

CAPSTONE PROJECT WORK REPORT

Phase II

COVID-19 VACCINE ANALYSIS USING PYTHON

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A report submitted in part fulfilment of the degree of

B.Sc. in Computer Science with Data Analytics

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Bonafide Work Done by

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Place:

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KPR COLLEGE OF ARTS SCIENCE AND RESEARCH

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ABOUT THE COLLEGE

KPR College of Arts Science and Research is the latest addition to the KPR fleet. The College is located in a picturesque campus of about 11. Acres. The College is run by KPR charities under the leadership of our Chairman Dr. K.P.Ramasamy. The KPR Group is one of the largest industrial conglomerate in the country with interest in Textiles, Sugar, Wind Turbines, Automobiles and Education. The College was established in the year 2019 with a vision of providing top class education and life skills to students and thereby serve the nation and beyond. KPRCAS today offers 12 UG programmes in Management, Commerce and Computer Science streams. The Students of KPRCAS undergo intense training not only in the syllabus and curriculum of the affiliating University but are also trained in various areas. So that they emerge as industry ready graduates to meet the varying demands of the competing industries. Character building and Leadership qualities are inculcated into the students to make them responsible citizens focusing on the development of society and nation. A plethora of Clubs and Events encouraged the students to take part in sports and other cultural activities. KPRCAS offers three years undergraduate courses, which are exclusively for Business, Commerce and Computer Science Stream. The students are equipped with skills and knowledge needed to take up various leadership positions and to develop the society. Beyond Book Teaching help them to be professionals. KPRCAS emphasis on making the students academically brilliant, and also prepare them for the real corporate world. The learning curve begins here for the students of KPRCAS.

ABOUT THE DEPARTMENT

Bachelor of Computer Science with Data Analytics (B.Sc. (CS with DA)) was established in the year 2020. Data Analytics helps to raise the quality of data in the entire business system. The goal of data analytics is to construct the means for extracting business-focused insights from data this requires an understanding of how value and information flows in a business, and the ability to use that understanding to identify business opportunities. The primary aim of a data analyst is to increase efficiency and improve performance by discovering patterns in data. Data analysts exist at the intersection of information technology, statistics and business. They combine these fields in order to help businesses and organizations succeed. The students get exposed to Big Data, Business Intelligence, Data Mining, Data Visualization, Advanced Excel, Predictive Analytics and R Programming.

SYNOPSIS

The number of COVID-19 cases in India is rising quickly, according to the abstract. It is challenging for the national and local authorities to identify patterns, conduct analyses, and predict the spread of COVID-19 in India. The primary goal of this project is to develop a statistical model for a better understanding of the COVID-19 outbreak in India by carefully examining the cases that have been reported up until 22 April 2020. The reported COVID-19 cases in India are being investigated and analysed using the Exploratory Data Analysis (EDA) method. The analysis & findings reveal how COVID-19 has affected India on a daily and weekly basis, compare India to nearby nations as well as to those that have been severely impacted, and organize India's economy.

Despite the record speed at which they have been developed, COVID-19 vaccines have still been subject to the same checks, balances, and scientific and regulatory rigour as any other vaccine, and shown to be safe.

An unprecedented combination of political will, global collaboration and funding have enabled the rapid development of COVID-19 vaccines, without compromising vaccine safety. The first polio vaccine created by Jonas Salk took only six years to develop, and more recently, a vaccine against the Zika virus took only 6.5 months from conception to human testing. However, prior to COVID-19, it frequently took a decade or longer to develop and make a vaccine widely accessible to the public. Within six months of the 2009 pandemic's onset, H1N1 vaccinations were also widely accessible. However, the COVID-19 vaccines, which are currently in late-stage clinical trials or are being introduced in some nations, were created in less than a year. Although some efficiency savings have been found in the processes for developing vaccines, this does not mean that vaccine safety has decreased, which is understandable for some people to be concerned about the speed of this accomplishment.

1.INTRODUCTION

The COVID-19 virus is a contagious agent that is a member of the Nidovirus family or Nidovirales, which also includes the Coronaviridae, Artieviridae, and Roiniviridae families. These families are known to cause respiratory illnesses in people, ranging from the common cold to more severe conditions like Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. The most typical COVID-19 signs and symptoms include fever, exhaustion, a dry cough, aches and pains, nasal congestion, a runny nose, and sore throat. The most important thing to keep in mind is that not everyone who contracts the infection exhibits these qualities or experiences these symptoms of illness. People of all ages who have a history of high blood pressure, cardiovascular disease, or diabetes are more likely to get an infection, and anyone experiencing fever, coughing, or difficulty breathing should seek medical attention right once. By incorporating some of the straightforward and simple-to-adopt precautions into daily routines, such as thoroughly cleaning hands with alcohol-based hand rub or washing them with soap and water, avoiding touching eyes, nose, and mouth as hands may come into contact with several surfaces that may be contaminated, one can reduce protection from and prevention of spreading

COVID-19. Stay at home if you're feeling under the weather and, most importantly, try to limit your travel as much as you can because your hands could operate as a carrier for COVID-19 and the virus can enter our bodies. Only adhere to national and local authorities because they will be the ones in the know about the circumstance. When a student returned

from Wuhan, the epicentre of the coronavirus, on January 30, 2020, India reported its first coronavirus case. Since that time, the number of cases has been rising quickly. There is currently being researched and no vaccination or medication is currently available in particular for the treatment of COVID- 19. This study uses Exploratory Data Analysis to examine the COVID-19& present trend in light of specific criteria. The best method is Exploratory Data Analysis (EDA)

1.2 SYSTEM SPECIFICATION

1.2.1 Hardware Configuration

Operating System	Self-Hosted Technical Requirement	Cloud Technical Requirement
Windows	Windows 11 Home Single Language	Windows 11 Home Single Language
Mac	Mac OS 10.14+	Mac OS 10.14+
Linux	Ubuntu LTS releases 18.04 or later	Ubuntu LTS releases 18.04 or later
RAM	8 GB	
HDD	1 TB	
Processor	64-bit, four-core, 2.5 GHz minimum per core (If your dataset size is significantly larger than the medium dataset, we recommend 8 cores.)	
Mouse	Flipkart KM-206W Wireless Mouse	
Keyboard	HP HID Keyboard Device	
Monitor	HP Generic PnP Monitor	

2.3. Software Configuration

IDE	Google Colab
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Language Support	Python 3.10
Platform	Google Colab
Browser	Google Version 107.0.5304.107 (Official Build) (64-bit)
Database	MySQL 8.0.29

2. SYSTEM STUDY

2.1 Existing System

Participants started getting baseline and periodic surveys on January 14, 2021, asking, Have you ever taken a COVID- 19 (SARS-CoV-2) vaccine & Immediately after a subject reported receiving a vaccination, follow-up questions were given to them asking about the number of doses, dates of the doses, vaccine brand, and location of the vaccination. A monthly follow-up survey asking about extra vaccination doses was given to participants. In order to reduce participant burden and because the administration schedules for vaccines with multiple doses separated doses by 3 to 4 weeks, monthly surveys were chosen. Receiving only one dose of any vaccine other than JNJ-78436735 was considered partial immunisation (Johnson & Johnson). A complete immunisation was defined as obtaining 2 doses of any other vaccine or 1 dose of JNJ-78436735.

2.1.1 Drawbacks

Participants were asked to list any negative effects of the vaccination after having reported receiving it. Response options included fever, chills, fatigue, sore/itchy throat, muscle pain, joint pain, headache, other pain, redness/swelling at the injection site, rash other than at the injection site, allergic reaction/anaphylaxis, other, and none of the above. Due to the fact that these side effects had been documented throughout vaccination clinical trials, these response alternatives were chosen. Participants had the option of responding to the other option in free-text. Participants who reported unfavourable effects were further questioned about the degree of the adverse effects they self- rated and their duration (very mild, mild, moderate, severe, and very severe). Participants were not asked to report side effects by dose individually if they indicated receiving two doses of the vaccine on the same survey.

2.2 Proposed System

COVID-19. Stay at home if you're feeling under the weather and, most importantly, try to limit your travel as much as you can because your hands could operate as a carrier for COVID-19 and the virus can enter our bodies. Only adhere to national and local authorities because they will be the ones in the know about the circumstance. When a student returned from Wuhan, the epicentre of the coronavirus, on January 30, 2020, India reported its first coronavirus case. Since that time, the number of cases has been rising quickly. There is currently being researched and no vaccination or medication is

currently available in particular for the treatment of COVID- 19. This study uses Exploratory Data Analysis to examine the COVID-19& present trend in light of specific criteria. The best method is Exploratory Data Analysis (EDA)

2.2.1 Features

Coronavirus disease 2019 (COVID-19), the highly contagious infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a catastrophic effect on the world's demographics resulting in more than 6 million deaths worldwide, emerging as the most consequential global health crisis since the era of the influenza pandemic of 1918.

- Identify the etiology and epidemiology of COVID-19.
- Describe the clinical features and radiological findings expected in patients with COVID-19.
- Summarize the latest available treatment in the management of COVID-19, including the different vaccines available to prevent COVID-19.
- Discuss interprofessional team strategies for improving care coordination and communication to care for patients with coronavirus and improve outcomes.

3.SYSTEM DESIGN AND DEVELOPMENT

3.2 Input Design

```
Import Package
import numpy as
np
import pandas as
pd
import seaborn as
sns
import
matplotlib.pyplot as
plt
import
plotly.express as px
%matplotlib inline
from google.colab
import drive
drive.mount('/conte
nt/drive')
df=pd.read_csv("/c
ontent/drive/MyDri
ve/Colab
Notebooks/data/CO
VID_data/country_
vaccinations.csv")
```

3.3 Output Design

```
plt.figure(figsize=(18,6))
sns.lineplot(data=df_India, x="date", y="total_vaccinations")
plt.title("Total vaccinations in India")
plt.xticks(rotation=45)
plt.show()
```

3.4 Database Design

country	iso_code	date	total_vaccinations	people_vaccinated	people_fully_vaccinated	daily_vaccinations_raw	daily_vaccinations	total_vaccinations_per_hundred	people_vaccinated_per_hundred	people_fully_vaccinated_per_hundred	daily_vaccinations_per_million	vaccines	source_name
Afghanistan	AFG	2021-02-22	0	0			0	0					Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing World Health Organization
Afghanistan	AFG	2021-02-23					1367						34 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing World Health Organization
Afghanistan	AFG	2021-02-24					1367						34 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing World Health Organization
Afghanistan	AFG	2021-02-25					1367						34 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing World Health Organization
Afghanistan	AFG	2021-02-26					1367						34 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/BioNTech, Sinopharm/Beijing World Health Organization

3.5 System Development

This project was developed using google colab using Python Programming language

4. Conclusion:

The primary goal of the paper is to investigate and analyse the COVID- 19 pattern of spread throughout India since the day of the outbreak in order to comprehend why national and local authorities are struggling to control the COVID-19 The disease spread in India compared to other nations, the state-by-state trend of the epidemic to get a detailed understanding of how this is spreading, as well as to analyse the Healthcare sector of India, will all be studied in addition to the common symptoms of COVID-19 that have been observed thus far. Finally, the epidemic future in India will be predicted. Future research could take this paper work to a higher level by developing a predictive model for COVID- 19 duration using machine learning methods, with the data from each graph serving as independent criteria for the algorithm. Furthermore, by extending the Future Prediction study, it was possible to anticipate the number of total cases in India with accuracy.

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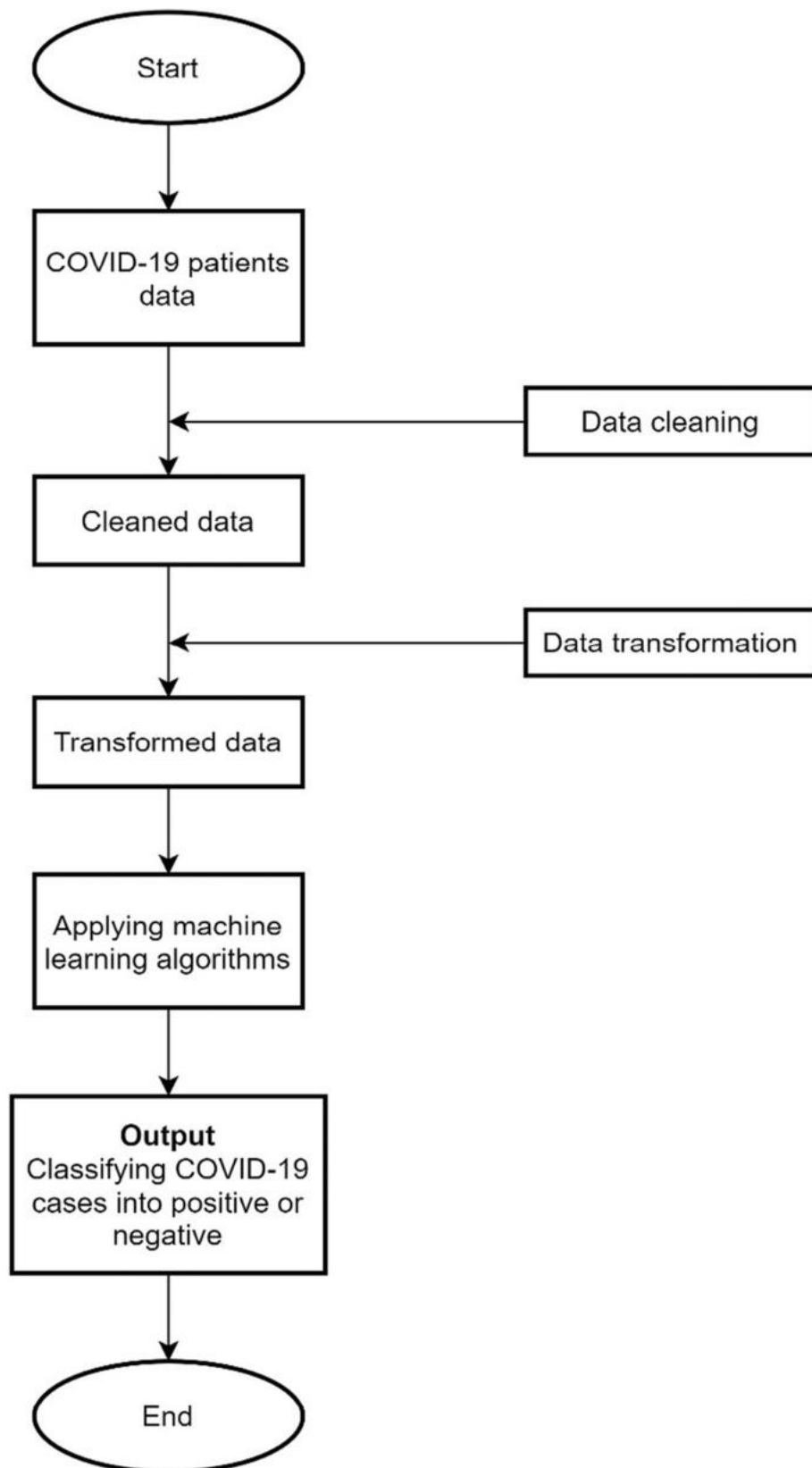
[6] <https://www.mohfw.gov.in/>

[7] <https://www.covid19india.org/>

[8] <https://github.com/CSSEGISandData/COVID-19>

APPENDICES

A. Data Flow Diagram



B. Source Code:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import plotly.express as px
%matplotlib inline
from google.colab import drive
drive.mount('/content/drive')
df=pd.read_csv("/content/drive/MyDrive/
Colab Notebooks/data/COVID_data
/country_vaccinations.csv")
df.head()
df.isnull().sum()
df.fillna(0, inplace = True)
df.drop(df.index[df['iso_code'] == 0], inplace = True)
df.isnull().sum()
df.info()
df['date'] = pd.to_datetime(df['date'], format='%Y-%m-%d')
df.columns
df_India = df[df["iso_code"] == 'IND'].copy()
df_India
df_India.drop(df_India.index[df_India
['total_vaccinations'] == 0], inplace = True)
plt.figure(figsize=(18,6))
sns.lineplot(data=df_India, x="date",
y="total_vaccinations")
plt.title("Total vaccinations in India")
plt.xticks(rotation=45)
plt.show()
```

OUTPUT:

