INFORMATION VISUALIZATION – CSE3044

SPREAD OF COVID – 19

REPORT

Prof. Edward Jero Sam Jeeva Raj

Abinandhan Kumar .T.S.S | Vignesh N | Roshan Srinivaas | Niranjan J

ACKNOWLEDGEMENT

Apart from the efforts of our team, the success of our project depends largely on the encouragement and guidelines of many others. I take this opportunity to express my gratitude to the people who have been instrumental in the successful completion of this project. I would like to show my greatest appreciation to Prof. Edward Jero Sam Jeeva Raj. I can't say thank you enough for his tremendous support and help. Without his encouragement and guidance this project would not have materialized. The guidance and support received from all the members who contributed and who are contributing to this project, was vital for the success of the project. I am grateful for their constant support and help.

ABSTRACT

This project is aimed at analysing the spread of coronavirus and the impact of coronavirus on Indian economy. This project describes the factors, effects and the consequences of coronavirus in India. We have designed graphs (bar chart, line chart, pie chart) in order to compare which states have been affected a lot due to coronavirus. And also, for the project to be interactive we have built dashboards which will be convenient for the user to select. These dashboards and graphs will show you many attributes like increase in daily cases, deceased, active and recovered cases among states in India. Most importantly, the consequences of coronavirus (unemployment, capital income, poverty) will also be covered in this project. Let's go ahead into the project!

INTRODUCTION

In current time, when every COVID-19 affected nation is making efforts to mitigate and alleviate the spread of this virus, it becomes essential to study the correlations of the cases of COVID-19 reported per day with respect to behavioural and environmental attributes.

A long-term prediction of cumulative cases, rate of spread, pandemic peak of COVID-19 was made for India. Prediction provided by the model considering most recent data is useful for making appropriate interventions to deal with the rapidly emerging pandemic. There are many analysts out there predicting how fast the coronavirus can spread. Many scientists from different countries proposed various models/theories about the coronavirus.

One such model is "**Epidemiological model**" which predicts that the impacts of COVID-19 will be particularly high in informal cities and there will be a major impact on income that will specially affect the poorest groups that depend on day-to-day labour activities, largely informal, to sustain their consumption. Furthermore, the epidemiological models also foresee less effectiveness of traditional containment measures in these settlements, public policy managers must think of alternative and different responses for these areas.

METHODS

- Introduction
- Finding datasets
- Data Extraction
- Analyse Numerical Variables
- Statistics
- Graphs/Plots
- Dashboard
- Comparison between states and countries
- Economy/GDP of India
- References

TOOLS AND SOFTWARES USED

Tools :

- Python
- Tableau
- Excel
- Matlab

Softwares & Packages :

- Streamlit
- Numpy
- Pandas
- Scipy
- Matplotlib
- Plotly

PROCEDURE

--> Introduction

--> Title description

--> Process

--> Collecting Datasets

--> Plotting graphs for each attribute (cases, deceased, recovered and active. Graphs are plotted in Python using matplotlib and plotly, graphs plotted in Excel with slicer function.

--> Impact of coronavirus on daily livelihood

--> Impact of coronavirus on Indian economy

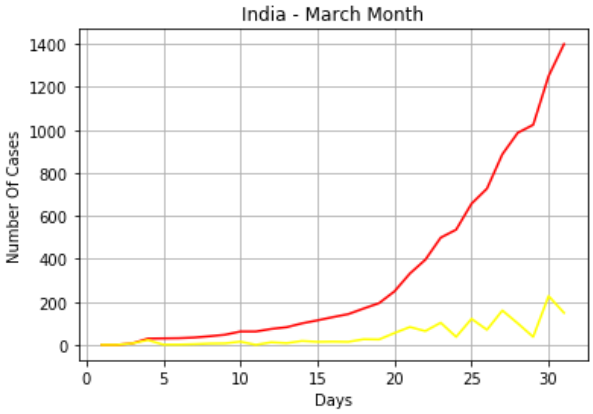
--> Dashboard was built using Streamlit, Tableau and Python, which shows the cases among states in India. Also, it displays the worldwide cases (in tableau).

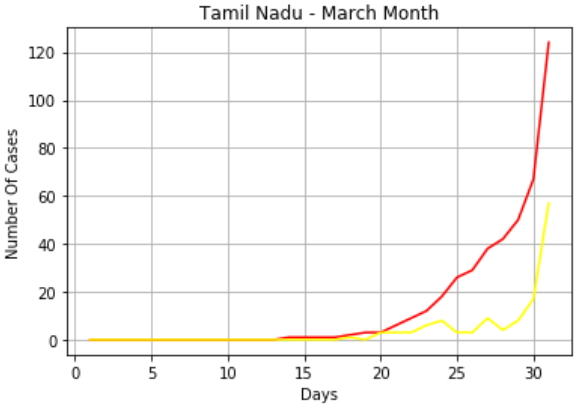
--> Explanation

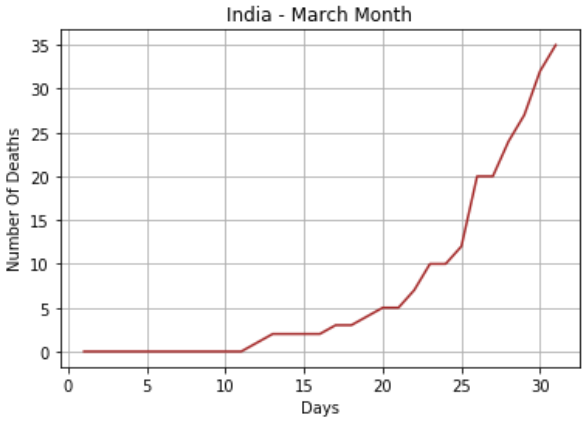
--> Summary

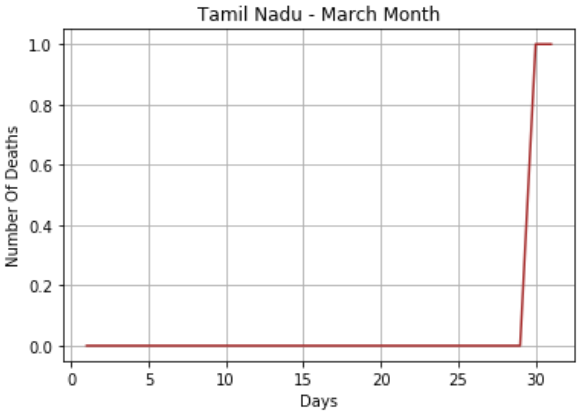
--> References

RESULTS

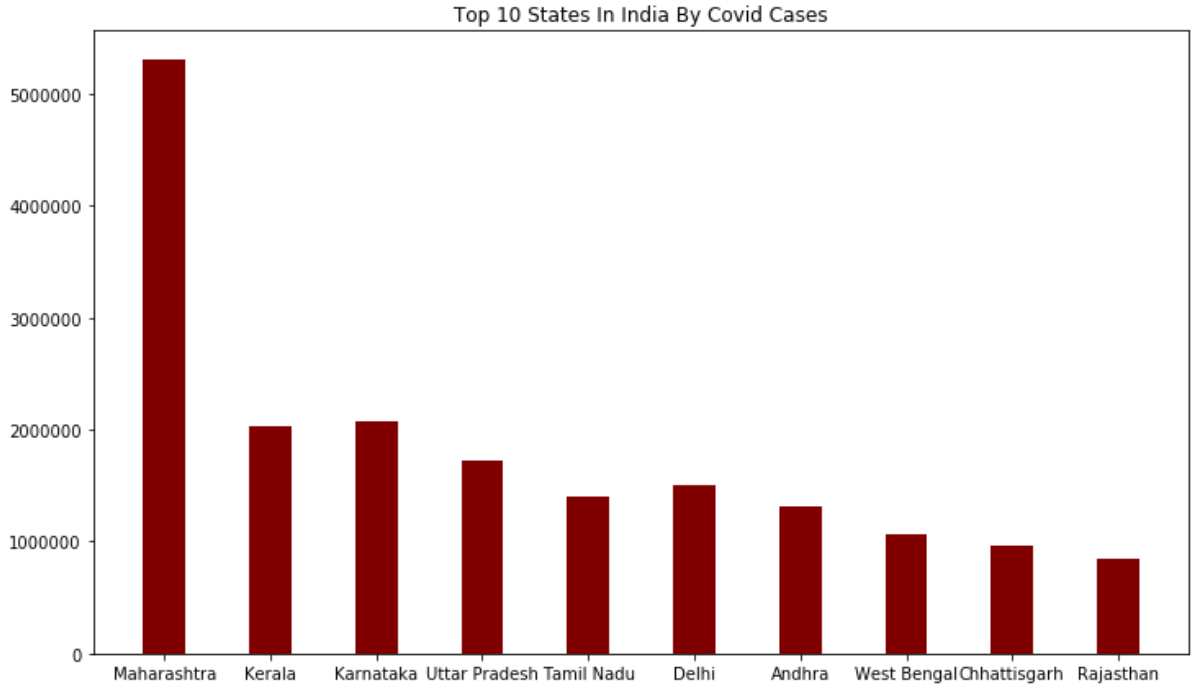


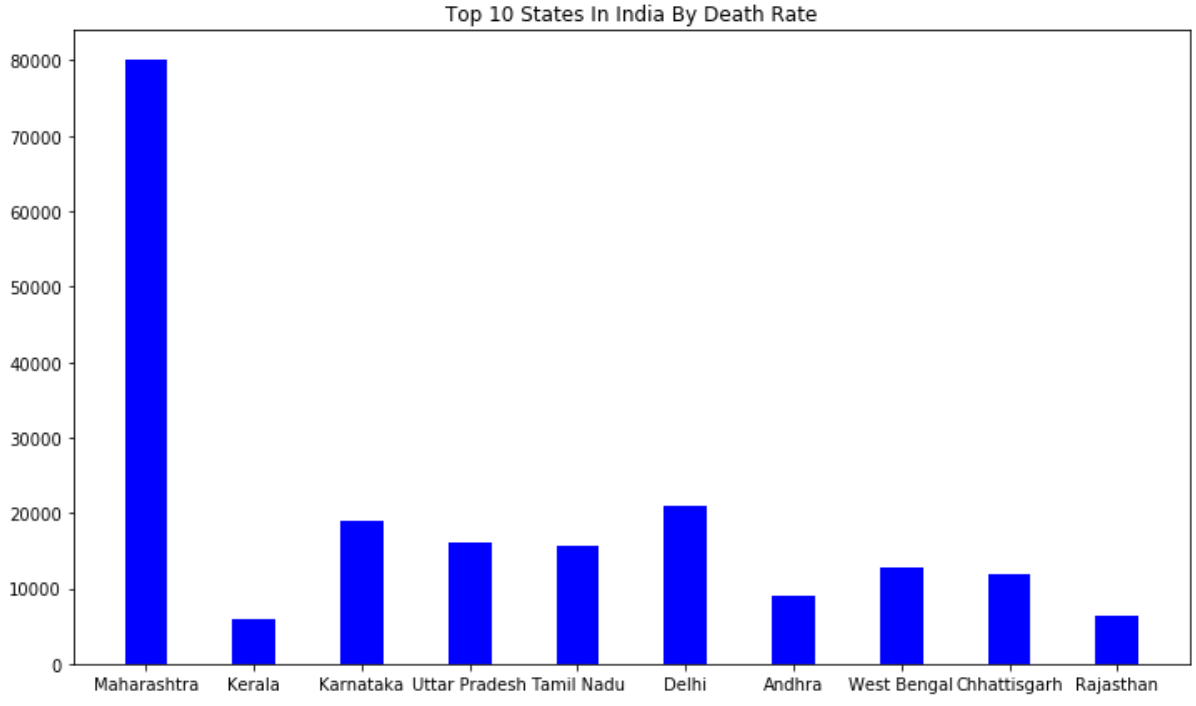




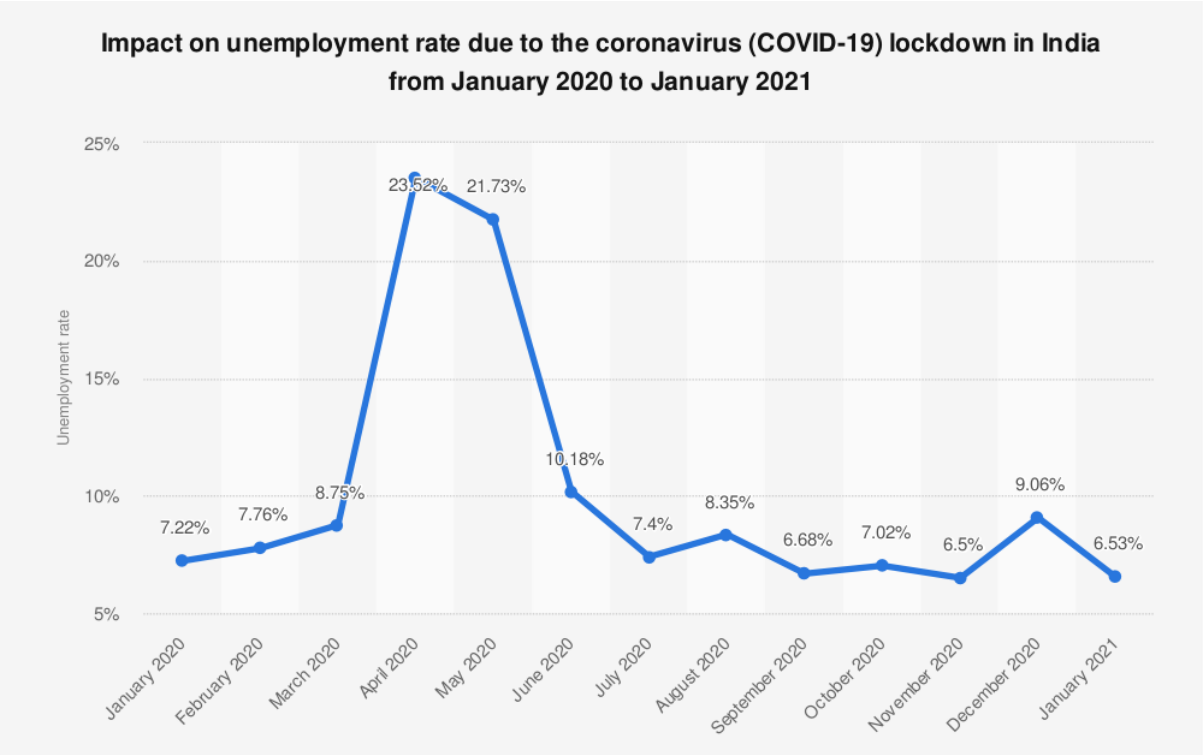


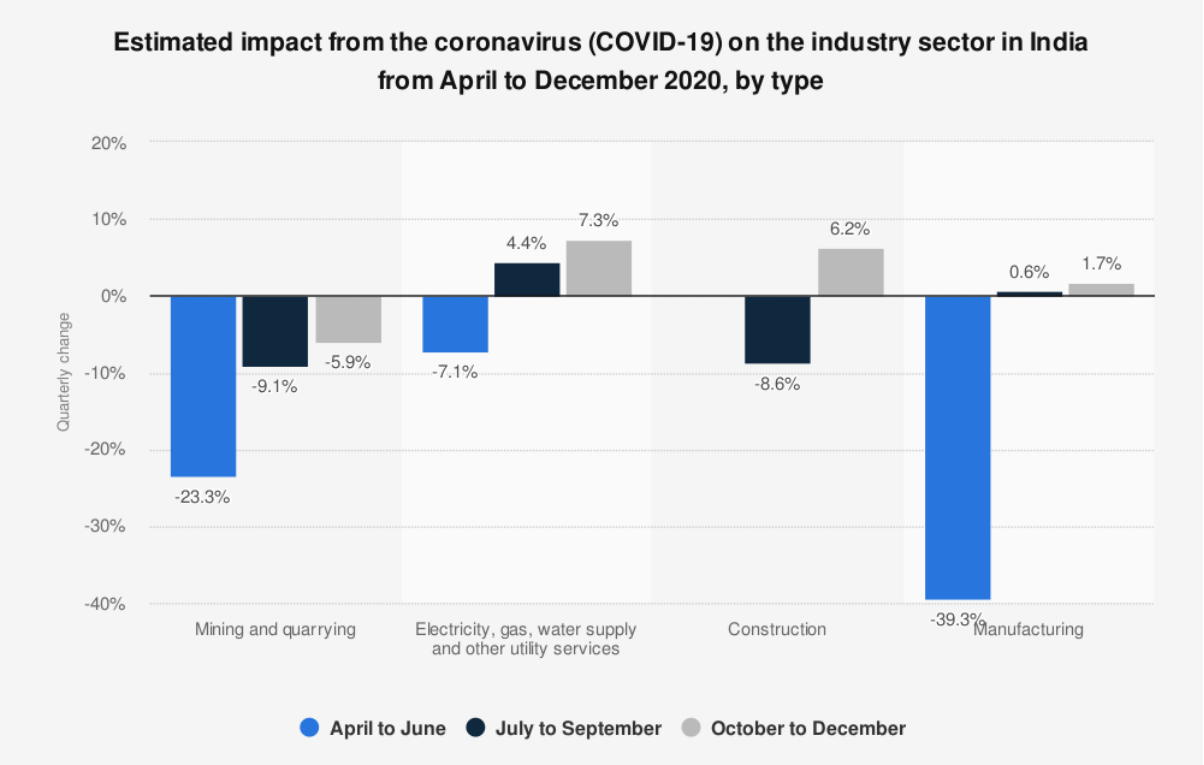
Similarly, we got the line charts for the month of April, May, June, July and August (in PPT).


Top 10 States In India By Covid Cases
5000000
4000000
3000000
2000000
1000000
0
Maharashtra
Kerala
Karnataka
Uttar Pradesh
Tamil Nadu
Delhi
Andhra
West Bengal
Chhattisgarh
Rajasthan


Top 10 States In India By Death Rate
80000
70000
60000
50000
40000
30000
20000
10000
0
Maharashtra
Kerala
Karnataka
Uttar Pradesh
Tamil Nadu
Delhi
Andhra
West Bengal
Chhattisgarh
Rajasthan

ECONOMY


Impact on unemployment rate due to the coronavirus (COVID-19) lockdown in India from January 2020 to January 2021
Unemployment rate
25%
20%
15%
10%
5%
7.22%
7.76%
8.75%
23.52%
21.73%
10.18%
7.4%
8.35%
6.68%
7.02%
6.5%
9.06%
6.53%
January 2020
February 2020
March 2020
April 2020
May 2020
June 2020
July 2020
August 2020
September 2020
October 2020
November 2020
December 2020
January 2021


Estimated impact from the coronavirus (COVID-19) on the industry sector in India from April to December 2020, by type
Quarterly change
20%
10%
0%
-10%
-20%
-30%
-40%
-23.3%
-9.1%
-5.9%
-7.1%
4.4%
7.3%
-8.6%
6.2%
-39.3%
0.6%
1.7%
Mining and quarrying
Electricity, gas, water supply and other utility services
Construction
Manufacturing
April to June
July to September
October to December

Many other graphs are plotted and are attached in the power point presentation. The code for plots and Dashboards are there in the ipynb file.

CODE

Streamlit :

```
import streamlit as st
import pandas as pd
import numpy as np
import plotly.offline as py
import plotly.express as px
from plotly.subplots import make_subplots
import plotly.graph_objects as go
from matplotlib import pyplot as plt

df = pd.read_csv('nation_level_daily.csv')
st.title("Covid-19 Dashboard For India | Team - 9")
st.sidebar.title("Visualization Selector")
st.sidebar.markdown("Select the Charts/Plots accordingly:")
st.subheader('INFORMATION VISUALIZATION CSE3044')
select1 = st.sidebar.selectbox(
    "Select",
    ("Daily Confirmed", "Daily Deceased", "Daily Recovered", "Total Confirmed",
"Total Deceased", "Total Recovered")
)
```

```
select2 = st.sidebar.selectbox(
    "Select State",
    ("Maharashtra", "Tamil Nadu", "Delhi", "Karnataka", "Andhra Pradesh", "Uttar Pradesh", "Gujarat", "West Bengal", "Telangana", "Rajasthan")
)
st.sidebar.title("Stay Safe | Get Vaccinated 💉")

data1 = pd.read_csv('nation_level_daily.csv')
df1 = pd.DataFrame(data1)

data2 = pd.read_csv('state_level_latest (1).csv')
df2 = pd.DataFrame(data2)

if select1 == 'Daily Confirmed':
st.title("Nation Wide Daily Confirmed Cases")
st.line_chart(df1['Daily Confirmed'])
if select1 == 'Daily Deceased':
st.title("Nation Wide Daily Deceased Counts")
st.line_chart(df1['Daily Deceased'])
if select1 == 'Daily Recovered':
st.title("Nation Wide Daily Recovered Cases")
st.line_chart(df1['Daily Recovered'])
```

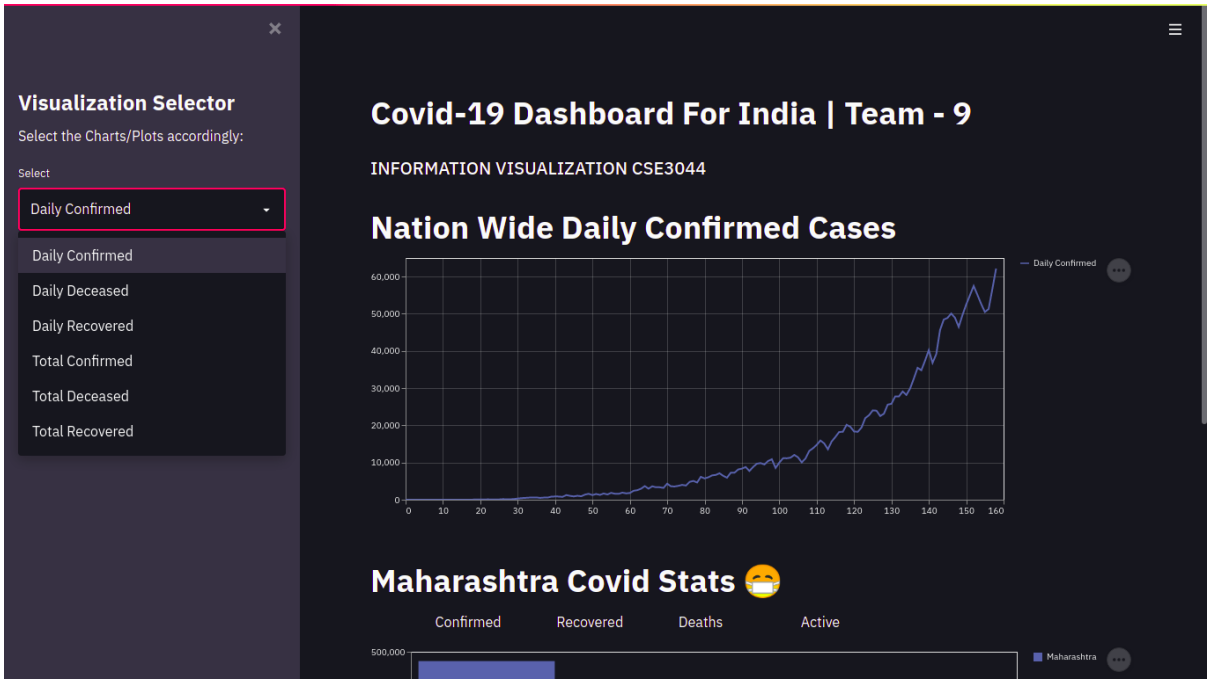
```
if select1 == 'Total Confirmed':
st.title("Nation Wide Total Confirmed Cases")
st.line_chart(df1['Total Confirmed'])
if select1 == 'Total Deceased':
st.title("Nation Wide Total Deceased Counts")
st.line_chart(df1['Total Deceased'])
if select1 == 'Total Recovered':
st.title("Nation Wide Total Recovered Cases")
st.line_chart(df1['Total Recovered'])

if select2 == 'Maharashtra':
st.title("Maharashtra Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Maharashtra'])
if select2 == 'Tamil Nadu':
st.title("Tamil Nadu Covid Stats ")
st.write('  Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Tamil Nadu'])
if select2 == 'Delhi':
st.title("Delhi Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Delhi'])
```

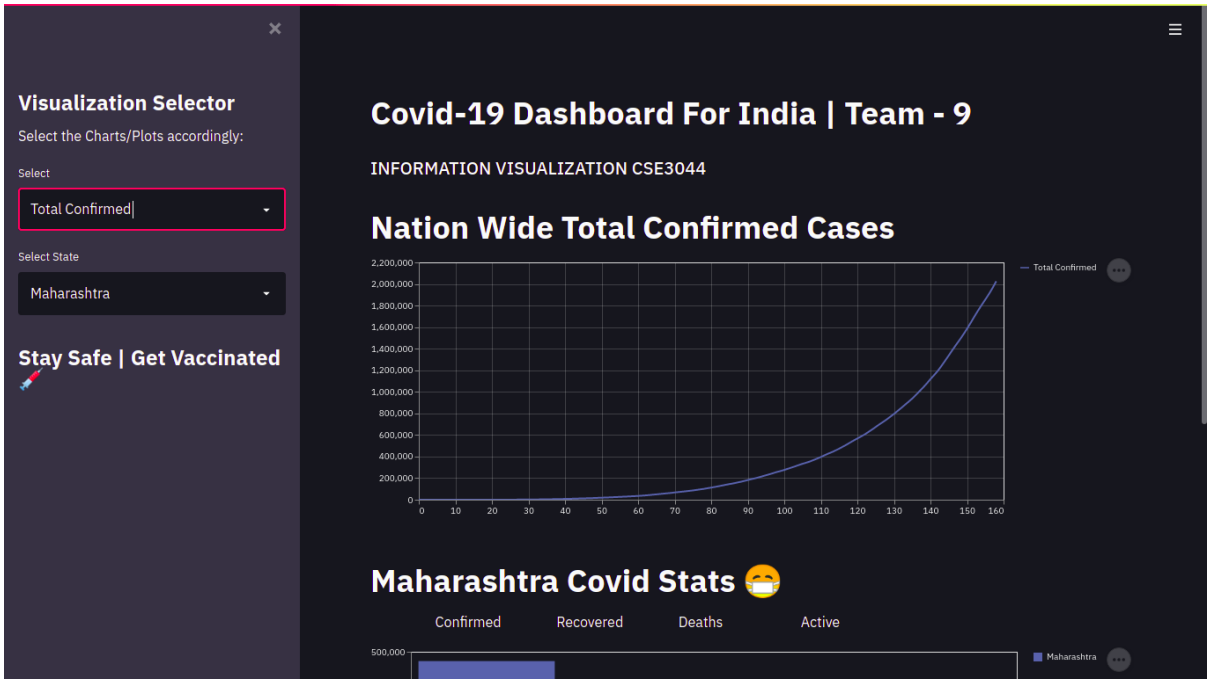
```
if select2 == 'Karnataka':
st.title("Karnataka Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Karnataka'])
if select2 == 'Andhra Pradesh':
st.title("Andhra Pradesh Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Andhra Pradesh'])
if select2 == 'Uttar Pradesh':
st.title("Uttar Pradesh Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Uttar Pradesh'])
if select2 == 'Gujarat':
st.title("Gujarat Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Gujarat'])
if select2 == 'West Bengal':
st.title("West Bengal Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['West Bengal'])
```

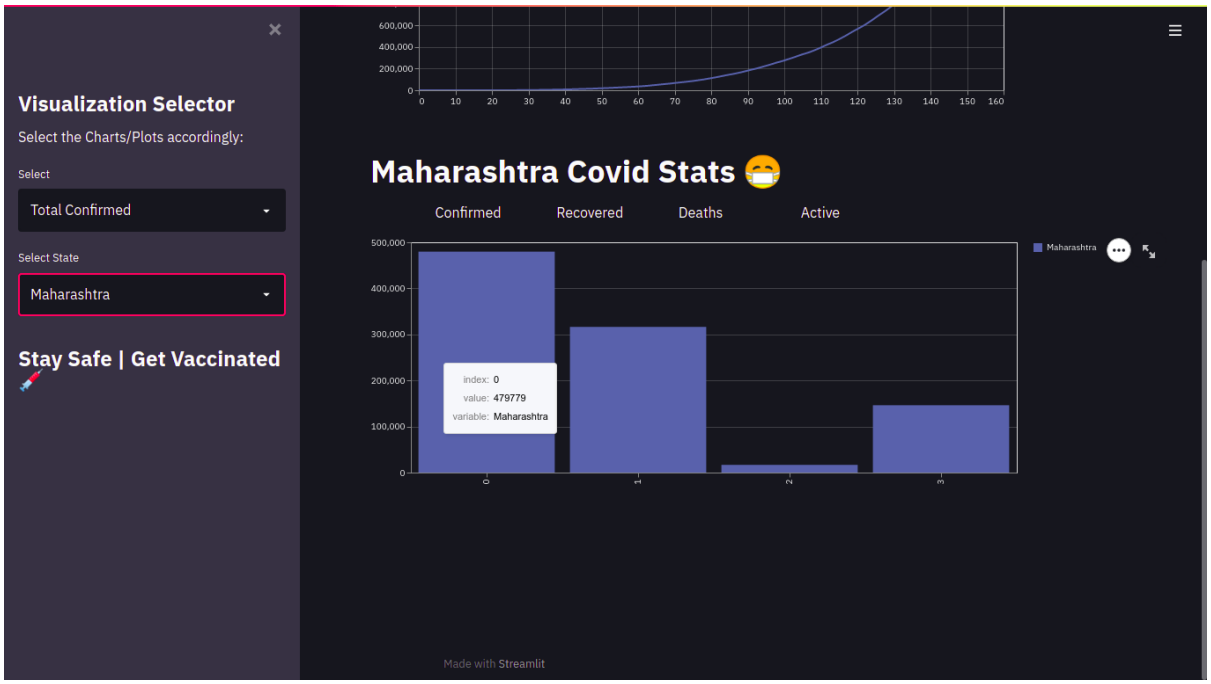
```
if select2 == 'Telangana':
st.title("Telangana Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Telangana'])
if select2 == 'Rajasthan':
st.title("Rajasthan Covid Stats ")
st.write('Confirmed  Recovered  Deaths  Active')
st.bar_chart(df2['Rajasthan'])
```

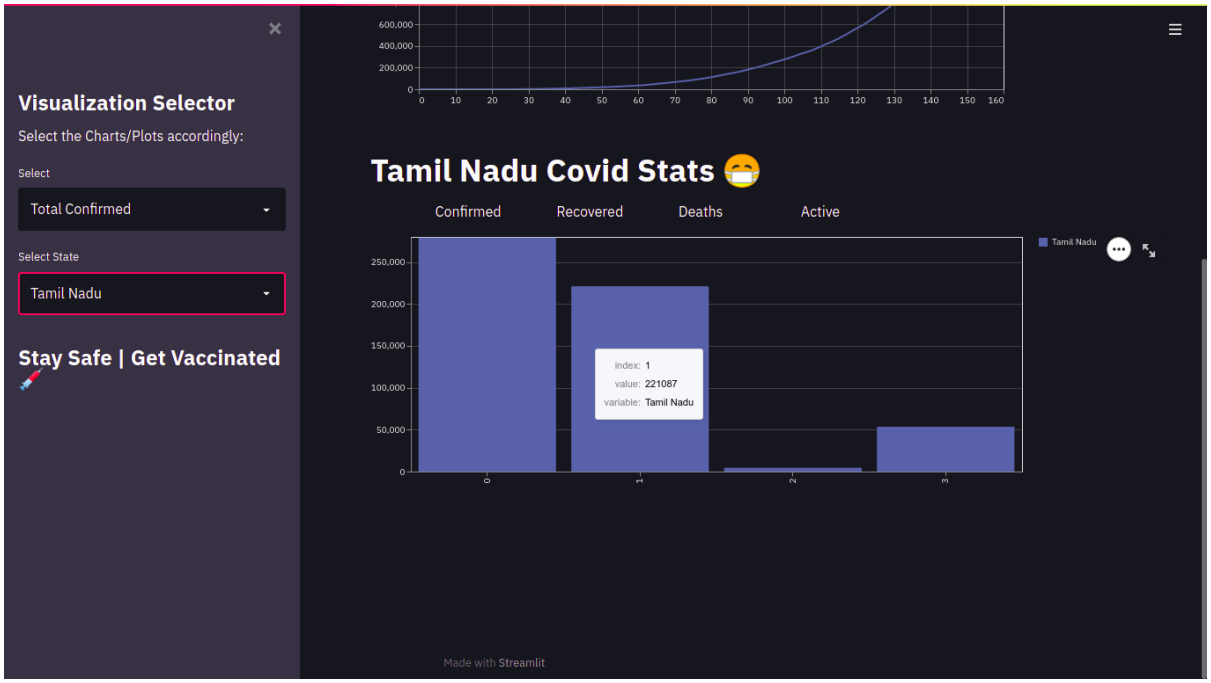
DASHBOARDS

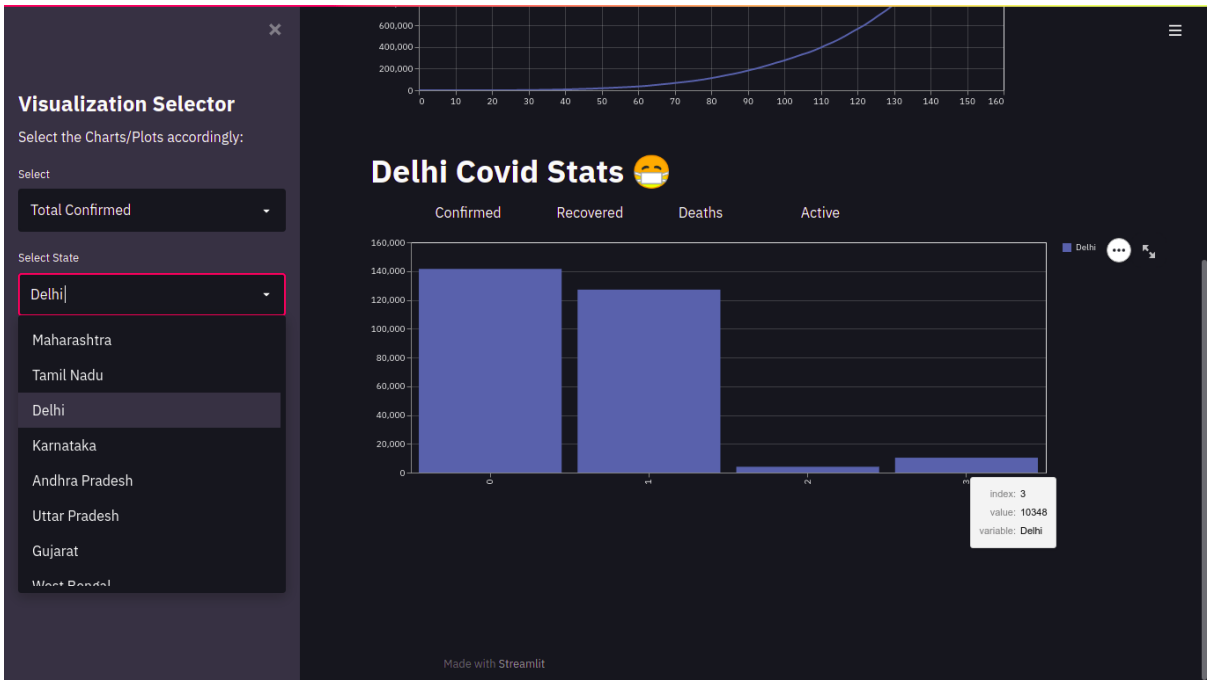
Streamlit :

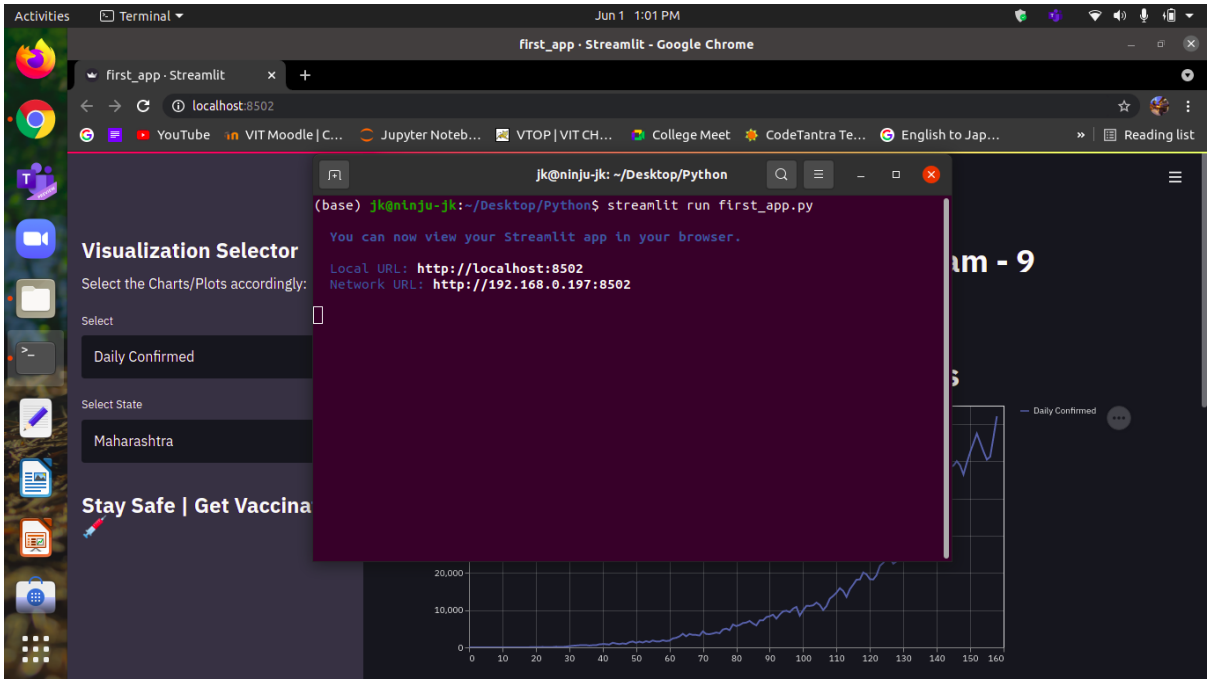




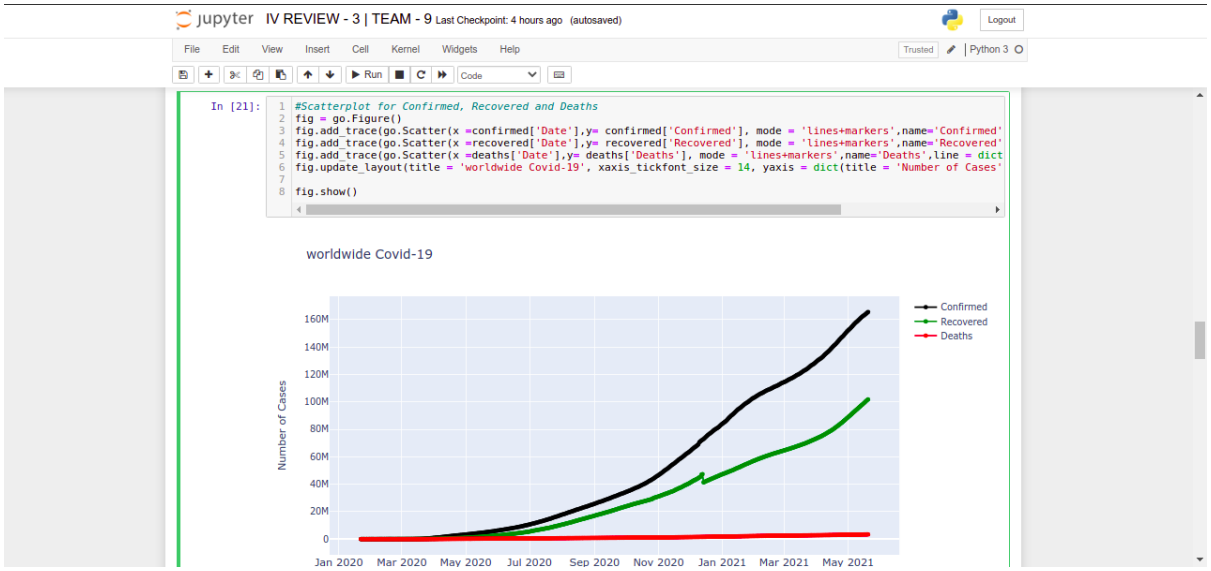

Visualization Selector
Select the Charts/Plots accordingly:
Select
Total Confirmed
Select State
Maharashtra
Stay Safe | Get Vaccinated
Maharashtra Covid Stats
Confirmed
Recovered
Deaths
Active
Maharashtra
index: 0
value: 479779
variable: Maharashtra
Made with Streamlit

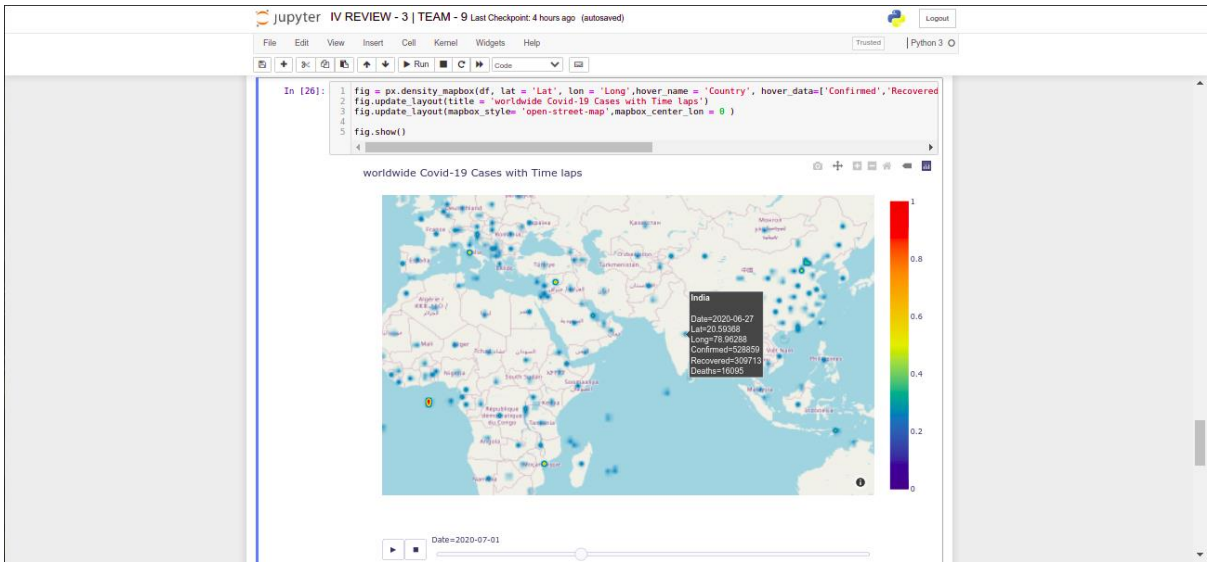

Visualization Selector
Select the Charts/Plots accordingly:
Select
Total Confirmed
Select State
Tamil Nadu
Stay Safe | Get Vaccinated
Tamil Nadu Covid Stats
Confirmed
Recovered
Deaths
Active
Tamil Nadu
index: 1
value: 221087
variable: Tamil Nadu
Made with Streamlit

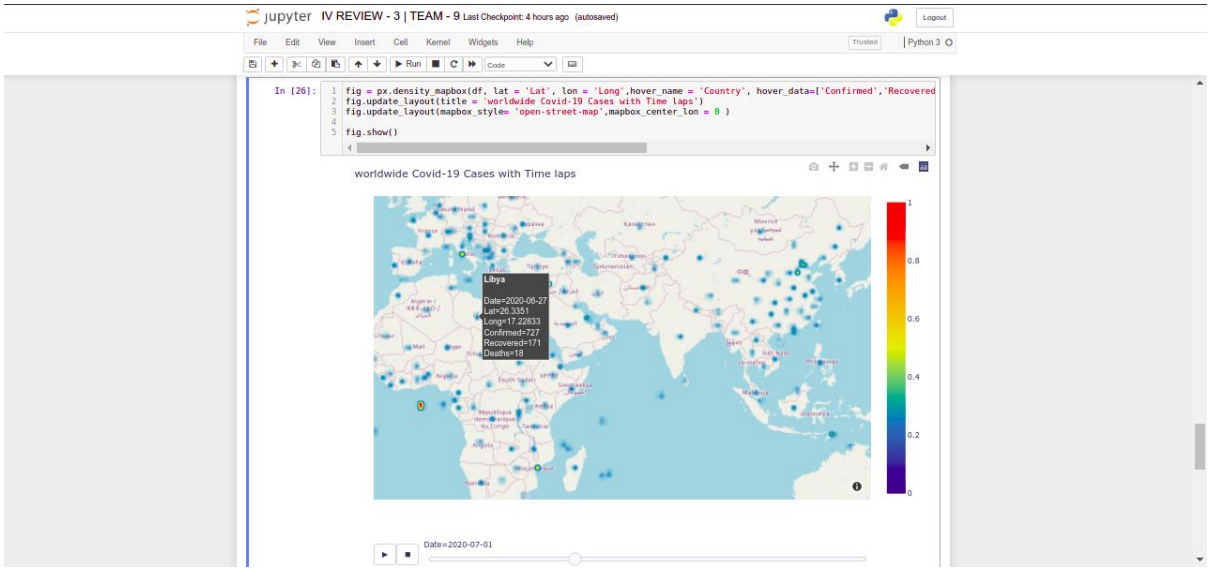

Visualization Selector
Select the Charts/Plots accordingly:
Select
Total Confirmed
Select State
Delhi
Maharashtra
Tamil Nadu
Delhi
Karnataka
Andhra Pradesh
Uttar Pradesh
Gujarat
Delhi Covid Stats
Confirmed
Recovered
Deaths
Active
Delhi
index: 3
value: 10348
variable: Delhi
Made with Streamlit

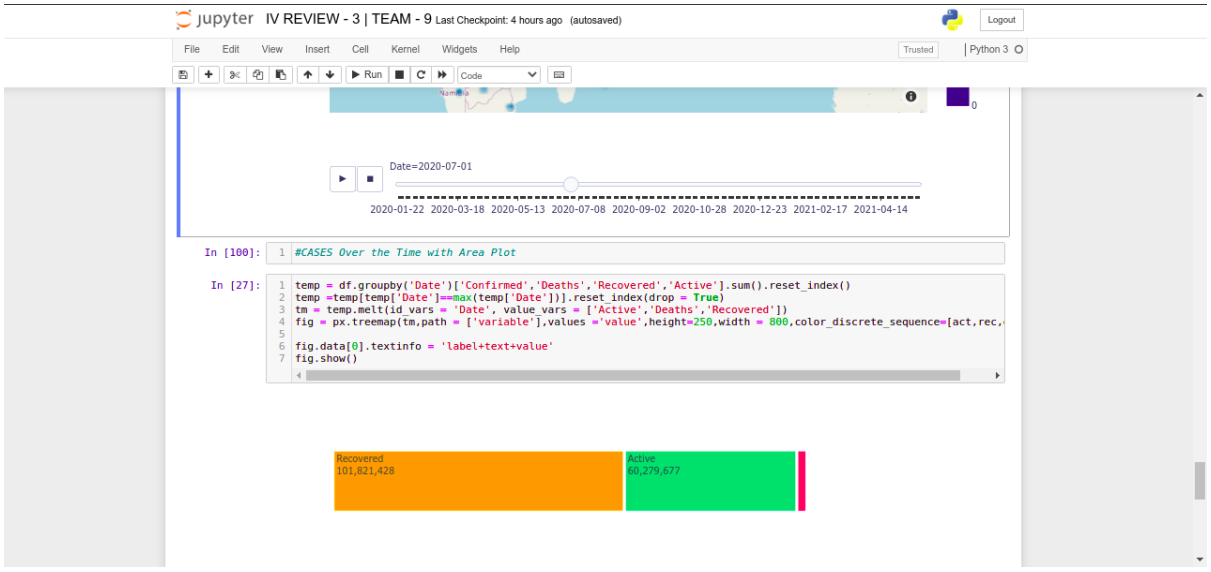

Activities
Terminal
Jun 1 1:01 PM
first_app · Streamlit - Google Chrome
first_app · Streamlit
localhost:8502
YouTube
VIT Moodle | C...
Jupyter Noteb...
VTOP | VIT CH...
College Meet
CodeTantra Te...
English to Jap...
Reading list
jk@ninju-jk: ~/Desktop/Python
(base) jk@ninju-jk:~/Desktop/Python$ streamlit run first_app.py
You can now view your Streamlit app in your browser.
Local URL: http://localhost:8502
Network URL: http://192.168.0.197:8502
Visualization Selector
Select the Charts/Plots accordingly:
Select
Daily Confirmed
Select State
Maharashtra
Stay Safe | Get Vaccina
Daily Confirmed

Python (Matplotlib) :






jupyter IV REVIEW - 3 | TEAM - 9 Last Checkpoint: 4 hours ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
In [26]:
fig = px.density_mapbox(df, lat = 'Lat', lon = 'Long',hover_name = 'Country', hover_data=['Confirmed','Recovered
fig.update_layout(title = 'worldwide Covid-19 Cases with Time laps')
fig.update_layout(mapbox_style= 'open-street-map',mapbox_center_lon = 0)
fig.show()
worldwide Covid-19 Cases with Time laps
Libya
Date=2020-06-27
Lat=26.3351
Long=17.22833
Confirmed=727
Recovered=171
Deaths=18
1
0.8
0.6
0.4
0.2
0
Date=2020-07-01


jupyter IV REVIEW - 3 | TEAM - 9 Last Checkpoint: 4 hours ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
0
Date=2020-07-01
2020-01-22 2020-03-18 2020-05-13 2020-07-08 2020-09-02 2020-10-28 2020-12-23 2021-02-17 2021-04-14
In [100]:
#CASES Over the Time with Area Plot
In [27]:
temp = df.groupby('Date')['Confirmed','Deaths','Recovered','Active'].sum().reset_index()
temp =temp[temp['Date']==max(temp['Date'])].reset_index(drop = True)
tm = temp.melt(id_vars = 'Date', value_vars = ['Active','Deaths','Recovered'])
fig = px.treemap(tm,path = ['variable'],values ='value',height=250,width = 800,color_discrete_sequence=[act,rec,
fig.data[0].textinfo = 'label+text+value'
fig.show()
Recovered
101,821,428
Active
60,279,677

jupyter IV REVIEW - 3 | TEAM - 9 Last Checkpoint: 4 hours ago (autosaved)

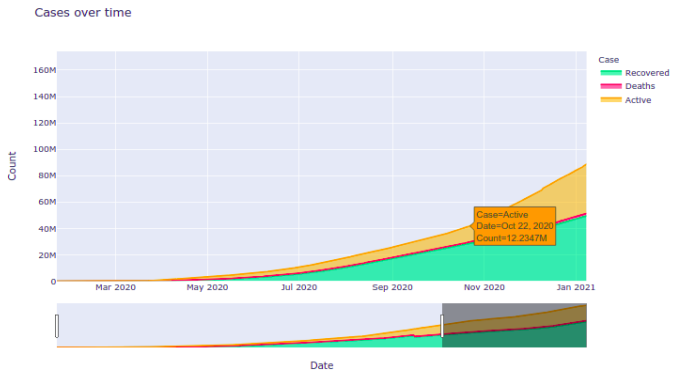
Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Run Code

In [28]:

```
temp = df.groupby('Date')['Recovered','Deaths','Active'].sum().reset_index()
temp = temp.melt(id_vars = 'Date', value_vars = ['Recovered','Deaths','Active'], var_name ='Case',value_name =

fig = px.area(temp, x ='Date',y = 'Count', color = 'Case', height =600, title = 'Cases over time',color_discret
fig.update_layout(xaxis_rangeslider_visible=True)
fig.show()
```



jupyter IV REVIEW - 3 | TEAM - 9 Last Checkpoint: 4 hours ago (autosaved)

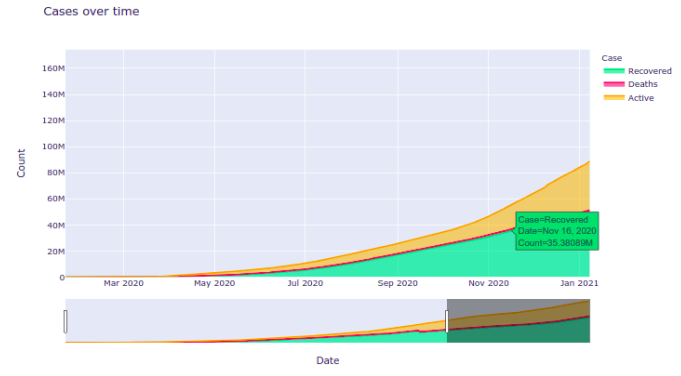
Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Run Code

In [28]:

```
temp = df.groupby('Date')['Recovered','Deaths','Active'].sum().reset_index()
temp = temp.melt(id_vars = 'Date', value_vars = ['Recovered','Deaths','Active'], var_name ='Case',value_name =

fig = px.area(temp, x ='Date',y = 'Count', color = 'Case', height =600, title = 'Cases over time',color_discret
fig.update_layout(xaxis_rangeslider_visible=True)
fig.show()
```



COVID-19 DASHBOARD

Download PDF

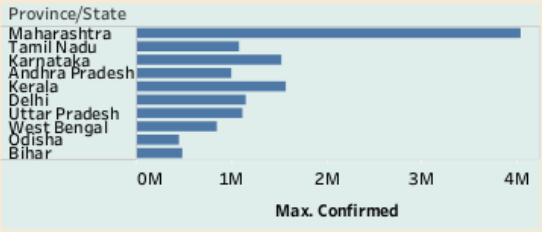
Country/Region
India

CONFIRMED NUMBERS

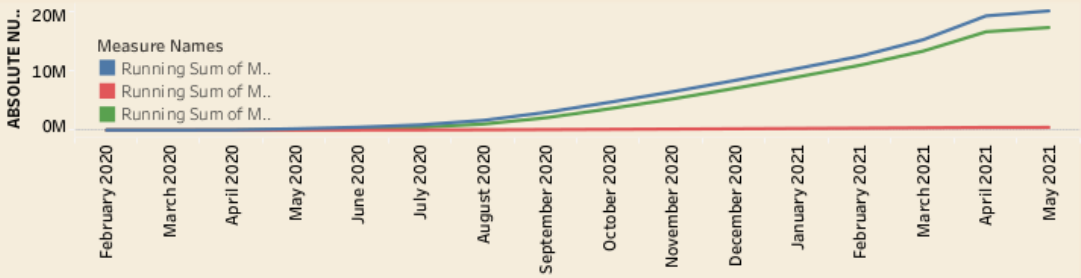
Max. Confirmed	4,027,827
Max. Deaths	61,911
Max. Recovered	3,268,449

MAP

TOP 10 STATES



ABSOLUTE NUMBERS



SUMMARY

Now, we are at the end of the report. I would like to conclude this report with the summary of the entire project “spread of coronavirus”. To summarize the report, we have seen :

- Introduction
- Title Description
- Process
- Methods
- Tools used
- Procedures
- Datasets
- Analyse Datasets
- Plots & Charts
- Code
- Economy Of India
- Interactive Dashboard
- Screenshots
- Results
- References

REFERENCES

- https://www.worldometers.info/coronavirus/

- https://www.covid19india.org/

- https://www.kaggle.com/ (datasets)

- https://www.moneycontrol.com/news/business/economy/covid-19-second-wave-7-5-million-jobs-lost-heres-which-sector-was-hit-badly-6951121

- https://theprint.in/ilanomics/these-4-factors-will-shape-how-indian-economy-rebounds-from-shock-of-covid-second-wave/662183

- https://www.statista.com/topics/6304/covid-19-economic-impact-on-india/

- https://economictimes.indiatimes.com/news/india/covid-second-wave-in-india-worsens-one-of-the-worlds-worst-gender-gaps/articleshow/83056614

- https://www.statista.com/topics/6304/covid-19-economic-impact-on-india/#dossierSummary