

The Map-based Airlines' Visualization with Twitter Sentiment Analysis

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1 Introduction

As a major public transportation, airline market has been ushering a booming development. On a global scale, a continuous world-wide growth of air traffic could be observed, and according to several market researches, the growth is expected to maintain positive rates up to 2030.

However, there are many factors that affect the performance of the commercial aviation system, which can lead to annoying results to their passengers sometimes. Given the uncertain factors of the whole aviation system, passengers usually have to plan their travel many days or even months before the departure date. Meanwhile, in order to decrease the trip costs, avoid the rush traffic hours, and then obtain a relaxed travel experience, travelers also hope to gain as more detailed information as possible.

Converting the traditional numeric information into a more vivid visualization form, could help the viewers gain their desired information efficiently and easily. So, we intend to build a map based interactive consulting visualization, which combines two data sets coming from the US Department of Transportation's Bureau of Transportation Statistics. We hope this application can reveal some potential patterns under the flight records and display them to the viewers [1].

2 One-sentence description

Combining two US domestic flights data sets to build a map-based consulting visualization, we intend to give an efficient and direct view to viewers that could assist them in making further decisions.

3 Project Type

Web-based consulting interactive application

4 Audience

Our target audiences are force on travelers and airline industry managers.

- Travelers: According to our application, they can make plans for their next trip through the reference supported by the application, so that they can comparing price, service, time period, route and so on, while they purchase the airline tickets.
- Airline Industry Managers: Based on the current operation airlines, different airline industries can adjust their strategy, exploring new airlines, improving their customer service based on the feedback, modifying the operation progress to reduce the occurrences of delay, cancelation and deviation.

5 Approach

5.1 Overall image

We plan to place a US national map as our main view, which can be zoomed in and out. There are circles with different size and darkness of color to distinguish the popularity of airports. Besides, there is a drop menu sit at the right part of the map, which is associate with the map to offer a way that allowing input from viewers.

5.2 Detail and filter functionality

While viewers click a specified state or select the departure and arrival places, the related flights information will be displayed. In addition, we will append the statistical data via bar chart, pie chart and other varieties to give a more comparable and readable image to viewers.

We try our best to let the application involving the detail and overall facets of the datasets we use and

dividing the whole visualization into several layers, so that viewers can easily understand the logical of the views without any adaptive period. On the other side, the past records are good references for the future, and using different tools to aggregate the scattered data, it may present worth information later then.

6 Best-case Impact Statement

In the best-case, on the one hand, a customer could find out which airline is a good choice to choose in a given day (day of the week) or in the case of known departures and destinations based on our visualization. At the meantime, a customer could find out what are the most popular places to take a tour. On the other hand, a airline manager could improve their quality based on the visualization, since it could help him or her to find the problem.

Moreover, we will focus on how to make the model be scalable instead of only being suitable for a specific dataset.

7 Major Milestones

- Achieve a Zoom-in and Zoom-out map view.
- Achieve a word filter.
- Find the correlation between the two datasets and integrate the two.
- Full experiment to compare all chosen visualization across all chosen metrics.
- Make the model scalable. Improve the performance of the whole visualization since we have a huge dataset.

8 Obstacles

8.1 Major obstacles

- Transfer the airlines and the airports into node and edge visualization [6], try to apply Node-Trix [5].
- Do research about how to deal with social dataset as well as combine the Twitter data with the airline dataset.
- The airline dataset is huge, how to appropriate present all airline and make interactions between views are two big problems for us.

8.2 Minor obstacles

- Using react.js, AWS, Java (or Python) and d3.js to design a website.
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9 Resources Needed

- Code to generate Map data visualization as our main view to depict the airports and the airlines.
- Code to make bar charts to reflect additional information such as sensitive feature and delay information.
- Code to make word filter to emphasise sentiments of Twitter users.
- Code to airport filter to help people make further decision.
- A thorough literature review of social data visualization.
- Integrate the above features with our experience of JavaScript, React.js, d3, Java (or Python), AWS and R to create an useful interactive data visualization.

10 5 Related Publications

List 5 major publications that are most relevant to this project, and how they are related.

- It gives an idea that how to depict a visualization of adjacency relations in hierarchical data, especially with a huge dataset [6].
- They presented a visual analysis of Twitter time-series, which combines sentiment and stream analysis with geoand time-based interactive visualizations for the exploration of real-world Twitter data streams [3].
- It introduced a novel visualization called Node-Trix [5].
- It restyles many useful and powerful d3 data visualizations [4].
- Elijah combined d3 with React which makes use of both two advantages to improve performance, and It's also a good way to deal with interactive visualizations. [2]

11 Define Success

If a customer could find out which airline is a good choice to choose in a given day (day of the week) or in the case of known departures and destinations based on our visualization, we would say it is a success.

References

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