In [1]:
```
pip install plotly
```

```
Requirement already satisfied: plotly in /srv/conda/envs/notebook/lib/python3.7/site-packages (5.1.0)
Requirement already satisfied: tenacity>=6.2.0 in /srv/conda/envs/notebook/lib/python3.7/site-packages (from plotly)
(8.0.1)
Requirement already satisfied: six in /srv/conda/envs/notebook/lib/python3.7/site-packages (from plotly) (1.15.0)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
pip install xlrd
```

```
Requirement already satisfied: xlrd in /srv/conda/envs/notebook/lib/python3.7/site-packages (2.0.1)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install openpyxl
```

```
Requirement already satisfied: openpyxl in /srv/conda/envs/notebook/lib/python3.7/site-packages (3.0.7)
Requirement already satisfied: et-xmlfile in /srv/conda/envs/notebook/lib/python3.7/site-packages (from openpyxl) (1.
1.0)
Note: you may need to restart the kernel to use updated packages.
```

In [57]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns


from sklearn.preprocessing import MinMaxScaler
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
from sklearn.metrics import r2_score
```

In [5]:
```
#----------------Daily wise Data (2020)----------------
```

In [6]:
```
df=pd.read_csv("day_wise.csv")
```

```
df
```

Out[6]:

	Date	Confirmed	Deaths	Recovered	Active	New cases	New deaths	New recovered	Deaths / 100 Cases	Recovered / 100 Cases	Deaths / 100 Recovered	No. of countries
0	2020-01-22	555	17	28	510	0	0	0	3.06	5.05	60.71	6
1	2020-01-23	654	18	30	606	99	1	2	2.75	4.59	60.00	8
2	2020-01-24	941	26	36	879	287	8	6	2.76	3.83	72.22	9
3	2020-01-25	1434	42	39	1353	493	16	3	2.93	2.72	107.69	11
4	2020-01-26	2118	56	52	2010	684	14	13	2.64	2.46	107.69	13
...	...	...	...	...	...	...	...	...	...	...	...	...
183	2020-07-23	15510481	633506	8710969	6166006	282756	9966	169714	4.08	56.16	7.27	187
184	2020-07-24	15791645	639650	8939705	6212290	281164	6144	228736	4.05	56.61	7.16	187
185	2020-07-25	16047190	644517	9158743	6243930	255545	4867	219038	4.02	57.07	7.04	187
186	2020-07-26	16251796	648621	9293464	6309711	204606	4104	134721	3.99	57.18	6.98	187
187	2020-07-27	16480485	654036	9468087	6358362	228693	5415	174623	3.97	57.45	6.91	187

188 rows × 12 columns

In [7]:

```
#----------Data Wrangling---------
df.isnull()
```

Out[7]:

	Date	Confirmed	Deaths	Recovered	Active	New cases	New deaths	New recovered	Deaths / 100 Cases	Recovered / 100 Cases	Deaths / 100 Recovered	No. of countries

	Date	Confirmed	Deaths	Recovered	Active	New cases	New deaths	New recovered	Deaths / 100 Cases	Recovered / 100 Cases	Deaths / 100 Recovered	No. of countries
0	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...
183	False	False	False	False	False	False	False	False	False	False	False	False
184	False	False	False	False	False	False	False	False	False	False	False	False
185	False	False	False	False	False	False	False	False	False	False	False	False
186	False	False	False	False	False	False	False	False	False	False	False	False
187	False	False	False	False	False	False	False	False	False	False	False	False

188 rows × 12 columns

In [8]:
```
df["Date"]=pd.to_datetime(df["Date"])
df["year"]=df["Date"].dt.year
df["month"]=df["Date"].dt.month
df["Day"]=df["Date"].dt.month
df
```

Out[8]:

	Date	Confirmed	Deaths	Recovered	Active	New cases	New deaths	New recovered	Deaths / 100 Cases	Recovered / 100 Cases	Deaths / 100 Recovered	No. of countries	year	month	Day
0	2020-01-22	555	17	28	510	0	0	0	3.06	5.05	60.71	6	2020	1	1
1	2020-01-23	654	18	30	606	99	1	2	2.75	4.59	60.00	8	2020	1	1
2	2020-01-24	941	26	36	879	287	8	6	2.76	3.83	72.22	9	2020	1	1

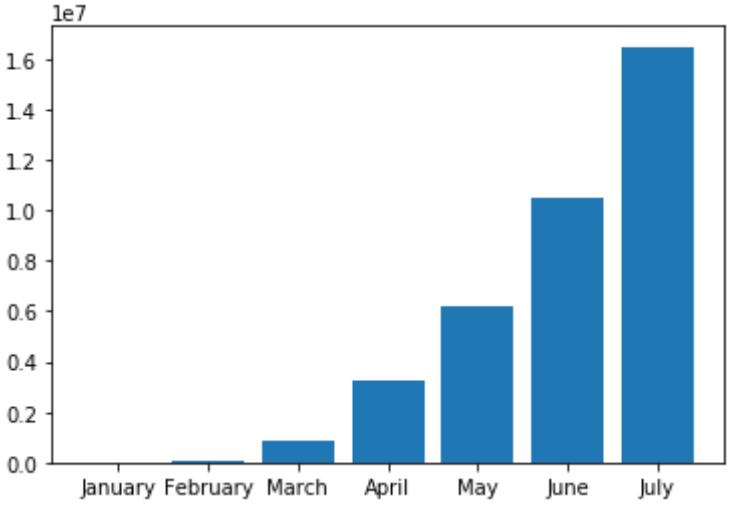
	Date	Confirmed	Deaths	Recovered	Active	New cases	New deaths	New recovered	Deaths / 100 Cases	Recovered / 100 Cases	Deaths / 100 Recovered	No. of countries	year	month	Day
3	2020-01-25	1434	42	39	1353	493	16	3	2.93	2.72	107.69	11	2020	1	1
4	2020-01-26	2118	56	52	2010	684	14	13	2.64	2.46	107.69	13	2020	1	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
183	2020-07-23	15510481	633506	8710969	6166006	282756	9966	169714	4.08	56.16	7.27	187	2020	7	7
184	2020-07-24	15791645	639650	8939705	6212290	281164	6144	228736	4.05	56.61	7.16	187	2020	7	7
185	2020-07-25	16047190	644517	9158743	6243930	255545	4867	219038	4.02	57.07	7.04	187	2020	7	7
186	2020-07-26	16251796	648621	9293464	6309711	204606	4104	134721	3.99	57.18	6.98	187	2020	7	7
187	2020-07-27	16480485	654036	9468087	6358362	228693	5415	174623	3.97	57.45	6.91	187	2020	7	7

188 rows × 15 columns

In [9]:
```
df["month"].replace([1,2,3,4,5,6,7,8,9,10,11,12],['January','February','March',
                                                   'April','May','June','July'
                                                    ,'August','September','October','November','December'],inplace=T
```

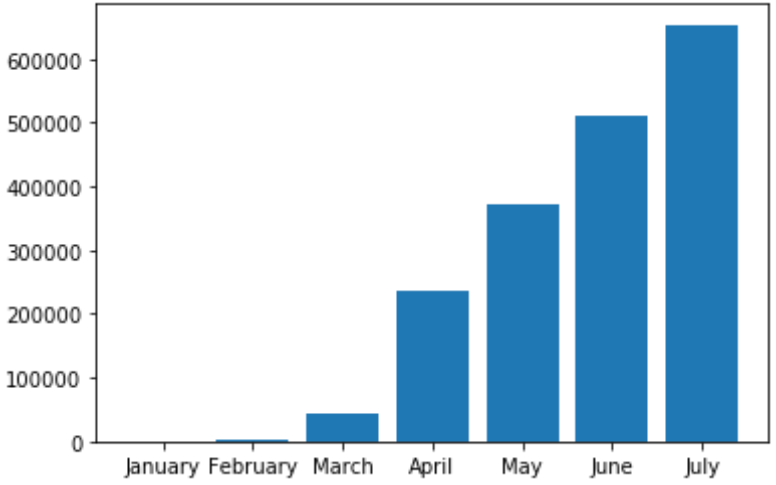
In [10]:
```
#Confirmed Cases
plt.bar(df["month"],df["Confirmed"])
```

Out[10]:
```
<BarContainer object of 188 artists>
```



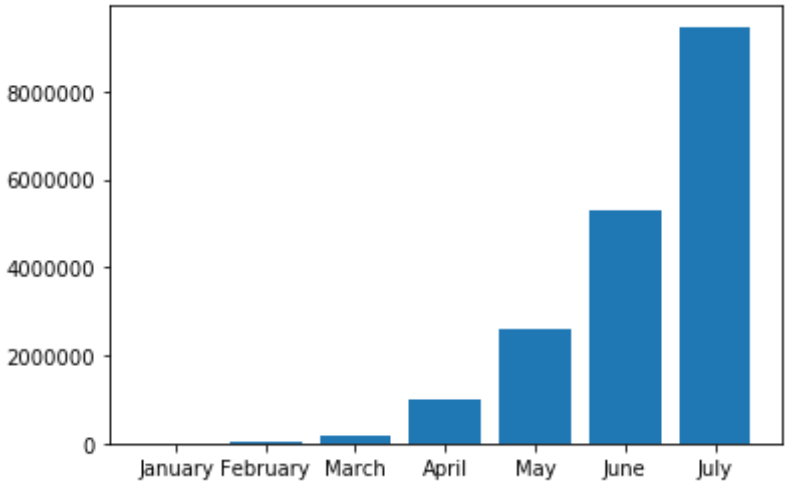
In [11]:
```
#Deaths
plt.bar(df["month"],df["Deaths"])
```

Out[11]: <BarContainer object of 188 artists>



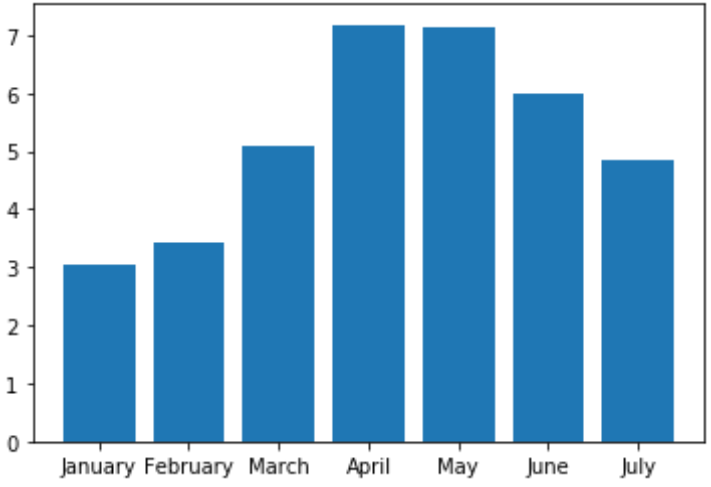
In [12]:
```
#Recovered
plt.bar(df["month"],df["Recovered"])
```

Out[12]: <BarContainer object of 188 artists>



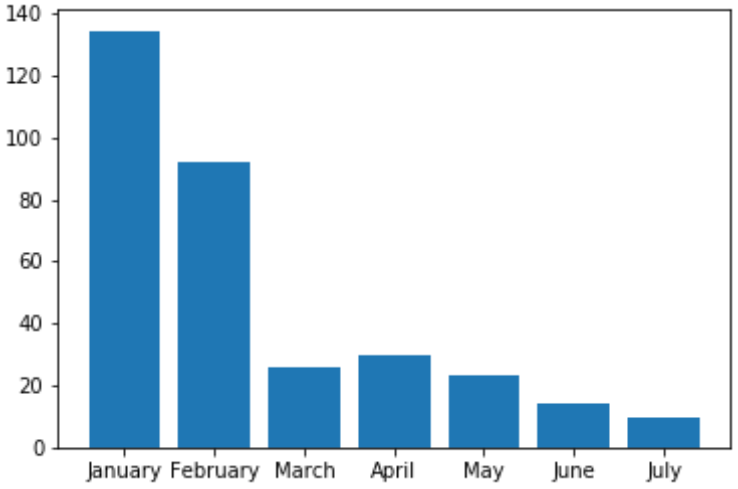
In [13]:
```
#Deaths / 100 Cases
plt.bar(df["month"],df["Deaths / 100 Cases"])
```

Out[13]: <BarContainer object of 188 artists>



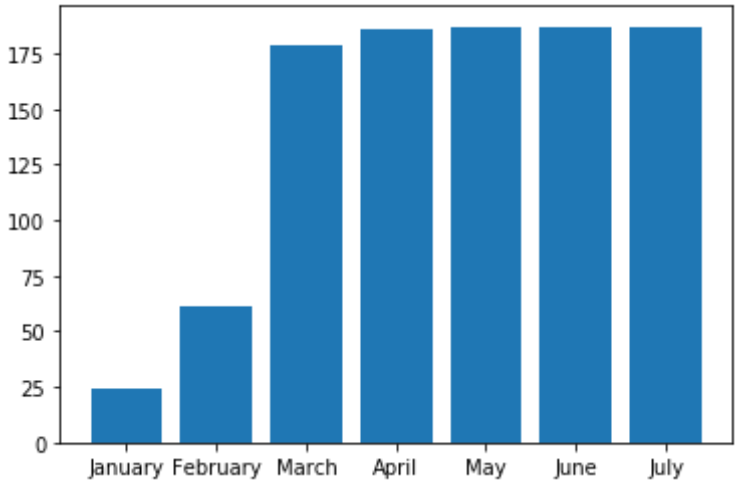
In [14]:
```
#Deaths / 100 Recovered------------

