Data Visualization Report on Global Terrorism Dataset

Introduction

This report presents a series of visualizations aimed at exploring and analyzing global terrorism incidents through various data visualization libraries: D3.js, Plotly, and Bokeh. The visualizations focus on different aspects of the dataset, allowing for interactive exploration and insightful analysis.

1. D3 Visualization: Global Terrorism Heatmap

Overview

The first visualization is a global heatmap that illustrates the number of terrorist incidents by country. It allows users to filter incidents by year and provides tooltips for additional information.

Design Choices

- **Color Scale**: A threshold color scale is used to represent the number of incidents visually.
- **Interactivity**: Tooltips and a year slider enhance user engagement, allowing for a more dynamic exploration of the data.

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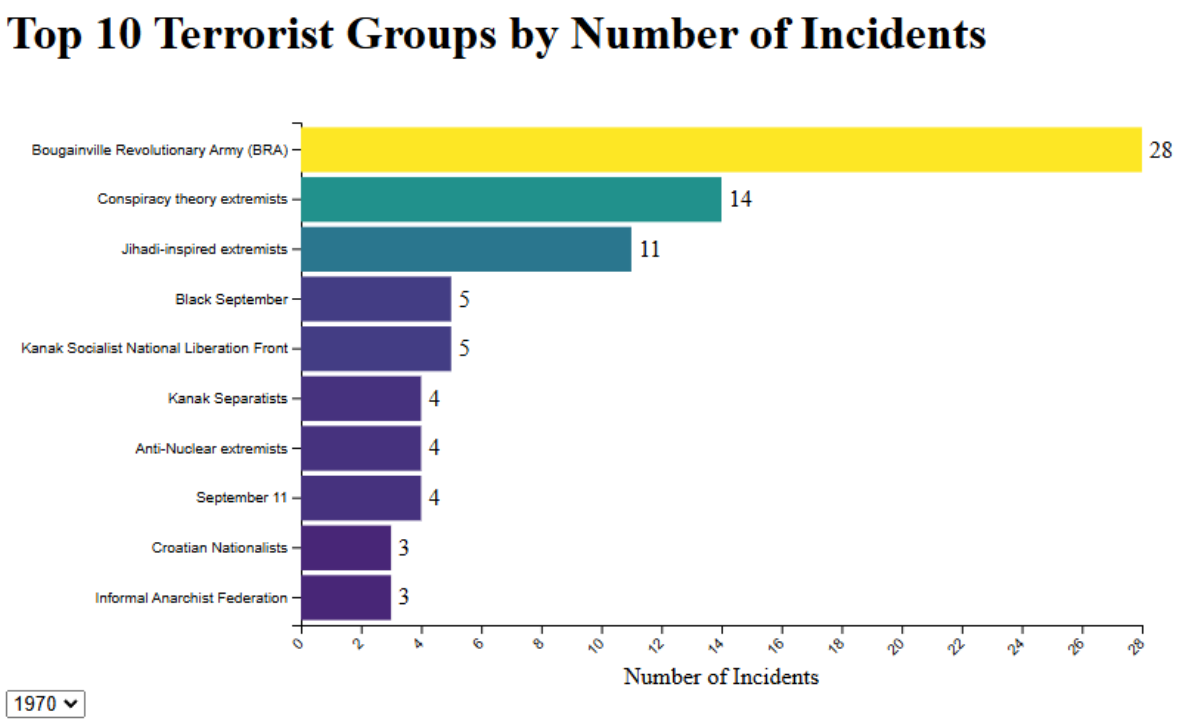
2. D3 Visualization: Top 10 Terrorist Groups Bar Chart

Overview



This visualization is a horizontal bar chart showing the top 10 terrorist groups by the number of incidents. It includes a dropdown menu to select the year and animated transitions when the year changes.

Design Choices

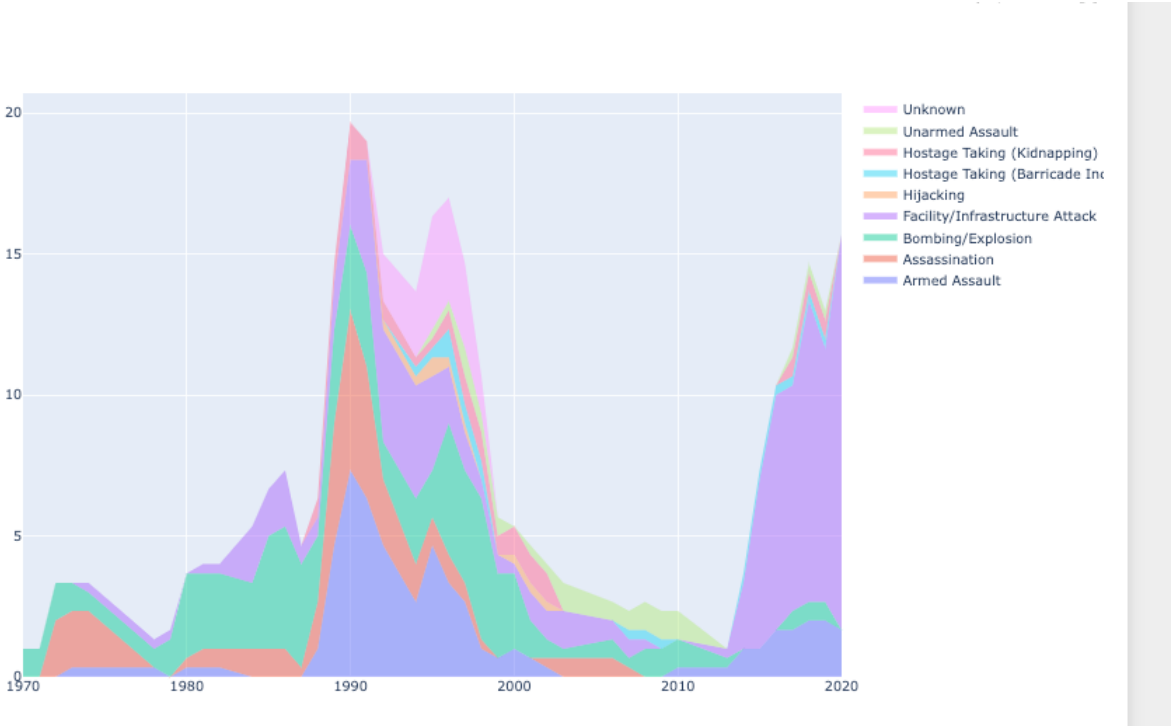
- **Horizontal Bar Chart**: This format efficiently displays the top groups and allows easy comparison.
- **Interactivity**: The dropdown allows users to select different years, and transitions provide a smooth update experience.

- Quick instructions: When running on visual studios, download the live server extension. After the installation is finished, go to the code, right click and click on open live server. This will show the website with the visualization.

- Some insight that was gained some groups are more frequent than others however, the top 10 groups are often closely matched in terms of numbers.

3. Plotly Visualization: Attack Types Over Time

Overview



The Plotly visualization is a stacked area chart representing the distribution of attack types over the years. Users can toggle between stacked, grouped, and 100% stacked views.

Design Choices

- **Stacked Area Chart**: This format effectively shows how different attack types contribute to total incidents over time.
- **Interactivity**: Hover information provides detailed insights, and buttons allow users to change the view dynamically.

4. Bokeh Visualization: Target Types and Casualties

Overview

This interactive scatter plot visualizes the relationship between target types and casualties. It allows users to filter the data by year using a range slider.

Design Choices

- **Scatter Plot**: This format highlights relationships between two continuous variables (killed and wounded).

- **Data Preparation:**
    - Pandas is used to load and preprocess the data from a CSV file.
    - The 'year' column is converted to datetime format for easier filtering.
    - NaN values are replaced with 0 for casualties, and total casualties are calculated.
- **Visualization Type:**
    - A scatter plot is created using Bokeh, where each point represents an incident.
    - The x-axis represents the number killed, and the y-axis represents the number wounded.
- **Visual Encoding:**
    - The size of each point represents total casualties (killed + wounded).
    - The color of each point indicates the target type.
- **Color Scheme:**
    - The Category20 color palette from Bokeh is utilized for different target types.
    - Color mapping is done using factor_cmap to assign colors to unique target types.
- **Legend:**
    - The legend is positioned on the right side of the plot.
    - It displays different target types, each with its corresponding color.
    - Customizations include:
        - Click policy set to "hide" (allows toggling visibility of data points by clicking on legend items).
        - Font size of 8pt.
        - Spacing of 1.
        - Glyph height of 15.
        - Label height of 15.
        - Label width of 150.
- **Interactivity:**
    - Tools for panning, wheel zooming, box zooming, and resetting are included.
    - A hover tool displays information about each point (target type, number killed, number wounded).
    - A range slider is implemented to filter data by year range.
- **Layout and Sizing:**
    - The main plot dimensions are set to 1000 pixels wide and 600 pixels high.

    - The range slider is placed above the main plot.
- **Output:**
    - The visualization is saved as an HTML file.
    - The HTML file is automatically opened in the default web browser.
- **Additional Features:**
    - A custom JavaScript callback for the year range slider dynamically updates the plot.
    - ColumnDataSource is used for efficient data handling in Bokeh.

Conclusion

The series of visualizations presented in this report utilize different data visualization libraries to analyze and explore the global terrorism dataset. Each visualization emphasizes different aspects of the data while providing interactive elements to enhance user engagement and understanding. By combining various techniques, the visualizations collectively offer comprehensive insights into the trends and patterns of terrorism incidents worldwide.

Year Range: **1970 .. 2020**