Sardar Patel Institute of Technology

SEM VII:ADVANCE DATA VISUALIZATION.

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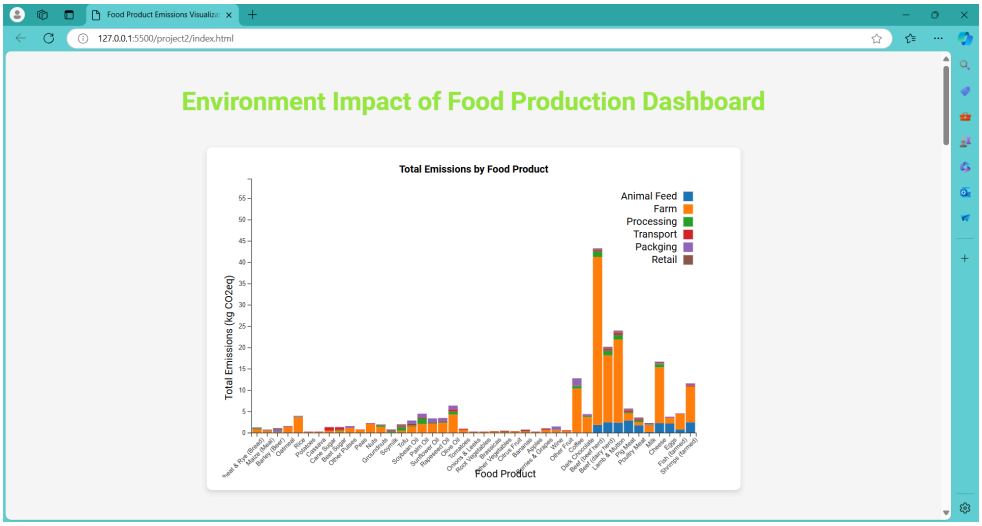
Branch	BE CSE DS (BATCH B)
Experiment no.	8

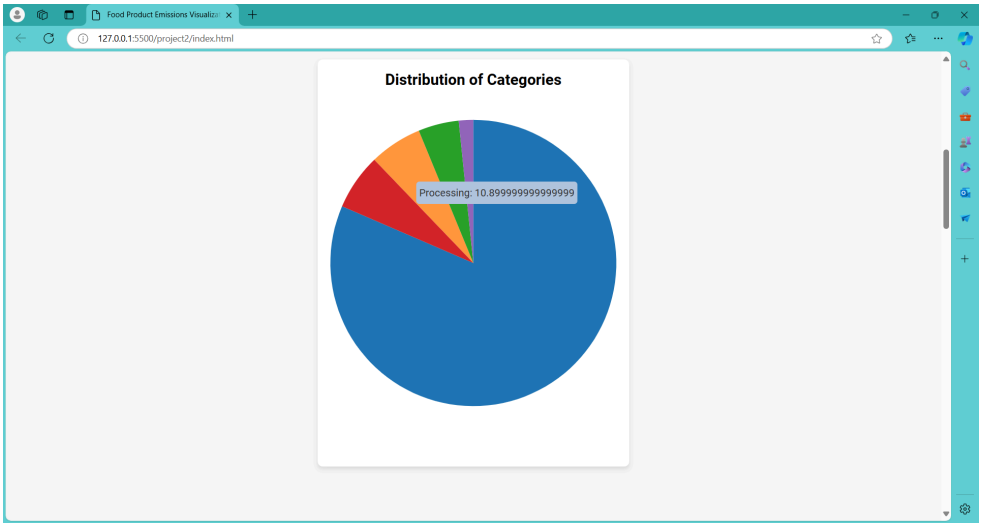
Topic:	To design interactive dashboards and create visual storytelling using D3.js on a dataset related to Environment/Forest cover, covering basic and advanced charts.
Aim:	1. To understand how to use D3.js for data visualization. 2. To implement basic charts like Bar chart, Pie chart, Histogram, Timeline chart, Scatter plot, and Bubble plot. 3. To implement advanced charts like Word chart, Box and whisker plot, Violin plot, Regression plot (linear and nonlinear), 3D chart, and Jitter. 4. To draw observations and insights from each chart. 5. To create an interactive storytelling dashboard using the above visualizations.
Theory:	Link : https://www.kaggle.com/datasets/selfvivek/environment-impact-of-food-production This dataset contains most 43 most common foods grown across the globe and 23 columns as their respective land, water usage and carbon footprints. Columns 1. Land use change - Kg CO2 - equivalents per kg product 2. Animal Feed - Kg CO2 - equivalents per kg product 3. Farm - Kg CO2 - equivalents per kg product 4. Processing - Kg CO2 - equivalents per kg product 5. Transport - Kg CO2 - equivalents per kg product

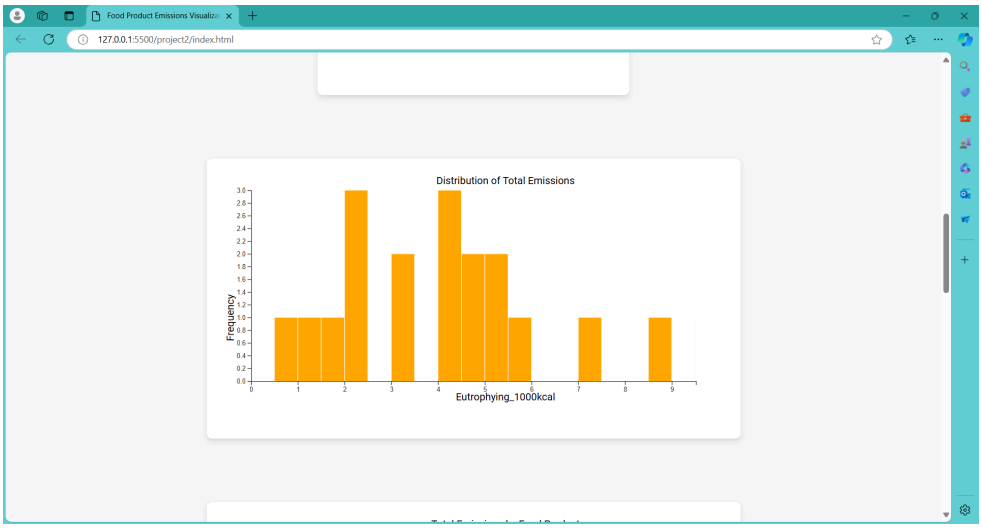
	6. Packaging - Kg CO2 - equivalents per kg product 7. Retail - Kg CO2 - equivalents per kg product These represent greenhouse gas emissions per kg of food product(Kg CO2 - equivalents per kg product) across different stages in the lifecycle of food production. Eutrophication – the pollution of water bodies and ecosystems with excess nutrients – is a major environmental problem. The runoff of nitrogen and other nutrients from agricultural production systems is a leading contributor.
Charts:	**1. Stacked Bar Chart: Emissions Breakdown by Production Stage** **Purpose**: To analyze the contribution of different production stages to total emissions across food products. **Key Insights**: ● Visualizes six key stages: Animal Feed, Farm, Processing, Transport, Packaging, and Retail ● Enables comparison of emission sources across different food products **2. Pie Chart: Distribution of Production Categories** **Purpose**: To show the relative proportion of emissions from different production stages. **Key Insights**: ● Provides a clear visual breakdown of emissions by category (Farm, Processing, Transport, Packaging, Retail) ● Enables quick identification of the most significant contributors to overall emissions **.** **3. Line Chart: Animal-Based Food Emissions Trend** **Purpose**: To track emissions patterns across different animal-based food products. **Key Insights**: ● Focuses specifically on animal-based products including beef, lamb, pig meat, poultry, dairy, eggs, and fish ● Shows emission intensity variations across different animal products

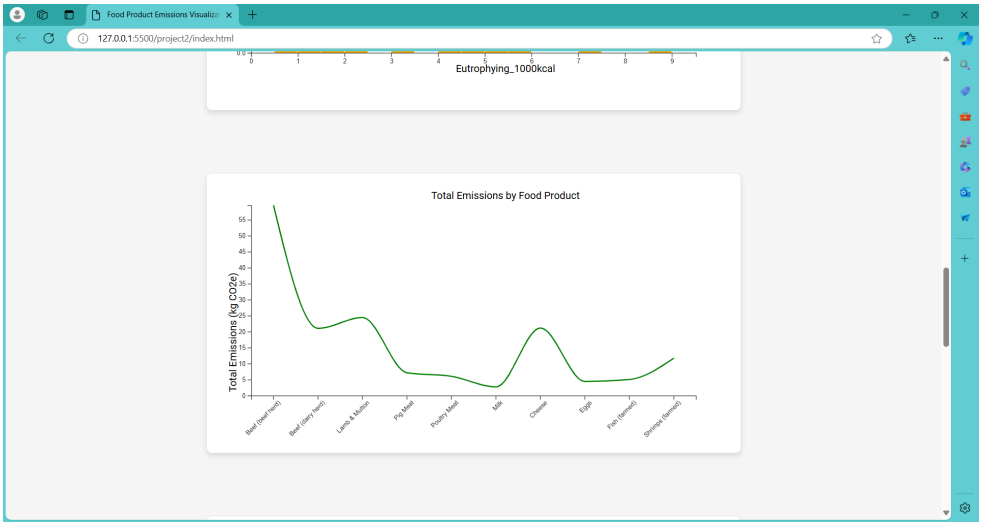
	• Enables identification of high and low-impact animal-based foods **4. Histogram: Distribution of Eutrophying Emissions** **Purpose**: To analyze the frequency distribution of eutrophying emissions per 1000kcal across food products. **Key Insights**: • Shows the spread and concentration of eutrophying emission levels • Identifies common emission ranges and outliers • Reveals the overall pattern of eutrophication impact **5. Area Chart: Plant-Based Food Emissions** **Purpose**: To visualize emission patterns across plant-based food products. **Key Insights**: • Focuses on plant-based foods including grains, vegetables, and pulses • Shows the relative environmental impact of different plant-based foods • Enables comparison of emission intensities within plant-based categories **6. Horizontal Bar Chart: Protein-Rich Foods Eutrophication** **Purpose**: To compare eutrophication impacts across protein-rich food sources. **Key Insights**: • Compares both plant-based (pulses, nuts, tofu) and animal-based protein sources • Shows eutrophication impact per 1000 kcal.

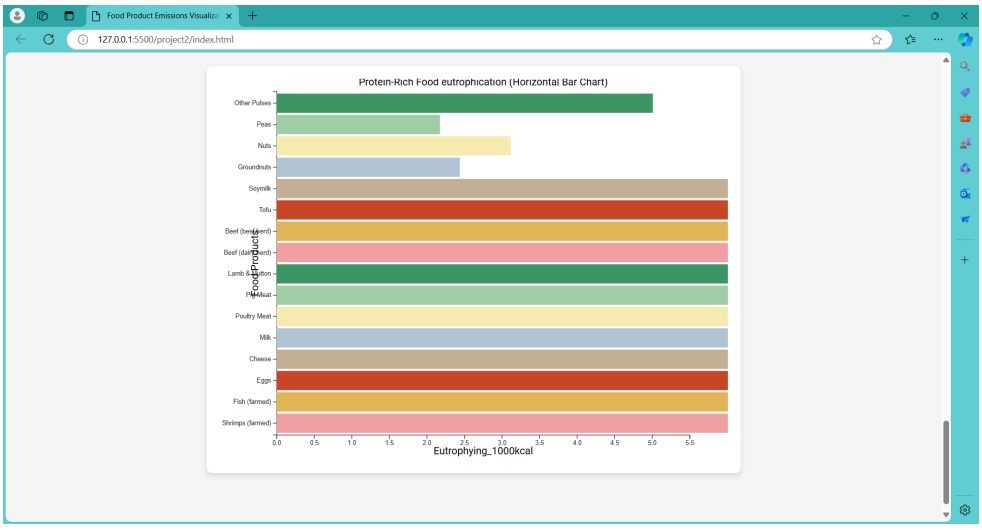
Result:


Food Product Emissions Visualiz
127.0.0.1:5500/project2/index.html
Environment Impact of Food Production Dashboard
Total Emissions by Food Product
Animal Feed
Farm
Processing
Transport
Packging
Retail
Total Emissions (kg CO2eq)
Food Product


Food Product Emissions Visualiz
127.0.0.1:5500/project2/index.html
Distribution of Categories
Processing: 10.899999999999999


Food Product Emissions Visualiz
127.0.0.1:5500/project2/index.html
Distribution of Total Emissions
Frequency
Eutrophying_1000kcal





Conclusion:	In this dashboard, I learned to effectively utilize D3.js for data visualization, which emphasizes that transitioning to plant-based protein sources can greatly mitigate

	eutrophication impacts and overall emissions, especially from high-impact animal products such as beef and lamb.