École Polytechnique Fédérale de Lausanne

Data Visualization

Air Crash Investigation

TEAM MEMBERS:

Andrija Jelenković, Lazar Radojević, Aleksa Milisavljević

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1 Visualization Ideas

We intend to present the dataset using three main visualizations:

1. Using an interactive map of the United States, we want to show the density of plane crashes per state. In the data analysis for the first milestone, we have noticed that this number varies greatly across different states. For example, California, Texas, and Florida have significantly more crashes, than the majority of other states. The first sketch of this is below:

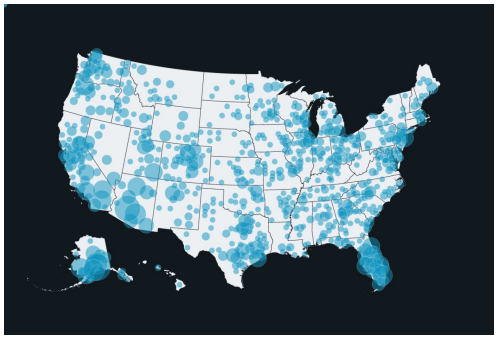

Figure 1.1: Heatmap of plane crashes that occurred in the United States

   We aim to make this map interactive, by enabling users to select the period during which the accidents happened.

2. Afterwards, we would like to illustrate the evolution of aviation. This visualization would show temporal trends in aviation, by plotting a number of crashes on a spiral. This type of illustration is called '**condegram**'. Every 360 degrees of the spiral would contain data of 5-15 years, divided on a monthly basis while utilizing different colors. For example, as observed in the data analysis of the first milestone, we notice an overall decrease in the number of crashes. Because the data is divided on a monthly basis, this visualization would also illustrate the frequency of plane crashes through different seasons of the year:

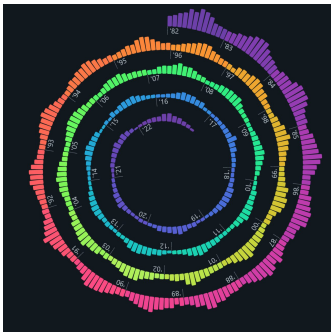

Figure 1.2: Temporal trends in plane crashes

   We were inspired by Kirel Benzi's Circadian Rhythm.

3. For our final visualization, we aim to show the mapping between the plane models and the U.S. states in which they crashed. We would position the most popular plane models on a circle surrounding a map of the U.S. Each plane model would be connected to the states by the line, the thickness of which would depend on the number of crashes in the given state.

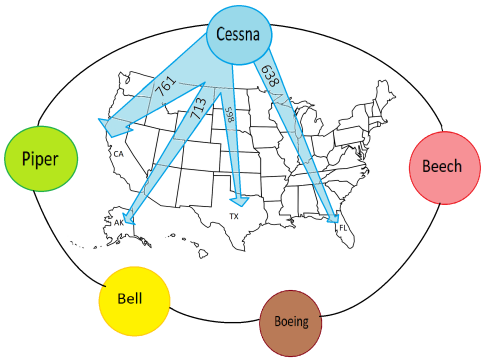

Figure 1.3: Correlation between models and states

2 Tools and Lectures

This work is heavily inspired by **Lecture 1: Introduction to Data Visualization** (and in particular the work of Kirell Benzi) and **Lecture 8: Maps**. We wanted to make this as simple and fast as possible and that is why, apart from **D3.js** we are using three more packages:

- **TopoJSON**: an extension of GeoJSON that encodes topology which is needed for drawing maps. Its advantage over other formats is that it is very compact so it can be loaded pretty fast.
- **Pico CSS**: a simple class-less CSS library suitable for quickly making website prototypes.
- **Vite**: a state of the arc build tool for bundling JS files with sane defaults.

3 Goals and Additional Work

The three described visualizations are the main focus of the project. We intend to work on them independently. As additional work, we list the following enhancements for these visualizations:

- As an enhancement to the first visualization, we are considering adding more filters or sliders. These would include filtering by the phase of flight during which the plane crashed, the number of wounded or mortally wounded in those crashes, etc. We aim to include interactivity in this visualization as well. Hovering or clicking on particular crashes could show some descriptive statistics for that region.
- We are thinking about making the second visualization more descriptive, by adding the information about the most fatal crash in the given month. When a user clicks on a particular month, we would write this information in the center of the circle and also present the report status, if available from the dataset.