Covid_19_Project(GC)

April 13, 2023

[1]:
```
#importing required libraries

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 plotly.graph_objects as go

import warnings
warnings.filterwarnings('ignore')
```

[2]:
```
#Loading all data file

df=pd.read_csv('covid_19_clean_complete.csv',parse_dates=['Date'])
df.head()
```

[2]:

	Province/State	Country/Region	Lat	Long	Date	Confirmed	Deaths	Recovered
0	NaN	Thailand	15.0000	101.0000	2020-01-22	2.0	0.0	0.0
1	NaN	Japan	36.0000	138.0000	2020-01-22	2.0	0.0	0.0
2	NaN	Singapore	1.2833	103.8333	2020-01-22	0.0	0.0	0.0
3	NaN	Nepal	28.1667	84.2500	2020-01-22	0.0	0.0	0.0
4	NaN	Malaysia	2.5000	112.5000	2020-01-22	0.0	0.0	0.0

[3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19220 entries, 0 to 19219
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
```

```
---  ------          --------------  -----
 0   Province/State  8432 non-null   object
 1   Country/Region  19220 non-null  object
 2   Lat             19220 non-null  float64
 3   Long            19220 non-null  float64
 4   Date            19220 non-null  datetime64[ns]
 5   Confirmed       19219 non-null  float64
 6   Deaths          19219 non-null  float64
 7   Recovered       19219 non-null  float64
dtypes: datetime64[ns](1), float64(5), object(2)
memory usage: 1.2+ MB
```

[4]:
```
df.describe()
```

[4]:

	Lat	Long	Confirmed	Deaths	Recovered
count	19220.000000	19220.000000	19219.000000	19219.000000	19219.000000
mean	25.088643	5.289362	287.734586	10.237994	103.066341
std	23.448518	80.081866	3297.651489	155.703574	1795.041235
min	-41.454500	-157.498300	0.000000	0.000000	0.000000
25%	12.518600	-70.162700	0.000000	0.000000	0.000000
50%	31.221000	9.775000	0.000000	0.000000	0.000000
75%	42.165700	57.500000	8.000000	0.000000	0.000000
max	72.000000	178.065000	67800.000000	5476.000000	59879.000000

[5]:
```
df.columns
```

[5]:
```
Index(['Province/State', 'Country/Region', 'Lat', 'Long', 'Date', 'Confirmed',
       'Deaths', 'Recovered'],
      dtype='object')
```

[6]:
```
#renaming columns
df.rename(columns={'Province/State':'state','Country/Region':'country',
                   'Date':'date','Confirmed':'confirmed','Deaths':
 ↪'deaths','Recovered':'recovered'},inplace=True)
df.head()
```

[6]:

	state	country	Lat	Long	date	confirmed	deaths	recovered
0	NaN	Thailand	15.0000	101.0000	2020-01-22	2.0	0.0	0.0
1	NaN	Japan	36.0000	138.0000	2020-01-22	2.0	0.0	0.0
2	NaN	Singapore	1.2833	103.8333	2020-01-22	0.0	0.0	0.0
3	NaN	Nepal	28.1667	84.2500	2020-01-22	0.0	0.0	0.0
4	NaN	Malaysia	2.5000	112.5000	2020-01-22	0.0	0.0	0.0

[7]:
```
#Finding out no of active cases

df['active']=df['confirmed']-df['deaths']-df['recovered']
df.head()
```

[7]:
```
  state    country      Lat      Long       date  confirmed  deaths  \
0   NaN   Thailand  15.0000  101.0000 2020-01-22        2.0     0.0
1   NaN      Japan  36.0000  138.0000 2020-01-22        2.0     0.0
2   NaN  Singapore   1.2833  103.8333 2020-01-22        0.0     0.0
3   NaN      Nepal  28.1667   84.2500 2020-01-22        0.0     0.0
4   NaN   Malaysia   2.5000  112.5000 2020-01-22        0.0     0.0

   recovered  active
0        0.0     2.0
1        0.0     2.0
2        0.0     0.0
3        0.0     0.0
4        0.0     0.0
```

[8]:
```
#finding out last date
df['date'].max()
```

[8]:
```
Timestamp('2020-03-23 00:00:00')
```

[9]:
```
#Finding total data country wise
top = df[df['date'] == df['date'].max()]
world=top.groupby(by='country')['confirmed','deaths','recovered','active'].
 ↪sum().reset_index()
world.head()
```

[9]:
```
       country  confirmed  deaths  recovered  active
0  Afghanistan       40.0     1.0        1.0    38.0
1      Albania       89.0     2.0        2.0    85.0
2      Algeria      201.0    17.0       65.0   119.0
3      Andorra      113.0     1.0        1.0   111.0
4       Angola        2.0     0.0        0.0     2.0
```

[10]:
```
world.shape
```

[10]:
```
(183, 5)
```

[11]:
```
#Finding top 20 countries by number of confimed cases
top_20=world.sort_values(by='confirmed',ascending=False).reset_index(drop=True).
 ↪head(20)

top_20
```

[11]:
```
           country  confirmed  deaths  recovered   active
0            China    81439.0  3274.0    72814.0   5351.0
1            Italy    59138.0  5476.0     7024.0  46638.0
2               US    33276.0   417.0      178.0  32681.0
3            Spain    28768.0  1772.0     2575.0  24421.0
4          Germany    24873.0    94.0      266.0  24513.0
```

```
5              Iran    21638.0  1685.0     7931.0  12022.0
6            France    16044.0   674.0     2200.0  13170.0
7       South Korea     8897.0   104.0     2909.0   5884.0
8       Switzerland     7245.0    98.0      131.0   7016.0
9    United Kingdom     5741.0   282.0       67.0   5392.0
10      Netherlands     4216.0   180.0        2.0   4034.0
11          Belgium     3401.0    75.0      263.0   3063.0
12          Austria     3244.0    16.0        9.0   3219.0
13           Norway     2383.0     7.0        1.0   2375.0
14           Sweden     1934.0    21.0       16.0   1897.0
15         Portugal     1600.0    14.0        5.0   1581.0
16           Brazil     1593.0    25.0        2.0   1566.0
17          Denmark     1514.0    13.0        1.0   1500.0
18           Canada     1470.0    21.0       10.0   1439.0
19        Australia     1314.0     7.0       88.0   1219.0
```

[12]:
```
#Plotting graph of top 20 countries

fig = px.bar(top_20, y='confirmed', x='country', text_auto='.2s',
             title="Top 20 countries by number of confirmed covid cases")
fig.show()
```

[13]:
```
#Plotting graph of all countries with covid active cases

figure = px.choropleth(world, locations = 'country',
                       locationmode = 'country names', color = 'active',
                       hover_name = 'country', range_color = [1,1000],
                       color_continuous_scale = "blues",
                       title = "Countries with Active Cases")

figure.show()
```

[14]:
```
#Datewise confirmed cases
total_cases = df.groupby('date')['date', 'confirmed'].sum().reset_index()
total_cases.head()
```

[14]:
```
        date  confirmed
0 2020-01-22      554.0
1 2020-01-23      652.0
2 2020-01-24      939.0
3 2020-01-25     1432.0
4 2020-01-26     2113.0
```

[15]:
```
total_cases.shape
```

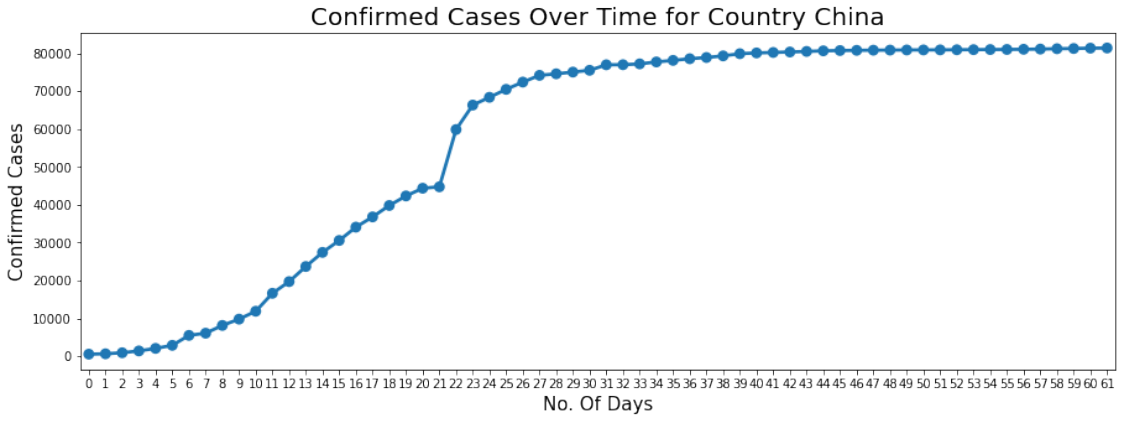
[15]:
```
(62, 2)
```

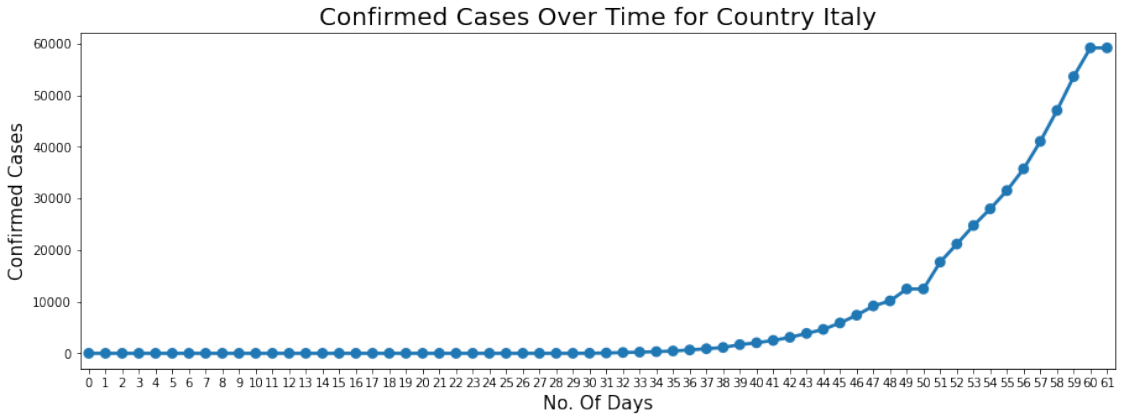
[16]:
```
#Plotting date wise graph of cases
fig = px.line(total_cases, x='date', y='confirmed',  markers=True,
              title='Worldwide Confirmed cases over time')
fig.show()
```

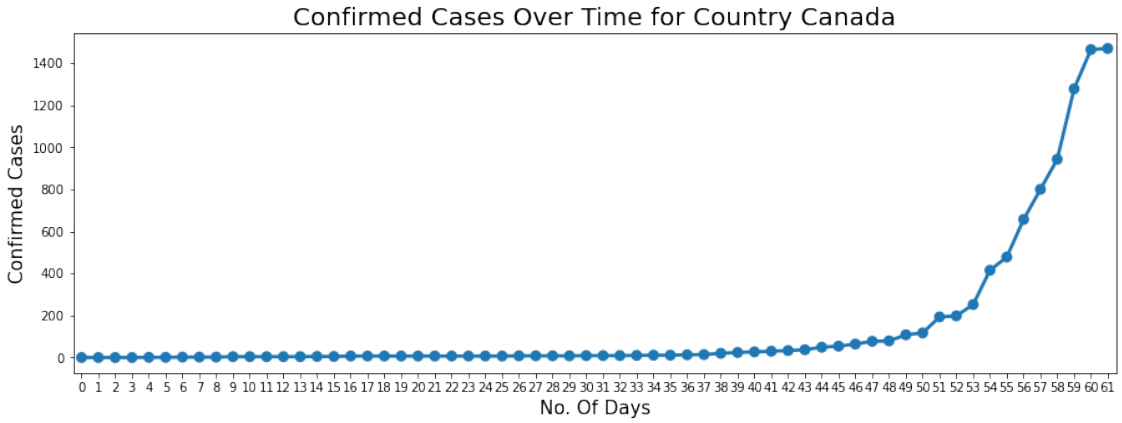
[17]:
```
#Taking top 20 country names

top_10=top_20['country'].value_counts().keys().tolist()[:10]
print(top_10)
```

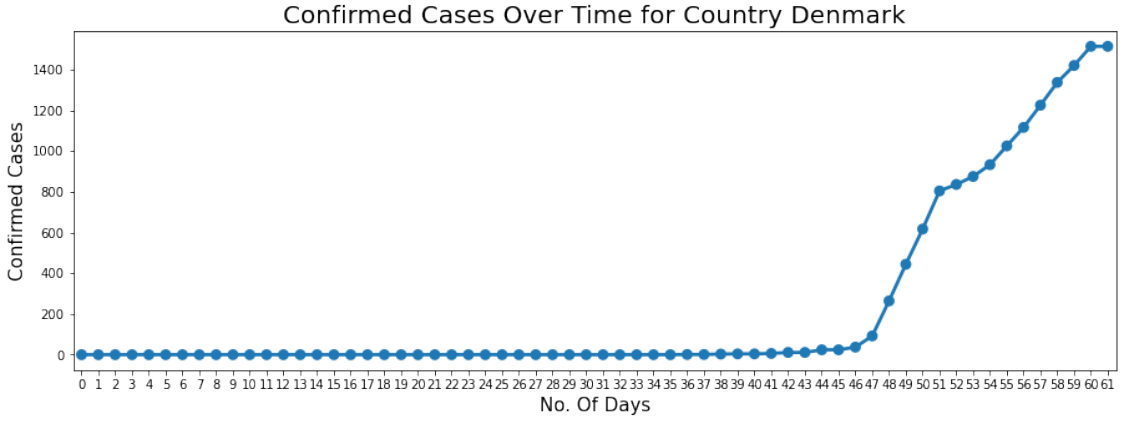
```
['China', 'Italy', 'Canada', 'Denmark', 'Brazil', 'Portugal', 'Sweden',
'Norway', 'Austria', 'Belgium']
```

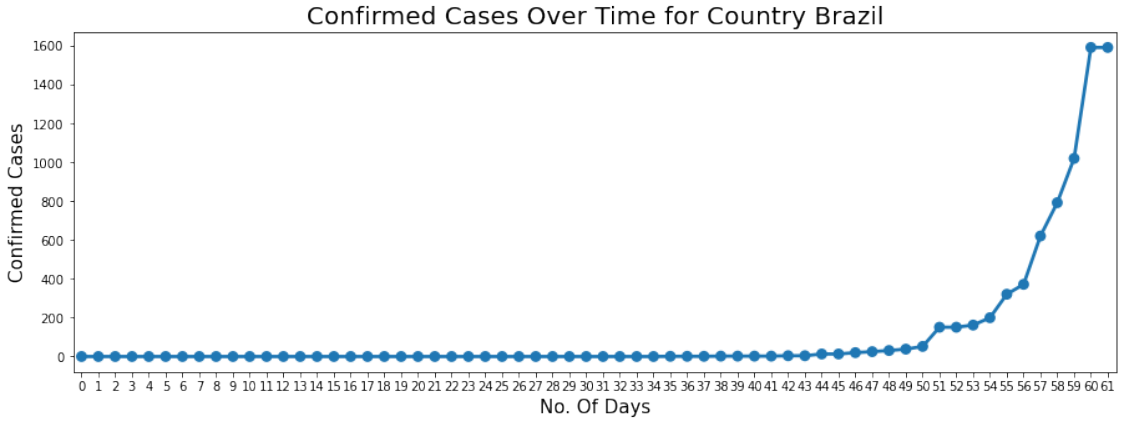
[18]:
```
#Plotting top 10 contries confirmed cases over time
for i in top_10:
    name = df[df.country == i]
    name = name.groupby(by = 'date')['recovered', 'deaths', 'confirmed',␣
 ↪'active'].sum().reset_index(drop=True)
    plt.figure(figsize=(15,5))
    sns.pointplot(name.index, name.confirmed)
    plt.title('Confirmed Cases Over Time for Country {}'.format(i), fontsize =␣
 ↪20)
    plt.xlabel('No. Of Days', fontsize = 15)
    plt.ylabel('Confirmed Cases', fontsize = 15)
    plt.show()
```

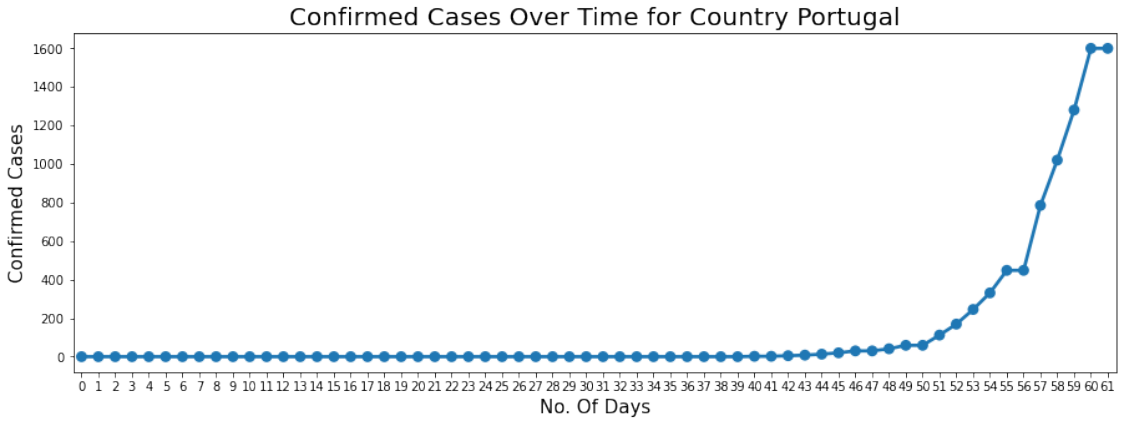


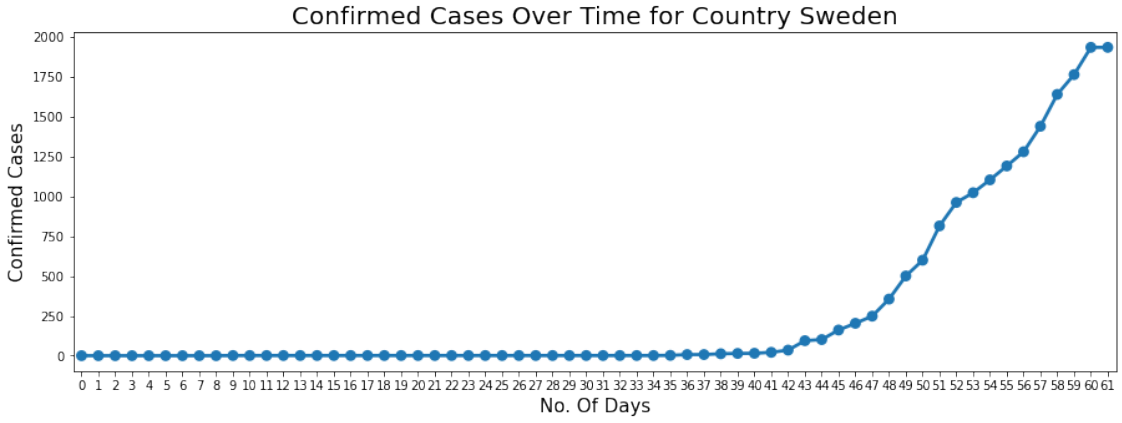

Confirmed Cases Over Time for Country Italy
Confirmed Cases
No. Of Days

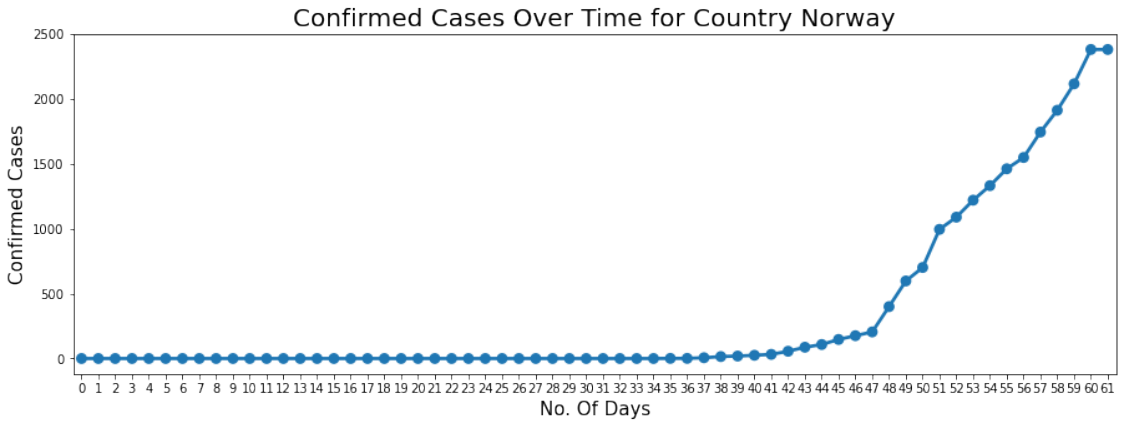

Confirmed Cases Over Time for Country Canada
Confirmed Cases
No. Of Days

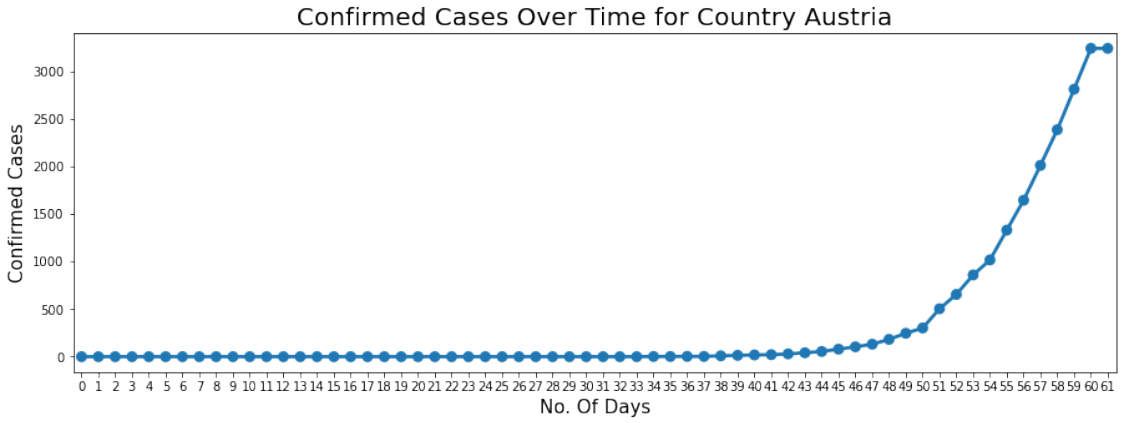

Confirmed Cases Over Time for Country Denmark
Confirmed Cases
No. Of Days

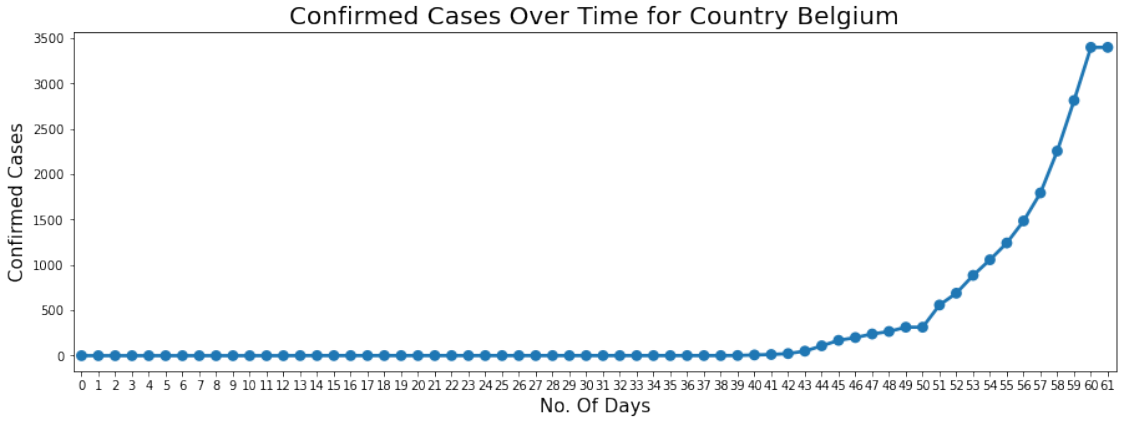

Confirmed Cases Over Time for Country Brazil
Confirmed Cases
No. Of Days


Confirmed Cases Over Time for Country Portugal
Confirmed Cases
No. Of Days


Confirmed Cases Over Time for Country Sweden
Confirmed Cases
No. Of Days

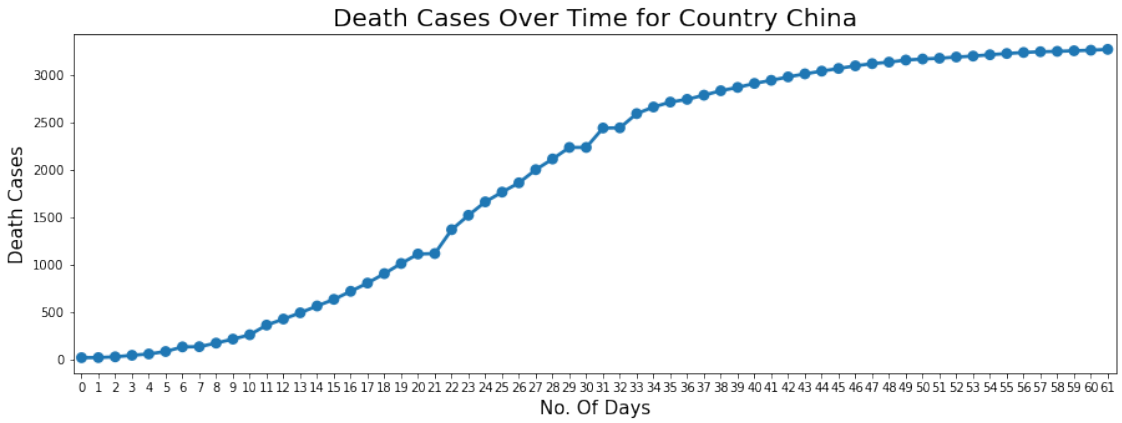


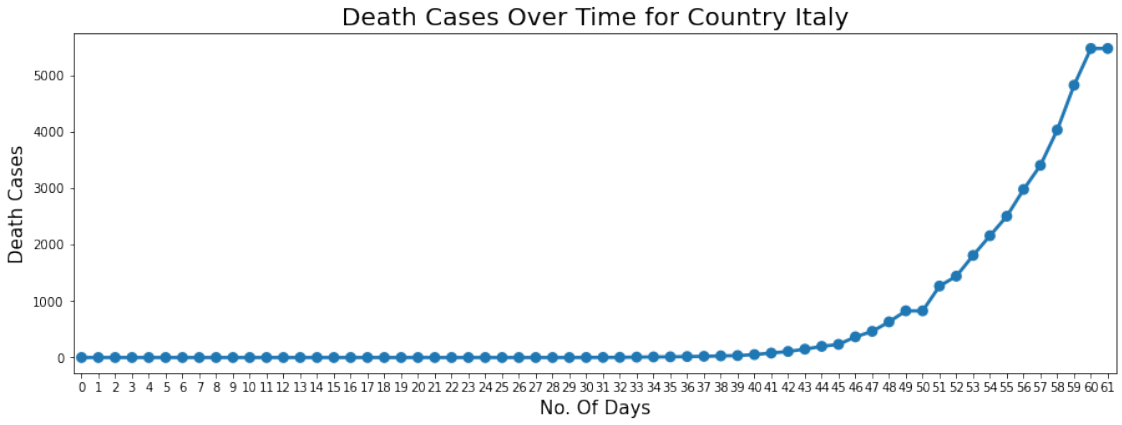


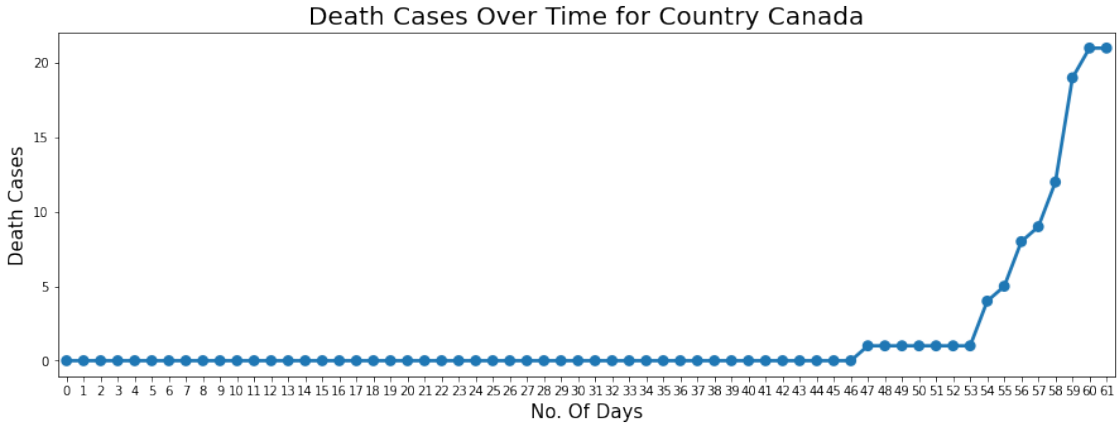


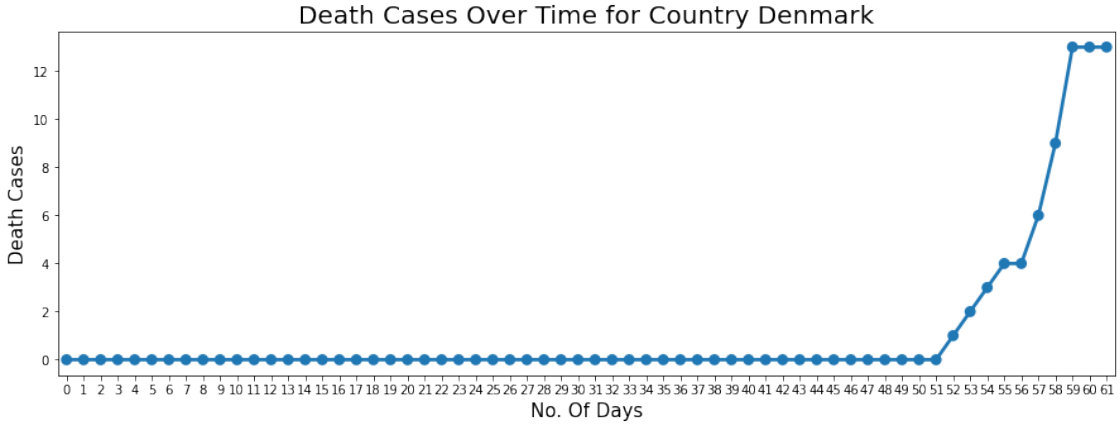
[19]:
```
#Plotting top 10 contries death cases over time
for i in top_10:
```

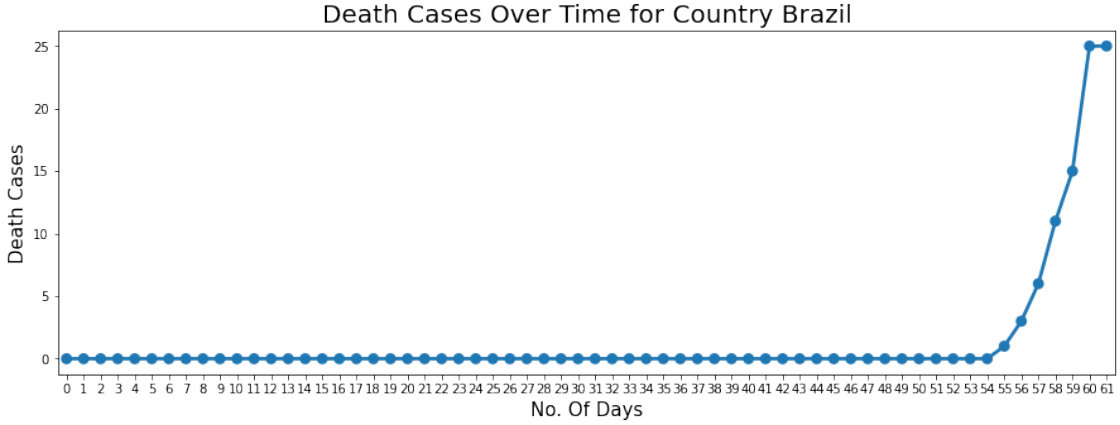
```
    name = df[df.country == i]
    name = name.groupby(by = 'date')['recovered', 'deaths', 'confirmed',␣
↪'active'].sum().reset_index()
    plt.figure(figsize=(15,5))
    sns.pointplot(name.index, name.deaths)
    plt.title('Death Cases Over Time for Country {}'.format(i), fontsize = 20)
    plt.xlabel('No. Of Days', fontsize = 15)
    plt.ylabel('Death Cases', fontsize = 15)
    plt.show()
```

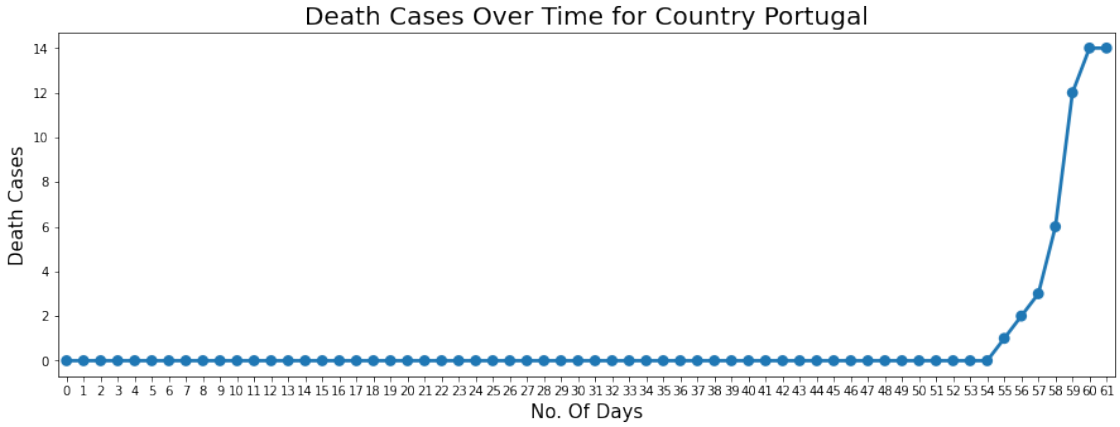


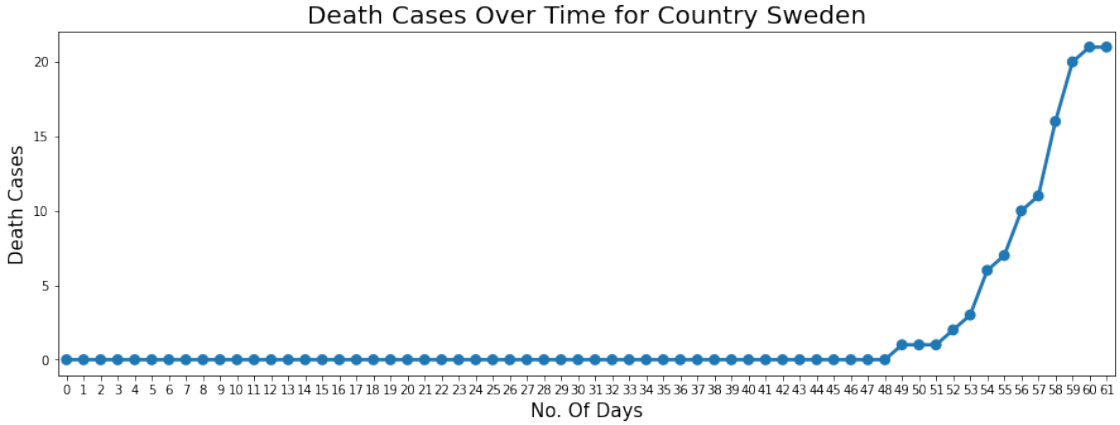


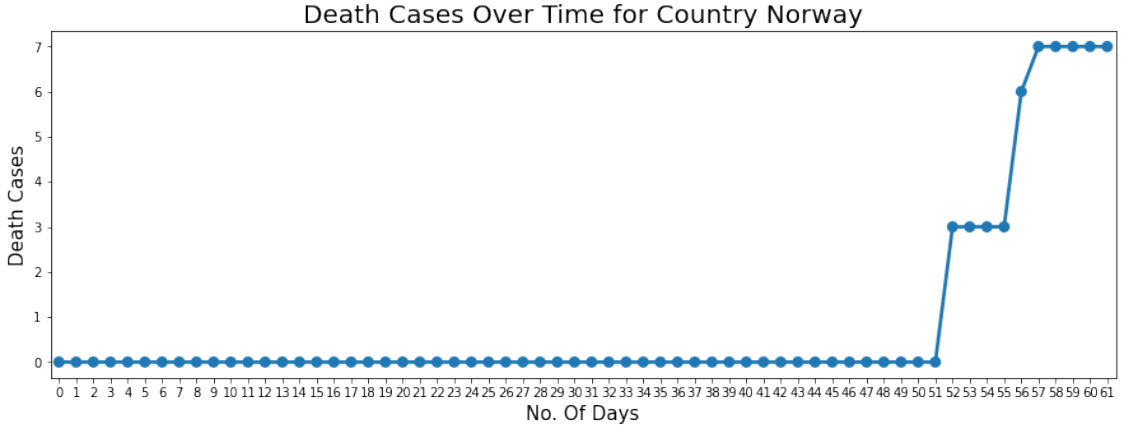

Death Cases Over Time for Country Canada
Death Cases
No. Of Days

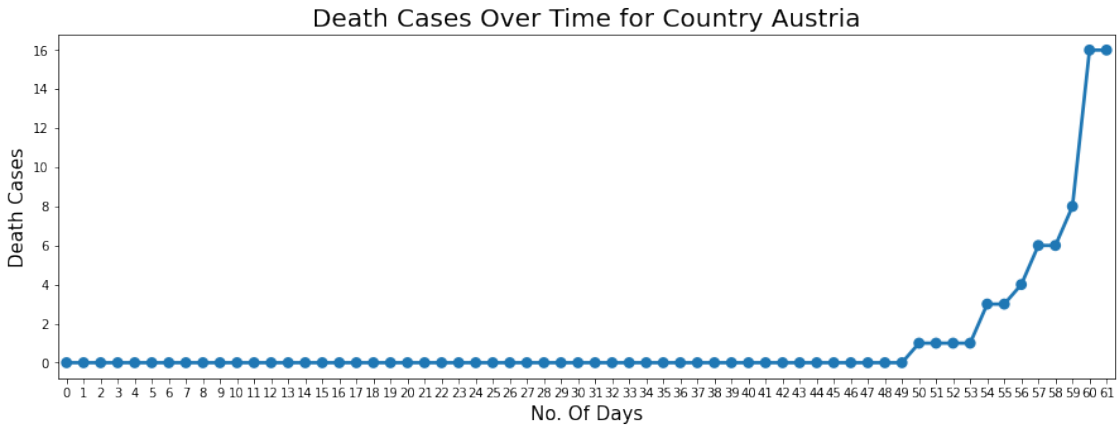

Death Cases Over Time for Country Denmark
Death Cases
No. Of Days

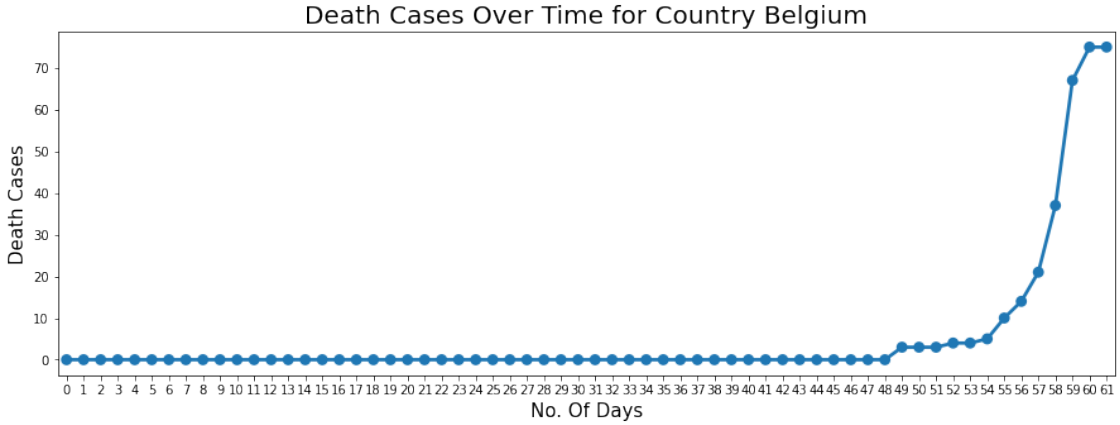

Death Cases Over Time for Country Brazil
Death Cases
No. Of Days


Death Cases Over Time for Country Portugal
Death Cases
No. Of Days

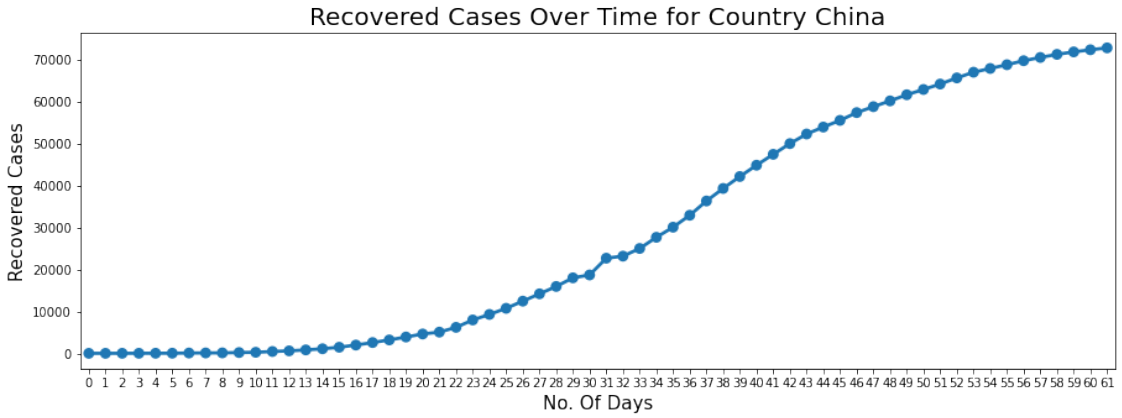

Death Cases Over Time for Country Sweden
Death Cases
No. Of Days

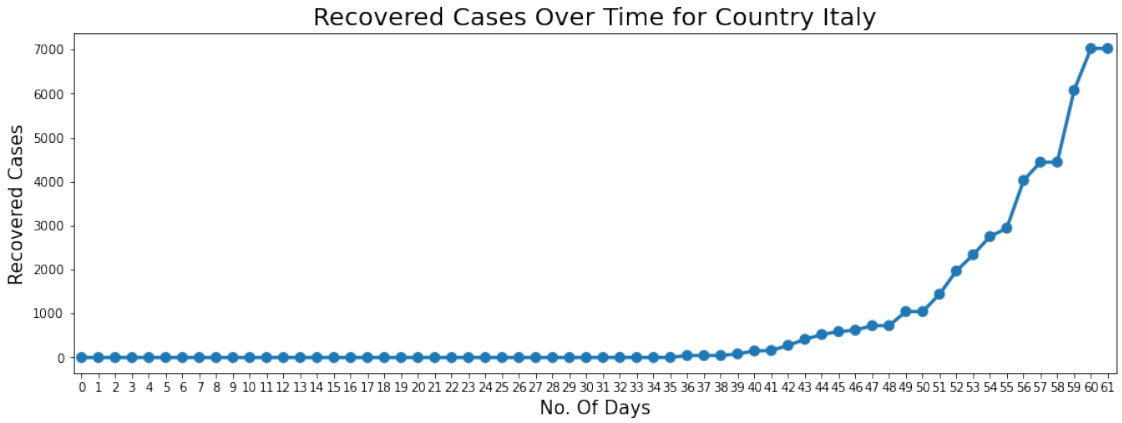

Death Cases Over Time for Country Norway
Death Cases
No. Of Days

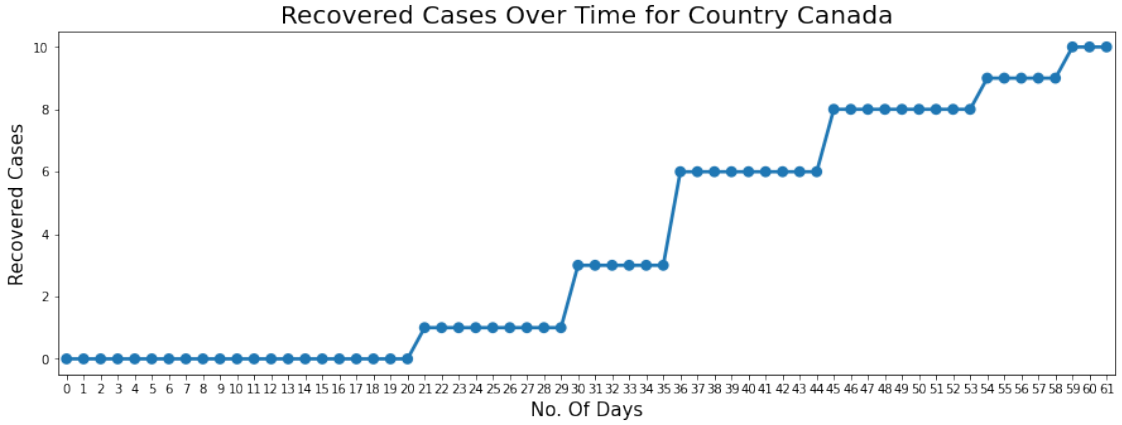


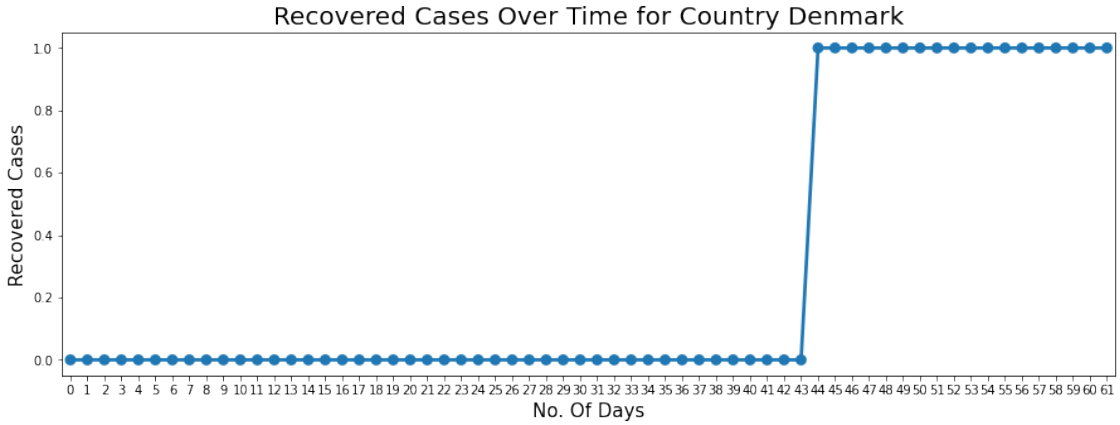


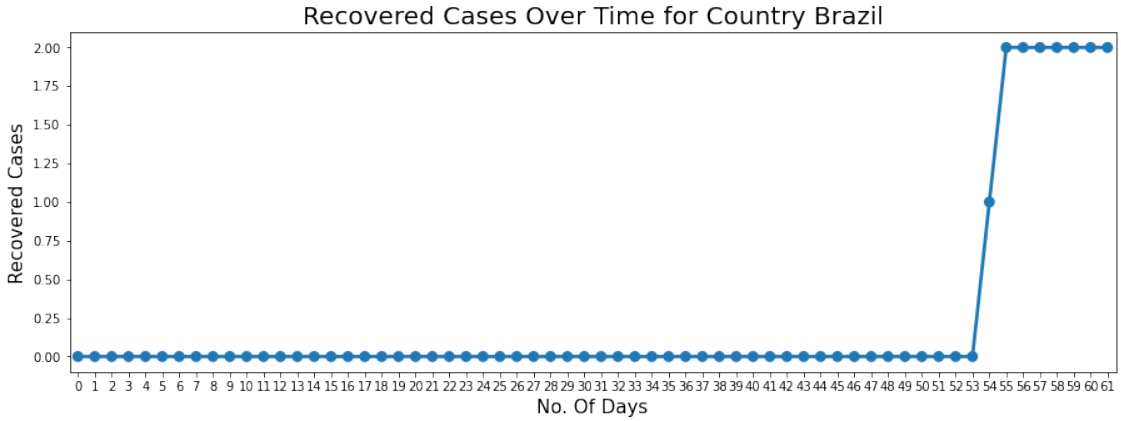
[20]:
```
#Plotting top 10 contries recovered cases over time
for i in top_10:
    name = df[df.country == i]
    name = name.groupby(by = 'date')['recovered', 'deaths', 'confirmed',␣
 ↪'active'].sum().reset_index()
    plt.figure(figsize=(15,5))
    sns.pointplot(name.index, name.recovered)
    plt.title('Recovered Cases Over Time for Country {}'.format(i), fontsize =␣
 ↪20)
    plt.xlabel('No. Of Days', fontsize = 15)
    plt.ylabel('Recovered Cases', fontsize = 15)
    plt.show()
```

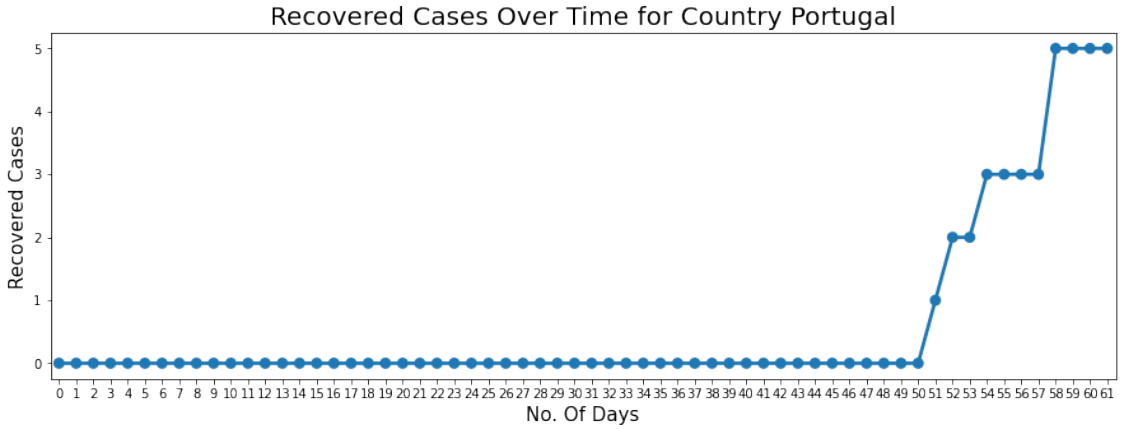

Recovered Cases Over Time for Country China
Recovered Cases
No. Of Days

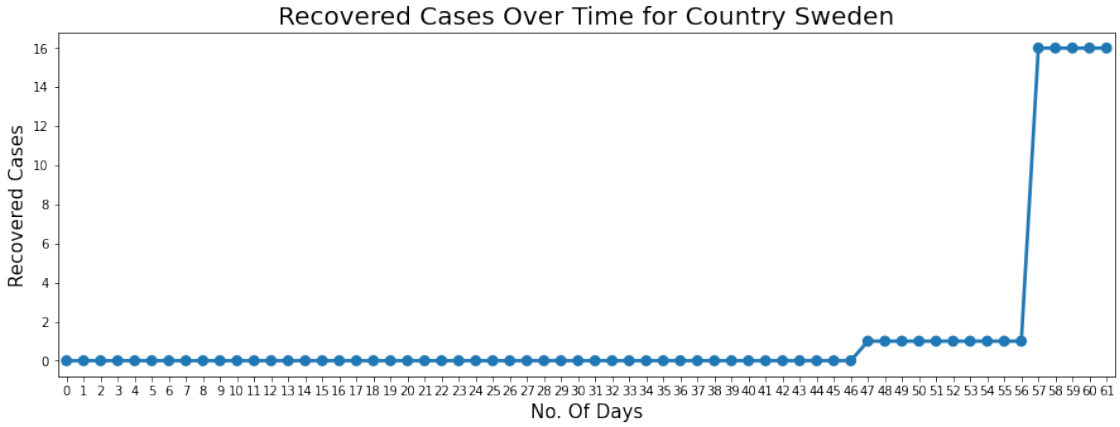

Recovered Cases Over Time for Country Italy
Recovered Cases
No. Of Days

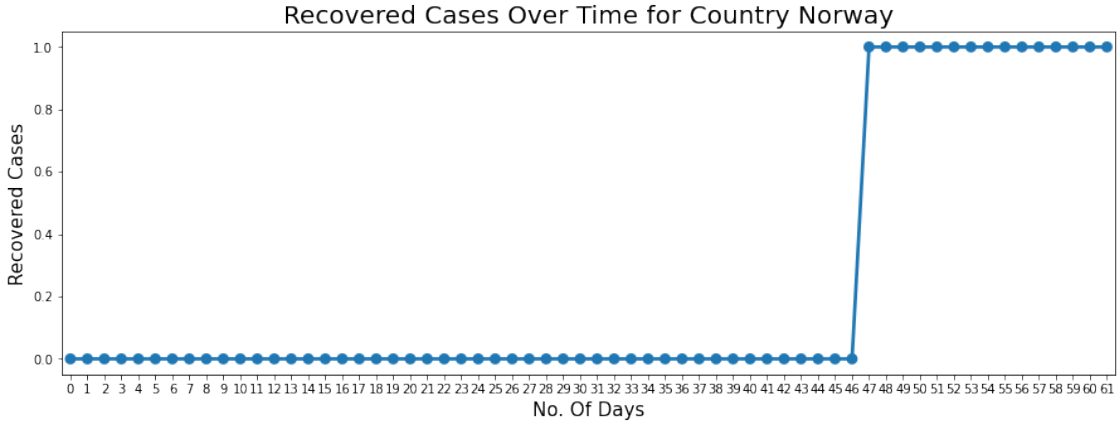

Recovered Cases Over Time for Country Canada
Recovered Cases
No. Of Days

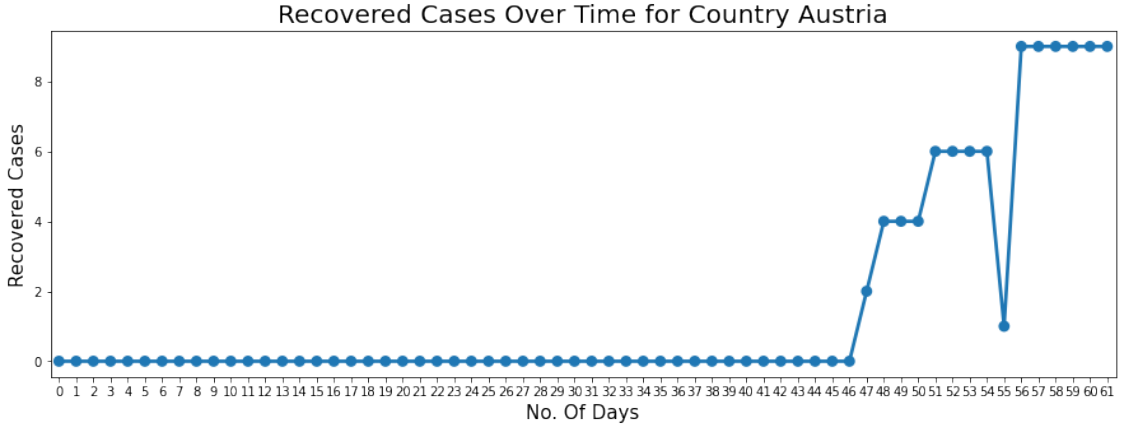

Recovered Cases Over Time for Country Denmark
Recovered Cases
No. Of Days

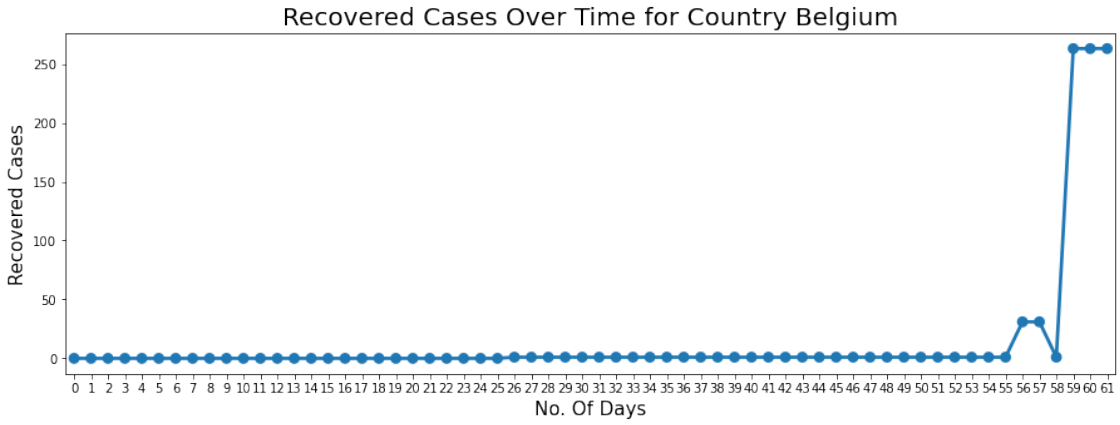

Recovered Cases Over Time for Country Brazil
Recovered Cases
No. Of Days


Recovered Cases Over Time for Country Portugal
Recovered Cases
No. Of Days

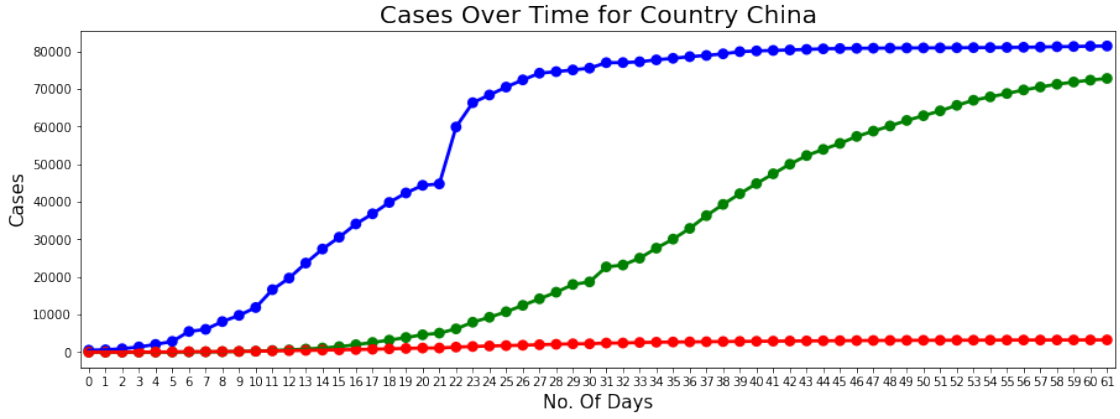

Recovered Cases Over Time for Country Sweden
Recovered Cases
No. Of Days

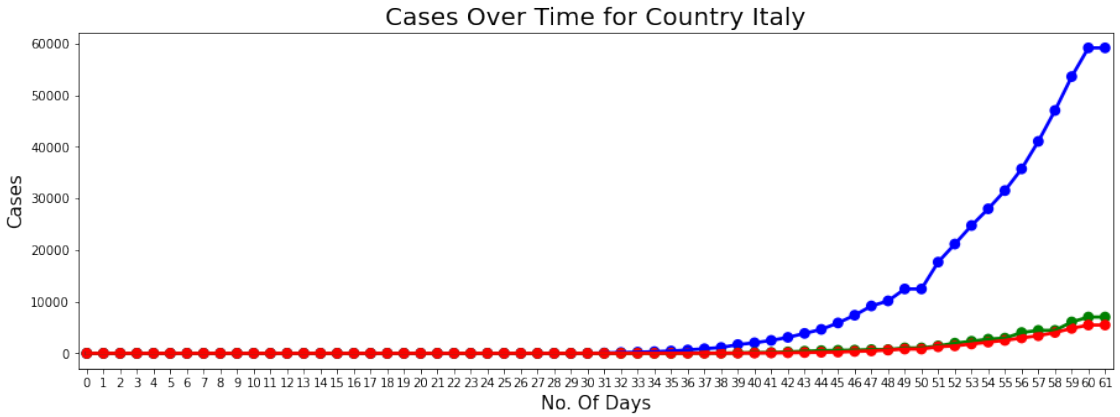

Recovered Cases Over Time for Country Norway
Recovered Cases
No. Of Days

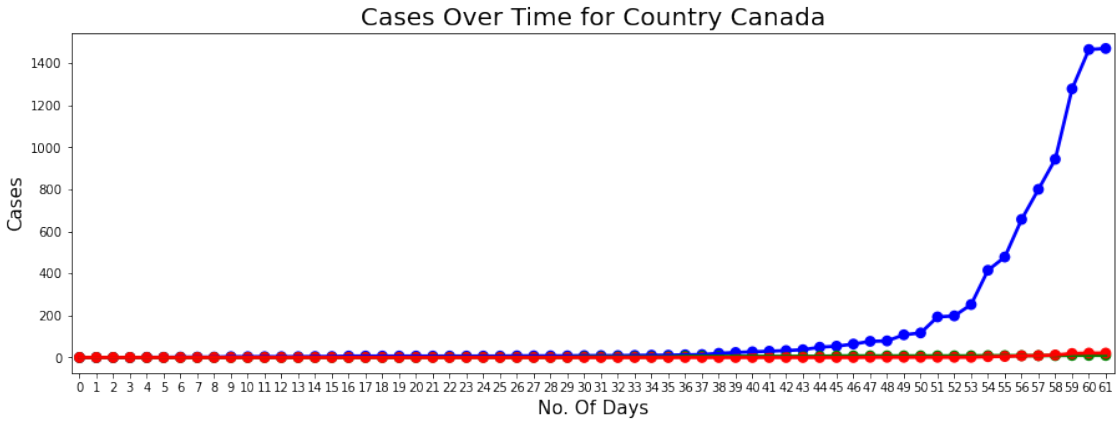

Recovered Cases Over Time for Country Austria
Recovered Cases
No. Of Days

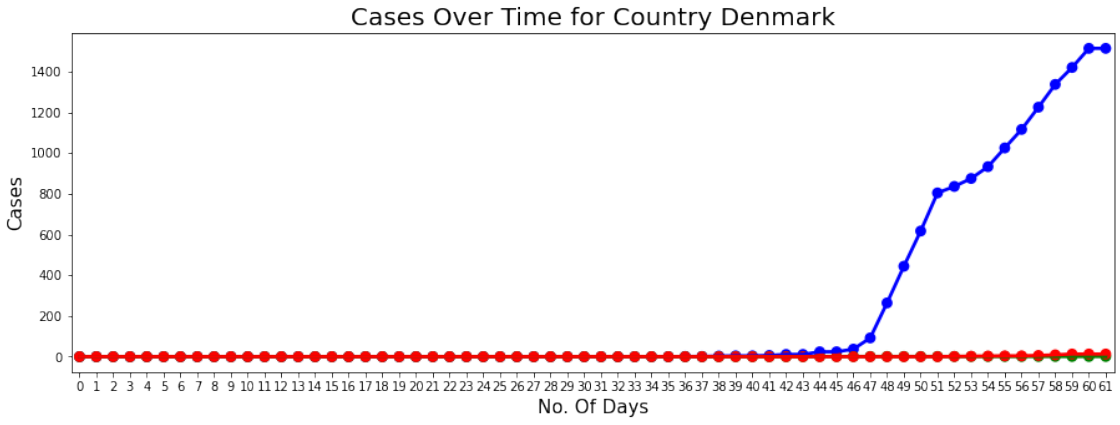


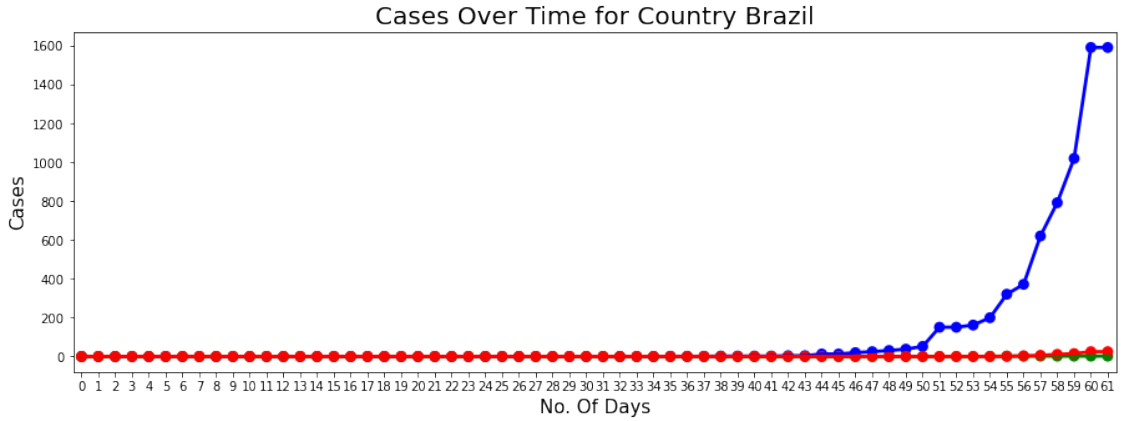
[21]:
```
#Plotting top 10 contries cases over time
for i in top_10:
    name = df[df.country == i]
    name = name.groupby(by = 'date')['recovered', 'deaths', 'confirmed',␣
 ↪'active'].sum().reset_index()
    plt.figure(figsize=(15,5))
    sns.pointplot(name.index, name.confirmed, color='blue')
    sns.pointplot(name.index, name.recovered,color='green')
    sns.pointplot(name.index, name.deaths,color='red')
    plt.title('Cases Over Time for Country {}'.format(i), fontsize = 20)
    plt.xlabel('No. Of Days', fontsize = 15)
    plt.ylabel('Cases', fontsize = 15)
    plt.show()
```

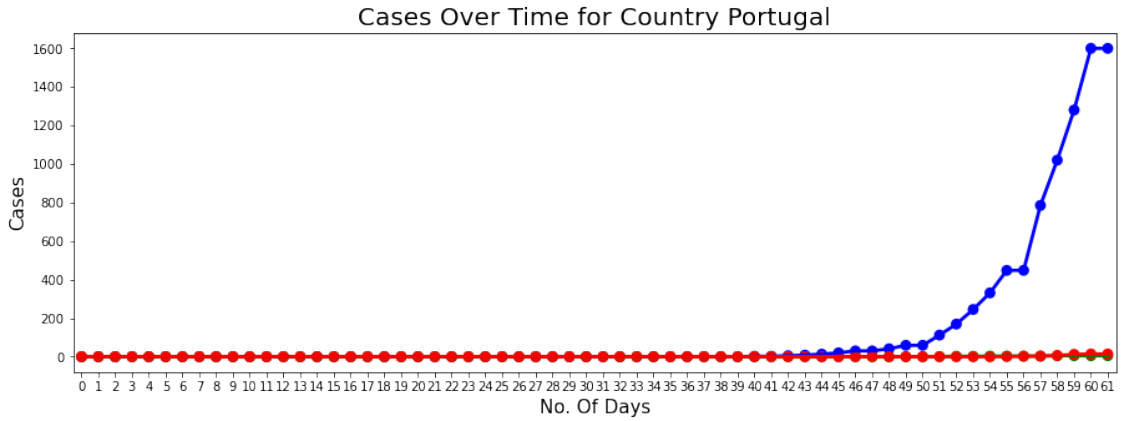


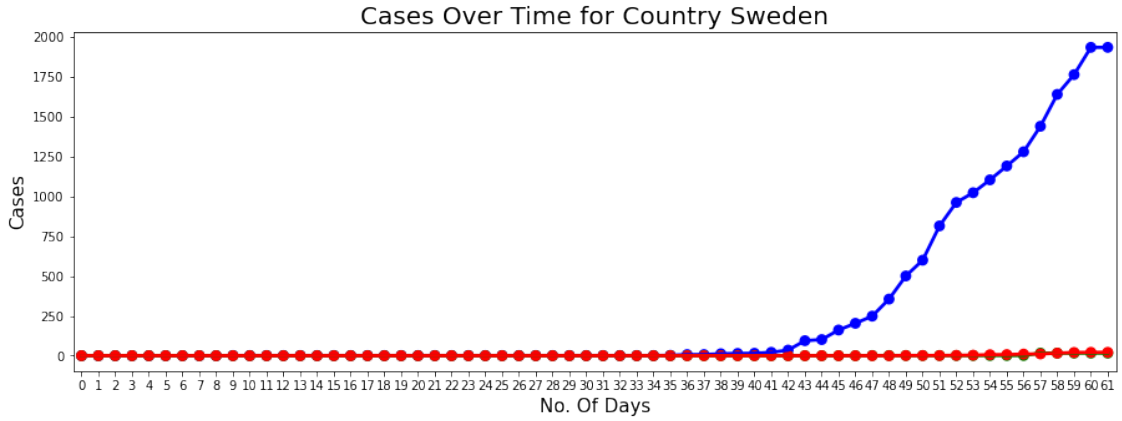

Cases Over Time for Country Italy
Cases
No. Of Days

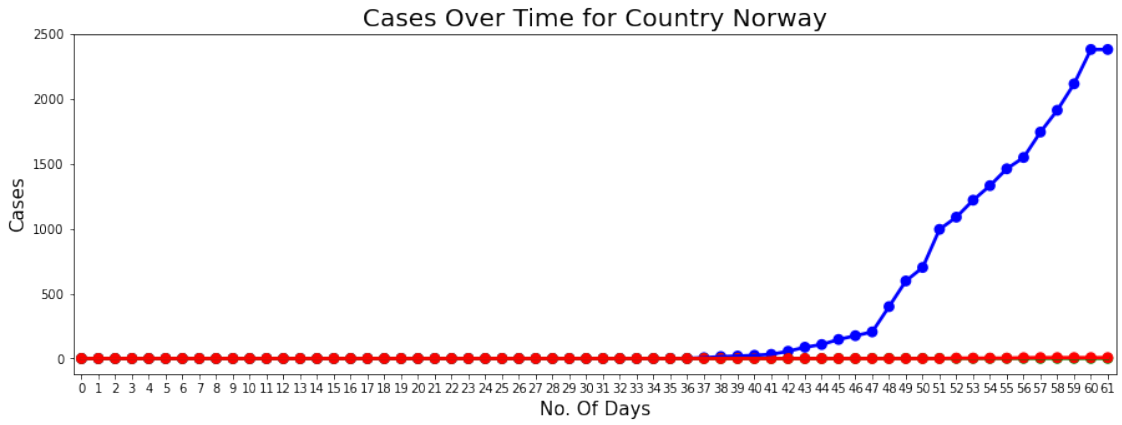

Cases Over Time for Country Canada
Cases
No. Of Days

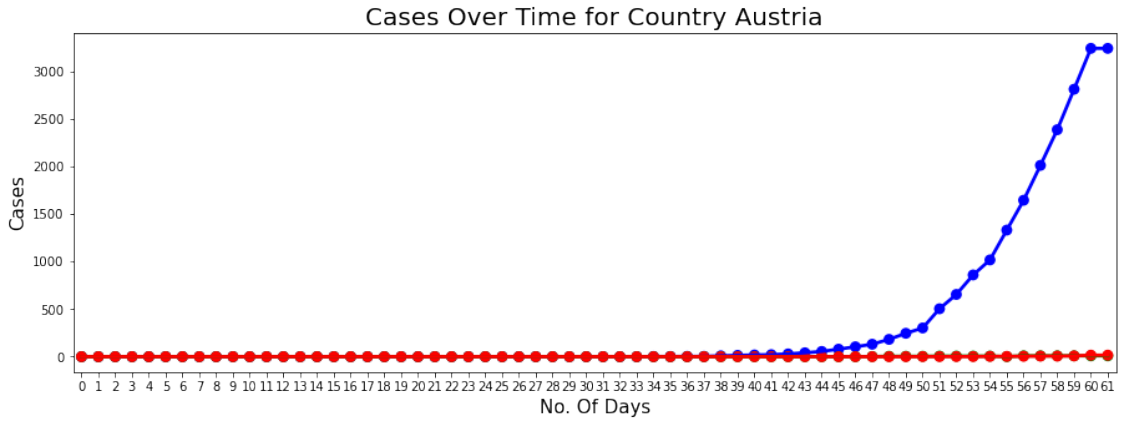

Cases Over Time for Country Denmark
Cases
No. Of Days

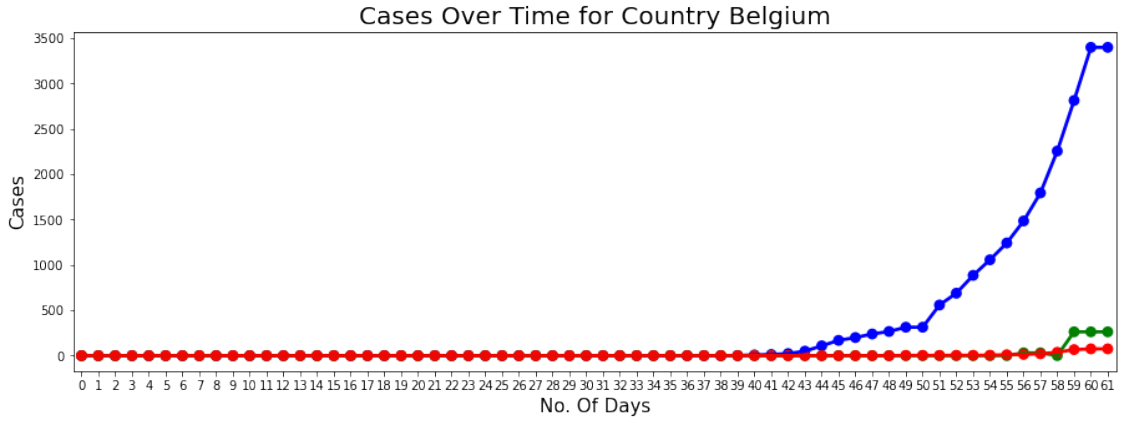

Cases Over Time for Country Brazil
Cases
No. Of Days


Cases Over Time for Country Portugal
Cases
No. Of Days


Cases Over Time for Country Sweden
Cases
No. Of Days







[22]:
```
#Top 20 countries contribution in covid cases
fig = px.pie(top_20, values='confirmed', names='country')
```

