7PAM2000 APPLIED DATA SCIENCE 1

ASSIGNMENT 1: VISUALIZATION

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GITHUB LINK:[https://github.com/Sanjana170/ADS-Assignment1.git]

DATALINK 1: [https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?view=chart]

DATALINK 2: [https://data.worldbank.org/indicator/SP.POP.TOTL?view=chart]

Exploration of Co2 emission using visualization among under developed, developing and developed county

Carbon dioxide is one of the leading causes of global warming. It is crucial to visualize CO2 emission data because this will enable us to see where in the world the emissions are coming from and how they have been changing over the years. This can also be used to monitor measures to reduce current levels of emissions.

Visualization plays a crucial role as a fundamental tool for data analysis, and decision-making. The use of this tool enables the effective distribution of intricate information, allowing users to acquire deep understandings, recognize recurrent trends, and provide well-informed judgements.

Visualization in this project is done in order to address two research questions.

RQ 1: How does under developed, developing and developed countries like Afghanistan, India and Germany act in terms of CO2 emission?

RQ 2: Is there any correlation among the population count and emission of CO2?

1.1 Exploration of population and CO2 emission for last 20 years

1.1.1 Population

Data about Afghanistan's, India's, and Germany's populations are included in the population dataset, which spans the years 2001 to 2020. A line plot is used to provide a visual representation of the data. The population count for each nation is shown in the following figure, which is updated annually.

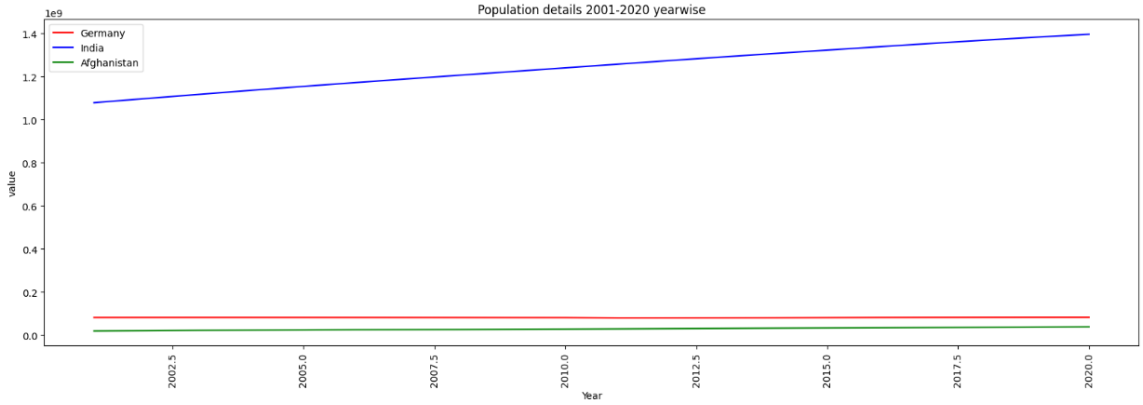


Figure 1 Line plot for population

Based on the line plot shown above, it can be deduced that the number of people living in India is continuously rising, whilst the populations of Afghanistan and Germany continue to stay unchanged.

1.1.2 CO2 emission

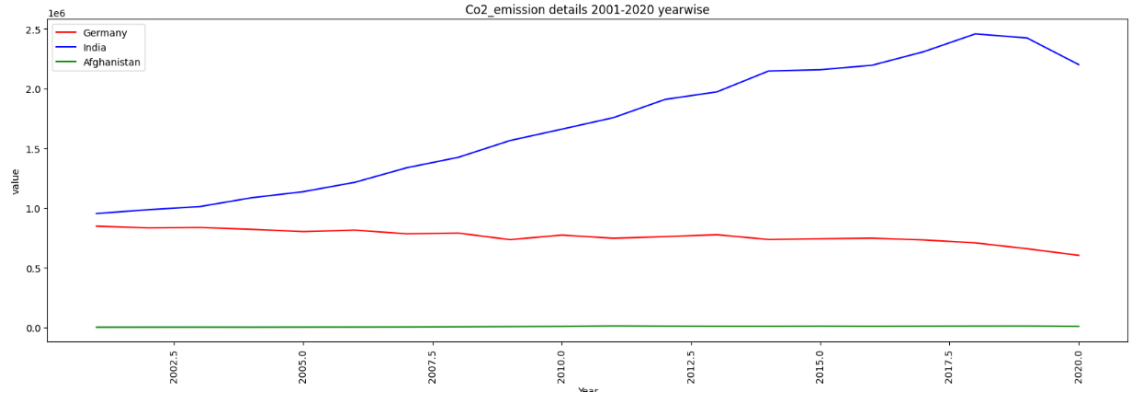


Figure 2 Line plot for CO2 emission in each country

According to the data shown in the figure above, India's CO2 emissions have been steadily rising over the last several years. However, there is a decrease of CO2 emission from the year 2017 in India and Germany.

1.2 Comparison of Population and CO2 emission

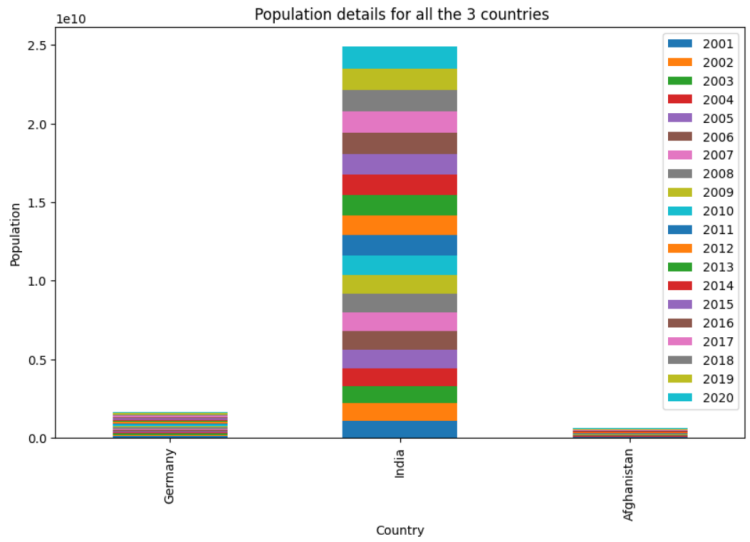


Figure 3 Population bar plot

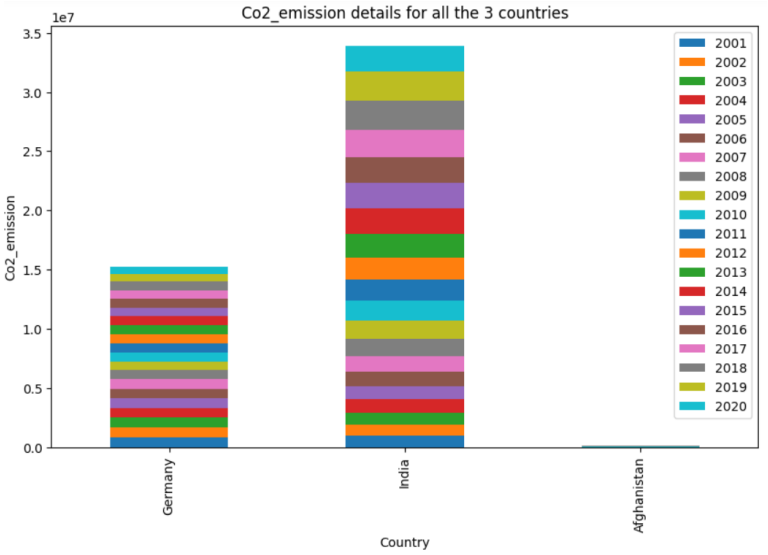


Figure 4 CO2 emission bar plot

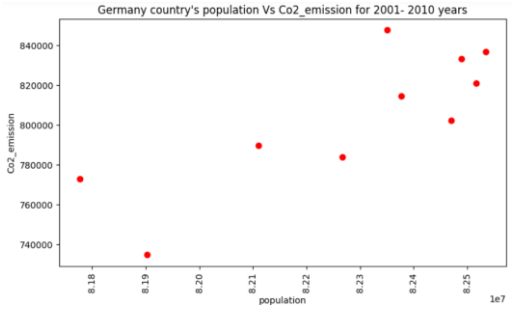
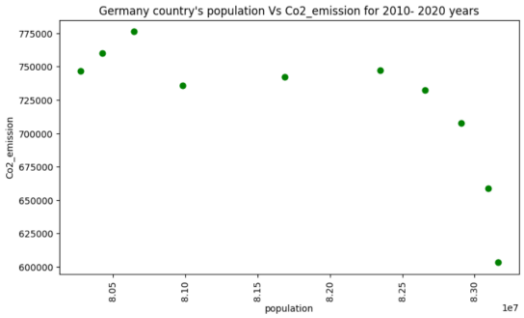
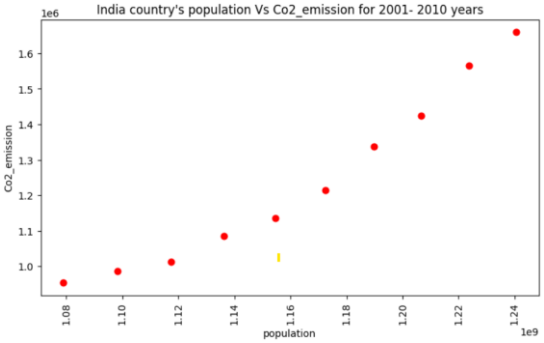
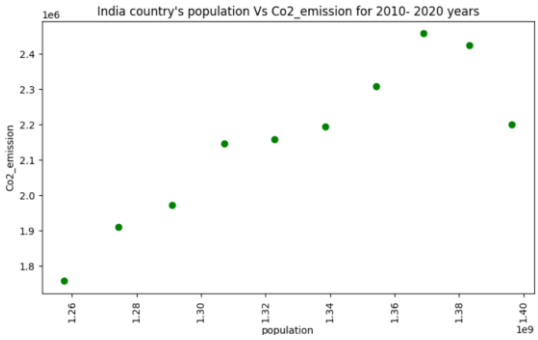
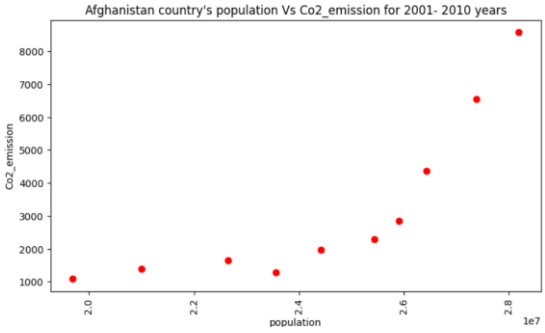
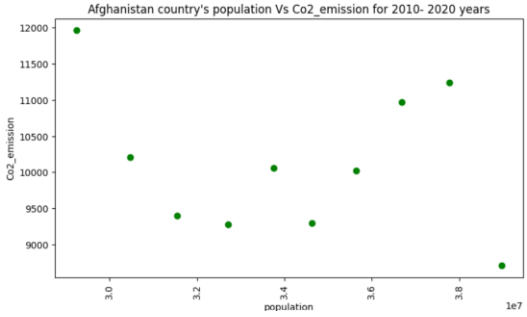
From the above bar plots, it is understood that the population of India increases rapidly from the past 20 years whereas the population of Germany and Afghanistan is stable. The Bar plot of CO2 emission shows that the population increase lead to the emission of CO2 where India has the highest emission and Afghanistan has the least emission of CO2 than Germany.

1.3 Correlation between population and CO2 emission

The second visualization is carried out in order to find out the correlation among the population and CO2 emission. This is visualization is carried out with the help of scatter plot.

The below table show the scatter plots for each country's population and CO2 emission for the year 2001 to 2020 years.

Table 1 Scatter plot

Country	2001-2010 years	2011-2020 years
Germany		
India		
Afghanistan		

From the above scatter plots, it is understood that when there is a rise in population, there is a rise in CO2 emission as well in every county.

From the line plot the population of Germany is staple but in the year 2001 to 2010 there was an increase in CO2 emission. Thus, it positively correlates. From the year 2011 to 2020, the population and CO2 emission negatively correlates.

The plot for India shows that the population increases along with which the CO2 emission also increases. Thus, it is highly correlated. However, there is a decrease from the year 2017-2020 which shows that India is taking steps to decrease the emission of CO2.

The population of Afghanistan and emission of CO2 steadily increases and thus they are positively correlated.