and classify successfully covid-19. We have demonstrated the efficacy and potential of using deep CNN to images.*

Keywords- covid-19, deep learning, TensorFlow, keras, CNN

I. INTRODUCTION

COVID-19 (coronavirus disease 2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is a strain of coronavirus. The disease was officially announced as a pandemic by the World Health Organisation (WHO) on 11 March 2020. Given spikes in new COVID-19 cases and the re-opening of daily activities around the world, the demand for curbing the pandemic is to be more emphasized.

Artificial intelligence (AI) have been found useful for rapid assessment to provide treatment of COVID-19 infected patients. Therefore, the design and deployment of AI tools for image classification of COVID-19 in a short period of time with limited data have been an urgent need for fighting the current pandemic. Radiologists have recently found that deep learning (DL) developed in AI, which was able to detect tuberculosis in chest X-rays, could be useful for identifying lung abnormalities related to COVID-19 and help clinicians in deciding the order of treatment of high-risk COVID-19 patients . The role of medical imaging has also been confirmed by others as playing an important source of information to enable the fast diagnosis of COVID-19 , and the coupling of AI and chest imaging can help explain the complications of COVID-19 .

II. OBJECTIVES

The goal is to develop a deep learning model for covid, pneumonia image classification by convolutional neural network algorithm for potentially classifying the results in the form of best accuracy by comparing the CNN architectures.

III. LITERATURE REVIEW

A literature review is a body of text that aims to review the critical points of current knowledge on and/or methodological approaches to a particular topic. It is secondary sources and discuss published information in a particular subject area and sometimes information in a particular subject area within a certain time period. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as future research that may be needed in the area and precedes a research proposal and may be just a simple summary of sources. Usually, it has an organizational pattern and combines both summary and synthesis.

A. Dual-Sampling Attention Network for Diagnosis of COVID-19 from Community Acquired Pneumonia

The coronavirus disease (COVID-19) is rapidly spreading all over the world, and has infected more than 1,436,000 people in more than 200 countries and territories as of April 9, 2020. Detecting COVID-19 at early stage is essential to deliver proper healthcare to the patients and also to protect the uninfected population. To this end, we develop a dual-sampling attention network to automatically diagnose COVID-19 from the community acquired pneumonia (CAP) in chest computed tomography (CT). In particular, we propose a novel online attention module with a 3D convolutional network (CNN) to focus on the infection regions in lungs when making decisions of diagnoses. Note that there exists imbalanced distribution of the sizes of the infection regions between COVID-19 and CAP, partially due to fast progress of COVID-19 after symptom onset. Therefore, we develop a dual-sampling strategy to mitigate the imbalanced learning.

Our method is evaluated (to our best knowledge) upon the largest multi-center CT data for COVID-19 from 8 hospitals. In the training-validation stage, we collect 2186 CT scans from 1588 patients for a 5-fold cross-validation. In the testing stage, we employ another independent large-scale testing dataset including 2796 CT scans from 2057 patients. Results show that our algorithm can identify the COVID-19 images with the area under the receiver operating characteristic curve (AUC) value of 0.944, accuracy of 87.5%, sensitivity of 86.9%, specificity of 90.1%, and F1-score of 82.0%. With this performance, the proposed algorithm could potentially aid radiologists with COVID-19 diagnosis from CAP, especially in the early stage of the COVID-19 outbreak

B. **Can AI help in screening Viral and COVID-19 pneumonia?**

Coronavirus disease (COVID-19) is a pandemic disease, which has already caused thousands of causalities and infected several millions of people worldwide. Any technological tool enabling rapid screening of the COVID-19 infection with high accuracy can be crucially helpful to the healthcare professionals. The main clinical tool currently in use for the diagnosis of COVID-19 is the Reverse transcription polymerase chain reaction (RT-PCR), which is expensive, less-sensitive and requires specialized medical personnel. X-ray imaging is an easily accessible tool that can be an excellent alternative in the COVID-19 diagnosis. This research was taken to investigate the utility of artificial intelligence (AI) in the rapid and accurate detection of COVID-19 from chest X-ray images. The aim of this paper is to propose a robust technique for automatic detection of COVID-19 pneumonia from digital chest X-ray images applying pre-trained deep-learning algorithms while maximizing the detection accuracy. A public database was created by the authors combining several public databases and also by collecting images from recently published articles. The database contains a mixture of 423 COVID-19, 1485 viral pneumonia, and 1579 normal chest X-ray images.

C. Trend Prediction of Influenza and the Associated Pneumonia in Taiwan Using Machine Learning

Trend prediction of influenza and the associated pneumonia can provide the information for taking preventive actions for public health. This paper uses meteorological and pollution parameters, and acute upper respiratory infection (AURI) outpatient number as input to multilayer perceptron (MLP) to predict the patient number of influenza and the associated pneumonia in the following week. The meteorological parameters in use are temperature and relative humidity, air pollution parameters are Particulate Matter 2.5 (PM 2.5) and Carbon Monoxide (CO), and the patient prediction includes both outpatients and inpatients. Patients are classified by tertiles into three categories: high, moderate, and low volumes. In the nationwide data analysis, the proposed method using MLP machine learning can reach the accuracy of 81.16% for the elderly population and 77.54% for overall population in Taiwan. The regional data analyses with various age groups are also provided in this paper.

D. **Atomatic Detection and Diagnosis of Severe Viral Pneumonia CT Images Based on LDASVM**

The identification of pneumonia types mainly depends on the experience of doctors, but some CT images of pneumonia are very similar, even experienced doctors are prone to misdiagnosis. In order to solve the problems of inefficiency, coarse granularity and poor accuracy under the background of large data, LDA-SVM (Linear Discriminate Analysis – support vector machine) classification algorithm in machine learning field is introduced. LDA is used to extract features from images, and SVM classifier is used to classify the sub-datasets with strong fusion features. On this basis, fusion index and intermediary centrality index are selected to measure the fusion degree of patent sub-centralization technology and identify the key technologies in the fusion process, Because of the fusion of several algorithms, the algorithm needs many iteration training, and the computation time is too long. And simulation results show that our proposed method has significant improvement on identification accuracy rate.

E. Field Trial of Aspiration Pneumonia Predicion based on Electronic Medical Records

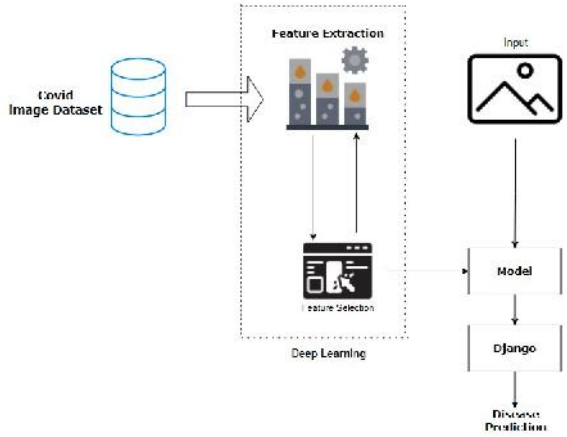
In this report, we propose a prediction method of aspiration pneumonia in department of neurosurgery and demonstrate the method in a hospital in order to reduce workload about care for aspiration pneumonia. In a field trial, medical staff provide preventive cares based on the output of the method. We show that the trial reduces workload of the medical staff, and the number of patients with aspiration pneumonia was reduced.

III. RESEARCH METHODOLOGY

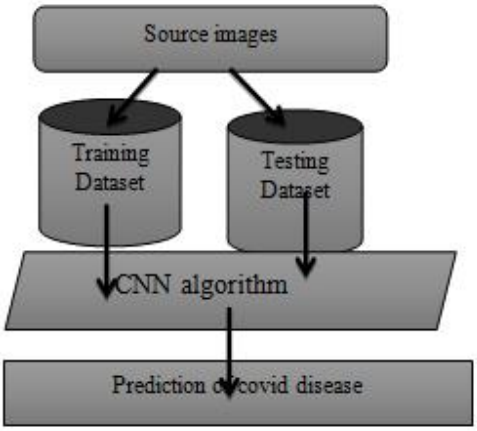
We are proposing recognition framework based on the structured two dimensional Convolutional Neural Networks (CNNs) type of AlexNet to classify the Covid-19 and improve the accuracy of workflow. The proposed method for this project is to train a Deep Learning algorithm capable of classifying Covid-19 images and data preprocessing and visualizing the image then feature extracting to build AlexNet

CNN using Covid-19 image dataset. we classify it such as Covid-19 or Normal this system using CNN model.It is predicted that the success of the obtained results will increase if the CNN method is supported by adding extra feature extraction methods and classify successfully covid-19. We have demonstrated the efficacy and potential of using deep CNN to images.

IV. SYSTEM ARCHITECTURE



V. WORK FLOW DIAGRAM



VI. MODULE DESCRIPTION

IMPORT THE GIVEN IMAGE FROM DATASET:

We have to import our data set using keras preprocessing image data generator function also we create size, rescale, range, zoom range, horizontal flip. Then we import our image dataset from folder through the data generator function. Here we set train, test, and validation also we set target size, batch size and class-mode from this function we have to train using our own created network by adding layers of CNN.

TO TRAIN THE MODULE BY GIVEN IMAGE DATASET:

To train our dataset using classifier and fit generator function also we make training steps per epoch's then total number of epochs, validation data and validation steps using this data we can train our dataset.

WORKING PROCESS OF LAYERS IN CNN MODEL:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics. The architecture of a ConvNet is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field. Their network consists of four layers with 1,024 input units, 256 units in the first hidden layer, eight units in the second hidden layer, and two output units.

Input Layer:

Input layer in CNN contain image data. Image data is represented by three dimensional matrixes. It needs to reshape it into a single column. Suppose you have image of dimension 28 x 28 =784, it need to convert it into 784 x 1 before feeding into input.

Convo Layer:

Convo layer is sometimes called feature extractor layer because features of the image are get extracted within this layer. First of all, a part of image is connected to Convo layer to perform convolution operation as we saw earlier and calculating the dot product between receptive field (it is a local region of the input image that has the same size as that of filter) and the filter. Result of the operation is single integer of the output volume. Then the filter over the next receptive field of the same input image by a Stride and do the same operation again. It will repeat the same process again and again until it goes through the whole image. The output will be the input for the next layer.

Pooling Layer:

Pooling layer is used to reduce the spatial volume of input image after convolution. It is used between two convolution layers. If it applies FC after Convo layer without applying pooling or max pooling, then it will be computationally expensive. So, the max pooling is only way to reduce the spatial volume of input image. It has applied max pooling in single depth slice with Stride of 2. It can observe the 4 x 4 dimension input is reducing to 2 x 2 dimensions.

Fully Connected Layer (FC):

Fully connected layer involves weights, biases, and neurons. It connects neurons in one layer to neurons in another layer. It is used to classify images between different categories by training.

Softmax / Logistic Layer:

Softmax or Logistic layer is the last layer of CNN. It resides at the end of FC layer. Logistic is used for binary classification and softmax is for multi-classification.

Output Layer:

Output layer contains the label which is in the form of one-hot encoded. Now you have a good understanding of CNN.

VII. FUTURE WORK

Medical department wants to automate the detecting of covid disease from eligibility process (real time). To optimize the work to implement in Artificial Intelligence environment.

VIII. CONCLUSION

It focused how image from given dataset (trained dataset) and past data set used to predict the pattern of covid diseases using CNN model. This brings some of the following insights about covid disease prediction. The major benefit of the CNN classification framework is the ability to classify images automatically. The covid diseases mainly contribute to face misshape and often can't be remedied because the patients are diagnosed too late with the diseases. In this study, we have discussed the overview of methodologies for detecting the abnormalities in covid images which includes collection of covid image data set, preprocessing techniques, feature extraction techniques and classification schemes.

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