```
fig.show()
```

[23]:
```
# Detailed Analysis of COVID Cases in India
```

[24]:
```
#Importing files

df_india=pd.read_excel('covid_19_india.xlsx')
df_india.head()
```

[24]:

	S. No.	Name of State / UT	Total Confirmed cases (Indian National)	Total Confirmed cases (Foreign National)	Cured	Death
0	1	Andhra Pradesh	9	0	0	0
1	2	Bihar	3	0	0	1
2	3	Chhattisgarh	1	0	0	0
3	4	Delhi	30	1	6	1
4	5	Gujarat	32	1	0	1

[25]:
```
#Checking shape of file
df_india.shape
```

[25]:
```
(25, 6)
```

[26]:
```
df_india['Total Cases'] = df_india['Total Confirmed cases (Indian National)'] +␣
↪df_india['Total Confirmed cases ( Foreign National )']
```

[27]:
```
df_india.set_index('S. No.',inplace=True)
```

[28]:
```
df_india
```

[28]:

S. No.	Name of State / UT	Total Confirmed cases (Indian National)	Total Confirmed cases (Foreign National)	Cured	Death	Total Cases
1	Andhra Pradesh	9	0	0	0	9
2	Bihar	3	0	0	1	3
3	Chhattisgarh	1	0	0	0	1
4	Delhi	30	1	6	1	31
5	Gujarat	32	1	0	1	33
6	Haryana	14	0	0	0	14
7	Himachal Pradesh	3	0	0	0	3
8	Karnataka	41	0	0	0	41
9	Kerala	101	0	0	0	101
10	Madhya Pradesh	9	0	0	0	9
11	Maharashtra	98	0	0	0	98

12	Manipur	1
13	Mizoram	1
14	Odisha	2
15	Puducherry	1
16	Punjab	29
17	Rajasthan	30
18	Tamil Nadu	16
19	Telengana	25
20	Chandigarh	7
21	Jammu and Kashmir	7
22	Ladakh	13
23	Uttar Pradesh	34
24	Uttarakhand	3
25	West Bengal	9

S. No.	Total Confirmed cases (Foreign National)	Cured	Death	Total Cases
1	0	0	0	9
2	0	0	1	3
3	0	0	0	1
4	1	6	1	31
5	1	0	1	33
6	14	11	0	28
7	0	0	1	3
8	0	3	1	41
9	8	4	0	109
10	0	0	0	9
11	3	0	2	101
12	0	0	0	1
13	0	0	0	1
14	0	0	0	2
15	0	0	0	1
16	0	0	1	29
17	2	3	0	32
18	2	1	0	18
19	10	1	0	35
20	0	0	0	7
21	0	1	0	7
22	0	0	0	13
23	1	11	0	35
24	1	0	0	4
25	0	0	1	9

[29]:
```
#Finding total active cases
df_india['Total Active'] = df_india['Total Cases'] - (df_india['Death'] +␣
 ↪df_india['Cured'])
```

[30]:
```
total_active = df_india['Total Active'].sum()
print(total_active)
```

```
512
```

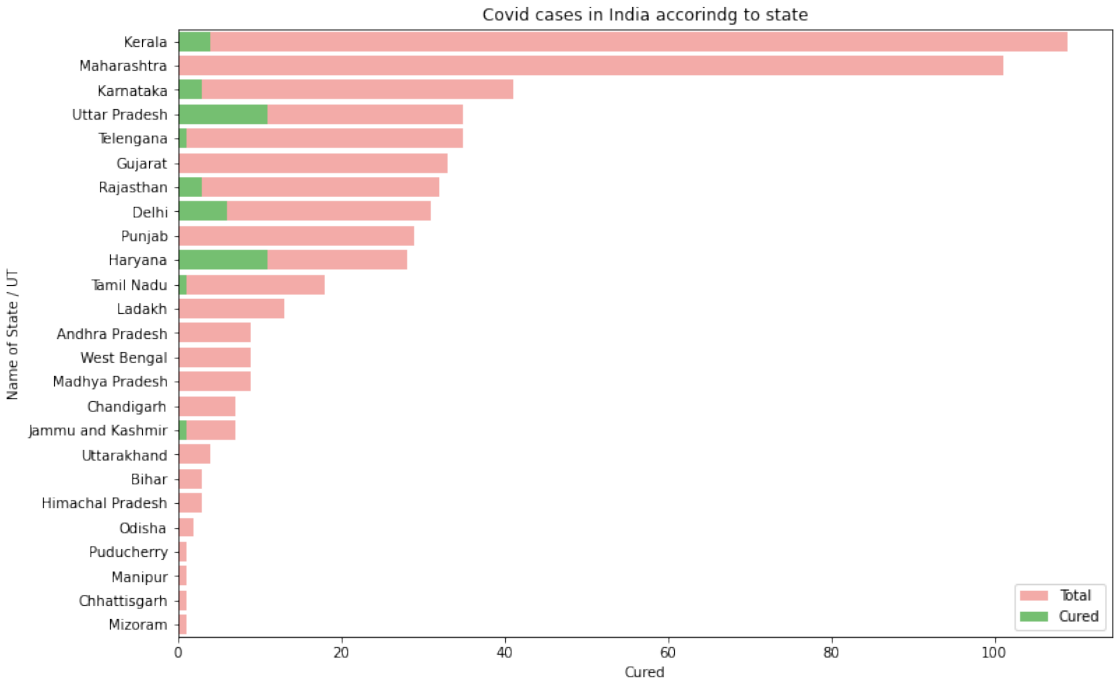
[31]:
```
#Finding highest to lowest cases
df_india[['Name of State / UT','Total Cases','Total Active']].
 ↪sort_values(by='Total Active',ascending=False).reset_index(drop=True)
```

[31]:

	Name of State / UT	Total Cases	Total Active
0	Kerala	109	105
1	Maharashtra	101	99
2	Karnataka	41	37
3	Telengana	35	34
4	Gujarat	33	32
5	Rajasthan	32	29
6	Punjab	29	28
7	Uttar Pradesh	35	24
8	Delhi	31	24
9	Haryana	28	17
10	Tamil Nadu	18	17
11	Ladakh	13	13
12	Andhra Pradesh	9	9
13	Madhya Pradesh	9	9
14	West Bengal	9	8
15	Chandigarh	7	7
16	Jammu and Kashmir	7	6
17	Uttarakhand	4	4
18	Odisha	2	2
19	Bihar	3	2
20	Himachal Pradesh	3	2
21	Puducherry	1	1
22	Manipur	1	1
23	Chhattisgarh	1	1
24	Mizoram	1	1

[32]:
```
plt.figure(figsize=(12,8))
data = df_india[['Name of State / UT','Total Cases','Cured','Death']]
data.sort_values('Total Cases', ascending=False, inplace = True)
sns.set_color_codes("pastel")
sns.barplot(x="Total Cases", y="Name of State / UT", data=data, label="Total",␣
 ↪color ="r")

sns.set_color_codes("muted")
sns.barplot(x="Cured", y="Name of State / UT", data=data, label="Cured", color␣
 ↪="g")
plt.title('Covid cases in India accorindg to state')
plt.legend(loc='best')
```

```
plt.show()
```



[33]:
```
per_day_india = pd.read_excel('per_day_cases.xlsx',parse_dates=True,␣
  ↪sheet_name='India')
per_day_india.head()
```

[33]:

	Date	Total Cases	New Cases	Days after surpassing 100 cases
0	2020-01-30	1	1	NaN
1	2020-01-31	1	0	NaN
2	2020-02-01	1	0	NaN
3	2020-02-02	2	1	NaN
4	2020-02-03	3	1	NaN

[34]:
```
#Per day cases in india
fig = px.line(per_day_india, x='Date', y="Total Cases",title='Covid cases trend␣
  ↪in India',markers=True)
fig.show()
```

[35]:
```
# Insights into COVID cases globally
```

[36]:
```
df_confirmed = pd.read_csv('time_series_covid19_confirmed_global.csv')
df_recovered = pd.read_csv('time_series_covid19_recovered_global.csv')
df_deaths = pd.read_csv('time_series_covid19_deaths_global.csv')

df_confirmed.rename(columns = {'Country/Region':'Country'}, inplace=True)
```

```
df_recovered.rename(columns = {'Country/Region':'Country'}, inplace=True)
df_deaths.rename(columns = {'Country/Region':'Country'}, inplace=True)
```

[37]:
```
df_confirmed.head()
```

[37]:

	Province/State	Country	Lat	Long	1/22/20	1/23/20	1/24/20	\
0	NaN	Afghanistan	33.0000	65.0000	0	0	0	
1	NaN	Albania	41.1533	20.1683	0	0	0	
2	NaN	Algeria	28.0339	1.6596	0	0	0	
3	NaN	Andorra	42.5063	1.5218	0	0	0	
4	NaN	Angola	-11.2027	17.8739	0	0	0	

	1/25/20	1/26/20	1/27/20	…	3/15/20	3/16/20	3/17/20	3/18/20	\
0	0	0	0	…	16	21	22	22	
1	0	0	0	…	42	51	55	59	
2	0	0	0	…	48	54	60	74	
3	0	0	0	…	1	2	39	39	
4	0	0	0	…	0	0	0	0	

	3/19/20	3/20/20	3/21/20	3/22/20	3/23/20	3/24/20
0	22	24	24	40	40	74
1	64	70	76	89	104	123
2	87	90	139	201	230	264
3	53	75	88	113	133	164
4	0	1	2	2	3	3

[5 rows x 67 columns]

[38]:
```
df_recovered.head()
```

[38]:

	Province/State	Country	Lat	Long	1/22/20	1/23/20	1/24/20	\
0	NaN	Thailand	15.0000	101.0000	0	0	0	
1	NaN	Japan	36.0000	138.0000	0	0	0	
2	NaN	Singapore	1.2833	103.8333	0	0	0	
3	NaN	Nepal	28.1667	84.2500	0	0	0	
4	NaN	Malaysia	2.5000	112.5000	0	0	0	

	1/25/20	1/26/20	1/27/20	…	3/14/20	3/15/20	3/16/20	3/17/20	\
0	0	2	2	…	35	35	35	41	
1	0	1	1	…	118	118	144	144	
2	0	0	0	…	105	105	109	114	
3	0	0	0	…	1	1	1	1	
4	0	0	0	…	35	42	42	49	

	3/18/20	3/19/20	3/20/20	3/21/20	3/22/20	3/23/20
0	42	42	42	42	44	44.0
1	144	150	191	232	235	235.0

```
2      114      114      124      140      144    144.0
3        1        1        1        1        1      1.0
4       60       75       87      114      139    139.0

[5 rows x 66 columns]
```

[39]:
```
df_deaths.head()
```

[39]:
```
  Province/State      Country       Lat       Long  1/22/20  1/23/20  1/24/20  \
0            NaN  Afghanistan  33.93911  67.709953        0        0        0
1            NaN      Albania  41.15330  20.168300        0        0        0
2            NaN      Algeria  28.03390   1.659600        0        0        0
3            NaN      Andorra  42.50630   1.521800        0        0        0
4            NaN       Angola -11.20270  17.873900        0        0        0

   1/25/20  1/26/20  1/27/20  …  12/3/22  12/4/22  12/5/22  12/6/22  \
0        0        0        0  …     7834     7834     7835     7835
1        0        0        0  …     3594     3594     3594     3594
2        0        0        0  …     6881     6881     6881     6881
3        0        0        0  …      157      157      157      157
4        0        0        0  …     1924     1924     1925     1925

   12/7/22  12/8/22  12/9/22  12/10/22  12/11/22  12/12/22
0     7837     7839     7839      7839      7839      7840
1     3594     3594     3594      3594      3594      3594
2     6881     6881     6881      6881      6881      6881
3      158      158      158       158       158       158
4     1925     1925     1925      1925      1925      1925

[5 rows x 1060 columns]
```

[40]:
```
confirmed = df.groupby('date').sum()['confirmed'].reset_index()
deaths = df.groupby('date').sum()['deaths'].reset_index()
recovered = df.groupby('date').sum()['recovered'].reset_index()
```

[41]:
```
df_india_cases = df.query('country == "India"').groupby("date")[['confirmed',␣
 ↪'deaths', 'recovered']].sum().reset_index()
india_confirmed, india_deaths, india_recovered = df_india_cases[['date',␣
 ↪'confirmed']], df_india_cases[['date', 'deaths']], df_india_cases[['date',␣
 ↪'recovered']]
```

[42]:
```
#Plotting world wide covid cases

fig = go.Figure()
fig.add_trace(go.Scatter(x=confirmed['date'], y=confirmed['confirmed'],␣
 ↪mode='lines+markers', name='confirmed', line = dict(color = 'blue')))
```

```
fig.add_trace(go.Scatter(x=deaths['date'], y=deaths['deaths'],␣
 ↪mode='lines+markers', name='deaths', line = dict(color = 'red')))
fig.add_trace(go.Scatter(x=recovered['date'], y=recovered['recovered'],␣
 ↪mode='lines+markers', name='recovered', line = dict(color = 'green')))
fig.update_layout(title_text='World wide COVID-19 Cases', xaxis_tickfont_size =␣
 ↪12, yaxis=dict(title='Number of Cases'))
fig.show()
```

[43]:
```
# TimeSeries Analysis of COVID cases
```

[45]:
```
#Importing libraries

from fbprophet import Prophet

import warnings;
warnings.simplefilter('ignore')
```

[46]:
```
#Predicting and forecasting data for number of confimed cases

confirmed.columns = ['ds', 'y']
confirmed['ds']= pd.to_datetime(confirmed['ds'])
```

[47]:
```
m = Prophet(interval_width=0.95)
m.fit(confirmed)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[47]:

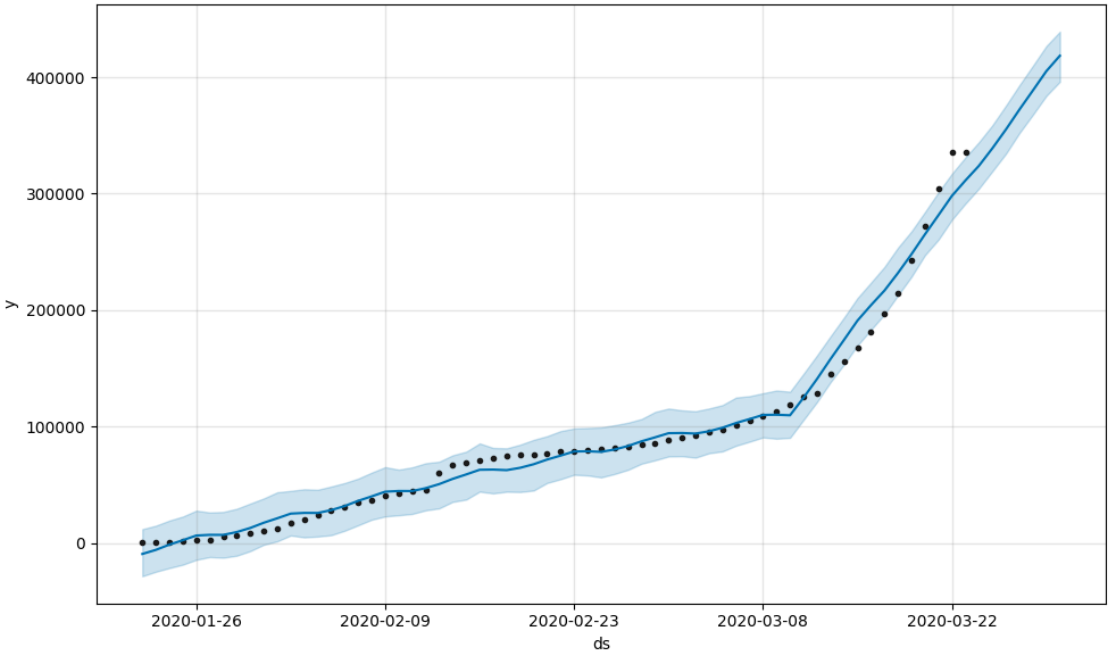
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[48]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

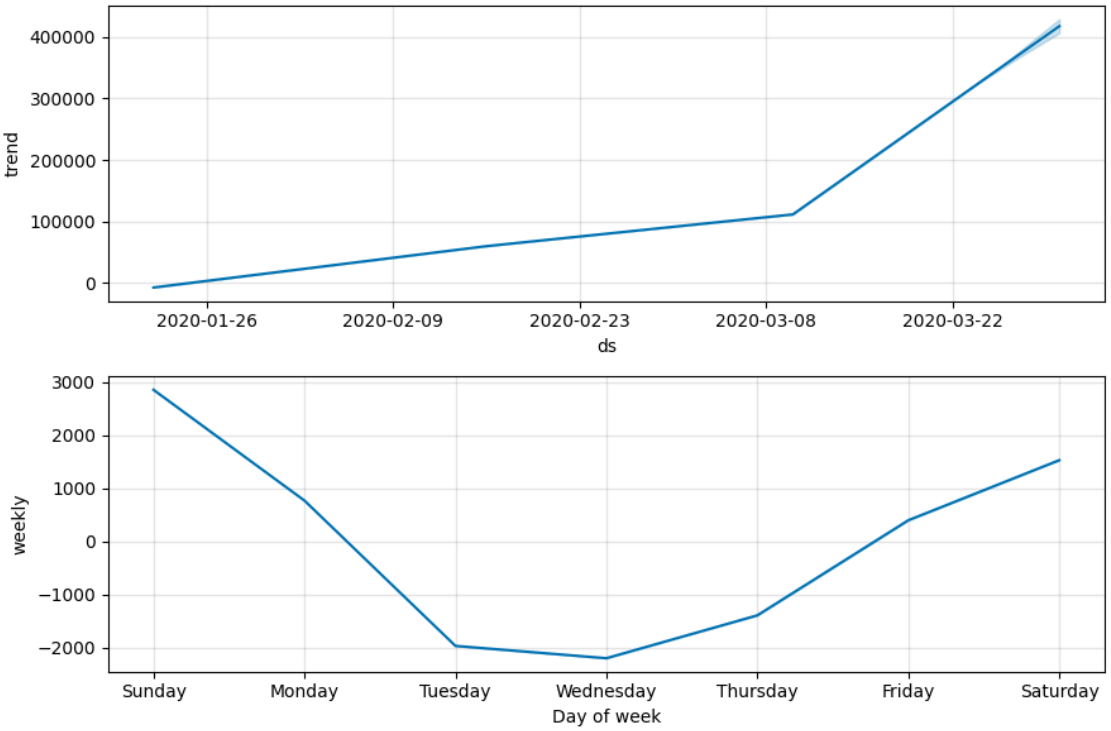
[48]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	355136.872975	334345.013345	375740.750619
65	2020-03-27	372235.326939	352101.810538	393240.569931
66	2020-03-28	388674.964143	367867.869753	409973.679899
67	2020-03-29	405307.954676	384146.661901	426977.315769
68	2020-03-30	418529.648467	396217.633200	439237.322834

[49]:
```
confirmed_forecast_plot = m.plot(forecast)
```



[50]:
```
confirmed_forecast_plot = m.plot_components(forecast)
```



[51]:
```
#Predicting and forecasting data for number of deaths cases
deaths.columns = ['ds', 'y']
deaths['ds']= pd.to_datetime(deaths['ds'])
```

[52]:
```
m = Prophet()
m.fit(deaths)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[52]:

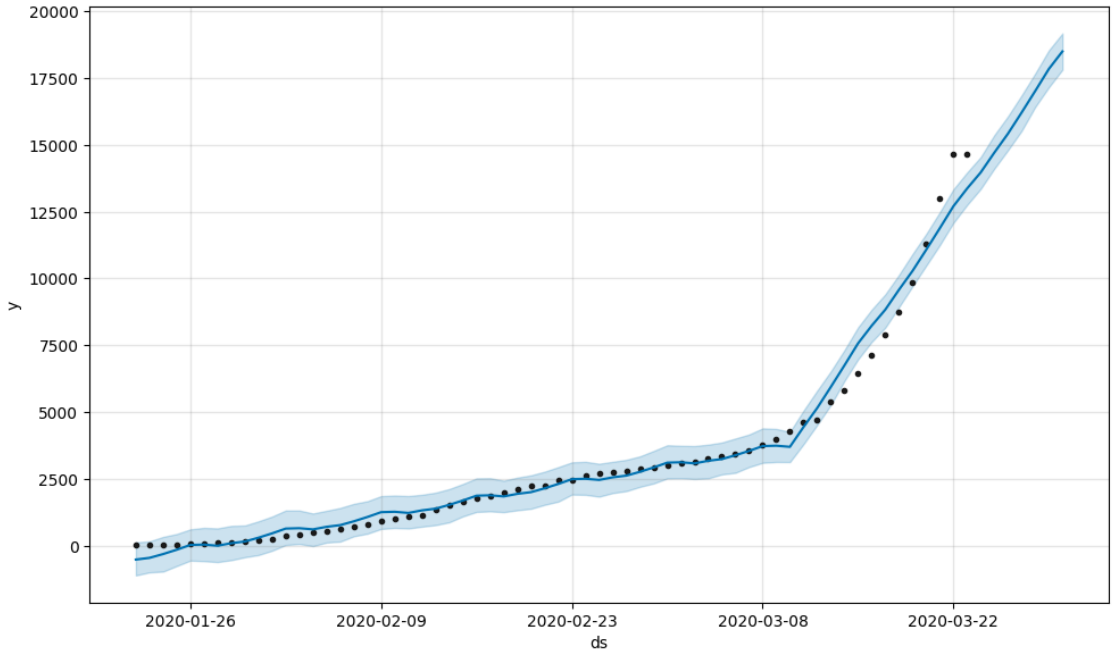
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[53]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

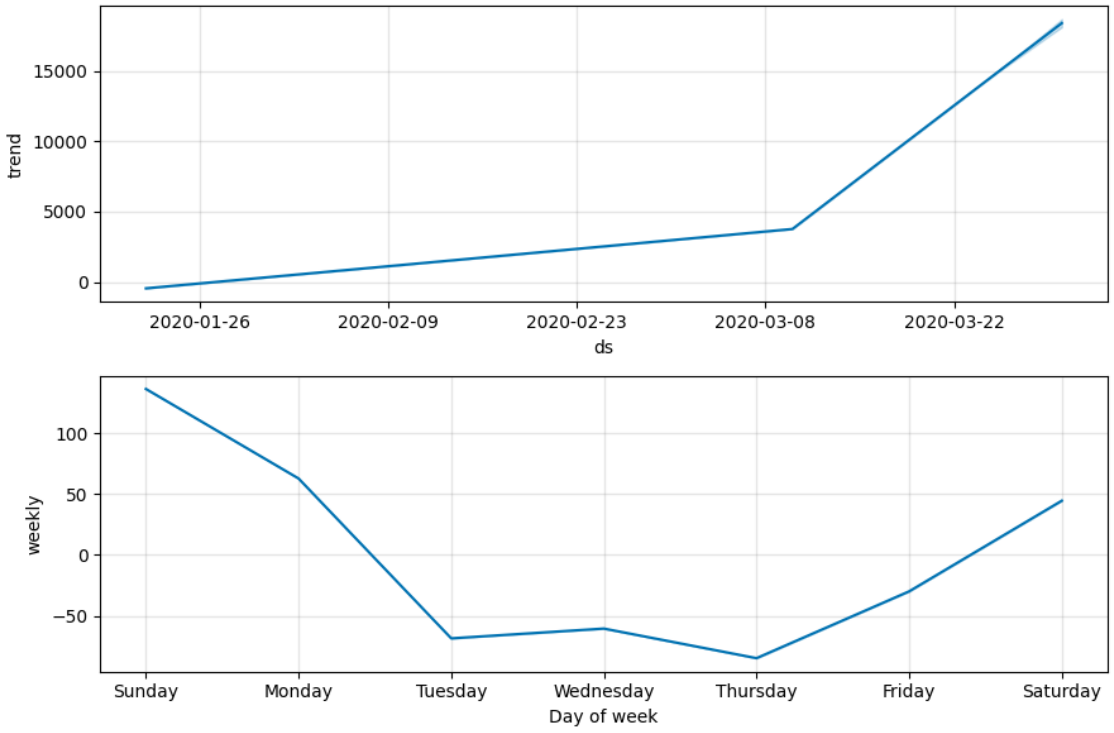
[53]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	15411.877522	14795.117034	16065.805856
65	2020-03-27	16199.617603	15515.179071	16847.272378
66	2020-03-28	17006.904589	16411.515978	17666.579586
67	2020-03-29	17831.505383	17148.141941	18532.632397
68	2020-03-30	18490.986176	17806.412151	19166.278702

[54]:
```
deaths_forecast_plot = m.plot(forecast)
```



[55]:
```
deaths_forecast_plot = m.plot_components(forecast)
```



[56]:
```
#Predicting and forecasting data for number of recovered cases
recovered.columns = ['ds', 'y']
recovered['ds']= pd.to_datetime(recovered['ds'])
```

[57]:
```
m = Prophet()
m.fit(recovered)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[57]:

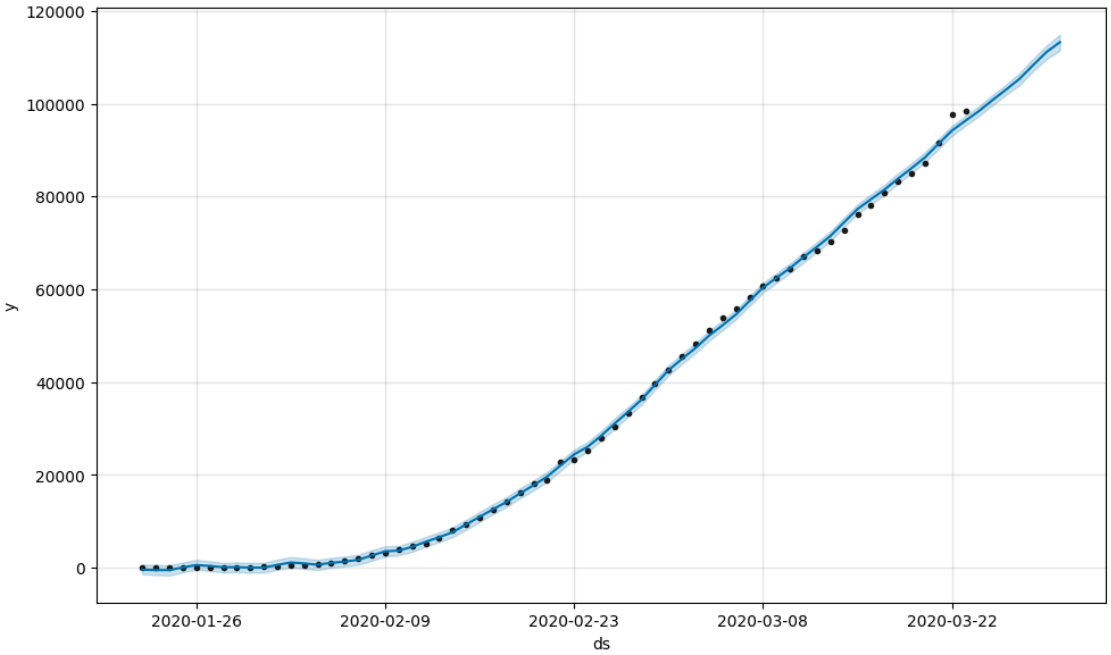
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[58]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

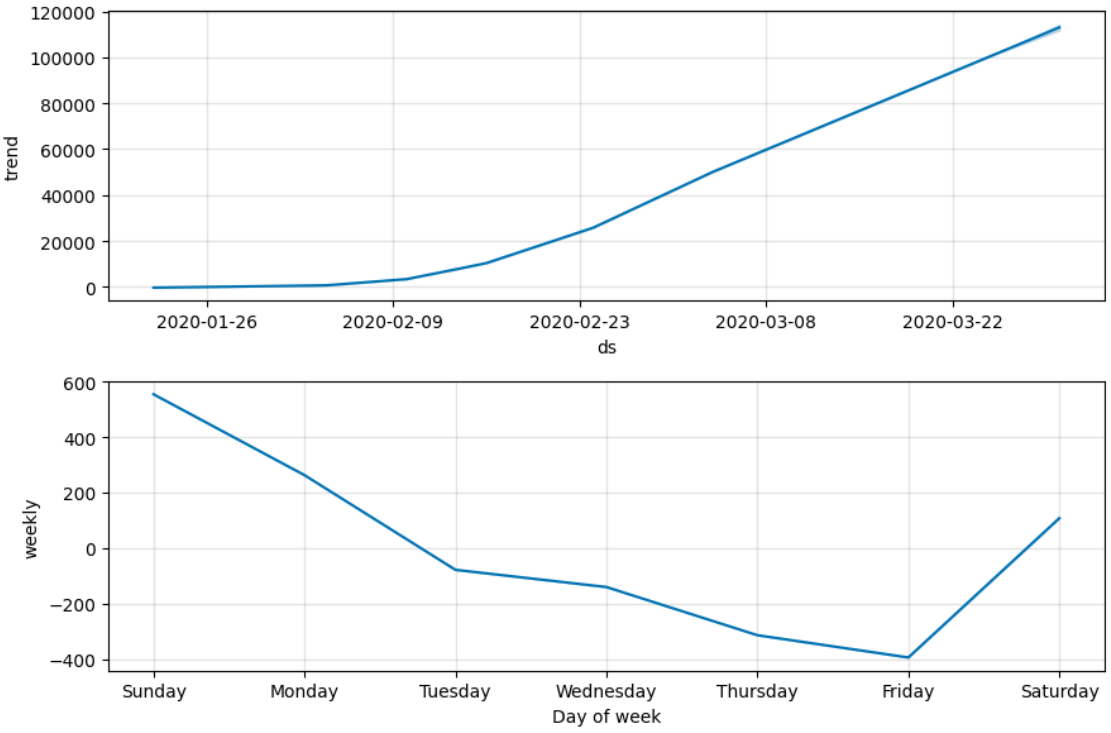
[58]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	103001.351030	101915.554468	104110.399803
65	2020-03-27	105338.024177	103996.964001	106598.827771
66	2020-03-28	108256.309828	106997.834924	109690.250325
67	2020-03-29	111119.295023	109622.069127	112539.276690
68	2020-03-30	113244.960489	111441.391626	114890.188774

[59]:
```
recovered_forecast_plot = m.plot(forecast)
```



[60]:
```
recovered_forecast_plot = m.plot_components(forecast)
```



[63]:
```
india_confirmed.columns = ['ds', 'y']
india_confirmed['ds']= pd.to_datetime(india_confirmed['ds'])
```

