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Future Forecasting with Machine Learning Models for Covid-19

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Abstract-- COVID-19 has spread around the world, putting humans at risk. Due to the widespread infection and spread of this disease, the resources of some of the world's most powerful economies are being strained. The performance of a Machine Learning prototype to predict the number of patients who will be afflicted by COVID-19, a virus that was currently contemplated a problem to humanity. In this study, four quality estimate models were used to calculate the COVID-19 problem factors: Least Absolute Shrinkage and Selection Operator (LASSO), Ridge Regression (RR), Linear Regression (LR), Random Forest (RF). For each of the models, three types of predictions are made: the count of recently cured patients,count of demise, and the count of recently affected patients. To solve the problem, a proposed method based on the long short-term Integrated Average (LSTIA) predicts the count of COVID-19 cases in the next upcoming days and the impact of preventive measures such as social distance and solitary confinement unit on COVID-19 circulation.

Index terms-Machine Learning-covid-19 future forecasting

Ⅰ. Introduction

COVID-19, a pandemic that is sweeping the globe, has found that human society is susceptible to serious infectious diseases, making it difficult to solve the issue in a globally interconnected complex system. COVID-19 impacted over 150 countries in just a few weeks. As a result, the entire human race can not only crowd together to tackle the outbreak, but also make reasonable plans to return to work and production in each country, based on the current situation. Many studies have been carried out in order to find a appropriate and easy way to identify contaminated patients at an starting stage.Sometimes changing the shape into round and an outer boundary lung distribution after performing lungs CT scans of some patients infected with COVID19 in China. As a result, COVID-19 detection can be thought of as an image separation issue for identifying the disease's primary features. A novel corona virus, is rapidly spreading around the world. As of April 9, 2020, it had affected more than 1,436,000 people in over 200 countries and regions.The corona-virus (SARS) causes COVID-19, an extremely contagious respiratory and cardiovascular disease.First ever instance of covidwas discovered in Wuhan, China, and the outbreak is still going on. Symptoms include fever, cough, exhaustion, breathing difficulties, and a loss of smell and taste. Symptoms occur 1 to 14 days after being exposed to the virus.Acute Respiratory Distress Syndrome (ARDS), which can be exacerbated by cytokine storms, organ failure, septic shock, or blood clots, affects a small percentage of people.There seems to be existence of a long neurological damage (especially to the cardiovascular system), and there is concern about a large proportion of patients who have healed

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from the acute phase of infection but continue to have a variety of causes as long COVID—for months afterward, including extreme tiredness, memory loss, and other conscious problems, low-grade fever, muscle weakness, and breathlessness.

Ⅱ Related work

Due to network self-connections, automatic extraction of using the functionality from the previous iteration as information for the time - step and extracting appropriate features from training set, machine learning techniques have proven to be efficient for prediction.Based on the findings of the model study, we believe that emergency interference steps taken in the early stages of the outbreak, such as blocking, restricting the movement of people, and boosting help, had a critical restraining effect on the epidemic's original spread.

Continue to raise support for different medical services to ensure that suspected patients can be diagnosed and treated as soon as possible is a much safer prevention and care option.To prove the validity of the existing mathematical models, the epidemic trends long short-term Integrated Average (LSTIA) were first fitted and analysed. In the case of COVID-19, the fit and analysis of the results were used. For different parameters and in different territories, the forecasting results of three different mathematical models vary.The proposed methodology might be correct during a certain set in predicting various components (number of positively reported cases recovered, number of cases, etc.) and will become a valuable tool for administration and medical experts.

Ⅲ Dataset

The data covers the total count of covid positively affected patients, the total count of demises, the total count of newly confirmed cases, and the total count of recovered cases by province. The information includes data derived from official notifications from various countries. All data is taken from the daily case report which is updated on a daily basis.

The aim of this study is to forecast COVID-19's potential progress by looking at the number of new reported cases, recoveries, including deaths.For the 2019 Novel Corona virus repository, that university built a visual dashboard. The data set document can be found from the (case covid 19 time series) folder on the GitHub repository. All the information is taken from the day to day report which is updated on a daily basis.

Ⅳ Experimental Setup

Because the number of cases is increasing, putting a strain on the administration and health officers or doctors, certain prediction methods are needed to predict the count of covid positively affected patients in the future. The proposed method accurately predicts different parameters (count of covid positive cases, count of cured cases, and count of demise cases) within a certain range, and will be a useful tool for administrators and health officials. Scientists, public health practitioners, and governments must gain a better understanding of such opposition before developing a COVID-19 vaccine. Real-time and quick advantages, which can analyse the incidence trend of infectious diseases as soon as possible and are suitable for a large number of people.

Ⅴ Methodology

A. Data

The data covers the total count of positively affected covidpeoples , the total count of demise, the total count of newly affected patients,and the total count of cured patients by province, which

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includes information derived from official notifications from a variety of countries. All data is taken from the daily case report which is updated on a daily basis.