plt.bar(df["month"],df["Deaths / 100 Recovered"])
```

Out[14]:
```
<BarContainer object of 188 artists>
```



In [15]:
```
#No. of countries
plt.bar(df["month"],df["No. of countries"])
```

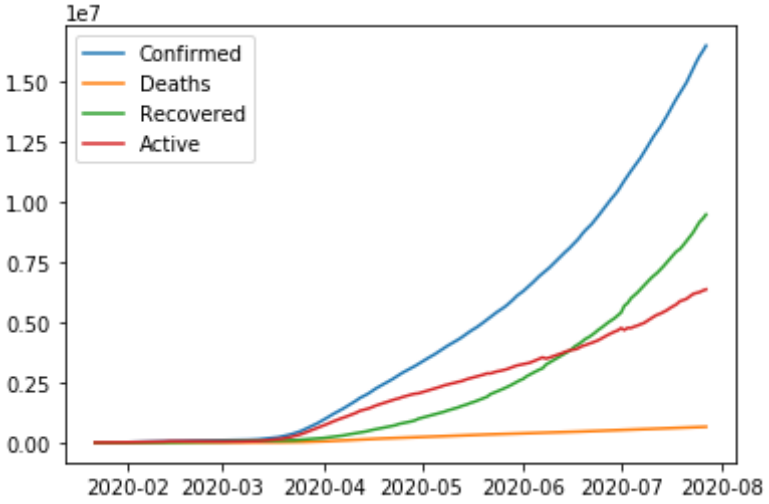
Out[15]:
```
<BarContainer object of 188 artists>
```



In [16]:
```
df.columns
```

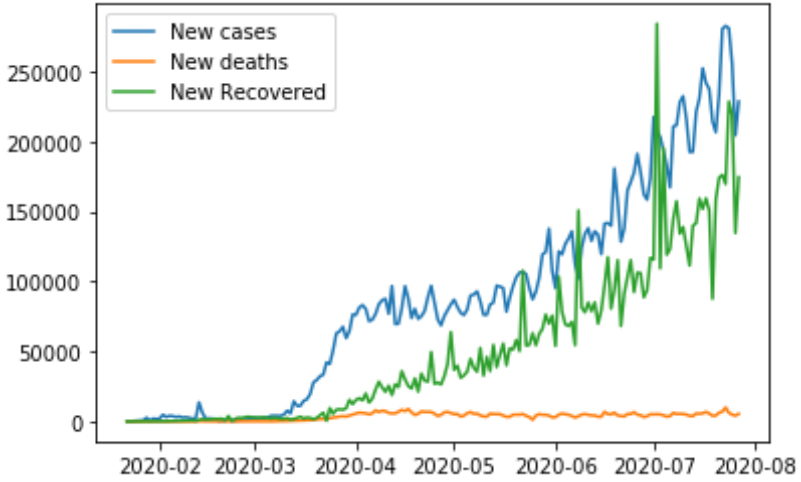
Out[16]:
```
Index(['Date', 'Confirmed', 'Deaths', 'Recovered', 'Active', 'New cases',
       'New deaths', 'New recovered', 'Deaths / 100 Cases',
       'Recovered / 100 Cases', 'Deaths / 100 Recovered', 'No. of countries',
       'year', 'month', 'Day'],
      dtype='object')
```

In [17]:
```
x=df["Date"]
plt.plot(x,df["Confirmed"],label="Confirmed")
plt.plot(x,df["Deaths"],label="Deaths")
plt.plot(x,df["Recovered"],label="Recovered")
plt.plot(x,df["Active"],label="Active")
plt.legend()
plt.show()
```

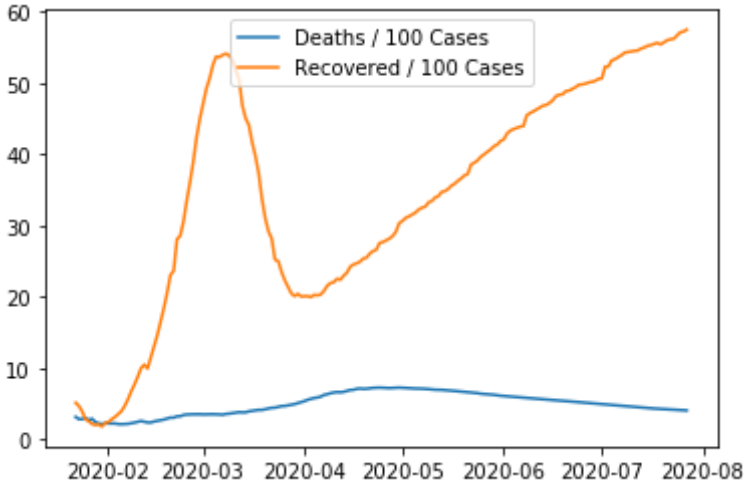


In [18]:

```
x=df["Date"]
plt.plot(x,df["New cases"],label="New cases")
plt.plot(x,df["New deaths"],label="New deaths")
plt.plot(x,df["New recovered"],label="New Recovered")

plt.legend()
plt.show()
```

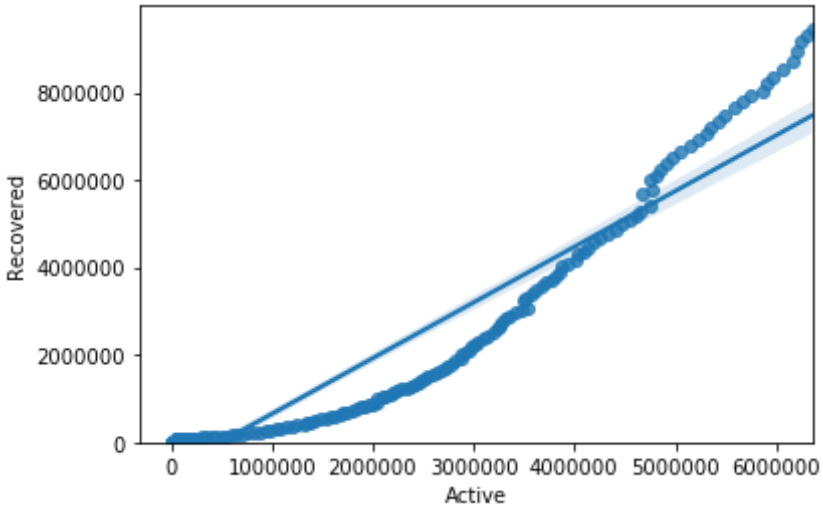


In [19]:
```
x=df["Date"]
plt.plot(x,df["Deaths / 100 Cases"],label="Deaths / 100 Cases")
plt.plot(x,df["Recovered / 100 Cases"],label="Recovered / 100 Cases")


plt.legend()
plt.show()
```



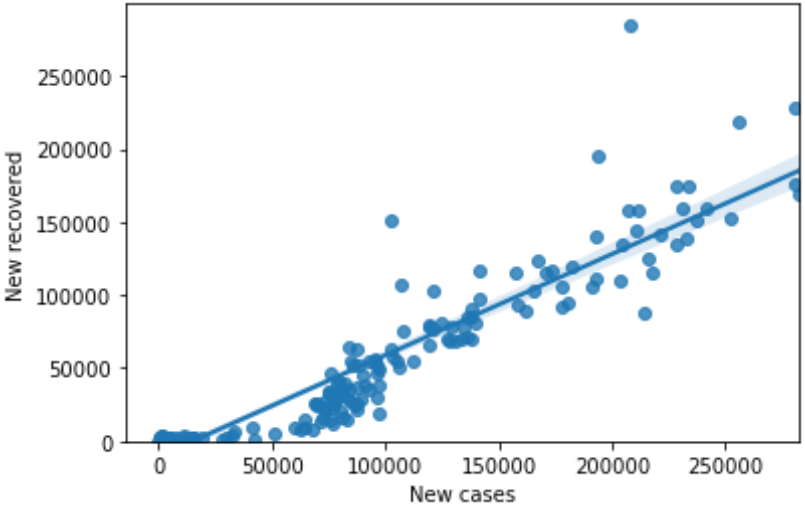
In [20]:
```
sns.regplot(x=df["Active"],y=df["Recovered"],data=df)
plt.ylim(0,)
```

Out[20]:
```
(0, 9980158.198117943)
```



In [21]:
```
sns.regplot(x=df["New cases"],y=df["New recovered"],data=df)
plt.ylim(0,)
```

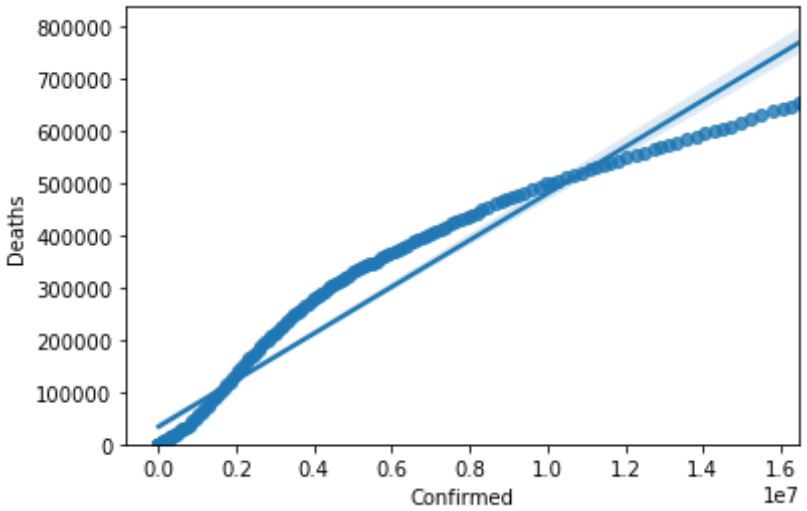
Out[21]: (0, 299317.06531421613)



In [22]:
```
sns.regplot(x=df["Confirmed"],y=df["Deaths"],data=df)
```

```
plt.ylim(0,)
```

Out[22]: (0, 838873.8831853295)



In [23]:
```
dependent_variable='Date'
independent_variables=df.columns.tolist()
independent_variables.remove(dependent_variable)
independent_variables.remove('month')
independent_variables.remove('Day')
independent_variables.remove('year')
independent_variables
```

Out[23]:
```
['Confirmed',
 'Deaths',
 'Recovered',
 'Active',
 'New cases',
 'New deaths',
 'New recovered',
 'Deaths / 100 Cases',
 'Recovered / 100 Cases',
 'Deaths / 100 Recovered',
 'No. of countries']
```

In [24]:
```
x=df[independent_variables].values
y=df[dependent_variable].values
```

In [25]:
```
x_train,x_test,y_train,y_test= train_test_split(x,y,test_size=0.2,random_state=0)
```

In [26]:
```
#transforming data
#min-max sclaer(normalization)
scaler=MinMaxScaler()
x_train=scaler.fit_transform(x_train)
x_test=scaler.transform(x_test)
```

In [27]:
```
x_train[0:10]
```

Out[27]:
```
array([[4.87568980e-01, 6.69294361e-01, 3.99634538e-01, 5.98414284e-01,
        4.71859129e-01, 3.38551074e-01, 2.45989718e-01, 6.69260700e-01,
        8.14133766e-01, 4.55916573e-02, 1.00000000e+00],
       [4.72517760e-04, 2.37433010e-04, 1.21591196e-05, 1.17479218e-03,
        7.31372632e-03, 3.81296408e-03, 5.62599774e-05, 7.78210117e-03,
        0.00000000e+00, 9.90088770e-01, 7.73480663e-02],
       [5.41791301e-01, 7.17240412e-01, 4.62538828e-01, 6.40493305e-01,
        5.57201262e-01, 4.26349589e-01, 4.05441043e-01, 6.30350195e-01,
        8.49287903e-01, 3.80935965e-02, 1.00000000e+00],
       [1.52462387e-01, 2.68188294e-01, 6.77719199e-02, 2.65314261e-01,
        2.59372038e-01, 5.46156934e-01, 7.49136761e-02, 9.68871595e-01,
        4.27438255e-01, 1.82883737e-01, 9.83425414e-01],
       [8.79418563e-01, 9.28321441e-01, 8.54853038e-01, 9.10576157e-01,
        8.40424253e-01, 5.64619707e-01, 5.30215124e-01, 4.22178988e-01,
        9.71335857e-01, 1.01697837e-02, 1.00000000e+00],
       [8.06514407e-01, 8.83113579e-01, 7.72707855e-01, 8.48436751e-01,
        6.81785709e-01, 3.82801525e-01, 4.92151733e-01, 4.53307393e-01,
        9.56913647e-01, 1.36171680e-02, 1.00000000e+00],
       [4.12379584e-02, 4.93058939e-02, 1.47170541e-02, 7.94737717e-02,
        2.39276974e-01, 3.69155127e-01, 2.91567333e-02, 5.31128405e-01,
        3.36938886e-01, 1.46427648e-01, 9.39226519e-01],
       [4.19721792e-03, 2.54238333e-03, 9.54867500e-04, 9.14331308e-03,
        7.33848265e-03, 1.43487859e-02, 4.53244443e-03, 7.39299611e-02,
        2.02632053e-01, 1.06093252e-01, 1.16022099e-01],
       [4.65509065e-03, 3.44277864e-03, 1.93017954e-03, 8.79350650e-03,
        2.22453281e-03, 4.01364640e-04, 2.09920041e-03, 1.77042802e-01,
```

```
       3.94267171e-01, 5.27449797e-02, 1.32596685e-01],
      [2.11494802e-01, 3.78025729e-01, 1.14740555e-01, 3.36893689e-01,
       2.89482805e-01, 5.34316677e-01, 1.40161185e-01, 9.90272374e-01,
       5.28393726e-01, 1.42980264e-01, 9.94475138e-01]])
```

In [28]:
```
#fitting MLR to the training set
regression=LinearRegression()
regression.fit(x_train,y_train)
```

Out[28]:
```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

In [29]:
```
y_predict=regression.predict(x_test)
```

In [30]:
```
y_predict=y_predict.astype("float")
y_test=y_test.astype('double')
```

In [31]:
```
mean_squared_error(y_test,y_predict)
```

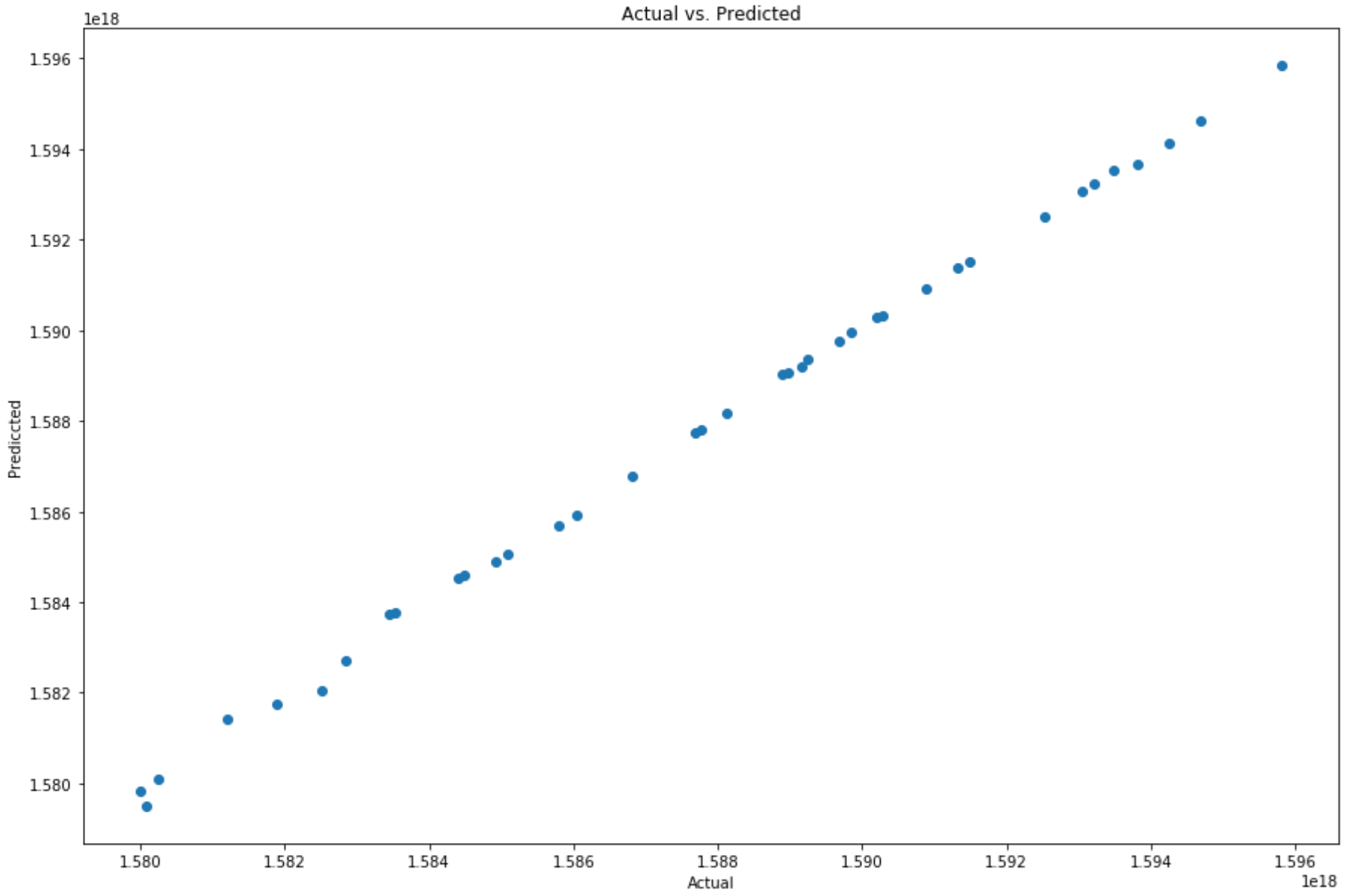
Out[31]:
```
2.691240478230908e+28
```

In [32]:
```
r2_score(y_test,y_predict)
```

Out[32]:
```
0.9986434648924857
```

In [33]:
```
plt.figure(figsize=(15,10))
plt.scatter(y_test,y_predict)
plt.xlabel('Actual')
plt.ylabel('Prediccted')
plt.title('Actual vs. Predicted')
```

Out[33]:
```
Text(0.5, 1.0, 'Actual vs. Predicted')
```



In [34]:
```
#Difference between Actual value and predicted values
```

```
predicted_value=pd.DataFrame({'Actual Value':y_test,'Predicted Value':y_predict,'Difference':y_test-y_predict})
predicted_value[0:20].astype('double')
```

Out[34]:

	Actual Value	Predicted Value	Difference
0	1.588896e+18	1.589035e+18	-1.386355e+14
1	1.583539e+18	1.583763e+18	-2.238009e+14
2	1.593475e+18	1.593522e+18	-4.701868e+13
3	1.585094e+18	1.585045e+18	4.985436e+13
4	1.590192e+18	1.590278e+18	-8.613426e+13
5	1.586822e+18	1.586772e+18	5.063754e+13
6	1.581206e+18	1.581413e+18	-2.070668e+14
7	1.589155e+18	1.589206e+18	-5.048218e+13
8	1.593216e+18	1.593232e+18	-1.573213e+13
9	1.580256e+18	1.580088e+18	1.681476e+14
10	1.580083e+18	1.579496e+18	5.875302e+14
11	1.589674e+18	1.589749e+18	-7.581197e+13
12	1.593043e+18	1.593055e+18	-1.165407e+13
13	1.585786e+18	1.585677e+18	1.088866e+14
14	1.588982e+18	1.589078e+18	-9.519781e+13
15	1.588118e+18	1.588180e+18	-6.154804e+13
16	1.582848e+18	1.582708e+18	1.396156e+14
17	1.587773e+18	1.587811e+18	-3.852808e+13
18	1.591315e+18	1.591363e+18	-4.809452e+13
19	1.586045e+18	1.585908e+18	1.371956e+14

In [35]:

```
#-------------India----------
```

In [36]:
```
#India Dataset(jan-2020 to june-2021)
df=pd.read_excel('covid_19_india (1).xlsx')
df
```

Out[36]:

	Sno	Date	Time	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed
0	1	2020-01-30	18:00:00	Kerala	1	0	0	0	1
1	2	2020-01-31	18:00:00	Kerala	1	0	0	0	1
2	3	2020-02-01	18:00:00	Kerala	2	0	0	0	2
3	4	2020-02-02	18:00:00	Kerala	3	0	0	0	3
4	5	2020-02-03	18:00:00	Kerala	3	0	0	0	3
...	...	...	...	...	...	...	...	...	...
15549	15550	2021-06-01	08:00:00	Telangana	-	-	540986	3281	578351
15550	15551	2021-06-01	08:00:00	Tripura	-	-	44908	519	51974
15551	15552	2021-06-01	08:00:00	Uttarakhand	-	-	294671	6452	329494
15552	15553	2021-06-01	08:00:00	Uttar Pradesh	-	-	1633947	20497	1691488
15553	15554	2021-06-01	08:00:00	West Bengal	-	-	1273788	15541	1376377

15554 rows × 9 columns

In [37]:
```
df.drop(['Sno'],axis=1,inplace=True)
df.drop(['Time'],axis=1,inplace=True)
df.drop(['Date'],axis=1,inplace=True)
```

In [38]:
```
#Data cleaning
df.isna()
```

Out[38]:

	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed
0	False	False	False	False	False	False
1	False	False	False	False	False	False

	State/UnionTerritory	ConfirmedIndianNational	ConfirmedForeignNational	Cured	Deaths	Confirmed
2	False	False	False	False	False	False
3	False	False	False	False	False	False
4	False	False	False	False	False	False
...	...	...	...	...	...	...
15549	False	False	False	False	False	False
15550	False	False	False	False	False	False
15551	False	False	False	False	False	False
15552	False	False	False	False	False	False
15553	False	False	False	False	False	False

15554 rows × 6 columns

In [39]:
```
df.replace("--",'0',inplace=True)
df.replace("-",'0',inplace=True)
```

In [40]:
```
#Total_Cases
df['Total_Cases']=df['ConfirmedIndianNational']+df['ConfirmedForeignNational']
df["Total_Cases"]=df["Total_Cases"].astype("int64")
df["ConfirmedIndianNational"]=df["ConfirmedIndianNational"].astype("int64")
df["ConfirmedForeignNational"]=df["ConfirmedForeignNational"].astype("int64")
total_cases=df["Total_Cases"].sum()
print("Total confirmed cases till date is : ",total_cases)
```

```
Total confirmed cases till date is :  6103
```

In [41]:
```
df["Total_Active"]=df["Total_Cases"]-(df["Deaths"]+df["Cured"])
df["Total_Active"][df["Total_Active"]<0]=0
total_Active=df["Total_Active"].sum()
print("Total Active cases till date is : ",total_Active)
active=df.groupby('State/UnionTerritory')["Total_Active"].sum().sort_values(ascending=False).to_frame()
active.head().style.background_gradient(cmap='Reds')
```

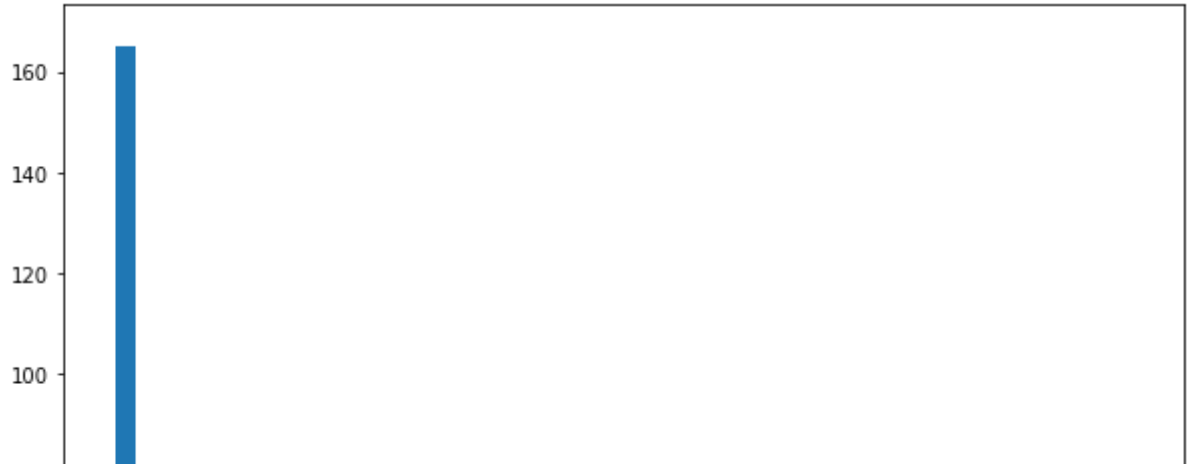
```
Total Active cases till date is :  5508
/srv/conda/envs/notebook/lib/python3.7/site-packages/ipykernel_launcher.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
```

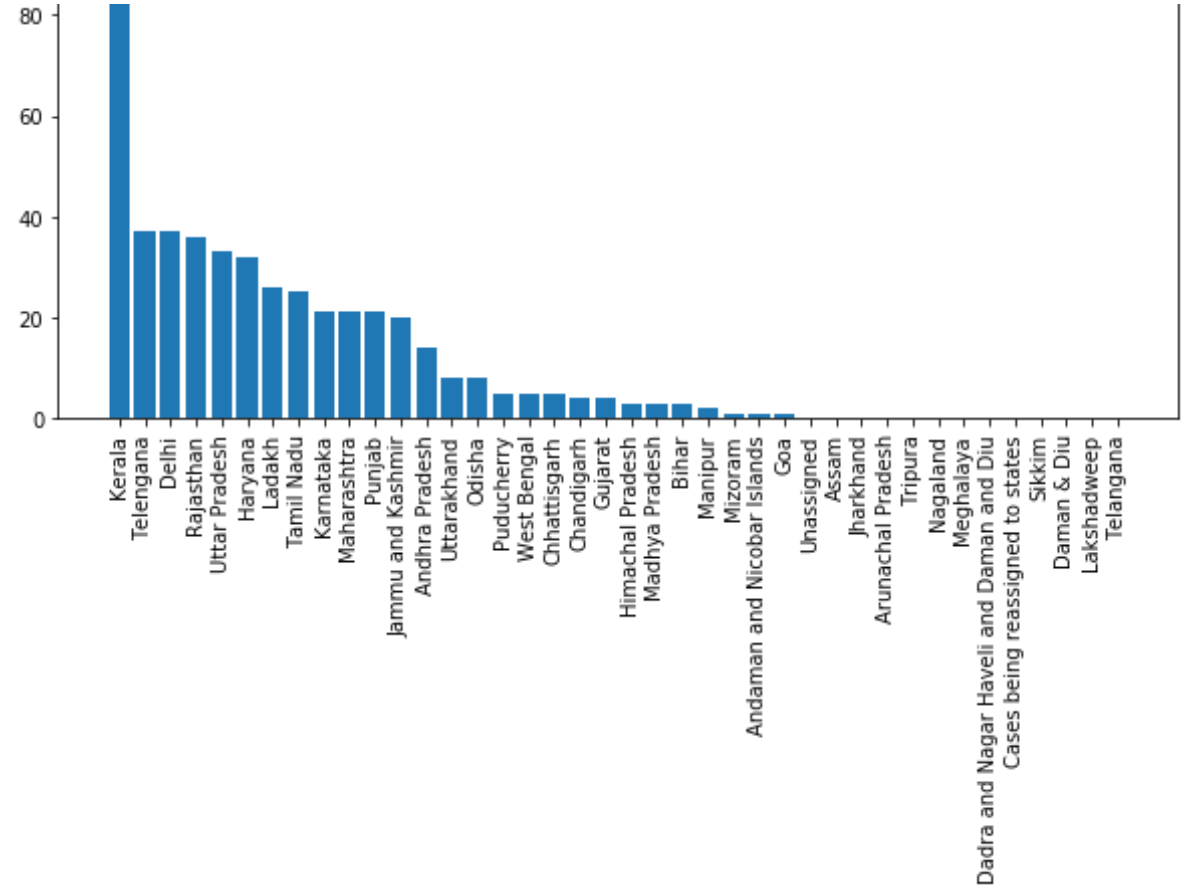
Out[41]:

State/UnionTerritory	Total_Active
Maharashtra	1079
Kerala	1061
Rajasthan	388
Karnataka	365
Uttar Pradesh	356

In [42]:

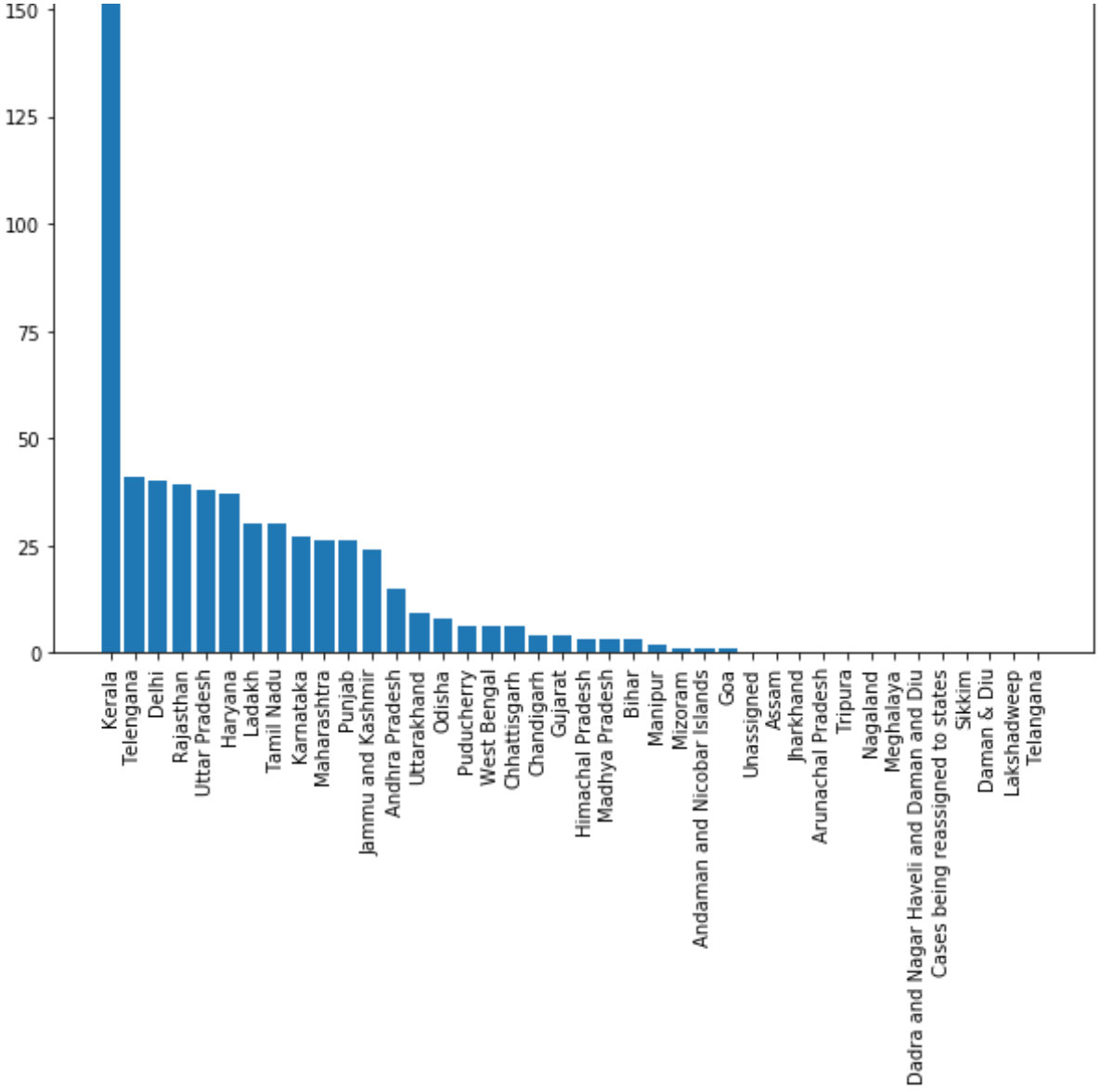
```
#Total Active
plt.figure(figsize=(10,8))
plt.bar(df["State/UnionTerritory"],df["Total_Active"].sort_values(ascending=False))
plt.xticks(rotation='vertical')

plt.show()
```





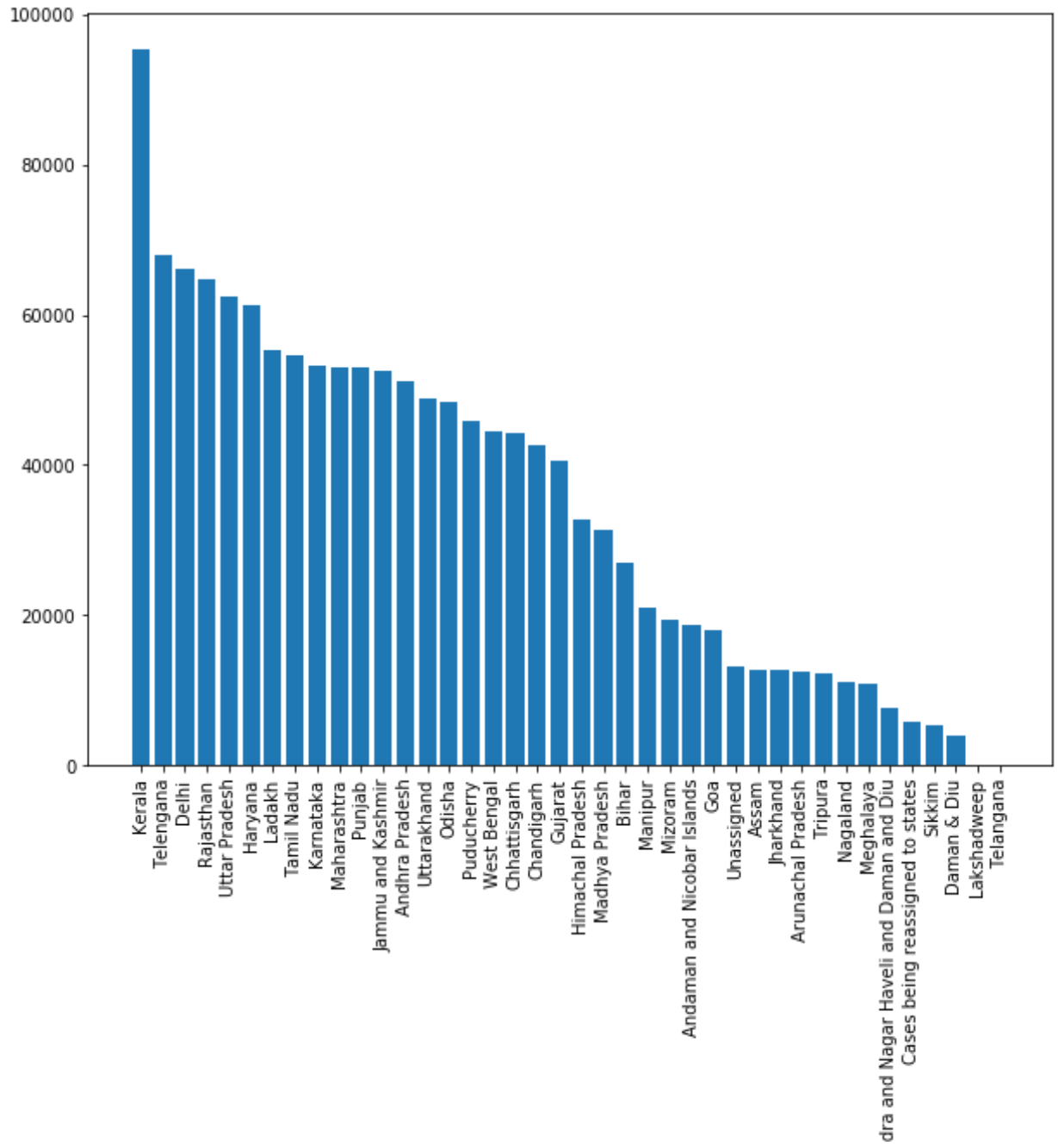
In [43]:

```
#States that have recorded highest number of cases
#Total Cases
plt.figure(figsize=(10,8))
plt.bar(df["State/UnionTerritory"],df["Total_Cases"].sort_values(ascending=False))
plt.xticks(rotation='vertical')
plt.show()
```



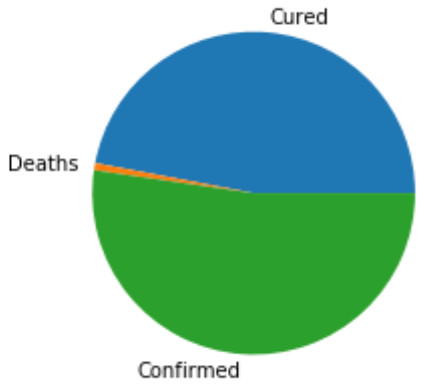
In [44]:

```
plt.figure(figsize=(10,8))
plt.bar(df["State/UnionTerritory"],df["Deaths"].sort_values(ascending=False))
plt.xticks(rotation='vertical')
plt.show()
```



Da

In [45]:
```
#summary of all states in India
values=[df["Cured"].sum(),df["Deaths"].sum(),df["Confirmed"].sum()]
label=["Cured","Deaths","Confirmed"]
plt.axis("equal")
plt.pie(values,labels=label,radius=0.6)
plt.show()
```



In [46]:
```
vaccination=pd.read_csv("covid_vaccine_statewise.csv")
vaccination
```

Out[46]:

	Updated On	State	Total Individuals Vaccinated	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
0	16/01/2021	India	48276.0	3455.0	2957.0	48276.0	0.0	23757.0	24517.0	2.0
1	17/01/2021	India	58604.0	8532.0	4954.0	58604.0	0.0	27348.0	31252.0	4.0
2	18/01/2021	India	99449.0	13611.0	6583.0	99449.0	0.0	41361.0	58083.0	5.0
3	19/01/2021	India	195525.0	17855.0	7951.0	195525.0	0.0	81901.0	113613.0	11.0
4	20/01/2021	India	251280.0	25472.0	10504.0	251280.0	0.0	98111.0	153145.0	24.0

	Updated On	State	Total Individuals Vaccinated	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
...	...	...	...	...	...	...	...	...	...	...
5139	30/05/2021	West Bengal	10547015.0	381157.0	1170.0	10547015.0	3865954.0	5871662.0	4674095.0	1258.0
5140	31/05/2021	West Bengal	10838457.0	839415.0	2511.0	10838457.0	3879678.0	6050228.0	4786796.0	1433.0
5141	01/06/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5142	02/06/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5143	03/06/2021	West Bengal	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

5144 rows × 18 columns

In [47]:
```
vaccination.fillna(0)
```

Out[47]:

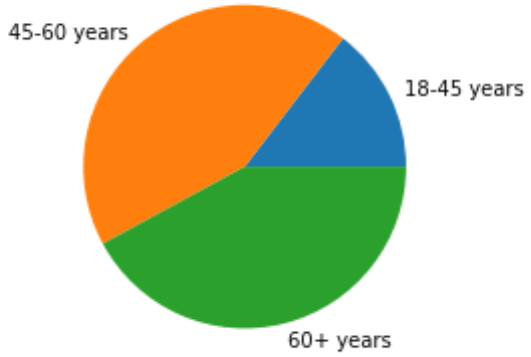
	Updated On	State	Total Individuals Vaccinated	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
0	16/01/2021	India	48276.0	3455.0	2957.0	48276.0	0.0	23757.0	24517.0	2.0
1	17/01/2021	India	58604.0	8532.0	4954.0	58604.0	0.0	27348.0	31252.0	4.0
2	18/01/2021	India	99449.0	13611.0	6583.0	99449.0	0.0	41361.0	58083.0	5.0
3	19/01/2021	India	195525.0	17855.0	7951.0	195525.0	0.0	81901.0	113613.0	11.0
4	20/01/2021	India	251280.0	25472.0	10504.0	251280.0	0.0	98111.0	153145.0	24.0
...	...	...	...	...	...	...	...	...	...	...
5139	30/05/2021	West Bengal	10547015.0	381157.0	1170.0	10547015.0	3865954.0	5871662.0	4674095.0	1258.0

	Updated On	State	Total Individuals Vaccinated	Total Sessions Conducted	Total Sites	First Dose Administered	Second Dose Administered	Male(Individuals Vaccinated)	Female(Individuals Vaccinated)	Transgender(Individuals Vaccinated)
5140	31/05/2021	West Bengal	10838457.0	839415.0	2511.0	10838457.0	3879678.0	6050228.0	4786796.0	1433.0
5141	01/06/2021	West Bengal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5142	02/06/2021	West Bengal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5143	03/06/2021	West Bengal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

5144 rows × 18 columns

In [48]:

```
values_v=[vaccination["18-45 years (Age)"].sum(),vaccination["45-60 years (Age)"].sum(),vaccination["60+ years (Age)"
vaccine=["18-45 years","45-60 years","60+ years"]
plt.axis("equal")
plt.pie(values_v,labels=vaccine,radius=0.6)
plt.show()
```



In [49]:

```
values_v=[vaccination["Total Covaxin Administered"].sum(),vaccination["Total CoviShield Administered"].sum(),vaccinat
```

```
vaccine=["Covaxin","CoviShield","Sputnik V"]
plt.axis("equal")
plt.pie(values_v,labels=vaccine,radius=0.6)
plt.show()
```

In [50]:
```
#karnataka vaccination data
```

In [51]:
```
tests_k=pd.read_excel('karnataka test.xlsx')
tests_k
```

Out[51]:

	Date	State	TotalSamples	Negative	Positive
0	2020-04-07	Karnataka	6580	5942.0	175.0
1	2020-04-08	Karnataka	6967	6473.0	181.0
2	2020-04-09	Karnataka	7613	7176.0	197.0
3	2020-04-10	Karnataka	7975	7673.0	207.0
4	2020-04-11	Karnataka	8560	8231.0	215.0
...	...	...	...	...	...
414	2021-05-27	Karnataka	29198945	NaN	NaN

	Date	State	TotalSamples	Negative	Positive
415	2021-05-28	Karnataka	29339728	NaN	NaN
416	2021-05-29	Karnataka	29475822	NaN	NaN
417	2021-05-30	Karnataka	29614631	NaN	NaN
418	2021-05-31	Karnataka	29736960	NaN	NaN

419 rows × 5 columns

In [52]:
```
tests_k["year"]=tests_k["Date"].dt.year
tests_k["month"]=tests_k["Date"].dt.month
```

In [53]:
```
tests_k["month"].replace([1,2,3,4,5,6,7,8,9,10,11,12],['January','February','March',
'April','May','June','July'
,'August','September','October','November','December'],inplace=True)
```

In [54]:
```
tests_k.fillna(0)
```

Out[54]:

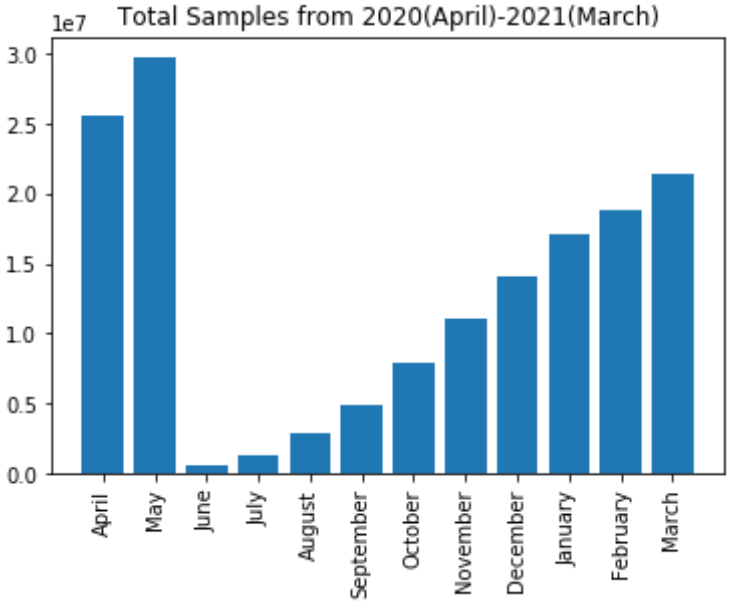
	Date	State	TotalSamples	Negative	Positive	year	month
0	2020-04-07	Karnataka	6580	5942.0	175.0	2020	April
1	2020-04-08	Karnataka	6967	6473.0	181.0	2020	April
2	2020-04-09	Karnataka	7613	7176.0	197.0	2020	April
3	2020-04-10	Karnataka	7975	7673.0	207.0	2020	April
4	2020-04-11	Karnataka	8560	8231.0	215.0	2020	April
...	...	...	...	...	...	...	...
414	2021-05-27	Karnataka	29198945	0.0	0.0	2021	May
415	2021-05-28	Karnataka	29339728	0.0	0.0	2021	May
416	2021-05-29	Karnataka	29475822	0.0	0.0	2021	May
417	2021-05-30	Karnataka	29614631	0.0	0.0	2021	May

	Date	State	TotalSamples	Negative	Positive	year	month
418	2021-05-31	Karnataka	29736960	0.0	0.0	2021	May

419 rows × 7 columns

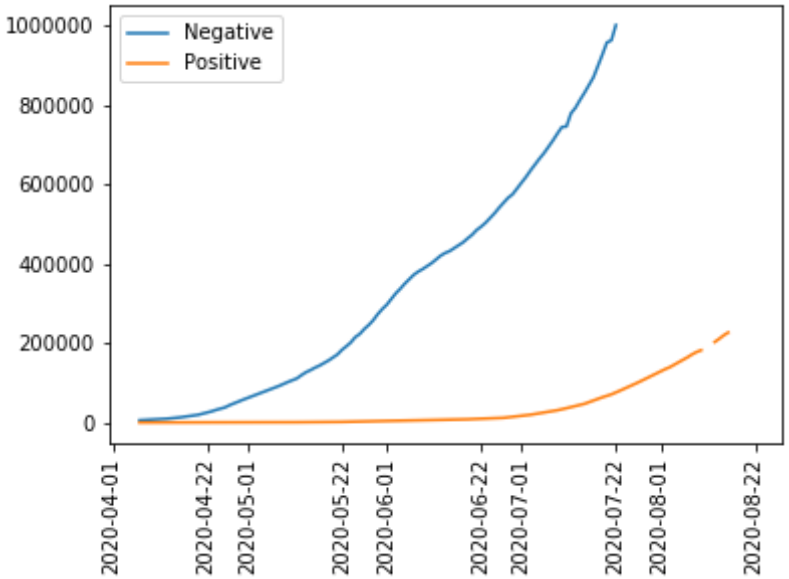
In [55]:

```
plt.bar(tests_k["month"],tests_k["TotalSamples"])
plt.xticks(rotation='vertical')
plt.title('Total Samples from 2020(April)-2021(March)')
plt.show()
```



In [56]:

```
x=tests_k["Date"]
plt.plot(x,tests_k["Negative"],label="Negative")
plt.plot(x,tests_k["Positive"],label="Positive")
plt.xticks(rotation='vertical')
plt.legend()
plt.show()
```



In [ ]: