BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL INSTITUTE OF TECHNOLOGY
(Empowered Autonomous Institute Affiliated to University of Mumbai)

[Knowledge is Nectar]

Department of Computer Engineering

Course – Data Analytics Open Elective

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Class and Batch	TE Computer Engineering - Batch A
Date	27/02/2024
Lab #	9
Aim	Explore and present interactive data insights from real world dataset (Dashboards) using Tableau
Theory	# Tableau

Tableau is a powerful data visualization tool that enables users to create interactive and shareable dashboards, reports, and visualizations from various data sources. The theory behind Tableau revolves around several key concepts:

1. Data Connection and Integration: Tableau allows users to connect to various data sources such as databases, spreadsheets, and cloud services. It supports live connections as well as data extracts, enabling users to work with large datasets efficiently.

2. Visual Encoding: Tableau employs visual encoding techniques to represent data in the form of visual elements such as charts, graphs, maps, and tables. These visualizations use attributes like color, size, shape, and position to encode data values, making it easier for users to interpret and analyze the information.

3. Drag-and-Drop Interface: One of the key features of Tableau is its intuitive drag-and-drop interface, which allows users to quickly create visualizations by simply dragging fields onto the canvas. This makes it easy for users with little to no programming knowledge to build complex visualizations and explore their data effectively.

4. Dashboard Creation: Tableau enables users to combine multiple visualizations into interactive dashboards. Dashboards allow users to view and interact with multiple |

visualizations simultaneously, providing a comprehensive overview of the data and facilitating data-driven decision-making.

5. Interactivity and Drill-Down: Tableau provides interactive features that allow users to explore data dynamically. Users can interact with visualizations by filtering, sorting, and drilling down into specific data subsets, enabling them to uncover insights and identify patterns within the data.

6. Sharing and Collaboration: Tableau offers various options for sharing and collaborating on visualizations and dashboards. Users can publish their work to Tableau Server or Tableau Online, allowing others to access and interact with the visualizations via web browsers or mobile devices. Additionally, Tableau supports embedding visualizations into websites and sharing them via email or social media.

7. Performance Optimization: Tableau includes features for optimizing performance when working with large datasets or complex visualizations. This includes techniques such as data blending, extract optimization, and performance tuning, which help ensure that visualizations are rendered quickly and efficiently.

Questions Answered from Dashboard

1) Who are the top countries contributing in CO2 emissions?

In analyzing CO2 emissions data using Tableau, I first identified the top countries contributing to CO2 emissions. By creating a visualization such as a bar chart, I was able to clearly see which countries have the highest levels of CO2 emissions. Utilizing Tableau's sorting and filtering capabilities, I could easily rank the countries based on their emissions levels and identify the top contributors. This information provides valuable insights into the countries that have the greatest impact on global CO2 emissions, guiding policymakers and stakeholders in targeting efforts to mitigate climate change.

2) How has CO2 Emission for a country increased over Time?

Using Tableau's time series analysis capabilities, I examined how CO_2 emissions for specific countries have changed over time. By plotting CO_2 emissions against time on a line chart, I could visualize the trend of emissions for each country. Tableau's interactive features allowed me to zoom in on specific time periods and compare the emissions trends across different countries. This analysis revealed whether CO_2 emissions for a country have been increasing, decreasing, or remaining relatively stable over time, providing valuable insights into the trajectory of each country's environmental impact.

3) Does High income produce higher CO_2 or not?

To investigate the relationship between income levels and CO_2 emissions, I utilized Tableau to create a heat map, with CO_2 emissions on one axis and income levels on the other. By assigning colors or sizes to the data points based on income levels, I could visually identify whether there is a correlation between high income and higher CO_2 emissions. Tableau's statistical analysis features allowed me to perform regression analysis or calculate correlation coefficients to quantify the relationship between income and CO_2 emissions. This analysis provided insights into whether higher income levels are associated with higher CO_2 emissions, informing discussions on the environmental impact of economic development and wealth distribution.

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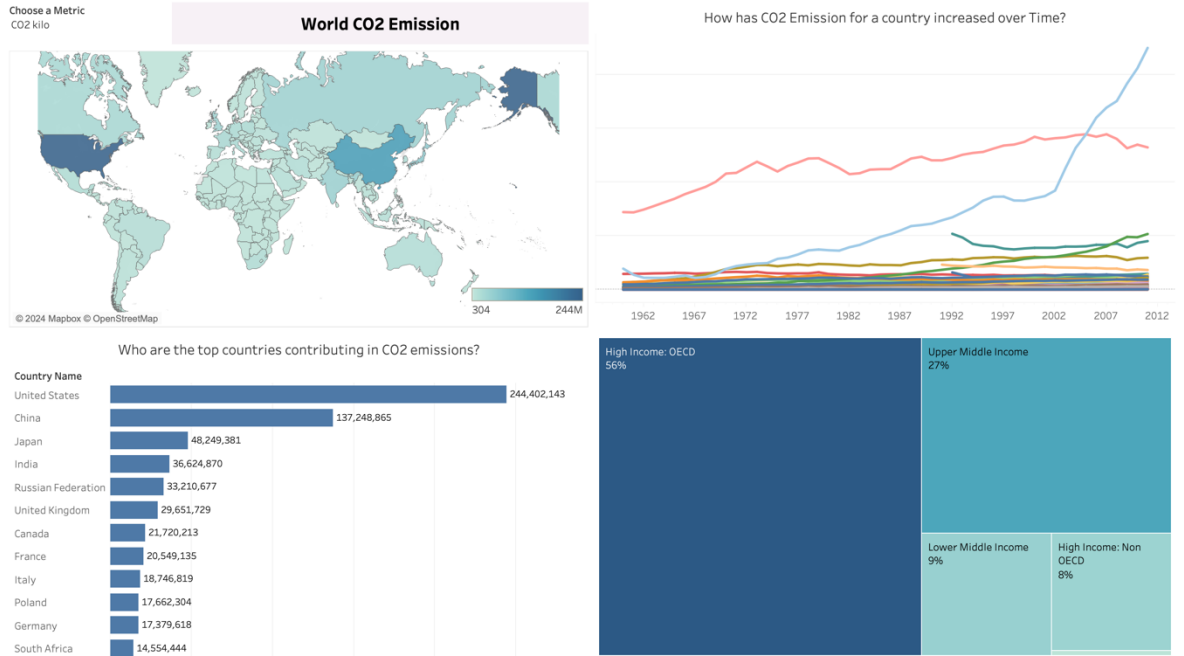
Visualization	
Conclusion	Through Tableau analysis, I've identified top CO2-emitting countries, tracked emissions trends over time, and explored the correlation between income and CO2 output. These insights inform targeted climate action and highlight the complex interplay between economic development and environmental impact.