

FUTURE CASE PREDICTION OF COVID USING PROPHET MODEL

In [2]:

```
#importing all the necessary libraries
import pandas as pd
import plotly.express as ply
import seaborn as sns
from statsmodels.tsa.seasonal import seasonal_decompose
from statsmodels import tsa
import numpy as np
import statistics
import plotly.express as px
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import os
from fbprophet import Prophet
import warnings
warnings.filterwarnings('ignore')
import plotly.graph_objects as go
pd.set_option('display.max_rows',20000, 'display.max_columns',100)
import datetime as datetime
```

IMPORTING THE DATASET OF INDIA

In [3]:

```
#reading the dataset
df=pd.read_csv('C:/Users/manik/OneDrive/Desktop/fci/covid_19_india.csv')
```

In [4]:

```
df_corona_in_india = pd.read_csv('C:/Users/manik/OneDrive/Desktop/fci/covid_19_india.csv')
```

EXPLORING DATASET

In [5]:

```
df.head(5)
```

Out[5]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	C
0	1	2020-01-30	6:00 PM	Kerala	1	0	
1	2	2020-01-31	6:00 PM	Kerala	1	0	
2	3	2020-02-01	6:00 PM	Kerala	2	0	
3	4	2020-02-02	6:00 PM	Kerala	3	0	
4	5	2020-02-03	6:00 PM	Kerala	3	0	

In [6]:

```
df.tail(5)
```

Out[6]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational
16521	16522	2021-06-28	8:00 AM	Telangana	-	
16522	16523	2021-06-28	8:00 AM	Tripura	-	
16523	16524	2021-06-28	8:00 AM	Uttarakhand	-	
16524	16525	2021-06-28	8:00 AM	Uttar Pradesh	-	
16525	16526	2021-06-28	8:00 AM	West Bengal	-	

In [7]:

```
import datetime
```

In [8]:

```
df['Date']=pd.to_datetime(df['Date'], format='%Y-%m-%d') #for prophet because prophet model
```

In [9]:

```
df.set_index('Date',inplace=True) #setting date as unique key
```

Resampling the data

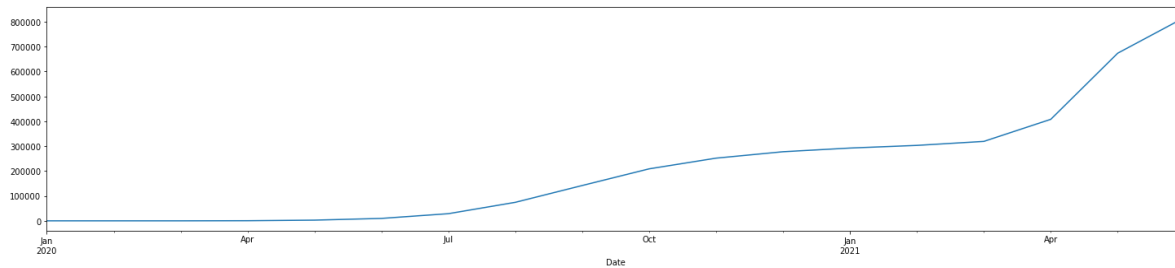
PLOTTING CONFIRMED CASES ON MONTHLY BASES FROM JAN 2020 TO JUNE 2021.

In [10]:

```
df['Confirmed'].resample(rule='M').mean().plot(figsize=(25,5))
```

Out[10]:

<AxesSubplot:xlabel='Date'>



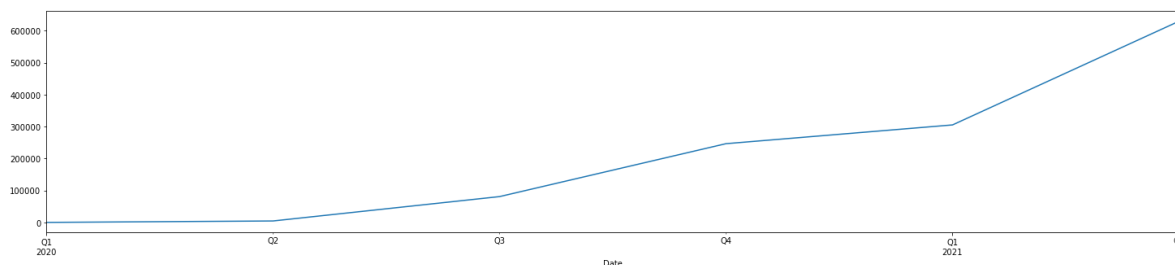
PLOTTING CONFIRMED CASES QUATERLY FROM Q1 2020 TO Q2 2021

In [11]:

```
df['Confirmed'].resample(rule='Q').mean().plot(figsize=(25,5))
```

Out[11]:

<AxesSubplot:xlabel='Date'>



In [12]:

```
#Dropping all the unnecessary columns
df1=pd.DataFrame()
df1=df.drop(columns=['Sno','Time','ConfirmedIndianNational','State/UnionTerritory','Confirm
```

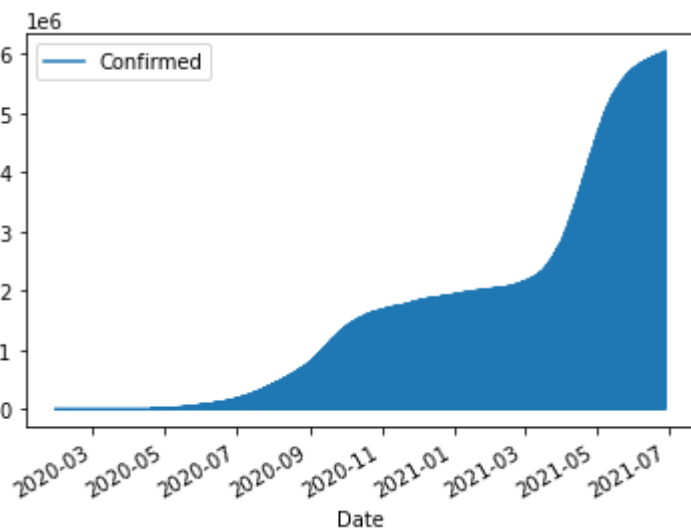
PLOTTING CONFIRMED CASES

In [13]:

```
df1.plot()
```

Out[13]:

<AxesSubplot:xlabel='Date'>



AS WE CAN SEE THAT THE NUMBER OF CONFIRMED CASES KEPT ON INCREASING AND IT IS INCREASING TILL DATE.

In [14]:

```
#checking for null values  
df_corona_in_india.isnull().sum()
```

Out[14]:

```
Sno                0  
Date               0  
Time              0  
State/UnionTerritory  0  
ConfirmedIndianNational  0  
ConfirmedForeignNational  0  
Cured             0  
Deaths            0  
Confirmed         0  
dtype: int64
```

In [15]:

```
#converting to numeric data format
df_corona_in_india['Deaths']=pd.to_numeric(df_corona_in_india['Deaths'])
```

In [16]:

```
Total cases of corona in India
df_corona_in_india['Total Cases'] = df_corona_in_india['Cured'] + df_corona_in_india['Deaths']
Active cases of corona in India
df_corona_in_india['Active Cases'] = df_corona_in_india['Total Cases'] - df_corona_in_india['Cured']
df_corona_in_india.head()
```

Out[16]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	C
0	1	2020-01-30	6:00 PM	Kerala	1	0	
1	2	2020-01-31	6:00 PM	Kerala	1	0	
2	3	2020-02-01	6:00 PM	Kerala	2	0	
3	4	2020-02-02	6:00 PM	Kerala	3	0	
4	5	2020-02-03	6:00 PM	Kerala	3	0	

In [17]:

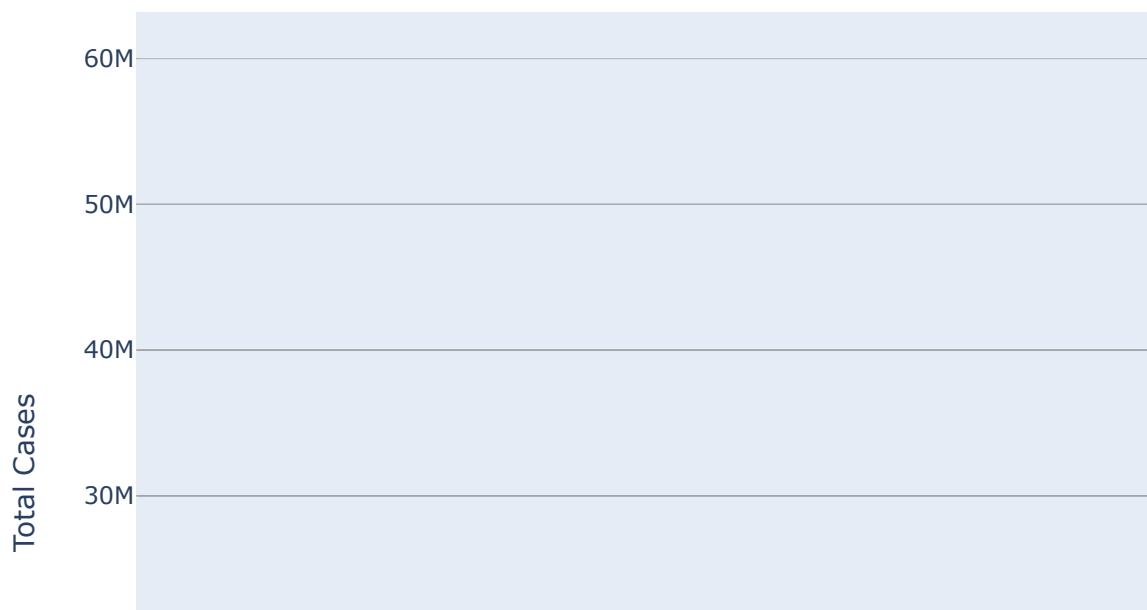
```
df_corona_in_india['Date'] =pd.to_datetime(df_corona_in_india.Date,dayfirst=True)
```

In [18]:

```
#Total Cases in India Datewise
```

```
corona_data = df_corona_in_india.groupby(['Date'])['Total Cases'].sum().reset_index().sort_  
fig = px.bar(corona_data, y='Total Cases', x='Date', hover_data = ['Total Cases'], color='Tot  
fig.update_layout(title='Total Cases in India Datewise')  
fig.show()
```

Total Cases in India Datewise



THE ABOVE PLOT CLEARLY SHOWS THAT THE TOTAL CASES IN INDIA TILL JUNE 2021 IS 60 MILLION AND IT IS STILL INCREASING.

In [55]:

```
#Daily Cases in India Datewise
corona_data = df_corona_in_india.groupby(['Date'])['Total Cases'].sum().reset_index().sort_
corona_data['Daily Cases'] = corona_data['Total Cases'].sub(corona_data['Total Cases'].shif
corona_data['Daily Cases'].iloc[0] = corona_data['Total Cases'].iloc[0]
corona_data['Daily Cases'] = corona_data['Daily Cases'].astype(int)
fig = px.bar(corona_data, y='Daily Cases', x='Date', hover_data=['Daily Cases'], color='Dai
fig.update_layout(
    title='Daily Cases in India Datewise')
fig.show()
```

Daily Cases in India Datewise

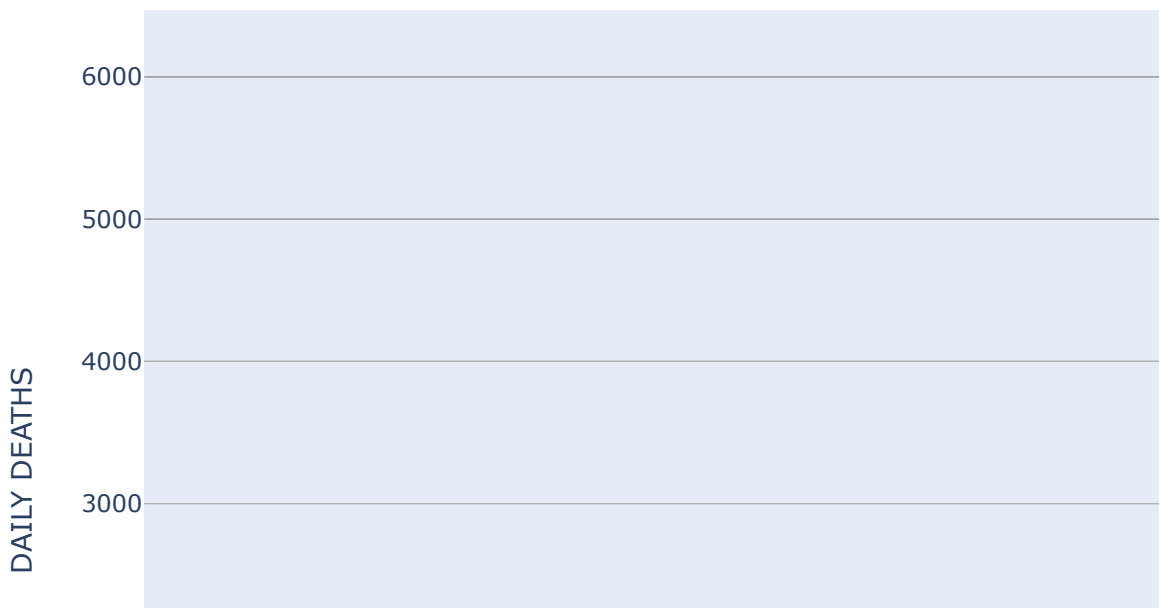


THE ABOVE PLOT SHOWS THAT THE HIGHEST CASES IN INDIA WERE RECORDED ON MAY 9 2021 AT 794274 CASES.

In [56]:

```
#DAILY DEATHS IN INDIA
corona_data = df_corona_in_india.groupby(['Date'])['Deaths'].sum().reset_index().sort_value
corona_data['DAILY DEATHS'] = corona_data['Deaths'].sub(corona_data['Deaths'].shift())
corona_data['DAILY DEATHS'].iloc[0] = corona_data['Deaths'].iloc[0]
corona_data['DAILY DEATHS'] = corona_data['DAILY DEATHS'].astype(int)
fig = px.bar(corona_data, y='DAILY DEATHS', x='Date', hover_data=['DAILY DEATHS'], color='D
fig.update_layout(
    title='DAILY DEATHS IN INDIA')
fig.show()
```

DAILY DEATHS IN INDIA

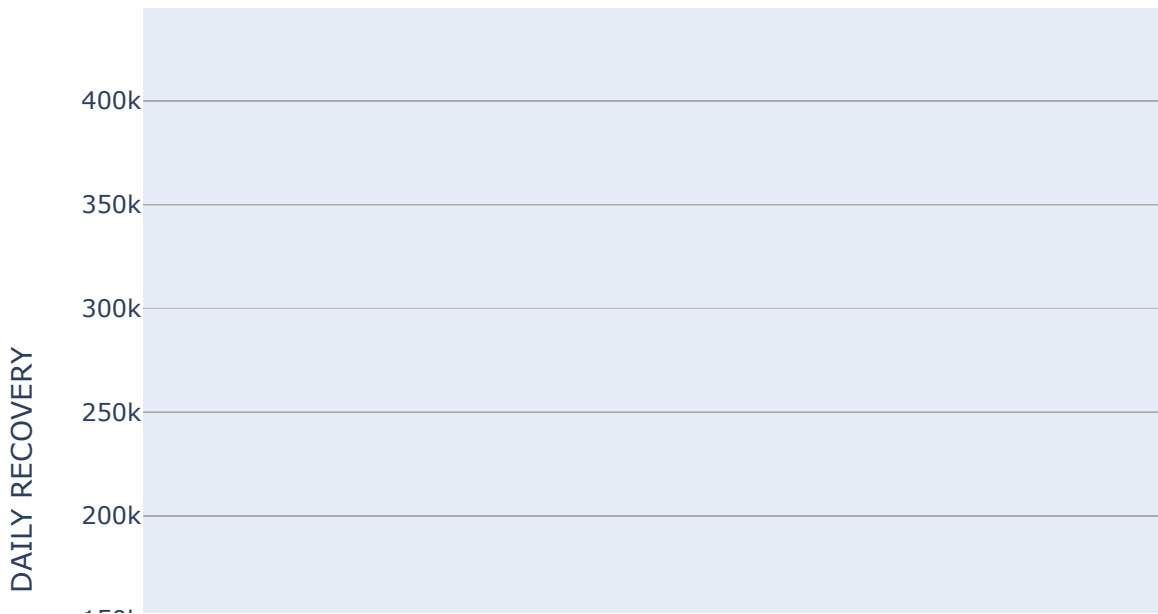


THE ABOVE PLOT SHOWS THAT THE HIGHEST DEATHS IN INDIA WERE RECORDED ON JUNE 10 2021 AT 6148 DEATHS.

In [57]:

```
#DAILY Recovery IN INDIA
corona_data = df_corona_in_india.groupby(['Date'])['Cured'].sum().reset_index().sort_values
corona_data['DAILY RECOVERY'] = corona_data['Cured'].sub(corona_data['Cured'].shift())
corona_data['DAILY RECOVERY'].iloc[0] = corona_data['Cured'].iloc[0]
corona_data['DAILY RECOVERY'] = corona_data['DAILY RECOVERY'].astype(int)
fig = px.bar(corona_data, y='DAILY RECOVERY', x='Date', hover_data=['DAILY RECOVERY'], color=
fig.update_layout(
    title='DAILY RECOVERY IN INDIA')
fig.show()
```

DAILY RECOVERY IN INDIA

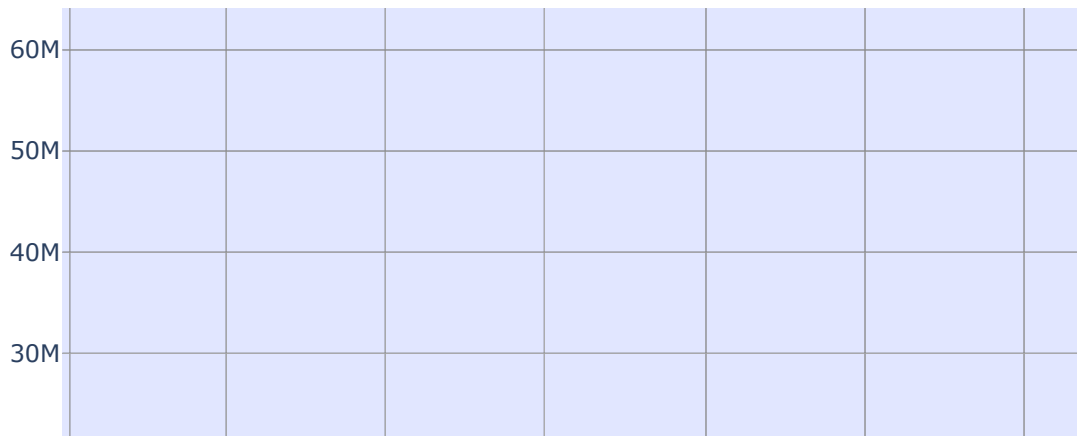


THE ABOVE PLOT SHOWS THAT ON MAY 18 2021 THE NUMBER OF RECOVERED CASES ARE 422436 WHICH IS HIGESHT NUMBER TILL DATE & THE RECOVERY RATE WAS AT PEAK BETWEEN APRIL TO JUNE DURING THE SECOND WAVE.

In [58]:

```
#Total Cases,Active Cases,Cured,Deaths from Corona Virus in India
corona_data = df_corona_in_india.groupby(['Date'])['Total Cases','Active Cases','Cured','Deaths']
fig = go.Figure()
fig.add_trace(go.Scatter(x=corona_data['Date'], y=corona_data['Total Cases'],
                        mode='lines+markers',name='Total Cases'))
fig.add_trace(go.Scatter(x=corona_data['Date'], y=corona_data['Active Cases'],
                        mode='lines+markers',name='Active Cases'))
fig.add_trace(go.Scatter(x=corona_data['Date'], y=corona_data['Cured'],
                        mode='lines+markers',name='Cured'))
fig.add_trace(go.Scatter(x=corona_data['Date'], y=corona_data['Deaths'],
                        mode='lines+markers',name='Deaths'))
fig.update_layout(title_text='Curve Showing Different Cases from COVID-19 in India',plot_bgcolor='white')
fig.show()
```

Curve Showing Different Cases from COVID-19 in India



The following plot gives information about the total cases and active cases and deaths and the amount of persons that were cured from coronavirus

In [59]:

```

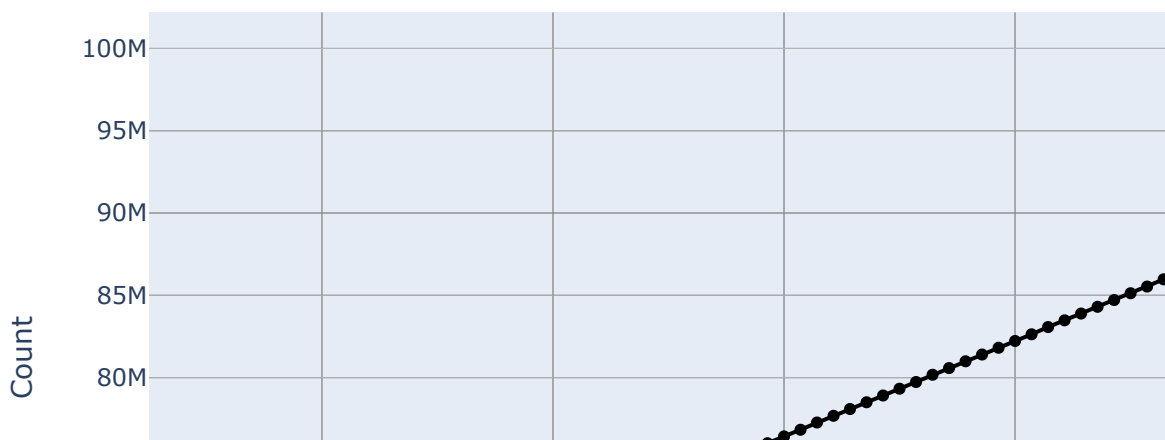
#Forecasting of Total Cases for Next 120 Days
df = df_corona_in_india.groupby('Date')['Total Cases'].sum().reset_index()
# Assigning variables to dates and total cases(Target Class)
df.columns = ['ds','y']
df['ds'] = pd.to_datetime(df['ds'])
# Prophet is a forecasting model made by Facebook
m = Prophet()
# Lets fit the model
m.fit(df)
# Getting the next 30 dates
future = m.make_future_dataframe(periods=120,include_history = False)
forecast = m.predict(future)
#Lets plot on the graph for a easy view and understanding
fig = go.Figure()
# yhat is the predicted value ds is the dates
fig.add_trace(go.Scatter(x=forecast['ds'], y=forecast['yhat'],
                        mode='lines+markers',name='Cases',marker_color='Black')))
fig.update_layout(
    title='Forecasting of Total Cases in INDIA for Next 120 Days',xaxis_title="Date",
    yaxis_title="Count")
fig.show()
from fbprophet.diagnostics import cross_validation
# help(cross_validation)
df_cv = cross_validation(m, horizon='30 days', period='15 days', initial='1 days')
print(forecast)
m.plot(forecast)

```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with yearly_seasonality=True to override this.

INFO:fbprophet:Disabling daily seasonality. Run prophet with daily_seasonality=True to override this.

Forecasting of Total Cases in INDIA for Next 120 Days



INFO:fbprophet:Making 33 forecasts with cutoffs between 2020-02-04 00:00:00 and 2021-05-29 00:00:00

WARNING:fbprophet:Seasonality has period of 7 days which is larger than initial window. Consider increasing initial.

A Jupyter widget could not be displayed because the widget state could not be found. This could happen if the kernel storing the widget is no longer available, or if the widget state was not saved in the notebook. You may be able to create the widget by running the appropriate cells.

INFO:fbprophet:n_changepoints greater than number of observations. Using 3.
INFO:fbprophet:n_changepoints greater than number of observations. Using 15.

	ds	trend	yhat_lower	yhat_upper	trend_lower \
0	2021-06-29	6.276218e+07	6.099998e+07	6.474274e+07	6.276218e+07
1	2021-06-30	6.317642e+07	6.139776e+07	6.503866e+07	6.317642e+07
2	2021-07-01	6.359067e+07	6.190727e+07	6.549171e+07	6.359067e+07
3	2021-07-02	6.400491e+07	6.224305e+07	6.589363e+07	6.400491e+07
4	2021-07-03	6.441915e+07	6.271089e+07	6.619972e+07	6.441915e+07
5	2021-07-04	6.483339e+07	6.295970e+07	6.659463e+07	6.482463e+07
6	2021-07-05	6.524764e+07	6.347497e+07	6.713080e+07	6.522330e+07
7	2021-07-06	6.566188e+07	6.386232e+07	6.758131e+07	6.561556e+07
8	2021-07-07	6.607612e+07	6.416570e+07	6.785297e+07	6.601417e+07
9	2021-07-08	6.649036e+07	6.473970e+07	6.827217e+07	6.640703e+07
10	2021-07-09	6.690460e+07	6.500771e+07	6.866308e+07	6.679824e+07
11	2021-07-10	6.731885e+07	6.549724e+07	6.903482e+07	6.718933e+07
12	2021-07-11	6.773309e+07	6.590687e+07	6.948670e+07	6.757216e+07
13	2021-07-12	6.814733e+07	6.632064e+07	7.007030e+07	6.796529e+07
14	2021-07-13	6.856157e+07	6.664861e+07	7.040127e+07	6.834463e+07
15	2021-07-14	6.897582e+07	6.712283e+07	7.082496e+07	6.871544e+07
16	2021-07-15	6.939006e+07	6.742161e+07	7.118821e+07	6.909165e+07
17	2021-07-16	6.980430e+07	6.794850e+07	7.165392e+07	6.947328e+07
18	2021-07-17	7.021854e+07	6.832109e+07	7.234607e+07	6.983245e+07
19	2021-07-18	7.063279e+07	6.878936e+07	7.247826e+07	7.020776e+07
20	2021-07-19	7.104703e+07	6.915944e+07	7.295991e+07	7.056864e+07
21	2021-07-20	7.146127e+07	6.942880e+07	7.343371e+07	7.093562e+07
22	2021-07-21	7.187551e+07	7.015406e+07	7.390153e+07	7.131775e+07
23	2021-07-22	7.228976e+07	7.024165e+07	7.436447e+07	7.168520e+07
24	2021-07-23	7.270400e+07	7.058888e+07	7.470322e+07	7.205502e+07
25	2021-07-24	7.311824e+07	7.111896e+07	7.518903e+07	7.240390e+07
26	2021-07-25	7.353248e+07	7.155597e+07	7.571793e+07	7.277609e+07
27	2021-07-26	7.394673e+07	7.198034e+07	7.609892e+07	7.315240e+07
28	2021-07-27	7.436097e+07	7.229008e+07	7.653288e+07	7.351034e+07
29	2021-07-28	7.477521e+07	7.270193e+07	7.701798e+07	7.386522e+07
30	2021-07-29	7.518945e+07	7.324783e+07	7.743674e+07	7.423567e+07
31	2021-07-30	7.560369e+07	7.358056e+07	7.771431e+07	7.458286e+07
32	2021-07-31	7.601794e+07	7.374597e+07	7.834987e+07	7.491191e+07
33	2021-08-01	7.643218e+07	7.428632e+07	7.868185e+07	7.526649e+07
34	2021-08-02	7.684642e+07	7.454014e+07	7.928348e+07	7.562260e+07
35	2021-08-03	7.726066e+07	7.485439e+07	7.953381e+07	7.596910e+07
36	2021-08-04	7.767491e+07	7.524217e+07	8.001003e+07	7.631632e+07
37	2021-08-05	7.808915e+07	7.559678e+07	8.037541e+07	7.664431e+07
38	2021-08-06	7.850339e+07	7.624513e+07	8.105947e+07	7.698635e+07
39	2021-08-07	7.891763e+07	7.643362e+07	8.137874e+07	7.735233e+07
40	2021-08-08	7.933188e+07	7.675562e+07	8.178226e+07	7.770158e+07

41	2021-08-09	7.974612e+07	7.709862e+07	8.254029e+07	7.804355e+07
42	2021-08-10	8.016036e+07	7.758497e+07	8.274285e+07	7.840059e+07
43	2021-08-11	8.057460e+07	7.803895e+07	8.331257e+07	7.875369e+07
44	2021-08-12	8.098885e+07	7.847928e+07	8.375978e+07	7.912003e+07
45	2021-08-13	8.140309e+07	7.855869e+07	8.420683e+07	7.947185e+07
46	2021-08-14	8.181733e+07	7.898021e+07	8.473007e+07	7.982619e+07
47	2021-08-15	8.223157e+07	7.953858e+07	8.522375e+07	8.018657e+07
48	2021-08-16	8.264582e+07	7.984091e+07	8.546191e+07	8.052788e+07
49	2021-08-17	8.306006e+07	8.011279e+07	8.613825e+07	8.087297e+07
50	2021-08-18	8.347430e+07	8.029753e+07	8.652961e+07	8.115640e+07
51	2021-08-19	8.388854e+07	8.091859e+07	8.678707e+07	8.147374e+07
52	2021-08-20	8.430279e+07	8.120630e+07	8.758200e+07	8.180624e+07
53	2021-08-21	8.471703e+07	8.179920e+07	8.795602e+07	8.213951e+07
54	2021-08-22	8.513127e+07	8.190915e+07	8.836048e+07	8.247278e+07
55	2021-08-23	8.554551e+07	8.243989e+07	8.892963e+07	8.281325e+07
56	2021-08-24	8.595975e+07	8.268094e+07	8.930132e+07	8.313596e+07
57	2021-08-25	8.637400e+07	8.315094e+07	9.010663e+07	8.349785e+07
58	2021-08-26	8.678824e+07	8.354222e+07	9.021104e+07	8.384828e+07
59	2021-08-27	8.720248e+07	8.380738e+07	9.083522e+07	8.413727e+07
60	2021-08-28	8.761672e+07	8.399725e+07	9.143161e+07	8.447483e+07
61	2021-08-29	8.803097e+07	8.438653e+07	9.189479e+07	8.480415e+07
62	2021-08-30	8.844521e+07	8.471628e+07	9.220548e+07	8.511571e+07
63	2021-08-31	8.885945e+07	8.513566e+07	9.275349e+07	8.546341e+07
64	2021-09-01	8.927369e+07	8.504303e+07	9.317691e+07	8.581324e+07
65	2021-09-02	8.968794e+07	8.583919e+07	9.363956e+07	8.616594e+07
66	2021-09-03	9.010218e+07	8.616031e+07	9.416150e+07	8.651533e+07
67	2021-09-04	9.051642e+07	8.662833e+07	9.466877e+07	8.684872e+07
68	2021-09-05	9.093066e+07	8.677804e+07	9.542504e+07	8.717799e+07
69	2021-09-06	9.134491e+07	8.722685e+07	9.590237e+07	8.750809e+07
70	2021-09-07	9.175915e+07	8.734925e+07	9.636146e+07	8.783129e+07
71	2021-09-08	9.217339e+07	8.771941e+07	9.685449e+07	8.810597e+07
72	2021-09-09	9.258763e+07	8.814273e+07	9.713213e+07	8.842657e+07
73	2021-09-10	9.300188e+07	8.815900e+07	9.753412e+07	8.879147e+07
74	2021-09-11	9.341612e+07	8.893057e+07	9.826153e+07	8.910887e+07
75	2021-09-12	9.383036e+07	8.894592e+07	9.847015e+07	8.946254e+07
76	2021-09-13	9.424460e+07	8.968088e+07	9.936447e+07	8.972907e+07
77	2021-09-14	9.465884e+07	8.962604e+07	9.990428e+07	9.006477e+07
78	2021-09-15	9.507309e+07	9.008276e+07	1.002844e+08	9.038925e+07
79	2021-09-16	9.548733e+07	9.014101e+07	1.005785e+08	9.073566e+07
80	2021-09-17	9.590157e+07	9.079681e+07	1.015414e+08	9.106893e+07
81	2021-09-18	9.631581e+07	9.110229e+07	1.017418e+08	9.140468e+07
82	2021-09-19	9.673006e+07	9.154611e+07	1.025836e+08	9.174215e+07
83	2021-09-20	9.714430e+07	9.210576e+07	1.026492e+08	9.208699e+07
84	2021-09-21	9.755854e+07	9.216073e+07	1.032647e+08	9.239558e+07
85	2021-09-22	9.797278e+07	9.244378e+07	1.042386e+08	9.274743e+07
86	2021-09-23	9.838703e+07	9.267036e+07	1.042933e+08	9.306964e+07
87	2021-09-24	9.880127e+07	9.335515e+07	1.047247e+08	9.340177e+07
88	2021-09-25	9.921551e+07	9.339669e+07	1.049839e+08	9.371744e+07
89	2021-09-26	9.962975e+07	9.378563e+07	1.060449e+08	9.401932e+07

	trend_upper	additive_terms	additive_terms_lower	additive_terms_upper
\				
0	6.276218e+07	12825.846490	12825.846490	12825.846490
1	6.317642e+07	5687.470124	5687.470124	5687.470124
2	6.359067e+07	3480.541749	3480.541749	3480.541749
3	6.400565e+07	-405.123860	-405.123860	-405.123860
4	6.442985e+07	-3238.811112	-3238.811112	-3238.811112
5	6.485572e+07	-4886.831485	-4886.831485	-4886.831485
6	6.529081e+07	-13463.091906	-13463.091906	-13463.091906
7	6.572691e+07	12825.846490	12825.846490	12825.846490
8	6.616395e+07	5687.470124	5687.470124	5687.470124

9	6.660009e+07	3480.541749	3480.541749	3480.541749
10	6.705721e+07	-405.123860	-405.123860	-405.123860
11	6.750895e+07	-3238.811112	-3238.811112	-3238.811112
12	6.795436e+07	-4886.831485	-4886.831485	-4886.831485
13	6.839549e+07	-13463.091906	-13463.091906	-13463.091906
14	6.883461e+07	12825.846490	12825.846490	12825.846490
15	6.927835e+07	5687.470124	5687.470124	5687.470124
16	6.972271e+07	3480.541749	3480.541749	3480.541749
17	7.016599e+07	-405.123860	-405.123860	-405.123860
18	7.061036e+07	-3238.811112	-3238.811112	-3238.811112
19	7.107084e+07	-4886.831485	-4886.831485	-4886.831485
20	7.153523e+07	-13463.091906	-13463.091906	-13463.091906
21	7.200029e+07	12825.846490	12825.846490	12825.846490
22	7.246626e+07	5687.470124	5687.470124	5687.470124
23	7.294536e+07	3480.541749	3480.541749	3480.541749
24	7.342720e+07	-405.123860	-405.123860	-405.123860
25	7.391120e+07	-3238.811112	-3238.811112	-3238.811112
26	7.438396e+07	-4886.831485	-4886.831485	-4886.831485
27	7.484253e+07	-13463.091906	-13463.091906	-13463.091906
28	7.533049e+07	12825.846490	12825.846490	12825.846490
29	7.578801e+07	5687.470124	5687.470124	5687.470124
30	7.625144e+07	3480.541749	3480.541749	3480.541749
31	7.673030e+07	-405.123860	-405.123860	-405.123860
32	7.720700e+07	-3238.811112	-3238.811112	-3238.811112
33	7.769641e+07	-4886.831485	-4886.831485	-4886.831485
34	7.817117e+07	-13463.091906	-13463.091906	-13463.091906
35	7.864973e+07	12825.846490	12825.846490	12825.846490
36	7.912015e+07	5687.470124	5687.470124	5687.470124
37	7.960829e+07	3480.541749	3480.541749	3480.541749
38	8.009249e+07	-405.123860	-405.123860	-405.123860
39	8.054672e+07	-3238.811112	-3238.811112	-3238.811112
40	8.104026e+07	-4886.831485	-4886.831485	-4886.831485
41	8.152491e+07	-13463.091906	-13463.091906	-13463.091906
42	8.202072e+07	12825.846490	12825.846490	12825.846490
43	8.249405e+07	5687.470124	5687.470124	5687.470124
44	8.299725e+07	3480.541749	3480.541749	3480.541749
45	8.347345e+07	-405.123860	-405.123860	-405.123860
46	8.396542e+07	-3238.811112	-3238.811112	-3238.811112
47	8.442920e+07	-4886.831485	-4886.831485	-4886.831485
48	8.491864e+07	-13463.091906	-13463.091906	-13463.091906
49	8.542139e+07	12825.846490	12825.846490	12825.846490
50	8.593212e+07	5687.470124	5687.470124	5687.470124
51	8.641929e+07	3480.541749	3480.541749	3480.541749
52	8.690204e+07	-405.123860	-405.123860	-405.123860
53	8.740125e+07	-3238.811112	-3238.811112	-3238.811112
54	8.791361e+07	-4886.831485	-4886.831485	-4886.831485
55	8.838002e+07	-13463.091906	-13463.091906	-13463.091906
56	8.886675e+07	12825.846490	12825.846490	12825.846490
57	8.935516e+07	5687.470124	5687.470124	5687.470124
58	8.984854e+07	3480.541749	3480.541749	3480.541749
59	9.038301e+07	-405.123860	-405.123860	-405.123860
60	9.085550e+07	-3238.811112	-3238.811112	-3238.811112
61	9.132362e+07	-4886.831485	-4886.831485	-4886.831485
62	9.183502e+07	-13463.091906	-13463.091906	-13463.091906
63	9.238323e+07	12825.846490	12825.846490	12825.846490
64	9.294167e+07	5687.470124	5687.470124	5687.470124
65	9.342141e+07	3480.541749	3480.541749	3480.541749
66	9.398257e+07	-405.123860	-405.123860	-405.123860
67	9.444561e+07	-3238.811112	-3238.811112	-3238.811112
68	9.496863e+07	-4886.831485	-4886.831485	-4886.831485
69	9.543109e+07	-13463.091906	-13463.091906	-13463.091906

70	9.592494e+07	12825.846490	12825.846490	12825.846490
71	9.644018e+07	5687.470124	5687.470124	5687.470124
72	9.693366e+07	3480.541749	3480.541749	3480.541749
73	9.743527e+07	-405.123860	-405.123860	-405.123860
74	9.791185e+07	-3238.811112	-3238.811112	-3238.811112
75	9.841713e+07	-4886.831485	-4886.831485	-4886.831485
76	9.894138e+07	-13463.091906	-13463.091906	-13463.091906
77	9.949625e+07	12825.846490	12825.846490	12825.846490
78	1.000045e+08	5687.470124	5687.470124	5687.470124
79	1.004799e+08	3480.541749	3480.541749	3480.541749
80	1.009777e+08	-405.123860	-405.123860	-405.123860
81	1.015484e+08	-3238.811112	-3238.811112	-3238.811112
82	1.020558e+08	-4886.831485	-4886.831485	-4886.831485
83	1.025347e+08	-13463.091906	-13463.091906	-13463.091906
84	1.030361e+08	12825.846490	12825.846490	12825.846490
85	1.035820e+08	5687.470124	5687.470124	5687.470124
86	1.041137e+08	3480.541749	3480.541749	3480.541749
87	1.046810e+08	-405.123860	-405.123860	-405.123860
88	1.052251e+08	-3238.811112	-3238.811112	-3238.811112
89	1.057054e+08	-4886.831485	-4886.831485	-4886.831485

	weekly	weekly_lower	weekly_upper	multiplicative_terms \
0	12825.846490	12825.846490	12825.846490	0.0
1	5687.470124	5687.470124	5687.470124	0.0
2	3480.541749	3480.541749	3480.541749	0.0
3	-405.123860	-405.123860	-405.123860	0.0
4	-3238.811112	-3238.811112	-3238.811112	0.0
5	-4886.831485	-4886.831485	-4886.831485	0.0
6	-13463.091906	-13463.091906	-13463.091906	0.0
7	12825.846490	12825.846490	12825.846490	0.0
8	5687.470124	5687.470124	5687.470124	0.0
9	3480.541749	3480.541749	3480.541749	0.0
10	-405.123860	-405.123860	-405.123860	0.0
11	-3238.811112	-3238.811112	-3238.811112	0.0
12	-4886.831485	-4886.831485	-4886.831485	0.0
13	-13463.091906	-13463.091906	-13463.091906	0.0
14	12825.846490	12825.846490	12825.846490	0.0
15	5687.470124	5687.470124	5687.470124	0.0
16	3480.541749	3480.541749	3480.541749	0.0
17	-405.123860	-405.123860	-405.123860	0.0
18	-3238.811112	-3238.811112	-3238.811112	0.0
19	-4886.831485	-4886.831485	-4886.831485	0.0
20	-13463.091906	-13463.091906	-13463.091906	0.0
21	12825.846490	12825.846490	12825.846490	0.0
22	5687.470124	5687.470124	5687.470124	0.0
23	3480.541749	3480.541749	3480.541749	0.0
24	-405.123860	-405.123860	-405.123860	0.0
25	-3238.811112	-3238.811112	-3238.811112	0.0
26	-4886.831485	-4886.831485	-4886.831485	0.0
27	-13463.091906	-13463.091906	-13463.091906	0.0
28	12825.846490	12825.846490	12825.846490	0.0
29	5687.470124	5687.470124	5687.470124	0.0
30	3480.541749	3480.541749	3480.541749	0.0
31	-405.123860	-405.123860	-405.123860	0.0
32	-3238.811112	-3238.811112	-3238.811112	0.0
33	-4886.831485	-4886.831485	-4886.831485	0.0
34	-13463.091906	-13463.091906	-13463.091906	0.0
35	12825.846490	12825.846490	12825.846490	0.0
36	5687.470124	5687.470124	5687.470124	0.0
37	3480.541749	3480.541749	3480.541749	0.0
38	-405.123860	-405.123860	-405.123860	0.0

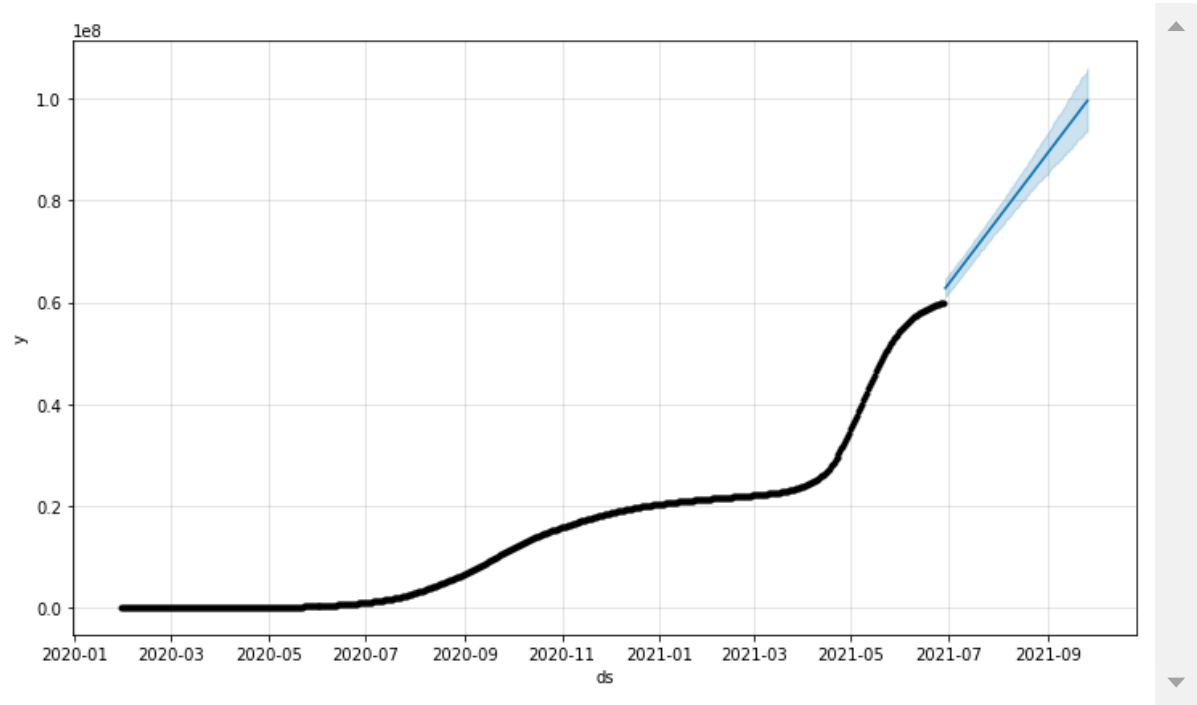
39	-3238.811112	-3238.811112	-3238.811112	0.0
40	-4886.831485	-4886.831485	-4886.831485	0.0
41	-13463.091906	-13463.091906	-13463.091906	0.0
42	12825.846490	12825.846490	12825.846490	0.0
43	5687.470124	5687.470124	5687.470124	0.0
44	3480.541749	3480.541749	3480.541749	0.0
45	-405.123860	-405.123860	-405.123860	0.0
46	-3238.811112	-3238.811112	-3238.811112	0.0
47	-4886.831485	-4886.831485	-4886.831485	0.0
48	-13463.091906	-13463.091906	-13463.091906	0.0
49	12825.846490	12825.846490	12825.846490	0.0
50	5687.470124	5687.470124	5687.470124	0.0
51	3480.541749	3480.541749	3480.541749	0.0
52	-405.123860	-405.123860	-405.123860	0.0
53	-3238.811112	-3238.811112	-3238.811112	0.0
54	-4886.831485	-4886.831485	-4886.831485	0.0
55	-13463.091906	-13463.091906	-13463.091906	0.0
56	12825.846490	12825.846490	12825.846490	0.0
57	5687.470124	5687.470124	5687.470124	0.0
58	3480.541749	3480.541749	3480.541749	0.0
59	-405.123860	-405.123860	-405.123860	0.0
60	-3238.811112	-3238.811112	-3238.811112	0.0
61	-4886.831485	-4886.831485	-4886.831485	0.0
62	-13463.091906	-13463.091906	-13463.091906	0.0
63	12825.846490	12825.846490	12825.846490	0.0
64	5687.470124	5687.470124	5687.470124	0.0
65	3480.541749	3480.541749	3480.541749	0.0
66	-405.123860	-405.123860	-405.123860	0.0
67	-3238.811112	-3238.811112	-3238.811112	0.0
68	-4886.831485	-4886.831485	-4886.831485	0.0
69	-13463.091906	-13463.091906	-13463.091906	0.0
70	12825.846490	12825.846490	12825.846490	0.0
71	5687.470124	5687.470124	5687.470124	0.0
72	3480.541749	3480.541749	3480.541749	0.0
73	-405.123860	-405.123860	-405.123860	0.0
74	-3238.811112	-3238.811112	-3238.811112	0.0
75	-4886.831485	-4886.831485	-4886.831485	0.0
76	-13463.091906	-13463.091906	-13463.091906	0.0
77	12825.846490	12825.846490	12825.846490	0.0
78	5687.470124	5687.470124	5687.470124	0.0
79	3480.541749	3480.541749	3480.541749	0.0
80	-405.123860	-405.123860	-405.123860	0.0
81	-3238.811112	-3238.811112	-3238.811112	0.0
82	-4886.831485	-4886.831485	-4886.831485	0.0
83	-13463.091906	-13463.091906	-13463.091906	0.0
84	12825.846490	12825.846490	12825.846490	0.0
85	5687.470124	5687.470124	5687.470124	0.0
86	3480.541749	3480.541749	3480.541749	0.0
87	-405.123860	-405.123860	-405.123860	0.0
88	-3238.811112	-3238.811112	-3238.811112	0.0
89	-4886.831485	-4886.831485	-4886.831485	0.0

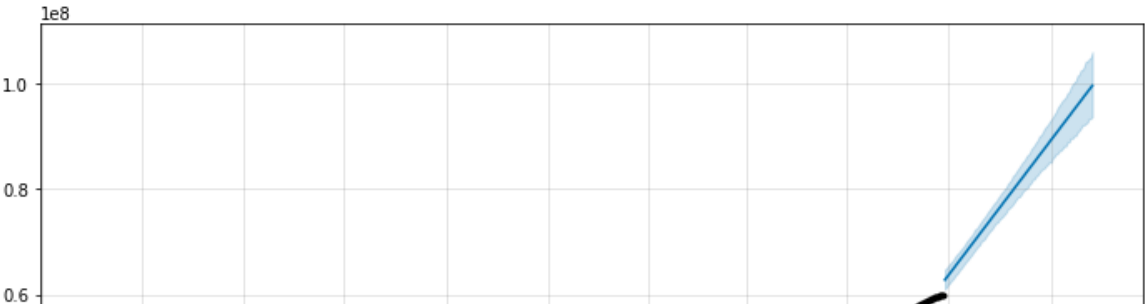
	multiplicative_terms_lower	multiplicative_terms_upper	yhat
0	0.0	0.0	6.277501e+07
1	0.0	0.0	6.318211e+07
2	0.0	0.0	6.359415e+07
3	0.0	0.0	6.400450e+07
4	0.0	0.0	6.441591e+07
5	0.0	0.0	6.482851e+07
6	0.0	0.0	6.523417e+07
7	0.0	0.0	6.567470e+07

8	0.0	0.0	6.608181e+07
9	0.0	0.0	6.649384e+07
10	0.0	0.0	6.690420e+07
11	0.0	0.0	6.731561e+07
12	0.0	0.0	6.772820e+07
13	0.0	0.0	6.813387e+07
14	0.0	0.0	6.857440e+07
15	0.0	0.0	6.898150e+07
16	0.0	0.0	6.939354e+07
17	0.0	0.0	6.980390e+07
18	0.0	0.0	7.021531e+07
19	0.0	0.0	7.062790e+07
20	0.0	0.0	7.103357e+07
21	0.0	0.0	7.147410e+07
22	0.0	0.0	7.188120e+07
23	0.0	0.0	7.229324e+07
24	0.0	0.0	7.270359e+07
25	0.0	0.0	7.311500e+07
26	0.0	0.0	7.352760e+07
27	0.0	0.0	7.393326e+07
28	0.0	0.0	7.437379e+07
29	0.0	0.0	7.478090e+07
30	0.0	0.0	7.519293e+07
31	0.0	0.0	7.560329e+07
32	0.0	0.0	7.601470e+07
33	0.0	0.0	7.642729e+07
34	0.0	0.0	7.683296e+07
35	0.0	0.0	7.727349e+07
36	0.0	0.0	7.768059e+07
37	0.0	0.0	7.809263e+07
38	0.0	0.0	7.850299e+07
39	0.0	0.0	7.891440e+07
40	0.0	0.0	7.932699e+07
41	0.0	0.0	7.973266e+07
42	0.0	0.0	8.017319e+07
43	0.0	0.0	8.058029e+07
44	0.0	0.0	8.099233e+07
45	0.0	0.0	8.140268e+07
46	0.0	0.0	8.181409e+07
47	0.0	0.0	8.222669e+07
48	0.0	0.0	8.263235e+07
49	0.0	0.0	8.307288e+07
50	0.0	0.0	8.347999e+07
51	0.0	0.0	8.389202e+07
52	0.0	0.0	8.430238e+07
53	0.0	0.0	8.471379e+07
54	0.0	0.0	8.512638e+07
55	0.0	0.0	8.553205e+07
56	0.0	0.0	8.597258e+07
57	0.0	0.0	8.637968e+07
58	0.0	0.0	8.679172e+07
59	0.0	0.0	8.720208e+07
60	0.0	0.0	8.761349e+07
61	0.0	0.0	8.802608e+07
62	0.0	0.0	8.843175e+07
63	0.0	0.0	8.887228e+07
64	0.0	0.0	8.927938e+07
65	0.0	0.0	8.969142e+07
66	0.0	0.0	9.010177e+07
67	0.0	0.0	9.051318e+07
68	0.0	0.0	9.092578e+07

69	0.0	0.0	9.133144e+07
70	0.0	0.0	9.177197e+07
71	0.0	0.0	9.217908e+07
72	0.0	0.0	9.259111e+07
73	0.0	0.0	9.300147e+07
74	0.0	0.0	9.341288e+07
75	0.0	0.0	9.382547e+07
76	0.0	0.0	9.423114e+07
77	0.0	0.0	9.467167e+07
78	0.0	0.0	9.507877e+07
79	0.0	0.0	9.549081e+07
80	0.0	0.0	9.590117e+07
81	0.0	0.0	9.631258e+07
82	0.0	0.0	9.672517e+07
83	0.0	0.0	9.713084e+07
84	0.0	0.0	9.757137e+07
85	0.0	0.0	9.797847e+07
86	0.0	0.0	9.839051e+07
87	0.0	0.0	9.880086e+07
88	0.0	0.0	9.921227e+07
89	0.0	0.0	9.962487e+07

Out[59]:





From the above Analysis we were able to state that there will be a huge increase in the number of cases in the coming 4 months by september. The number of people that will be affected in the coming 4 months can be very high, so we need to take preventive measures and vaccination in order to prevent the occurrence of third wave in India.