# Sardar Patel Institute of Technology

## SEM VII:ADVANCE DATA VISUALIZATION.

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| **Name** | Smruti Sonekar |
| **UID no.** | 2021700064 |
| **Branch** | BE CSE DS (BATCH B) |
| **Experiment no.** | 2 |

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| **Topic:** | Create advanced charts using Tableau / Power BI / R / Python / Plotly or Chart or D3.js to be performed on the dataset - Socio economic data |
| **Aim:** | ● Advanced - Word chart, Box and whisker plot, Violin plot, Regression plot (linear and<br>nonlinear), 3D chart, Jitter, Line, Area, Waterfall, Donut, Treemap, Funnel<br>● Write observations from each chart<br>Practice dataset:<br>World Socio Economic dataset and Power BI file |
| **Theory:** | I have used the World Population DataSet for Data Visualization .<br>Link :<br>https://www.kaggle.com/datasets/iamsouravbanerjee/world-population-dataset<br><br>The global population is currently 7,577,130,400, surpassing the 2015 7.2 billion. China is the most populous country with a population exceeding 1.4 billion, followed by India with over 1.355 billion. The 11 most populous countries have populations exceeding 100 million, except for Russia and Japan, which will see their populations drop by 2030 before falling again by 2050. The world's population growth rate has been 1.12% since the 1970s, and it is expected to continue growing at a slower pace. By 2030, the population will exceed 8 billion, and by 2040, it will reach over 9 billion. By 2055, it will rise to over 10 billion. Nine specific countries, including the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, Uganda, the United Republic of Tanzania, and the United States, are expected to contribute to the population growth more quickly than other nations.<br><br>● **Rank**: Rank by Population.<br>● **CCA3**: 3 Digit Country/Territories Code.<br>● **Country/Territories**: Name of the Country/Territories.<br>● **Capital**: Name of the Capital.<br>● **Continent**: Name of the Continent. |

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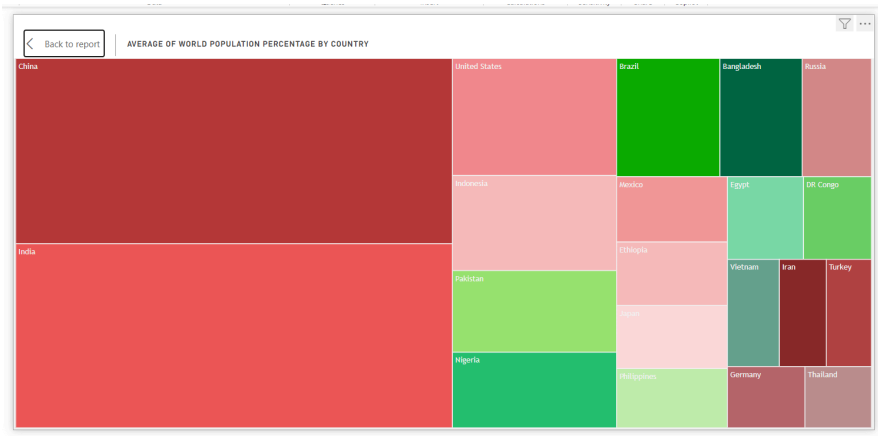
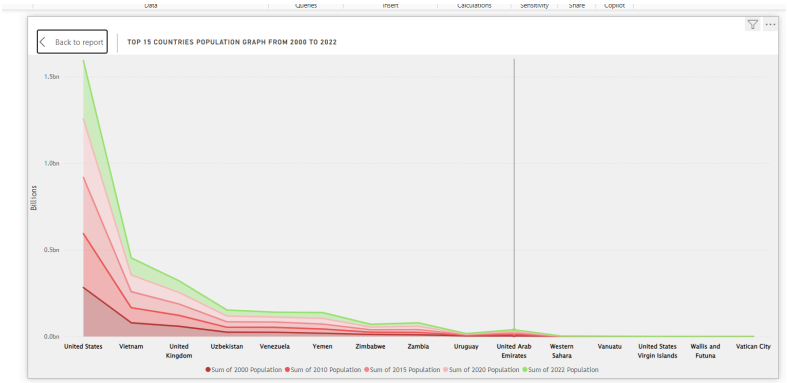
| | • **2022 Population**: Population of the Country/Territories in the year 2022.<br>• **2020 Population**: Population of the Country/Territories in the year 2020.<br>• **2015 Population**: Population of the Country/Territories in the year 2015.<br>• **2010 Population**: Population of the Country/Territories in the year 2010.<br>• **2000 Population**: Population of the Country/Territories in the year 2000.<br>• **1990 Population**: Population of the Country/Territories in the year 1990.<br>• **1980 Population**: Population of the Country/Territories in the year 1980.<br>• **1970 Population**: Population of the Country/Territories in the year 1970.<br>• **Area (km²)**: Area size of the Country/Territories in square kilometer.<br>• **Density (per km²)**: Population Density per square kilometer.<br>• **Growth Rate**: Population Growth Rate by Country/Territories.<br>• **World Population Percentage**: The population percentage by each Country/Territories. |
| **Program:** | 1) Treemap : In this treemap chart, I have visualized the average world population percentage for each country. The size of each rectangle represents the proportion of the world's population that resides in each country, based on the average values. The larger the rectangle, the higher the percentage of the world's population that the country represents. This visualization helps to quickly identify which countries have the largest and smallest shares of the global population, providing a clear and immediate understanding of population distribution across different countries. The use of color can also be leveraged to distinguish between different regions or population ranges, enhancing the clarity and depth of the analysis. |

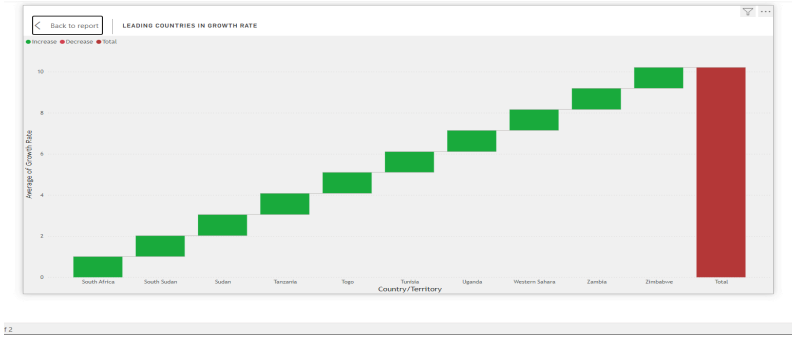



2) Stacked Area Chart:In this stacked area chart, I have plotted the population data of the top 15 countries from the year 2000 to 2022. This chart effectively illustrates the population growth trends over the past two decades, allowing for a clear comparison of how different countries' populations have changed over time. By stacking the areas, we can easily see both the absolute population numbers and the relative growth rates, highlighting any significant changes or patterns in population dynamics among these countries.

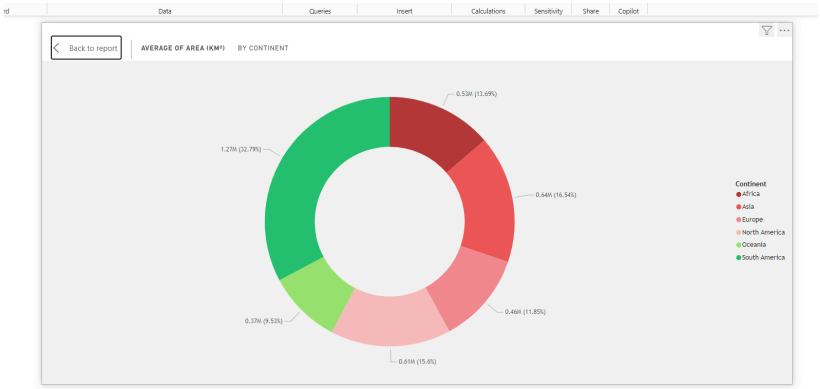



3) WaterFall Chart:In this waterfall chart, I've visualized the growth rates of the leading top 10 countries. Each bar in the chart represents the incremental changes in growth rate for each country, allowing us to see how each country's population or economic indicators have changed over a specific period. The chart effectively highlights positive and negative growth, making it easy

to identify which countries have experienced significant increases or decreases. This visualization is particularly useful for analyzing trends, understanding the contribution of each country to overall growth, and identifying any outliers or notable shifts in the data.




4) Donut Chart:In this donut chart, I have represented the area per square kilometer for each continent. The chart showcases the distribution of land area among the continents, highlighting how much space each continent occupies in comparison to the others. This visualization allows for a quick and clear understanding of the relative sizes of the continents, providing insights into their geographical footprint and helping to identify which continents have the largest and smallest land areas.




5) Funnel Chart:The funnel shape illustrates the distribution of population sizes and growth rates. Countries with larger populations are wider at the top of the funnel, gradually narrowing down to countries

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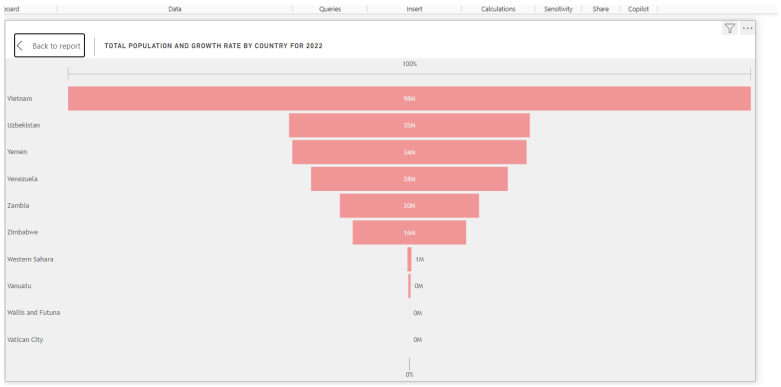
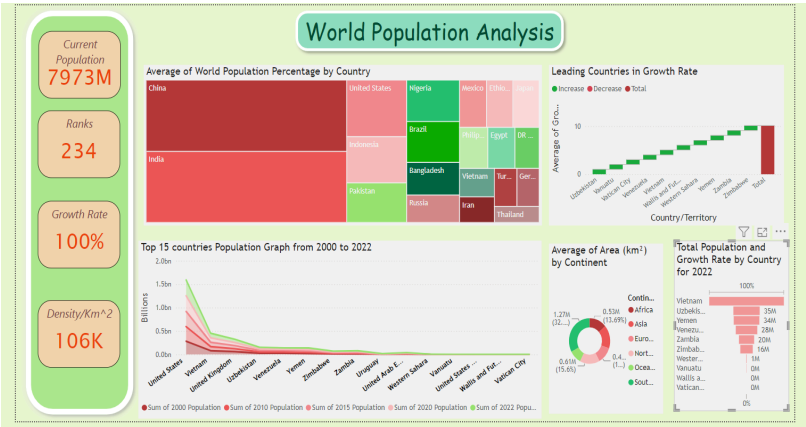
| | with smaller populations. Each stage of the funnel provides a snapshot of both population size and growth rate, showing how growth rates relate to population sizes.<br>  |
| **Result:** | Made A Power BI dynamic report provides information on the population, area, density, and rank of each country from 1970 to 2022. It also captures the growth evolution over the previous few decades, enabling us to analyze which countries are growing, which could result in the largest market, what policies are effective, and which areas in terms of population growth and density require improvement. This study may also be very helpful to companies trying to enter new markets or to governments trying to put in place efficient population control plans.<br>  |

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| **Conclusion:** | In this experiment , I learned how to use PowerBI and created different charts, which helped me analyze this complex world population data . By visualizing the data in various ways, I was able to identify trends and patterns that were not immediately apparent from the raw numbers. This experience has enhanced my data analysis skills and provided valuable insights into global population dynamics. |