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COVID-19 Disease Dynamics

Shivam Jade, Abhishek Shelke, Mayur Kadam, Prof. A. R. Nawadkar

Department of Computer Engineering

Smt. Kashibai Navale College of Engineering, Vadgaon, Pune

ABSTRACT

Today the pandemic COVID-19, has resulted across the world which is called as which infected millions of people. It is producing a massive outbreak in over 150 nations around the world, with serious health consequences. As a result, to diagnose 20 severe acute respiratory syndrome coronavirus 2, named as SARS CoV-2, which is responsible for coronavirus disease, is crucial for both patients and doctors. In the nations where the laboratory kits are unavailable for testing, it is becoming even more critical. In this paper we used to detect COVID- 19 disease we have investigated a model that is built based on text dataset processing and deep learning techniques. We used different processing approaches to analysis textual dataset, Regression, Linear Regression Algorithm apply. Based on machine learning we calculate state, country wise and date wise calculate Covid-19 patient, also we analysis death, recovered and confirmed patient using machine learning.

Keywords: Covid-19, Deep learning, Text Dataset, Regression, Linear Regression, Pre-processing.

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I. INTRODUCTION

In December 2019, the novel Covid showed up in the Wuhan city of China and was accounted for to the World Health Organization (W.H.O) on 31st December 2019. The infection made a worldwide danger and was named as COVID-19 by W.H.O on eleventh February 2020. The COVID-19 is the group of infections including SARS, ARDS. W.H.O announced this flare-up as a general wellbeing crisis and referenced the accompanying; the infection is being sent through the respiratory lot when a sound individual interacts with the tainted individual. The infection may communicate between people through different roots which are presently indistinct. The contaminated individual shows indications inside 2–14 days, contingent upon the brooding time of the center east respiratory condition (MERS), and the extreme intense respiratory disorder (SARS). As per W.H.O the signs and indications of gentle to direct cases are dry hack, weakness and fever while as in extreme cases dyspnea (windedness), Fever and sluggishness may happen. The people having different illnesses like asthma, diabetes, and coronary illness are more powerless against the infection and may turn out to be seriously sick. The individual is analyzing dependent on indications and his movement history. Indispensable signs are being noticed definitely of the customer having side effects. No particular treatment has been found as on tenth April 2020, and patients are being dealt with apparently. The medications like hydroxyl chloriquine, antipyretic, against virals are utilized for the indicative treatment. As of now, no such antibody is created for forestalling this lethal illness, and we may avoid potential risk to forestall this sickness. By washing hands consistently with cleanser for 20 s and staying away from close contact with others by keeping the distance of around 1 m may decrease the odds of getting influenced by this infection. While sniffling, Covering the mouth and nose with the assistance of dispensable tissue and staying away from the contact with the nose, ear and mouth can help in its counteraction. SARS is an airborne infection that showed up in 2003 in China and influenced 26 nations by having 8K cases around the same time and moved from one individual to another.

The signs and side effects of SARS are fever, cold, looseness of the bowels, shuddering, disquietude, myalgia and dyspnea. The ARDS (intense respiratory trouble disorder) is described by fast beginning of irritation in lungs which prompts respiratory disappointment and its signs and manifestations are pale blue skin tone, weakness and windedness. ARDS is analyzed by PaO2/FiO2 proportion of under 300 mm Hg. Till tenth of April 2020, practically 1.6 million affirmed instances of Covid are distinguished all throughout the planet.

II. LITERATURE SURVEY

[1] "COVIDGR DATASET AND COVID-SDNET METHODOLOGY FOR PREDICTING COVID-19 BASED ON CHEST X-RAY IMAGES", PDFS. Tabik ; A. Gómez-Ríos; J. L. Martín-Rodríguez; I. Sevillano-García; M. Rey-Area; D. Charte; E. Guirado; J. L. Suárez.

Currently, Coronavirus disease (COVID-19), one of the most infectious diseases in the 21st century, is diagnosed using RT-PCR testing, CT scans and/or Chest X-Ray (CXR) images. CT (Computed Tomography) scanners and RT-PCR testing are not available in most medical centers and hence in many cases CXR images become the most time/cost effective tool for assisting clinicians in making decisions. Deep learning neural networks have a great potential for building COVID-19 triage systems and detecting COVID-19 patients, especially patients with low severity. Unfortunately, current databases do not allow building such systems as they are highly heterogeneous and biased towards severe cases. This article is threefold: (i) we demystify the high sensitivities achieved by most recent COVID-19 classification models, (ii) under a close collaboration with Hospital Universitario Clínico San Cecilio, Granada, Spain, we built COVIDGR-1.0, a homogeneous and balanced database that includes all levelsof severity, from normal with Positive RT-PCR, Mild, Moderate to Severe. COVIDGR-1.0 contains 426 positive and 426 negative PA (PosteroAnterior) CXR views and (iii) we propose COVID Smart Data based Network (COVID-SDNet) methodology for improving the generalization capacity of COVID-classification models.

[2] "MODEL DECISION SUPPORT SYSTEM FOR DIAGNOSIS COVID-19 USING FORWARD CHAINING: A CASE IN INDONESIA", Henderi; Miftah Maulana; Harco Leslie Hendrie S. Warnars; Didik Setiyadi; Taufik Qurrohman,

The government in Indonesia and its staff work together to make tactical steps to prevent the spread of COVID-19 in the community. From the ministerial level to the heads of the provinces, regencies, and even the government. Therefore, this study aims to make a model decision support system to diagnose patients exposed to Covid-19, such as people in control, patients in oversight, and those who are positive for the Covid-19 Virus. Model decision support system development aims to provide information about the development of COVID- 19 and help the community in diagnosing themselves related to COVID-19 infection. In this study, the authors use the forward chaining method in application to get conclusions from the symptoms of the Covid-19. This research resulted in an application that patients exposed to the Covid19, and it's also provided a solution for healing from patients. And this could be a reference for patients before consulting further with the doctor

[3] "COVID-19 Cases in Iraq; Forecasting Incidents Using Box - Jenkins ARIMA Model", Hadeel I. Mustafa; Noor Y. Fareed, The pandemic outbreak of COVID-19 created panic all over the world. The mathematical principle in developing forecasting models aims to predict the number of future infections is considered crucial at this stage. The present investigation aims to analyze the time series using the Box-Jenkins method (Diagnostic, The Estimate, and selection, Forecasting) to find the best ARIMA model (Autoregressive Integrated Moving Average) for predicting the numbers of people infected with Covid-19 disease in Iraq. The data used were collected in the period between 1 -March and 31- July. The results showed that the appropriate forecasting model is ARIMA (2,1,5). Depending on this model, they predict the numbers of those infected with COVID-19 daily and for thirty days. Predictive values are consistent with original series values, indicating the efficiency of the model.

[4] Development and evaluation of an AI System for early detection of Covid-19 pneumonia using X-ray (Student Consortium)", Mohit Mishra; Varun Parashar; Rushikesh Shimpi

This paper aims to integrate AI (Artificial Intelligence) with medical science to develop a classification tool to recognize Covid-19 infection and other lung ailments. Four conditions evaluated were Covid-19 pneumonia, non-Covid-19 pneumonia, pneumonia and normal lungs. The proposed AI system is divided into 2 stages. Stage 1 classifies chest X-Ray volumes into pneumonia and non-pneumonia. Stage 2 gets input from stage 1 if X-ray belongs to pneumonic class and further classifies it into Covid-19 positive and Covid-19 negative.

[5] "Fuzzy Rule-Based System for Predicting Daily Case in COVID-19 Outbreak", Pınar Cihan,

The Covid-19 outbreak appeared in Wuhan in December 2019 and spread rapidly all over the world. The Covid-19 disease does not yet have a clinically proven vaccine and drug for treatment. The most important physical factors in reducing the spread of the epidemic are washing hands, reducing social distance and using a mask. Today in addition

to clinical studies, computer-aided studies are also widely carried out for Covid-19 outbreak. Artificial intelligence methods are successfully applied in epidemic studies. In this study, fuzzy rule basing system (FRGS) used to predict the number of Covid-19 daily cases. As a result of the study, the number of daily cases was successfully estimated with FRGS (R 2 = 0.96, MAE = 186 and RMSE = 254).

