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Project Design

Examining the Evolution of Aviation Fatalities (1960 – 2022)

This project looks at airplane accidents from 1960 to 2022 using easy-to-understand charts. By studying crash causes, fatalities, and trends, we aim to learn more about air travel safety. The visuals help us see patterns, making it easier to improve safety in the future.

Anticipated Insights:

1. Observing yearly trends in total fatality numbers.
2. Examining patterns in crash causes concerning flight age and corresponding fatality rates.
3. Assessing survival rate variations based on crash locations.
4. Exploring crash site patterns across different flight types.
5. Investigating peak crash hours during distinct flight phases.
6. Identifying aircraft models with higher crash frequencies and total fatalities in the commercial sector.
7. Visualizing the cumulative crash count categorized by both crash causes and sites.

Visualizations and Encoding:

Line Chart

Visual encoding: The line chart presents a temporal depiction of total number of crashes from 1960 to 2022.

Rationale: The line chart offers a chronological view of total fatalities from 1960 to 2022, with the horizontal axis detailing the years for temporal analysis. The vertical axis quantifies total crashes yearly, ensuring a clear quantitative scale. The connecting line depicts trends, facilitating the observation of patterns and fluctuations in total crash numbers over the specified period.

Butterfly chart:

Visual encoding: The butterfly chart will represent the relationship between aircraft crash causes and their association with the average aircraft age and the fatality Rate.

Crash Causes on Common Axis with **Average Aircraft Age** (Left Side) and **Fatality Rate** (Right Side)

Rationale: The butterfly chart design facilitates a direct visual comparison of aircraft crash causes along a common axis. Its balanced layout associates the average aircraft age with causes on the left, revealing potential trends. Fatality rate on the right, highlighted with darker shades, emphasize severity. The color gradient adds insight, aiding the identification of correlations**.**

Bubble Bar Chart:

Visual encoding: The bubble bar chart visually represents the relationship between aircraft crash causes and their associated average survival rates.

crash causes on the horizontal axis and average survival rates on the vertical axis. This provides a clear understanding of the relationship between these key variables.
Rationale: The bubble chart features average survival rates on the vertical axis for a clear representation of trends, with higher positions signifying better survival outcomes. Crash locations, presented as categorical data on the horizontal axis, allow for location-based survival rate comparisons. The bubble size reflects the magnitude of average survival rates, emphasizing locations with superior outcomes through larger bubbles.

Stacked Bar Chart:

Visual Encoding: The stacked bar chart illustrates crash distribution by flight type.
The vertical axis indicates the percentage of total crash sites, with different flight types on the horizontal axis. Segmented bars show proportional contributions for each type.
Rationale: The percentage of total crash sites on the vertical axis in the stacked bar chart offers a clear, quantitative representation of distribution for each flight type. Using different flight types on the horizontal axis allows categorical comparison, while stacked segments provide a visual breakdown proportional to their contribution, facilitating precise interpretation of crash patterns.

Line Chart

Visual Encoding: The line chart visually depicts the correlation between the number of crashes and hours of the day.
Rationale: The line chart portrays crash frequency by placing the number of crashes on the vertical axis, providing a quantitative scale. Using hours of the day on the horizontal axis offers a temporal representation, facilitating observation of crash patterns. The connecting line visually reveals trends and variations, providing insights into potential correlations or patterns in the data.

Grouped Bar Line Chart

Visual Encoding: The grouped bar line chart visually compares aircraft types based on crash data for commercial flights for top 15 crash count records.
Rationale: The grouped bar line chart presents aircraft types categorically on the horizontal axis for easy identification. The primary vertical axis employs bars to quantify crash frequencies, while the secondary axis uses a line chart to connect data points, representing total fatalities. This combination offers a comprehensive view of crash severity alongside frequency for each aircraft type.

Tree map

Visual Encoding: The tree map visually encodes crash data, where the area of rectangles corresponds to the total number of crashes, reflecting the aggregated counts for specific crash site and cause combinations.
Rationale: The tree map employs rectangle area to effectively represent total crashes, with larger rectangles indicating higher crash frequencies for specific site-cause combinations.

Different colors assigned to crash causes within rectangles enhance visualization, aiding the identification of patterns or dominant causes across various crash sites for a comprehensive understanding.

Line Chart

Visual encoding: The line chart presents a temporal depiction of total fatalities from 1960 to 2022.

Rationale: The line chart offers a chronological view of total fatalities from 1960 to 2022, with the horizontal axis detailing the years for temporal analysis. The vertical axis quantifies fatalities, ensuring a clear quantitative scale. The connecting line depicts trends, facilitating the observation of patterns and fluctuations in fatality rates over the specified period.

Conclusion:

In this project, we will use Tableau to evaluate historical flight crash data. We intend to effectively study numerous aspects of crash data, highlighting critical factors such as crash causes, Average fatality rates, types of aircrafts and draw meaningful results to the above-mentioned questions precisely to make sense of every visualization we create.