B. Estimation process

The Basic Reproduction Number changes dramatically across the stages, and it has a direct impact on the intensity of control. Furthermore, the virus's development time has an impact on the direct transmission momentum. These two variables must be calculated. According to current research, uncontrolled Basic reproduction is a problem. As a result, we selected an estimate range that was identical to the actual range. The range of estimation for the authority Basic reproduction number was specified within [0, 1.5]

C. Methods for predicting covid-19 based on data

The information was used, with 80% of the data being used for checking and the remaining 20% being used for testing and validating with the help of cross validation method. The forecasted total count of positively affected patients with the help of the official information available and forecasted data. It's worth noting the count of positively affected covid peoples predicted is nearly identical to the official data.

D. Data preprocessing

Data preprocessing is a technique for converting raw data into a clean set of information or opted data. Raw data is often insufficient, irrational, or insufficient in certain actions or trends, and it is likely to contain numerous errors. Preprocessing data is a proven method of addressing such issues.

E. Prediction of accuracy

This method is appropriate for neural networks or specific data, such as infection event or non-event binomial effects. Various measurements' prediction accuracy can be used for a variety of applications. The rate at which normal (non-predicted prediction accurately predicts sensitivity non-infectious disease), accuracy (predicted percentage of predicted trend), positive predictive value, negative predictive value (correctly predicted infection rate is), and the ratio are all included. Expected forecasts are a measure of how much the overall process has improved over the individual's accuracy.

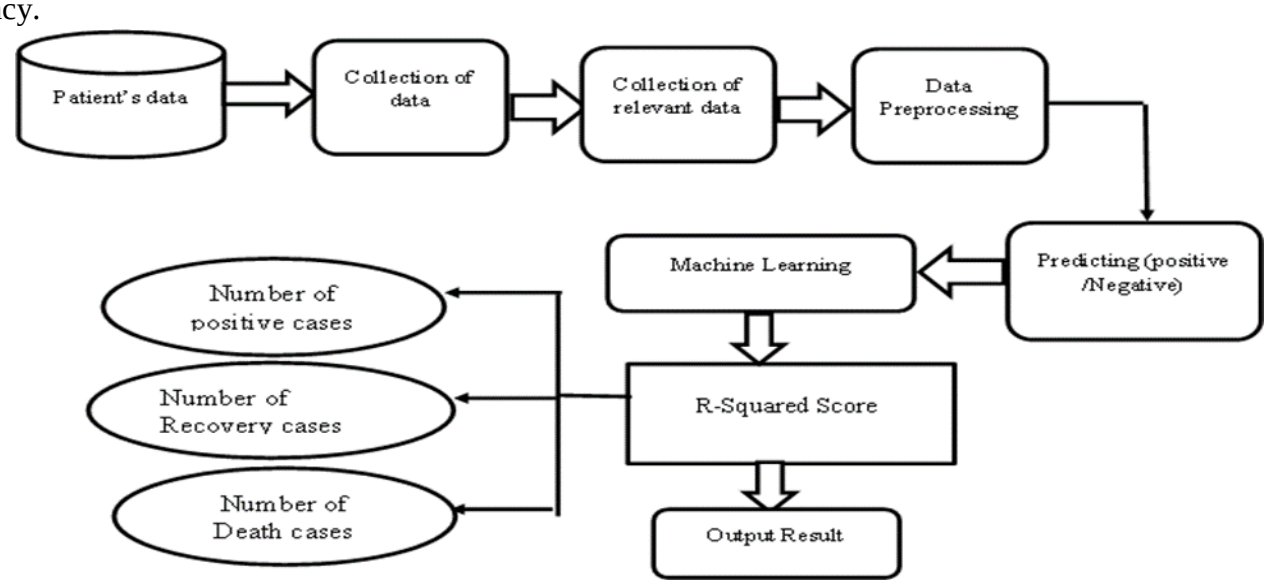

Fig-1 System Flow Diagram

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VI Result

For the next 30 days, the count of possible corona positively confirmed patients across the India, was estimated using an estimation method. Curve fitting was also used to quantify the number of recovered cases, Long Short-Term Integrated Average (LSTIA) daily covid positive cases, and death cases.Preventive steps such as social distance and quarantine have also been found to have an impact, indicating the spread of the virus can be steadily decreased by these preventive measures. Although maintaining this approach often necessitates a large amount of data, , Short-term emergency prevention programmes are provided in order to monitor and programme enforcement at all levels of the agencies. The predictions of three different mathematical prototypes for different frameworks and zones. In general, the organization prototype's connection effect may be the best of the four prototypes.

Fig-2 Compared Cases

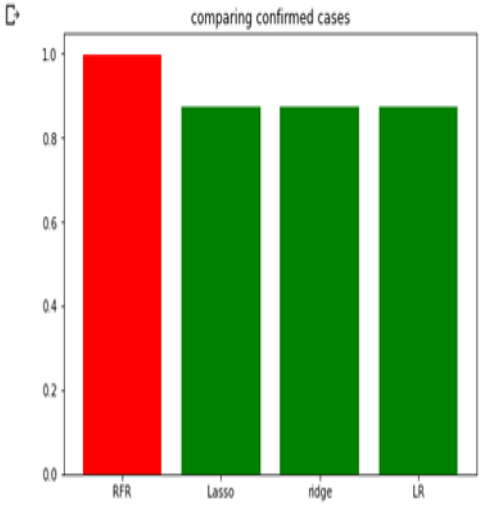

Fig-3 Recovery Cases

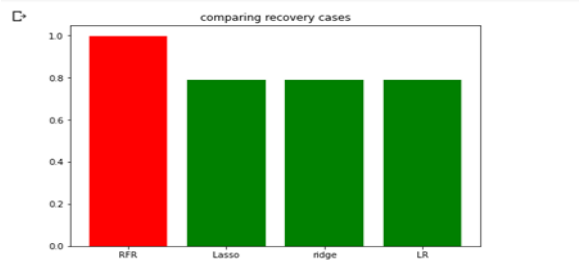

Fig-4 Death Cases

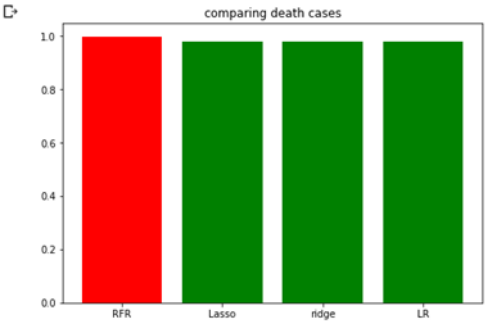

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Fig-5 Confirmed Cases

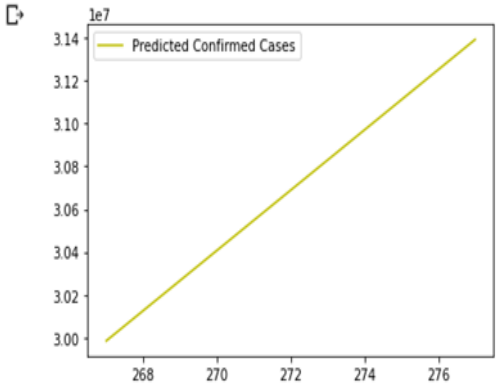


Fig-6 Recovery Cases

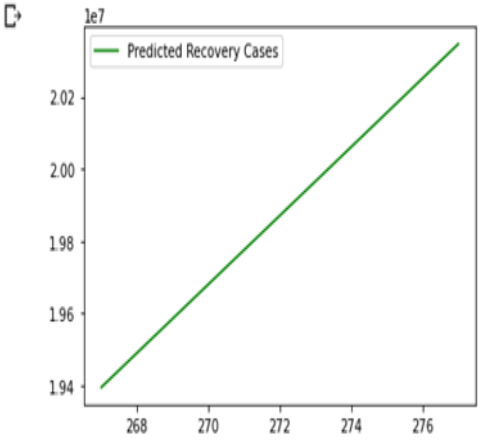
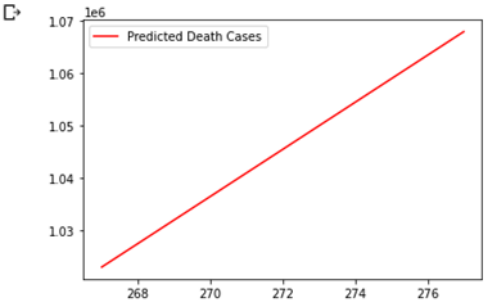


Fig-7 Death cases



VII Summary

The universal threat of COVID-19 has the potential to cause a major international occurrence.Most government departments and scholars around all the countries are sceptical that the epidemic will have an effect on a significant part of the global population. In this paper, a Machine Learning-based prediction system for forecasting the danger of a COVID-19 pandemic in the global population is proposed. The system uses machine learning algorithms to analyse a data set containing day-by-day real past data and make forecasts for the coming days.Given the data set existence and scale,the study's findings show that the Random Forest Algorithm performs excellent in the new domain of analysis. Linear Regression and the Least Absolute Shrinkage and Selection Operator (LASSO) are also good at predicting death rates and confirming cases to some extent. Based on the outcomes of these two prototypes, demise cases will be rise in the upcoming day, while recovery

cases will be slow.Because of all the data set peaks and troughs, ridge provides bad results in all cases. Creating an identical hyper plane between the relevant data variables was incredibly hard.We assume that model predictions depending on the present layout are correct in general, and that they may be useful in understanding the upcoming situation. As a result, the learning predict will greatly assist authorities in taking fast actions and decisions are needed to control the COVID-19 issue.

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