III. PROPOSED SYSTEM

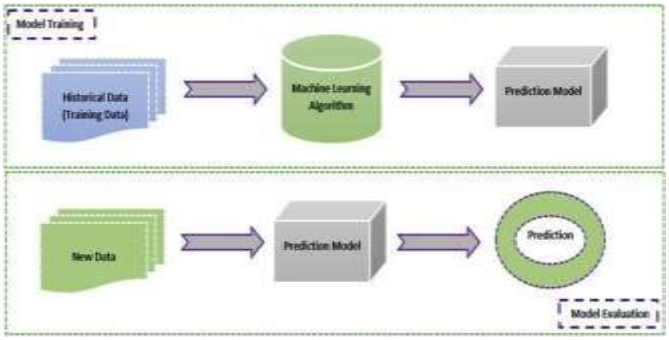

Fig 1. System Architecture

In our proposed system, logistic regression classification system is implemented on the classification of the Covid-19, Pneumonia and normal cold with their stages level are known. The classification is made by the Training and Testing system where the feature extracted values are tested. Thus the classification tends to get out the complete managing of the levels and stages of the Disease.

Algorithm used:

Linear Regression -

Linear regression is a statistical regression method which is used for predictive analysis.

It is one of the very simple and easy algorithms which works on regression and shows the relationship between the continuous variables.

It is used for solving the regression problem in machine learning.

Linear regression shows the linear relationship between the independent variable (X-axis) and the dependent variable (Y-axis), hence called linear regression.

If there is only one input variable (x), then such linear regression is called simple linear regression. And if there is more than one input variable, then such linear regression is called multiple linear regression.

2. Support Vector Machine

Text-based classification is a technique (SVM) which may be used to identify different types of data from the applications' point of view. Different researches are going on to identify ways of finding out the classes of data from a set of input data. In the present paper, we use the covid-19 recovered, death and confirmed patient dataset near about 306429 dataset available from all country, a text-based classifier has been implemented and this classifier model can be used to classify input text into one of two categories, as defined by the user. The classifier is first trained with an initial dataset using the principle of supervised learning. After the training process is complete, the classifier makes use of the trained data in order to classify any new input text that may be provided. The proposed model also offers an incremental approach to text classification as it dynamically trains the classifier from a new set of data provided by the users.

3. Holts Linear Model

As part of the study, a linear Holt model was developed, the quality of the models was shown in the form of the size of the forecast error, and a graph was built on which you can clearly see the calculation of the predicted incidence of COVID-19 for 10, 20 and 30 days. On the basis of the developed model, an information system has been implemented that allows analyzing the dynamics of the incidence of COVID-19 in the regions of all county. The results of the forecasting of incidence for 10, 20 and 30 days show that short-term forecasting for 10 days is the most accurate. Nevertheless, for use in practice, you can also use the results for 20 days, since such a forecast shows what will happen to the population after the 14-day incubation period.

IV. RESULT

	Dates	LR	SVR	Holts Linear Model Prediction
0	2021-05-30	134093578	52518353	150838731
1	2021-05-31	134427503	52765087	151241709
2	2021-06-01	134761427	53013822	151644687
3	2021-06-02	135095352	53264572	152047665
4	2021-06-03	135429276	53517347	152450642

Table 1. Predicted Count of Confirmed Cases Count On Respected Dates

V. CONCLUSION

The COVID-19 pandemic outbreak has devastated the whole world and lead to a state of worldwide health emergency. Several efforts have been performed to combat this pandemic. In this study, we aimed to explore the impact of vital signs, chronic disease, preliminary clinical data, and demographic features to predict the COVID-19 transmission trends among countries using supervised machine learning algorithms.

VI. REFERENCES

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