Dataset Description:

The dataset is from NOAA's National Weather Service. It includes various attributes such as state, event type, year, direct and indirect injuries and deaths, property and crop damage, and the magnitude of events. The dataset spans several years and allows for the analysis of trends and patterns in storm occurrences and their impacts.

Attributes used for this project:

STATE:

- Type: Categorical
- Semantics: The name of the state where the event occurred (in ALL CAPS).

EVENT_TYPE:

- Type: Categorical
- Semantics: The type of meteorological event leading to fatalities, injuries, damage, etc.

YEAR:

- Type: Quantitative
- Semantics: The four digit year for the event in this record.

INJURIES_DIRECT:

- Type: Ordered (Quantitative)
- Semantics: The number of injuries directly caused by the weather event.

INJURIES_INDIRECT:

- Type: Ordered (Quantitative)
- Semantics: The number of injuries indirectly caused by the weather event.

DEATHS_DIRECT:

- Type: Ordered (Quantitative)
- Semantics: The number of deaths directly caused by the weather event.

DEATHS_INDIRECT:

- Type: Ordered (Quantitative)
- Semantics: The number of deaths directly caused by the weather event.

DAMAGE_PROPERTY:

- Type: Ordered (Quantitative)
- Semantics: The estimated amount of damage to property incurred by the weather event (in dollars).

DAMAGE_CROPS:

- Type: Ordered (Quantitative)
- Semantics: The estimated amount of damage to crops incurred by the weather event (in dollars).

MAGNITUDE:

- Type: Quantitative
- Semantics: The measured extent of the magnitude type, typically used for wind speeds (in knots) and hail size (in inches).

Questions:

Below are the questions my visualization answered.

1. How is the frequency of a particular storm distributed over the states across the past years?
2. How are the trends of injuries, deaths, and damages changed over the past years due to storm events?
3. what is the relationship between the intensity of a storm and the number of injuries or damages?

The project is an interactive data visualization tool that utilizes NOAA's National Weather Service data to analyze and present the geographical distribution and impacts of storm events across the United States over a 23-year period. It features a detailed choropleth map with dynamic user interface elements such as a dropdown menu and a time slider for selecting storm types and years. The tool also integrates line charts and scatter plots to illustrate trends in storm-related injuries, deaths, and property or crop damages, as well as to explore the correlation between storm intensity and these impacts. The design focuses on user interactivity and intuitive data representation, employing color scales and icons for easy understanding of various storm categories.

Task 1 of the project involves creating a choropleth map to visualize the geographical distribution of storm events across various states. This map displays event counts for each state, with darker shades indicating higher frequencies. The map is enhanced by a filter (dropdown menu) allowing users to select specific storm types, and a time slider to observe changes over the last 23 years. The task is designed to identify regions prone to certain storm events and understand their distribution over time, aiding in geographic and temporal analysis of storm patterns.

The project categorizes storm events into six distinct types, each represented by a unique color scale and specific icons on the choropleth map. These categories include Winter Weather and Cold Events, Severe Storms and Wind Events, Heat and Drought Events, Water-Related and Flooding Events, Atmospheric and Visibility Events, and Special and Rare Events. Each category is visually distinguished to aid in the identification and analysis of different storm types and their geographic distribution.

The colors for each storm category were chosen to intuitively represent the nature of the events. For instance, Winter Weather and Cold Events use a cool color scale, while Heat and Drought Events employ warm colors like orange. This intuitive color mapping aids in quickly identifying and differentiating between various storm types on the choropleth map.

Task 2 focuses on analyzing the trends in storm-related impacts using line charts. Specifically, it illustrates the changes in injuries, deaths, property damages, and crop damages over 23 years. These charts, differentiated by colors, allow users to select a specific state and observe how these impacts have evolved in that state over time, offering a focused and detailed analysis of the temporal trends of storm consequences.

Task 3 in the project involves the use of scatter plots to explore the relationship between the intensity of storms and their impact. This task includes two types of scatter plots: one showing the correlation between storm intensity (like wind speed or heat temperature) and the number of injuries and deaths, and another depicting the relationship between storm intensity and the extent of property and crop damage. This approach helps in visually identifying patterns and understanding how the severity of storms affects their impact on people and property.

The project incorporates interactive elements allowing users to engage dynamically with the visualization. Users can select specific storm types from a dropdown menu and adjust the time slider to view data from different years. Additionally, clicking on a state on the choropleth map updates the line charts and scatter plots to display data relevant to that state, enhancing the user's ability to perform focused, state-specific analyses of storm patterns and impacts.

In the visualization project, various marks and channels are utilized:

Choropleth Map: Uses color saturation as a channel to mark storm event frequency across states. Different shades indicate varying event counts, with darker shades representing higher frequencies.

Line Charts: Employ lines (marks) with their position along the X and Y axes (channels) to display trends in injuries, deaths, and damages over time.

Scatter Plots: Utilize dots (marks) positioned according to storm intensity (X-axis) and impact (Y-axis) to show correlations between these variables.

Geographical Distribution: The choropleth map, with its color gradients and state-specific data, shows the frequency and types of storm events across states, answering questions about regional storm patterns.

Trend Analysis: Line charts depicting injuries, deaths, and damages over time allow for the examination of trends, answering questions about how storm impacts have evolved.

Intensity-Impact Correlation: Scatter plots correlate storm intensity with injuries, deaths, and damages, providing insights into how storm severity affects its consequences.