[64]:
```
#Predicting and forecasting data for number of confimed cases in India
m = Prophet()
m.fit(india_confirmed)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[64]:

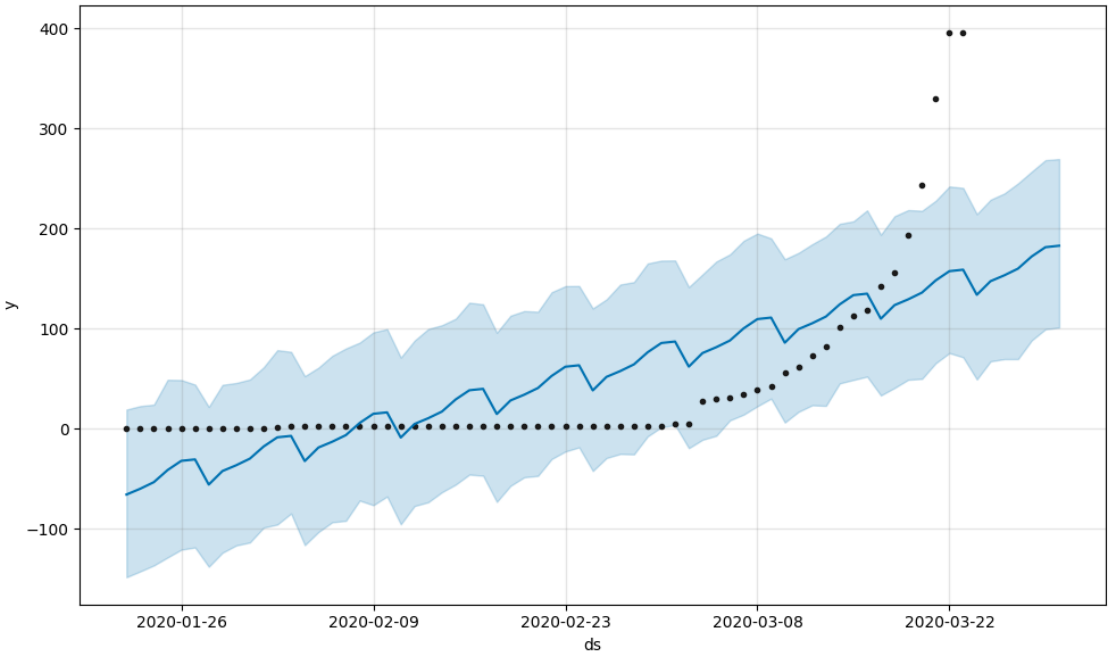
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[65]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

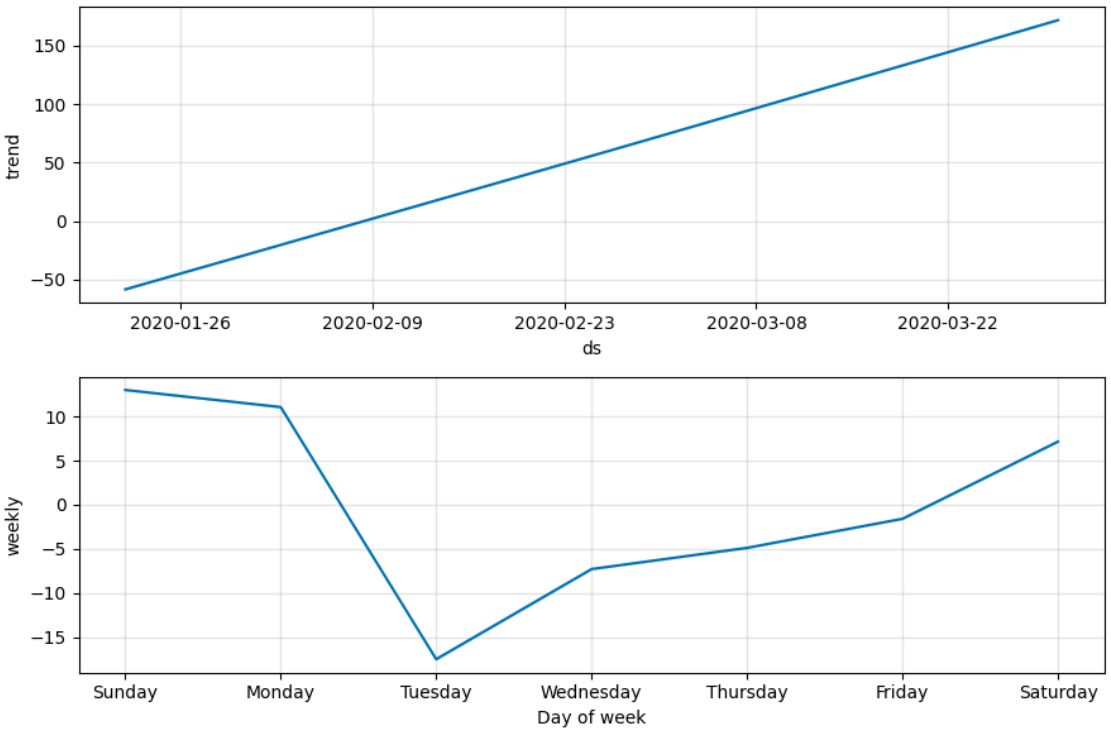
[65]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	153.433237	69.791504	235.296098
65	2020-03-27	160.140437	69.815260	245.389883
66	2020-03-28	172.292065	88.466902	257.171116
67	2020-03-29	181.553191	99.615806	268.605575
68	2020-03-30	183.035658	101.267164	269.675513

[66]:
```
india_confirmed_plot = m.plot(forecast)
```



[67]:
```
india_confirmed_plot = m.plot_components(forecast)
```



[68]:
```
#Predicting and forecasting data for number of death cases in India

india_deaths.columns = ['ds', 'y']
india_deaths['ds']= pd.to_datetime(india_deaths['ds'])
```

[69]:
```
m = Prophet()
m.fit(india_deaths)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[69]:

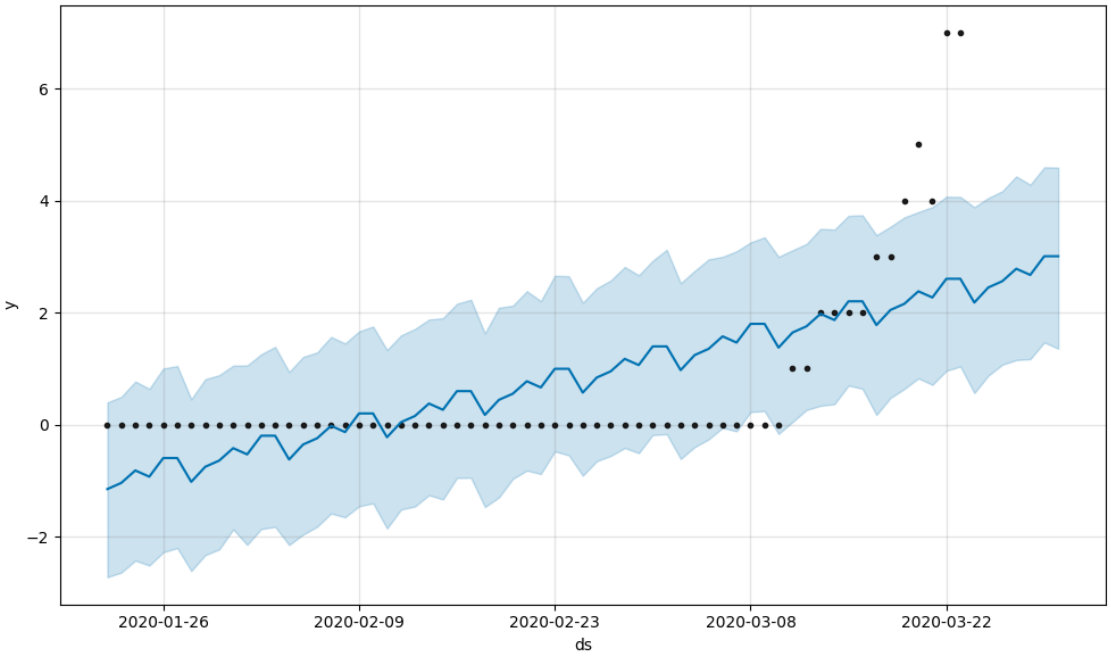
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[70]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

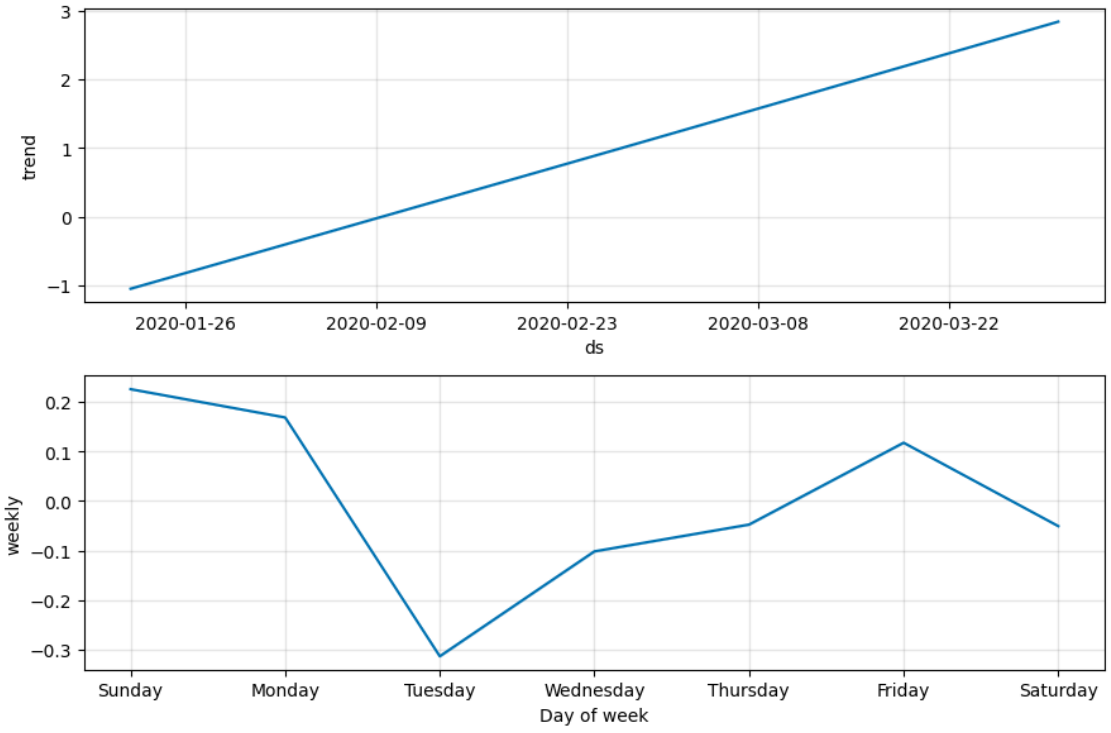
[70]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	2.561546	1.071141	4.170057
65	2020-03-27	2.784182	1.154907	4.434041
66	2020-03-28	2.673488	1.171034	4.284819
67	2020-03-29	3.007224	1.468946	4.595740
68	2020-03-30	3.007627	1.357895	4.591305

[71]:
```
india_deaths_plot = m.plot(forecast)
```



[72]:
```
india_deaths_plot = m.plot_components(forecast)
```



[73]:
```
#Predicting and forecasting data for number of recovered cases in India
india_recovered.columns = ['ds', 'y']
india_recovered['ds']= pd.to_datetime(india_recovered['ds'])
```

[74]:
```
m = Prophet()
m.fit(india_recovered)
future=m.make_future_dataframe(periods=7)
future.tail()
```

```
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.
```

[74]:

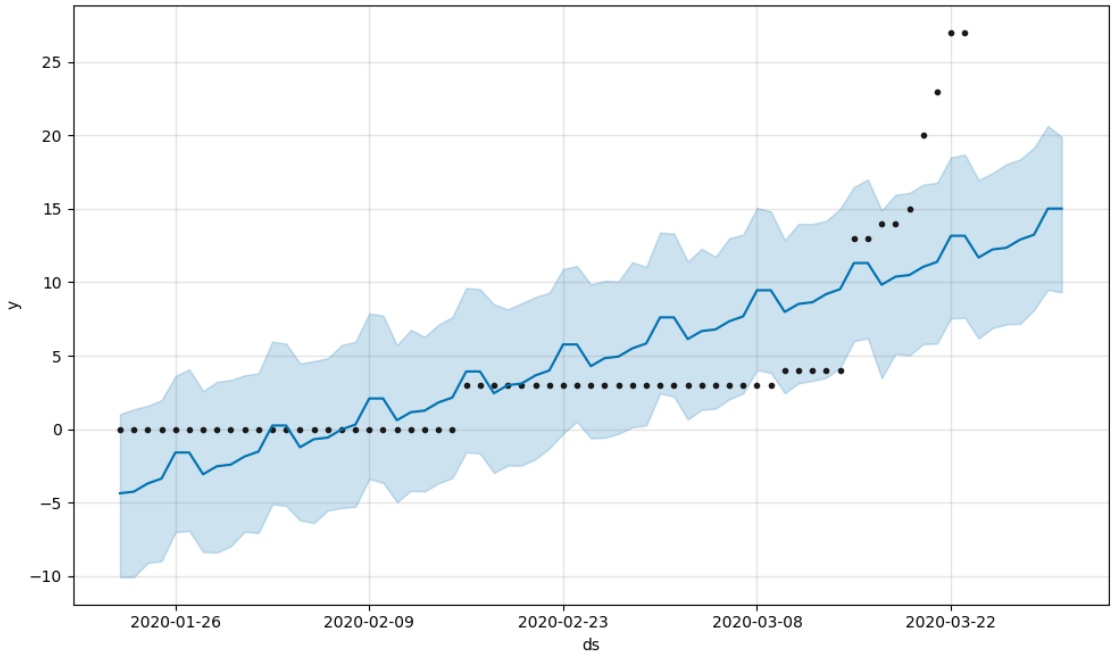
	ds
64	2020-03-26
65	2020-03-27
66	2020-03-28
67	2020-03-29
68	2020-03-30

[75]:
```
forecast = m.predict(future)
forecast[['ds', 'yhat', 'yhat_lower', 'yhat_upper']].tail()
```

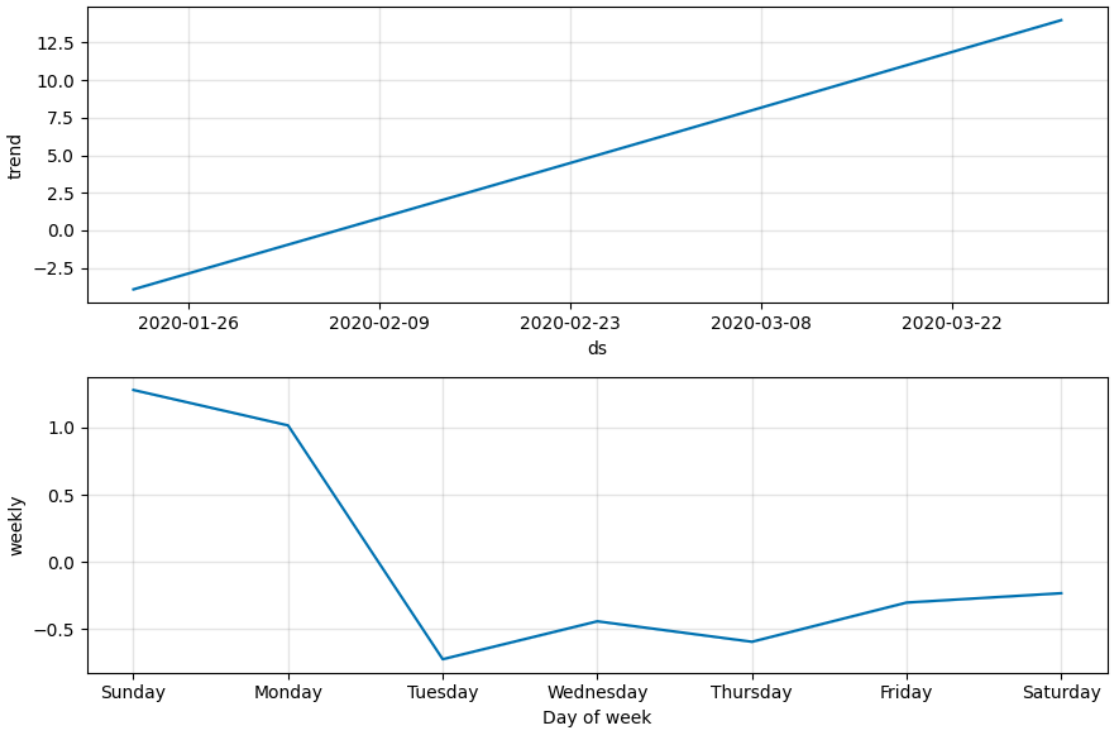
[75]:

	ds	yhat	yhat_lower	yhat_upper
64	2020-03-26	12.347317	7.133187	18.044285
65	2020-03-27	12.904069	7.177575	18.372424
66	2020-03-28	13.238538	8.110721	19.160788
67	2020-03-29	15.017417	9.489461	20.646886
68	2020-03-30	15.018436	9.312856	19.898825

[76]:
```
india_recovered_plot = m.plot(forecast)
```



[77]:
```
india_recovered_plot = m.plot_components(forecast)
```



[ ]: