CO2 Emission and GDP Per Capita

Introduction and Aim

The emission of CO2 is the result of the usability of the fuels for industry and household purposes. The GPP per capita is the measure of the output of a country per person. It means the total revenue of the country is divided by the number of people living there to calculate GDP Per capita. As the major part of a country's income come from industries, so a large number of fuels are consumed there to produce power. So, if the number of people in a country will be higher, certainly, the emission of CO2 will be higher. In this project, the relationship of the emission of CO2 with the GDP per capita to understand the growth of a country and the pollution factors.

Data Collection

The data has been collected from World Back concerning the GPP per capita and CO2 Emissions for three countries namely India, Vietnam and Great Britain. To collect the data, two docstrings have been used which are as follows:

- NY.GDP.PCAP.PP.CD for GDP Per Capita
- EN.ATM.CO2E.KT for CO2 Emission

The respective data are shown below:

GDP Per Capita Data

economy	GBR	IND	VNM
YR1990	17091.305116	1204.242059	1184.121960
YR1991	17420.421211	1231.955439	1269.694401
YR1992	17840.551028	1301.824124	1382.001087
YR1993	18673.348462	1367.697536	1499.160068
YR1994	19755.255084	1460.115434	1636.064414

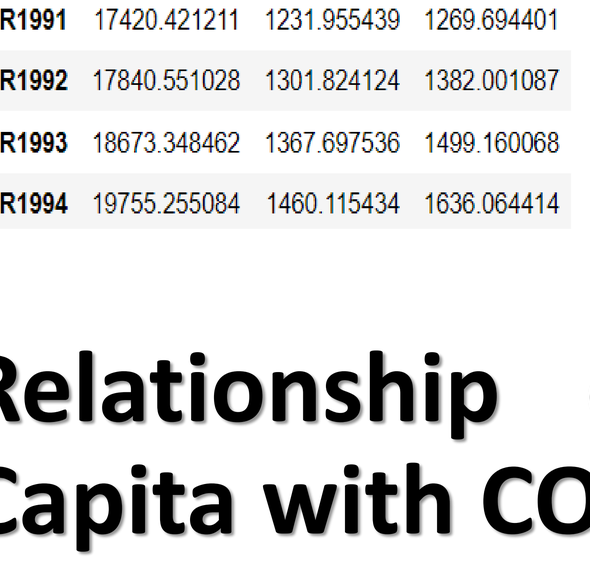
CO2 Emission Data

economy	GBR	IND	VNM
YR1990	561774.2	563577.2	19327.9
YR1991	570681.3	607225.8	19796.6
YR1992	557885.3	626294.3	20812.9
YR1993	541376.1	651351.7	24244.9
YR1994	535182.9	685903.4	26682.4

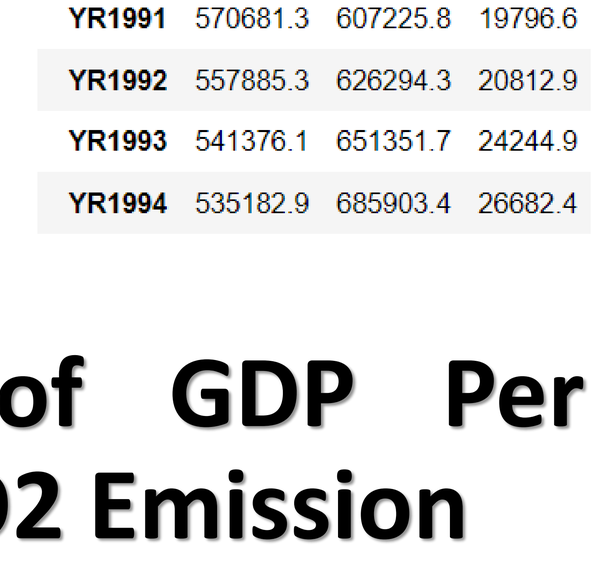
Relationship of GDP Per Capita with CO2 Emission

To understand the relationship of GDP Per Capita with CO2 Emission for three selected countries, Correlation has been applied and the heatmaps have been produced which are shown below:

GDP Per Capita Data



CO2 Emission Data



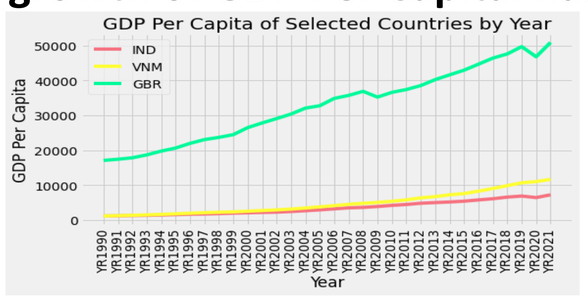
Technology and Background

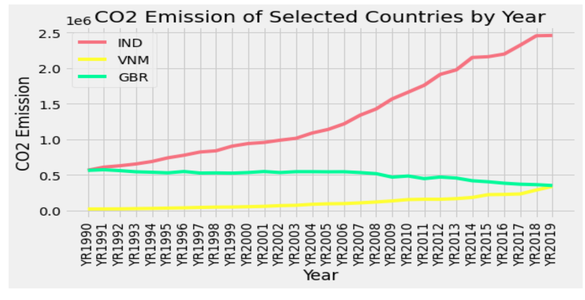
The collected data has been analyzed and the analytics have been applied there to get insights of the indicators which have been selected. In this context, the below-mentioned technologies have been applied:

- Correlation
- Normalization
- Clustering
- •Curve Fitting

Data Analysis

The analyses have been done on both data to understand the progress of CO2 Emissions and GDP Per Capita for the selected countries. It has been seen that the highest CO2 emission has been seen for India whereas the highest growth of GDP Per Capital has been seen for Great Britain.





Result of Clustering

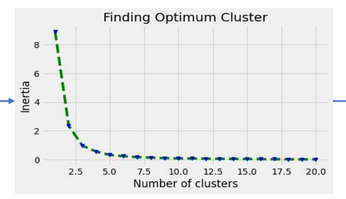
Clustering has been to visualize the statistics of countries for GDP Per Capita. The clustering has been done using K-Means algorithms after normalizing the data. The pipeline is shown below:

Normalization

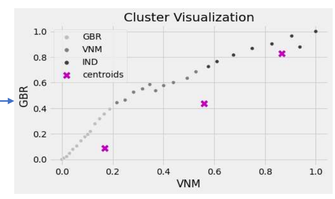
economy	GBR	IND	VNM
YR1990	0.000000	0.000000	0.000000
YR1991	0.009746	0.004590	0.008156
YR1992	0.022187	0.016162	0.018860
YR1993	0.046849	0.027072	0.030027
YR1994	0.078887	0.042379	0.043075

economy	GBR	IND	VNM
YR1990	0.959834	0.000000	0.000000
YR1991	1.000000	0.023061	0.001478
YR1992	0.942298	0.033136	0.004682
YR1993	0.867851	0.046375	0.015503
YR1994	0.839924	0.064630	0.023188

K-Value Selection

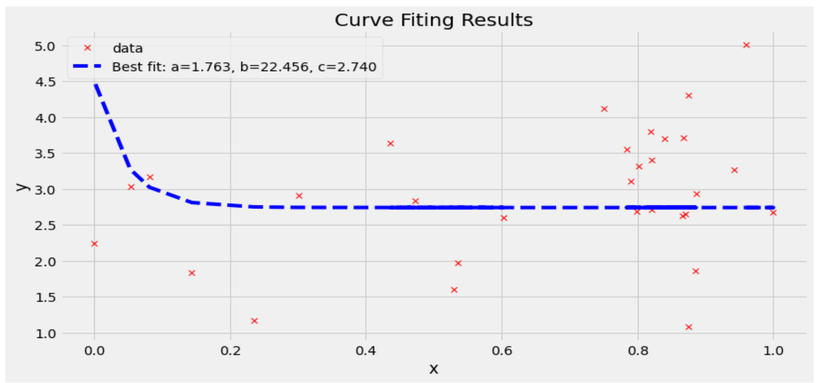


Clustering



Curve Fitting

The error range has been used between 1 to 5 on the CO2 Emission data and the curve fitting has been used. It is widely used to determine the relationship of the predictors in a data. Hence, this has been applied here to determine the country's relationship for CO2 emission. The result of curve fitting is shown below:



References

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