COVID-19 CASES ANALYSIS

Abstract:

The importance of data science and machine learning is evident in all the domains where any kind of data is generated. The multi aspect analysis and visualizations help the society to come up with useful solutions and formulate policies. This paper takes the live data of current pandemic of Corona Virus and presents multi-faceted views of the data as to help the authorities and Governments to take appropriate decisions to take this unprecedented problem. Python and its libraries along with Google Co lab platform is used to get the results. The best possible techniques and combinations of modules/libraries are used to present the information related to COVID-19.

Introduction:

In the current situation of wide spread Novel Corona Virus spread as a pandemic , almost entire world is on halt and lockdown. The spread and the death counts are alarming. If the situation does not improve rapidly the world can slip into a disastorous economic depression affecting every individual in the society. This demands a rapid recovery and in this task two communities are working day and night to ensure the health care. One is the team of health workers and the

second ones are computer scientists who are fighting this menace with their tools. With advancements in data science and machine learning , we are getting the answers to some very difficult questions. The data analysis and presentations regarding the problems gives the directions and thrust areas on which we should be working. This paper is dedicated to the analysis and visualisation of the NCOVID-19 spread data from 1st January 2020 to 2nd April 2020.

Data Science as a scientific discipline is influenced by

Data Science as a scientific discipline is influenced by informatics, computer science, mathematics, operations research, and statistics as well as the applied sciences. the public image of Data Science, the importance of computer science and business applications is often much more stressed, in particular in the era of Big Data.(Weihs & Ickstadt, 2018) Data Visualizations is the subset of Data Science. Data visualization is the final piece and skill set for accomplished data scientists and data analysts. It involves communicating their findings effectively through graphical means. The amount of digital data that exists is growing at a rapid rate, doubling every two years, and changing the way we live.

Existing features:

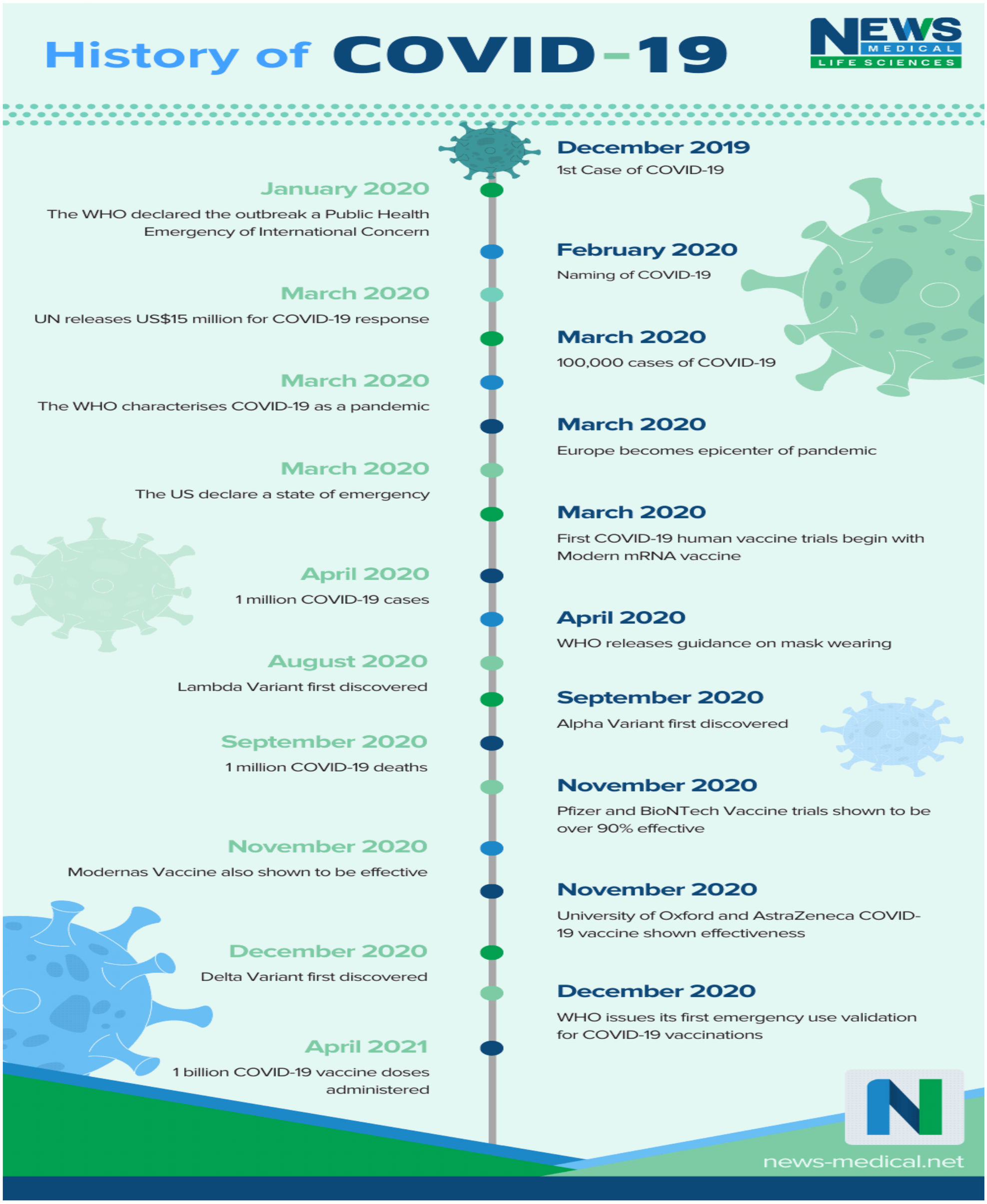
- fever
- cough
- sore throat
- malaise
- headache
- muscle pain
- nausea
- vomiting
- diarrhea
- anosmia
- dysgeusia
- mild illness
- shortness of breath

History of COVID-19:

The highly infectious coronavirus disease (COVID-19) was first detected in Wuhan, China in December 2019 and subsequently spread to 212 countries and territories around the world, infecting millions of people.

The **World Health Organization** (WHO) has decided to name the disease caused by the novel coronavirus "COVID-19" and refers to the virus that causes it as the "COVID-19 virus." CO for corona, VI for virus, D for diseaseand 19 for the year the out break was first

recognized.

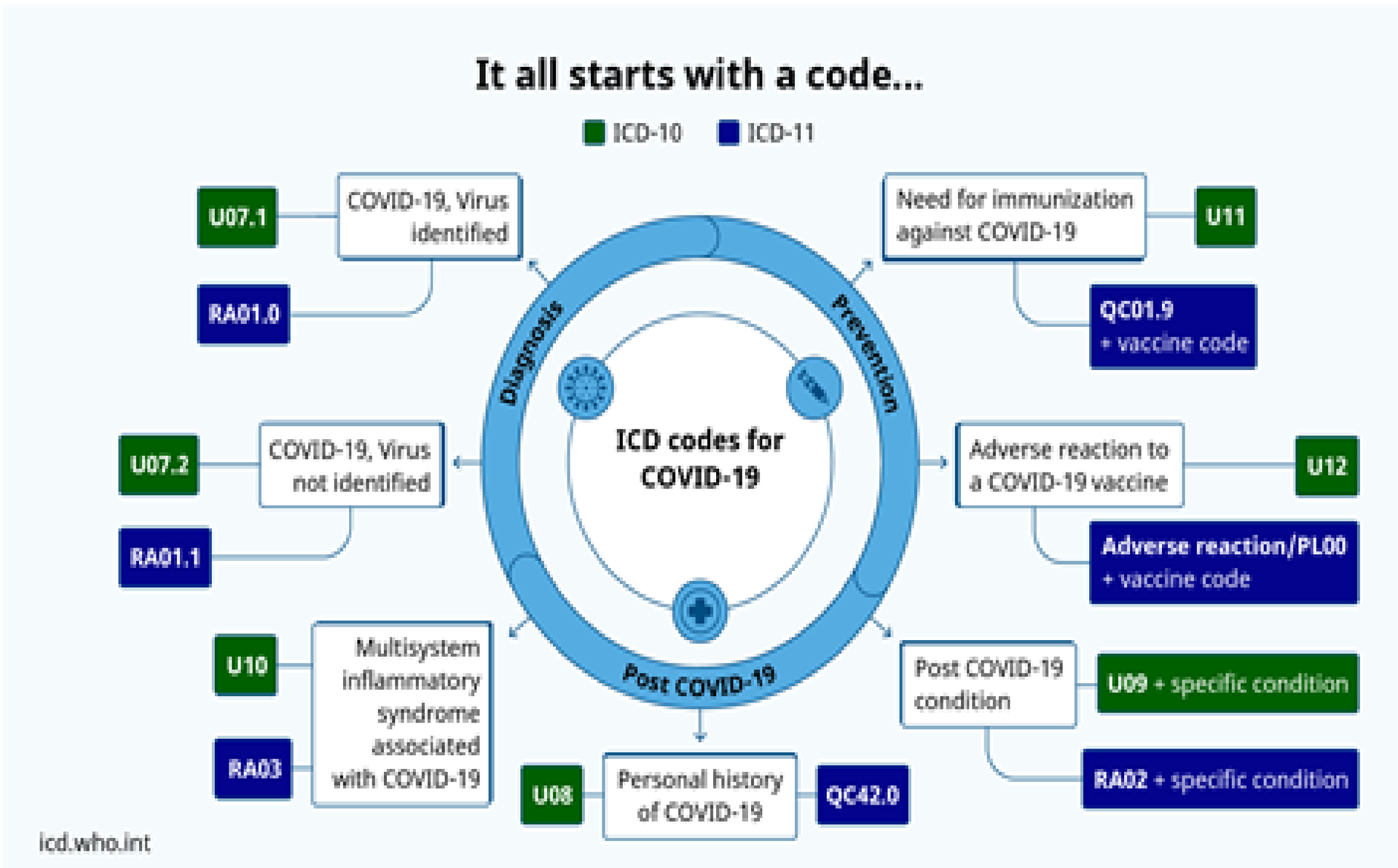

History of COVID-19
NEWS MEDICAL LIFE SCIENCES
December 2019
1st Case of COVID-19
January 2020
The WHO declared the outbreak a Public Health Emergency of International Concern
February 2020
Naming of COVID-19
March 2020
UN releases US$15 million for COVID-19 response
March 2020
100,000 cases of COVID-19
March 2020
The WHO characterises COVID-19 as a pandemic
March 2020
Europe becomes epicenter of pandemic
March 2020
The US declare a state of emergency
March 2020
First COVID-19 human vaccine trials begin with Modern mRNA vaccine
April 2020
1 million COVID-19 cases
April 2020
WHO releases guidance on mask wearing
August 2020
Lambda Variant first discovered
September 2020
Alpha Variant first discovered
September 2020
1 million COVID-19 deaths
November 2020
Pfizer and BioNTech Vaccine trials shown to be over 90% effective
November 2020
Modernas Vaccine also shown to be effective
November 2020
University of Oxford and AstraZeneca COVID-19 vaccine shown effectiveness
December 2020
Delta Variant first discovered
December 2020
WHO issues its first emergency use validation for COVID-19 vaccinations
April 2021
1 billion COVID-19 vaccine doses administered
news-medical.net

COVID-19 Dashboard of India:

- COVID-19 Dashboard of India by 27th March 2022.

Total samples tested	78,69,22,965
Total positive cases	4,30,19,453
New samples tested	6,20,251
New positive cases	1421
New positivity rate	0.23%
Total activity cases	16,187
Total deaths	5,21,004
Total recovered cases	4,24,82,262
Total doses administered	1,830,285,290
People vaccinated 1st dose	1,003,924,602
People vaccinated 2nd dose	826,360,688

ICD CODES FOR COVID 19:



APPROVAL AND USAGE OF VACCINES IN INDIA:

Vaccine	Status	Approval	Deployment
Covishield	In use	1st January 2021	16 January 2021
Covaxin	In use	3rd January 2021	16 January 2021
Moderna	Approved	29 June 2021	Order cancelled
Sputnik V	In use	12 April 2021	14 may 2021

Things to do for preventing covid19:

- Maintain hygiene
- Practice social distancing
- Seek medical help in case of emergency
- Avoid going out
- Eat healthy foods
- Drink plenty of water
- Get vaccinated and boosted
- Get tested and stay home if you are sick
- Isolate if you test is positive
- Wear masks

Things to avoid during covid19:

- Avoid touching your face
- Do not eat outside food
- Do not skip the disinfection of the house
- Avoid stepping out without a face cover
- Do not lose your proof of vaccination

If Your COVID-19 Test Is

Positive:

Any positive COVID-19 test means the virus was detected and **you have or recently had an infection.**

- **Isolate** and take precautions, including wearing a **high-qualilty mask or respirator,** to protect others around you from getting infected.
- Tell people you had recent contact with that they **may have been exposed.**

- Monitor your **symptoms.** If you have any **emergency warning signs,** seek emergency care immediately.

You are more likely to get very sick if you are an older adult or have an underlying medical condition. **Treatment** is available. Talk with your healthcare provider to determine what is the best option for you.

If Your COVID-19 Test Is

Negative :

A negative COVID-19 test means the test did not detect the virus, but this **doesn't rule out that you could have an infection.** If you used an antigen test, follow **FDA recommendations for repeat testing.**

- If you have symptoms:
  - ► You may have COVID-19 but tested before the virus was detectable.
  - ► Consider that you may have another viral infection or illness that you need to get tested for. For many diseases, including **flu,** early diagnosis and prompt treatment is very important for preventing severe illness.
  - ► Take everyday preventive actions to prevent spreading an illness to others.

- ► Contact a healthcare provider if you have any questions about your test result or if your symptoms worsen.

- If you do not have symptoms but were exposed to the virus that causes COVID-19, you should continue to take recommended steps after exposure.
- If you do not have symptoms and have not been exposed to the virus that causes COVID-19, you may return to normal activities.
  - ► Continue to take steps to protect yourself and others, including monitoring for symptoms. Get tested again if symptoms appear.

ANALYSIS STAGES AND LIBRARIES

Below stages indicates the process of corona virus data visualization.

- Gathering
- Storing
- Cleaning and data evaluation
- Data visualization

Stage 1: Collecting various dataset such as COVID-19

India, Individual details, Age Wise Group Details, complete information of corona infected, UTM ZONE of India (longitude and latitude of India), population of India census 2011, covid19 Italy province, covid19 Italy region, Hospital Beds India, ICMR Testing Details, states of India (JSON file).

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import plotly.express as px
import folium
import os
import warnings
warnings.filterwarnings('ignore')
import plotly.graph_objects as go
```

Stage 2: Upload and Storing in data frame

```
df_corona_in_india = pd.read_csv("inputs/covid19-corona-virus-india
-dataset/covid_19_india.csv")
df_corona_india =
pd.read_csv("inputs/covid19-corona-virus-india-dataset/complete.csv")
df_ICMR =
pd.read_csv("inputs/covid19-corona-virus-india-dataset/ICMRTestingDetails.csv")
```

```
df_Individual =
pd.read_csv("inputs/covid19-corona-virus-india-datas
et/IndividualDetails.csv")
df_Hospital =
pd.read_csv("inputs/covid19-corona-virus-india-dataset
/HospitalBedsIndia.csv")
df_Age =
pd.read_csv("inputs/covid19-corona-virus-india-dataset/
Ag
eGroupDetails.csv")
df_Italy =
pd.read_csv("inputs/covid19-corona-virus-india-dataset/c
o
vid19_italy_region.csv")
```

Stage 3: Clean null values and creating new columns for evaluation.

```
#Total cases of corona in India
df_corona_in_india['Total Cases'] =
df_corona_in_india['Cured'] + df_corona_in_india['Deaths']
+ df_carona_in_india['Confirmed']
#Active cases of corona in India
df_corona_in_india['Active Cases'] =
df_corona_in_india['Total Cases']
df_carona_in_india['Cured']
- df_corona_in_india['Deaths']
df_corona_in_india
```

Stage 4: Finding using various data visualization libraries.

#Till 2nd April Cases in India

```
df1=
df_carona_in_india[df_carona_in_india['Date']=='02/04/20'
]
fig = px.bar(df1, x='State/UnionTerritory', y='Total Cases',
color='Tot
al Cases', height=600)
fig.update_layout(title='Till 2nd April Total Cases in India')
fig.show()
```

Data Visualization libraries in python:

Visualization is the graphic representation of data through the use of pictorial design. The goal is to make a visual easy to comprehend and presentable.

- **Matplotlib :**
  - ► It is a cross-platform library for making 2D plots from data in arrays.

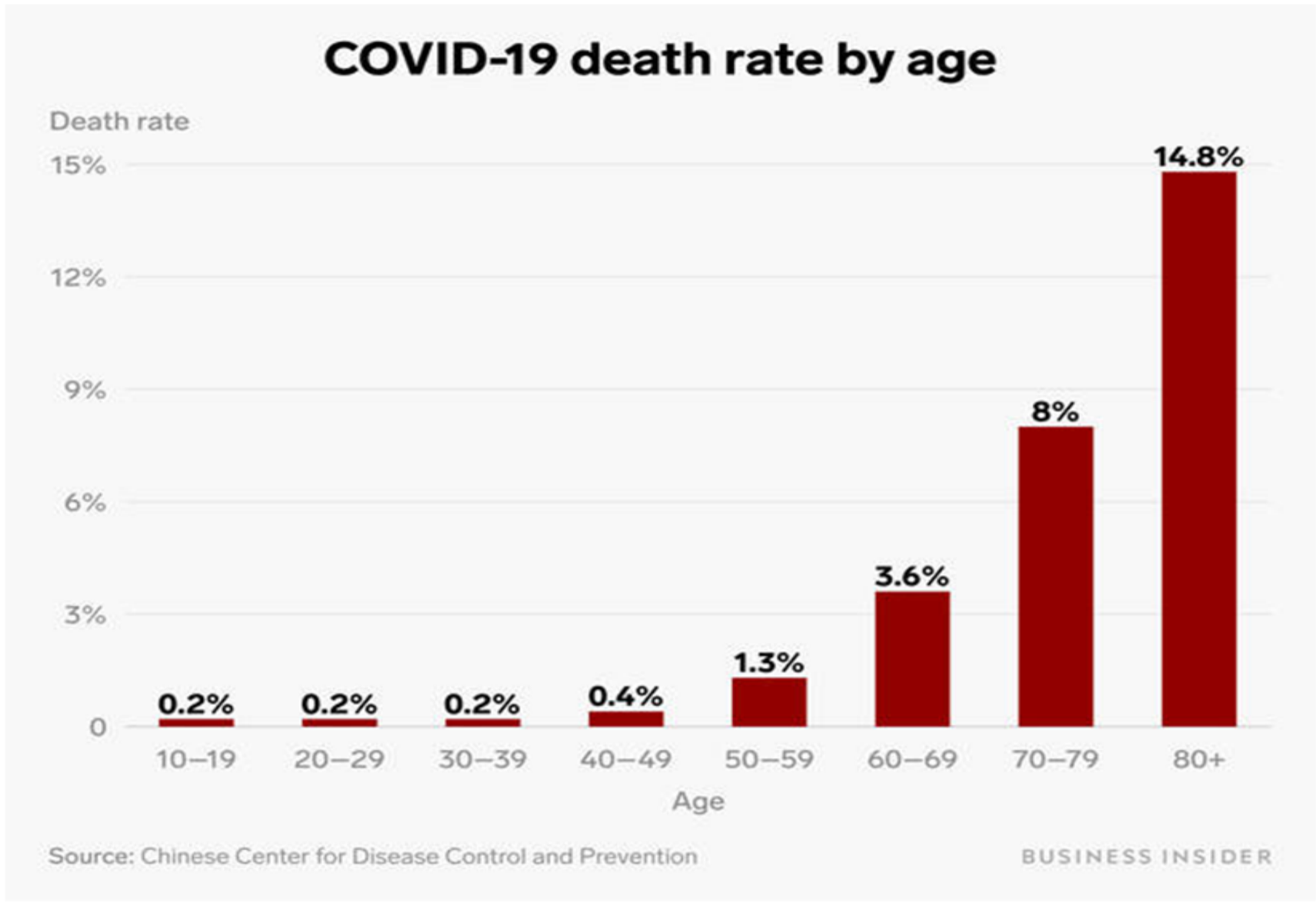
- **Seaborn:**
  - ► It is a library built on prime of Matplotlib.

► Seaborn is more integrated for working with Pandas Data Frames.

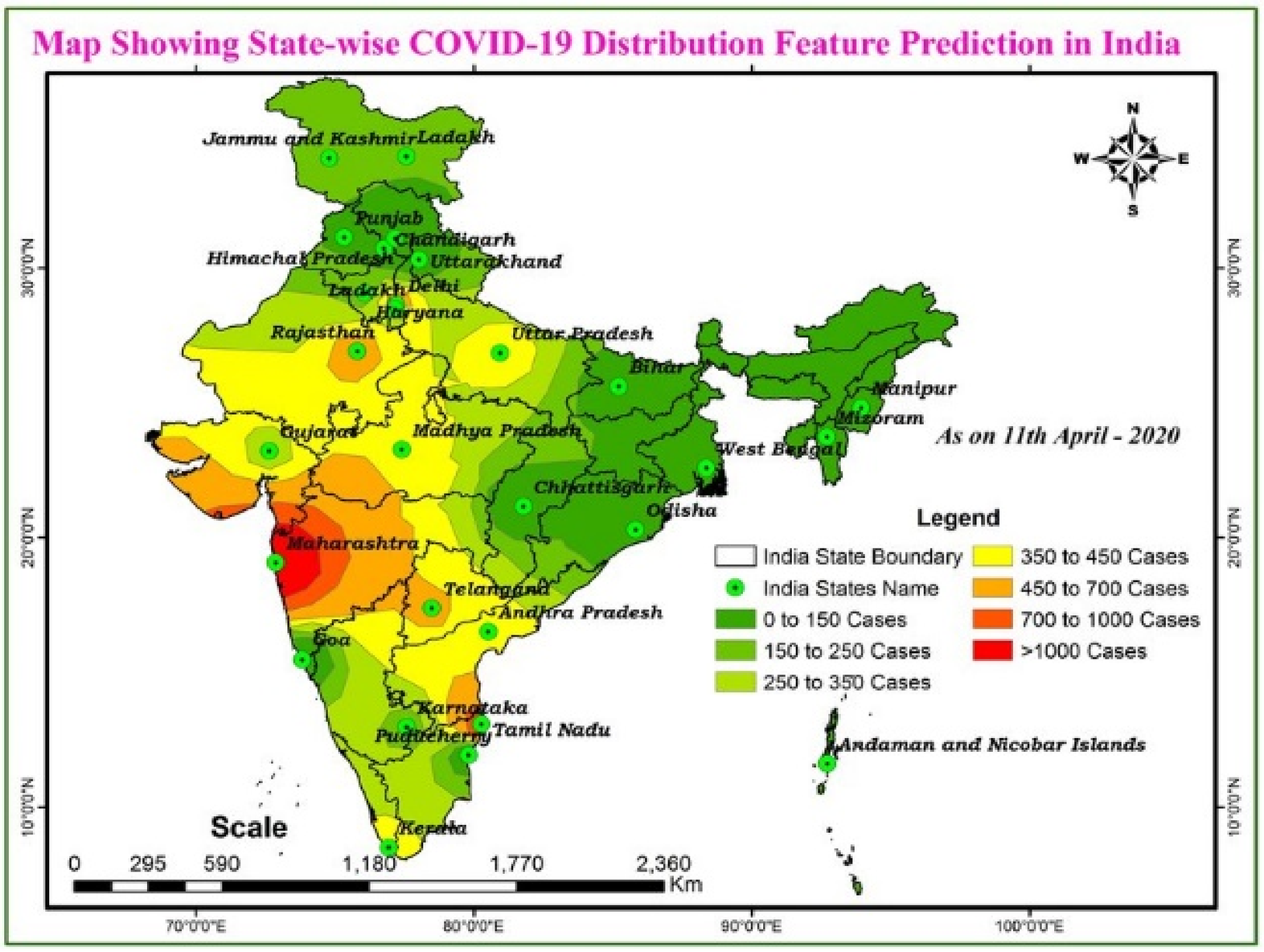
- **Plotly:**
  - ► Plotly.js is a declarative JavaScript data visualization library built on D3 and Web GL that supports a wide range of statistical, scientific, financial, geographic, and 3-dimensional visualizations. For creating Plotly.js visualizations from Python is provided by the plotly.py library.

- **Folium:**
  - ► It shows how to create a Leaflet web map from scratch with Python and the Folium library. That should generate a map.html file. Later, you can simply put that HTML file on a live server and have the map online.

AGE GROUP AFFECTED WITH COVID-19:



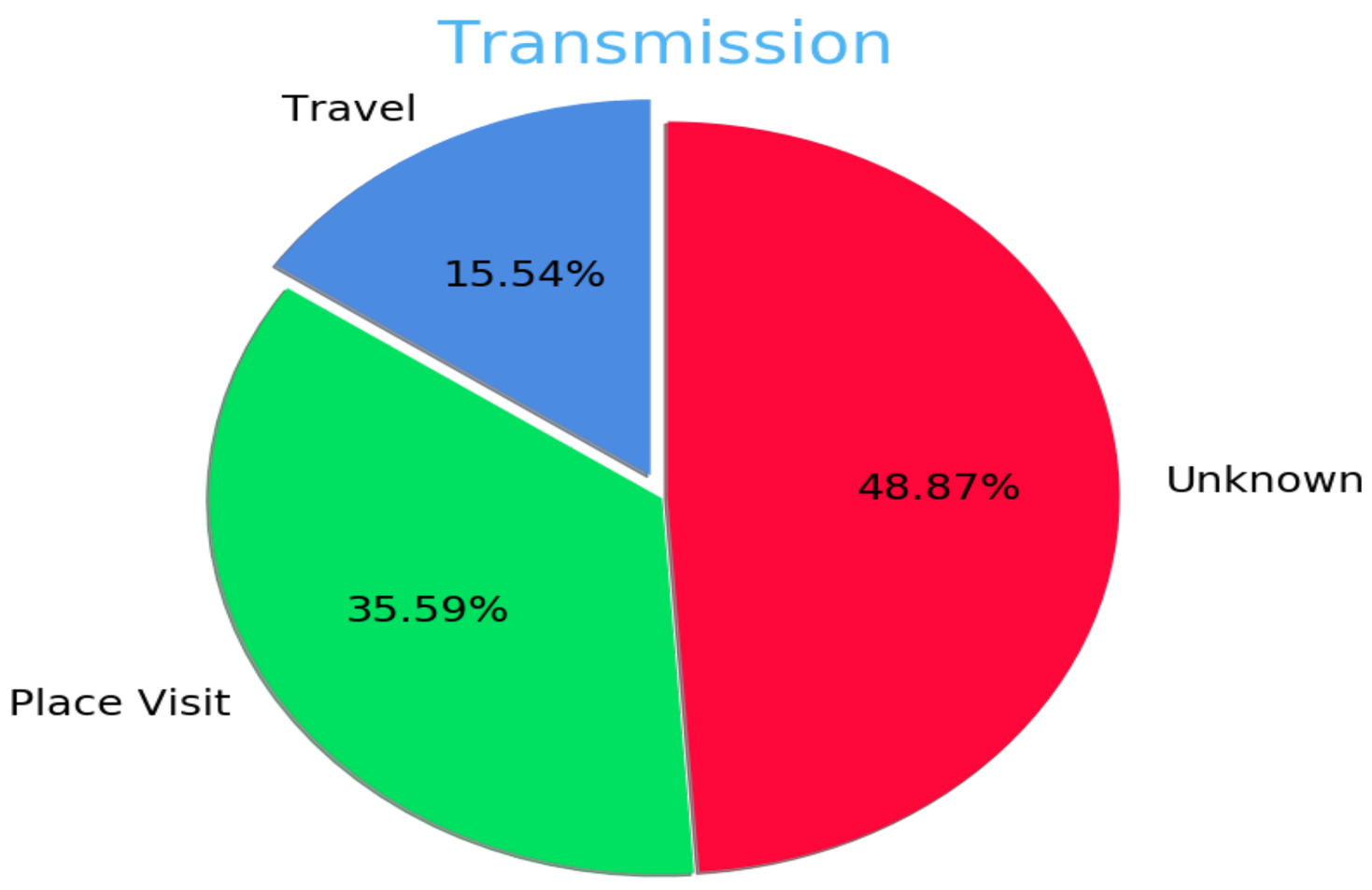
INDIA’S MAP WITH STATE WISE DATA OF TOTAL CASES, DEATHS AND CURE:



PROGRAM:

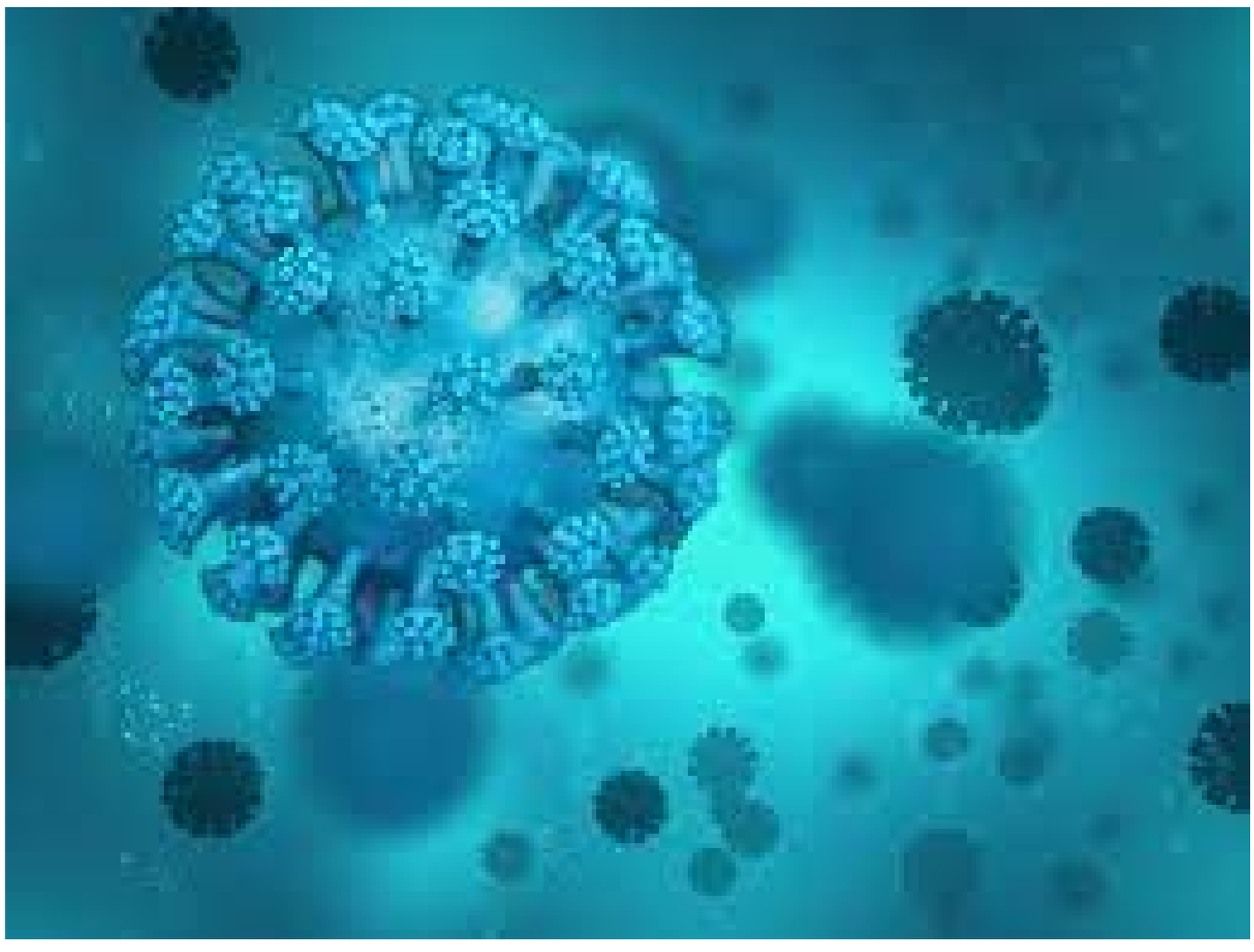
```
slices = [62, 142, 195]
activities = ['Travel', 'Place Visit', 'Unknown']

cols=['#4C8BE2','#00e061','#fe073a']
exp = [0.2,0.02,0.02]

plt.pie(slices,labels=activities,
        textprops=dict(size=25,color='black'),
        radius=3,
        colors=cols,
        autopct='%2.2f%%',
        explode=exp,
        shadow=True,
        startangle=90)

plt.title('Transmission\n\n\n\n',color='#4fb4f2',size=40)
```

OUTPUT:



DESIGN OF COVID 19:

Coronaviruses are named for their appearance: “corona” means “crown.” The virus's outer layers are covered with spike proteins that surround them like a crown.



Both COVISHIELD™ (manufactured by Serum Institute of India Pvt Ltd) and COVID-19 Vaccine AstraZeneca (manufactured by AstraZeneca) are ChAdOx1 nCoV- 19 Corona Virus Vaccines (Recombinant).

PREVENTIVE MEASURES OF COVID 19

1. Wash your hands frequently

2. Avoid touching your eyes, nose and mouth

3. Cover your cough

4. Avoid crowded places and close contact with anyone that has fever or cough

5. Stay at home if you feel unwell

6. If you have a fever, cough and difficulty breathing, seek medical care early — but call first

7. Get information from trusted sources

CONCLUSION:

In this research paper, we have presented a data visualization of COVID19 dataset in a multi-dimensional and multi-faceted way. The research paper aimed at providing insights, new directions and opportunities for research in the field of Corona virus (COVID-19) Data visualization and analytics. The results gives the present scenario of penadamic and may vary with the time depending upon action taken by Governments and innovation in medical practices. The results are the pointers to the thrust areas which should be focussed upon. Comparison of India (the moderately affected) is done with Italy (the worst affected). Multiple disciplines like Sociology, Economics, Medical Science, Behavioural Sciences can use this data in different ways.