# LR-confirmed-gdp-population21

October 16, 2021

[2]:
```
import pandas as pd
import numpy as np
from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split
from matplotlib import pyplot as plt

data = pd.read_csv('/home/vbinkeri/Documents/IDS/project/data/
 ↪covid_data_22-09-2021_2-full.csv')
print(data.shape)
data.head()
```

```
(149, 13)
```

[2]:

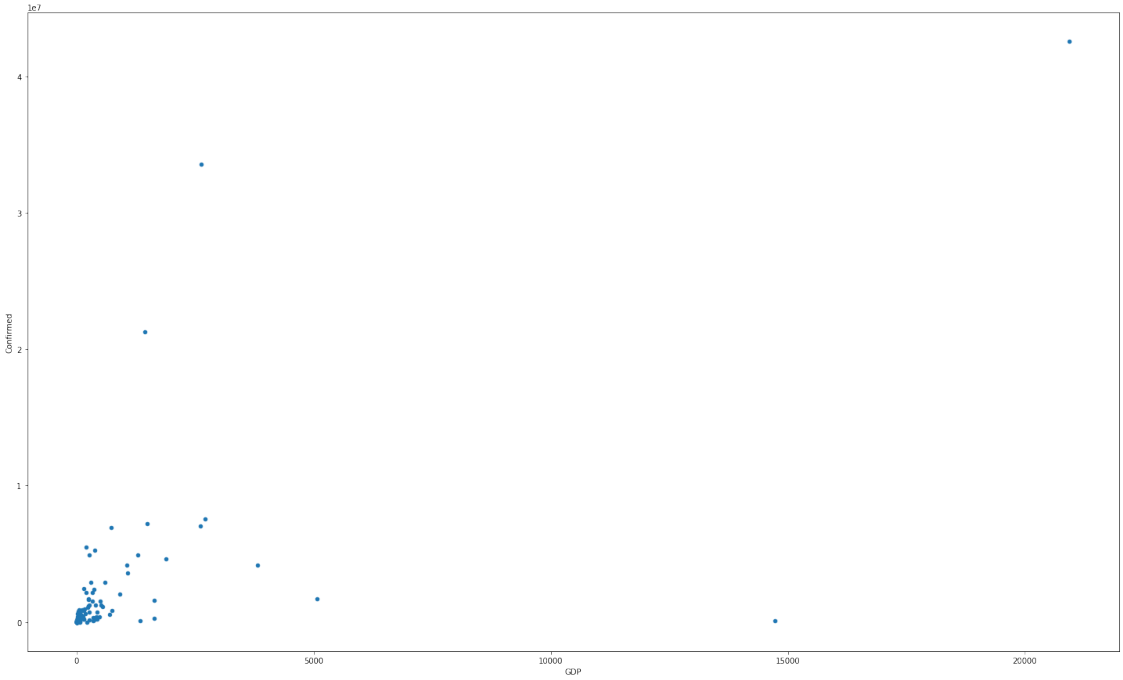
| | Unnamed: 0 | Country | Confirmed | proportion infected | Deaths | \ |
|---|---|---|---|---|---|---|
| 0 | 0 | Albania | 165096 | 5746.60 | 2601 | |
| 1 | 1 | Algeria | 202122 | 453.02 | 5739 | |
| 2 | 2 | Antigua and Barbuda | 2625 | 2658.74 | 57 | |
| 3 | 3 | Argentina | 5245265 | 11501.30 | 114684 | |
| 4 | 4 | Armenia | 254709 | 8581.47 | 5181 | |

| | GDP | Population Density | 2021 Population | Area | Literacy | Employment | \ |
|---|---|---|---|---|---|---|---|
| 0 | 14.80 | 100 | 2872933 | 28748 | 0.972489 | 0.707484 | |
| 1 | 145.00 | 19 | 44616624 | 2381741 | 0.774214 | 0.896187 | |
| 2 | 1.42 | 223 | 98731 | 442 | 0.990000 | 0.994403 | |
| 3 | 383.00 | 16 | 45605826 | 2780400 | 0.980849 | 0.938704 | |
| 4 | 12.65 | 100 | 2968127 | 29743 | 0.996145 | 0.783675 | |

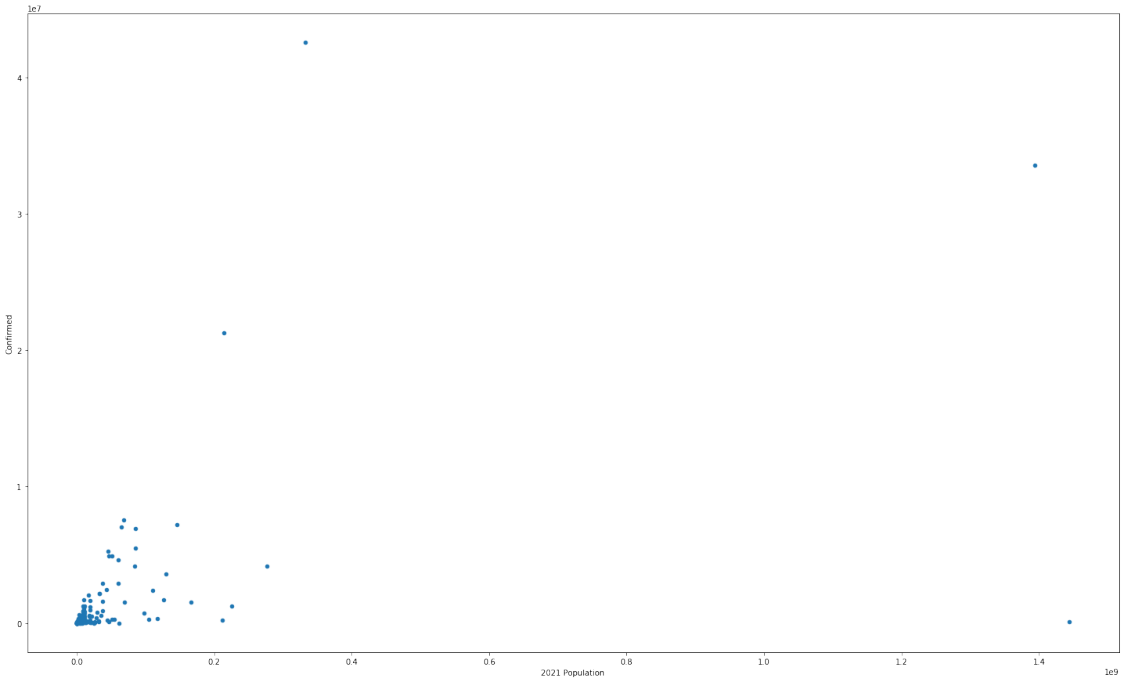
| | Population 65 + | Foreigners |
|---|---|---|
| 0 | 0.147591 | 0.018337 |
| 1 | 0.053393 | 0.003512 |
| 2 | 0.088592 | 0.296995 |
| 3 | 0.116861 | 0.045017 |
| 4 | 0.119087 | 0.065531 |

[3]:
```
y = data['Confirmed']
x1 = data['GDP']
x2 = data['2021 Population']
```

[5]:
```
data.plot(kind = 'scatter', x = 'GDP', y = 'Confirmed',figsize=(25,15))
plt.show()
```

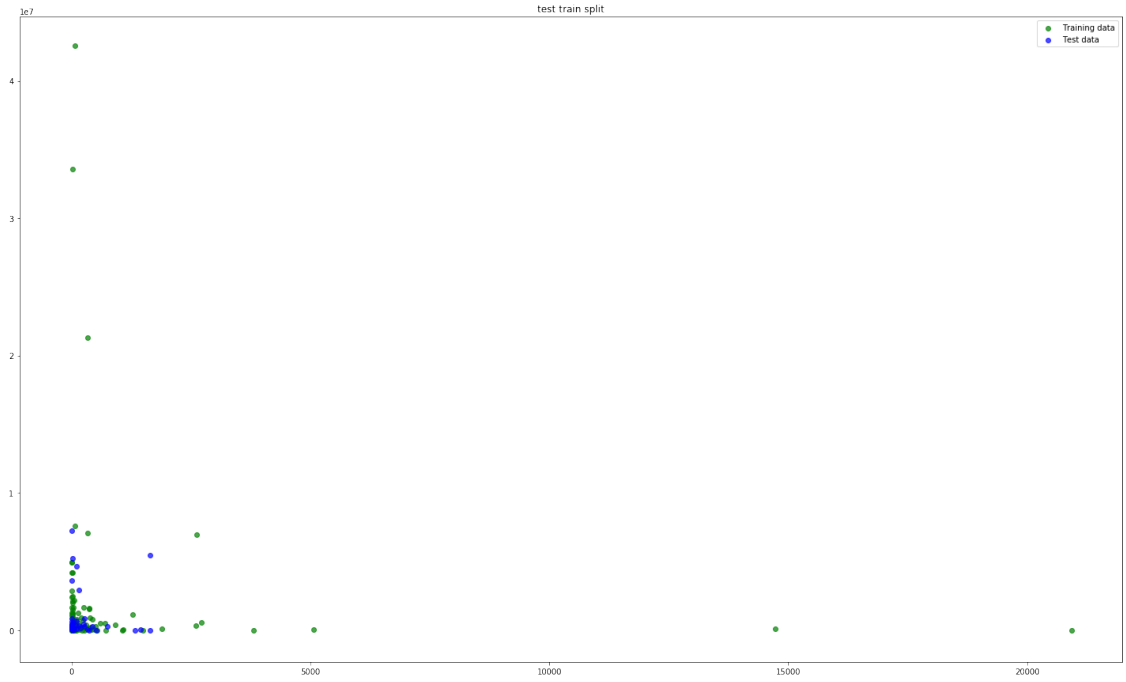



[6]:
```
data.plot(kind = 'scatter', x = '2021 Population', y = 'Confirmed',␣
 ↪figsize=(25,15))
plt.show()
```

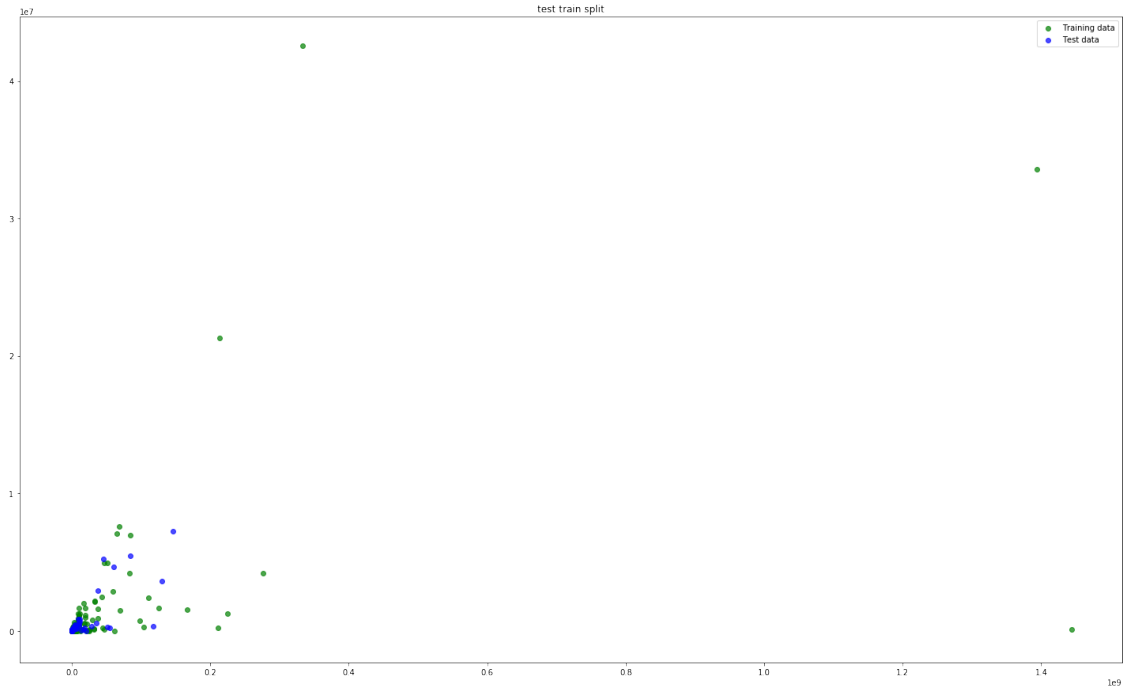



[7]:
```
# test train split, Confirmed and GDP
X1_train, X1_test, y_train, y_test = train_test_split(x1,y)

# test train split, Confirmed and 2021 Population
X2_train, X2_test, y_train, y_test = train_test_split(x2,y)
```

[8]:
```
# visualization of Confirmed and GDP
plt.figure(figsize=(25,15))
plt.scatter(X1_train, y_train, label="Training data", color="g", alpha=.7)
plt.scatter(X1_test, y_test, label="Test data", color="b", alpha=.7)
plt.legend()
plt.title('test train split')
plt.show()
```




[9]:
```
# visualization of Confirmation and 2021 Populations
plt.figure(figsize=(25,15))
plt.scatter(X2_train, y_train, label="Training data", color="g", alpha=.7)
plt.scatter(X2_test, y_test, label="Test data", color="b", alpha=.7)
plt.legend()
plt.title('test train split')
plt.show()
```

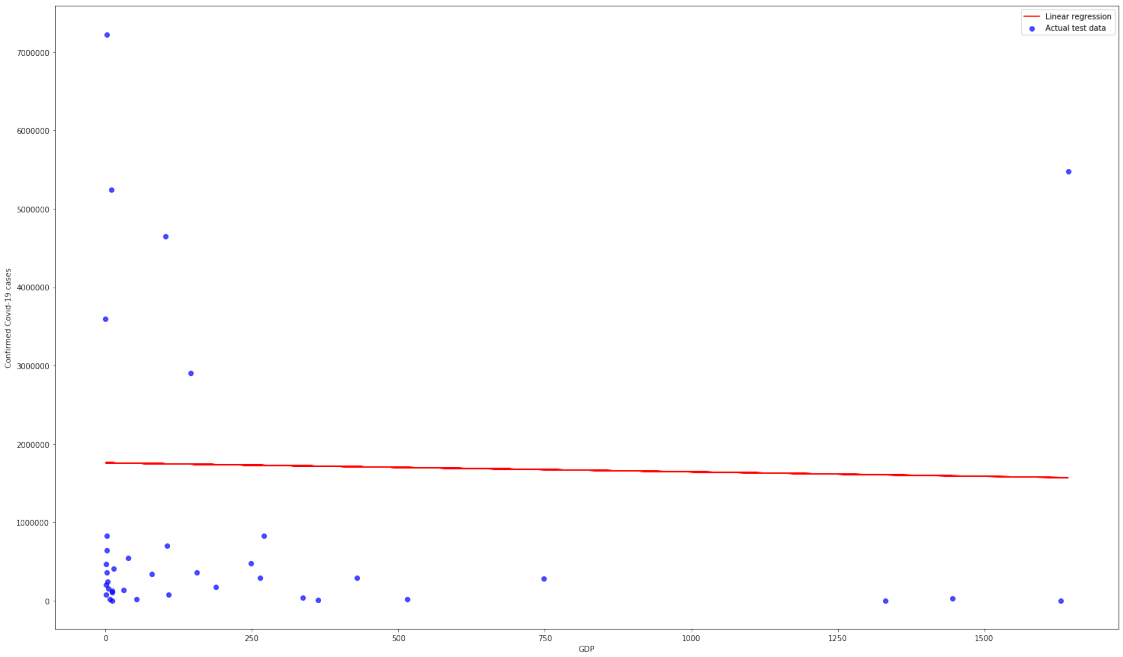



[10]:
```
# linear model Confirmed & GDP
LR1 = LinearRegression()
LR1.fit(X1_train.values.reshape(-1,1), y_train.values)

# linear model Confirmed & 2021 Populations
LR2 = LinearRegression()
LR2.fit(X2_train.values.reshape(-1,1), y_train.values)
```

[10]:
```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

[15]:
```
# predict Confirmed & GDP
prediction1 = LR1.predict(X1_test.values.reshape(-1,1))

# plot of prediction
plt.figure(figsize=(25,15))
plt.plot(X1_test, prediction1, label='Linear regression', color='r')
plt.scatter(X1_test, y_test, label='Actual test data', color='blue', alpha=.7)
plt.xlabel("GDP")
plt.ylabel("Confirmed Covid-19 cases")
plt.legend()
plt.show
```

[15]:
```
<function matplotlib.pyplot.show(*args, **kw)>
```

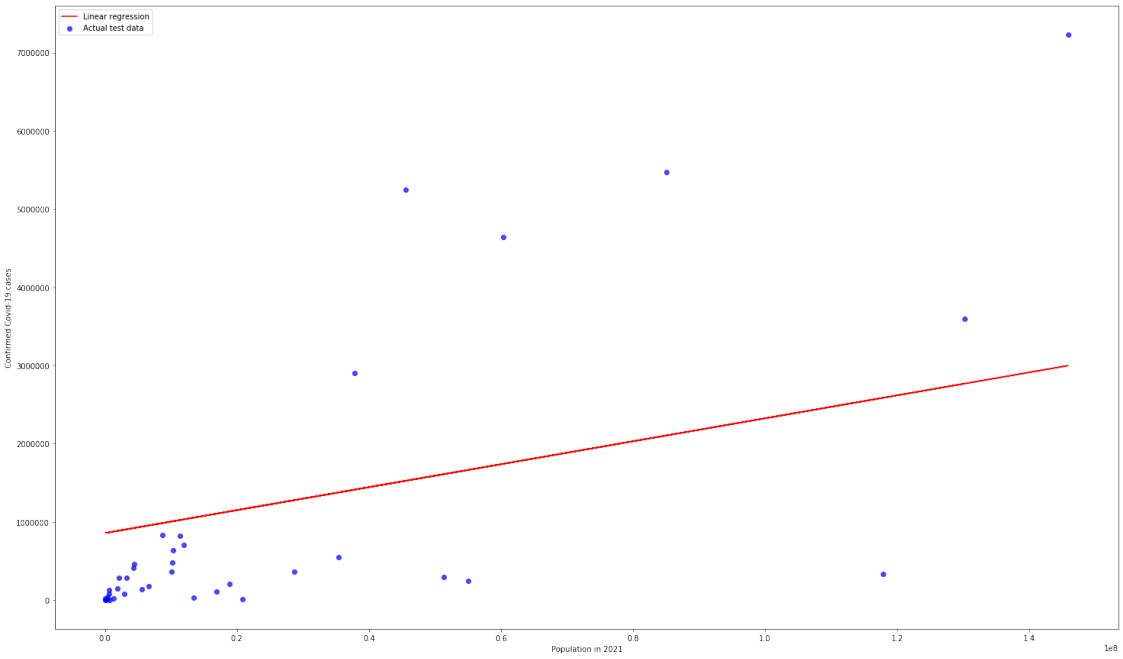



[12]:
```
# scoring the model LR1
LR1.score(X1_test.values.reshape(-1,1), y_test.values)
```

[12]: -0.17790251530788082

[16]:
```
# predict Confirmed & 2021 Population
prediction2 = LR2.predict(X2_test.values.reshape(-1,1))

# plot of prediction
plt.figure(figsize=(25,15))
plt.plot(X2_test, prediction2, label='Linear regression', color='r')
plt.scatter(X2_test, y_test, label='Actual test data', color='blue', alpha=.7)
plt.xlabel("Population in 2021")
plt.ylabel("Confirmed Covid-19 cases")
plt.legend()
plt.show
```

[16]: <function matplotlib.pyplot.show(*args, **kw)>




[17]:
```
# scoring the model LR2
LR2.score(X2_test.values.reshape(-1,1), y_test.values)

# this one's maybe alright
```

[17]: 0.33428036660736926

[ ]:

[ ]: