Assignment 2

Interactive Data Visualisation in R

GEOM90007

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Summary:

An examination of the performance of the air travel network in a country yields valuable insights into its aviation system. The **"Flight Performance"** Dashboard for the United States in the year 2015 provides a comprehensive view of flight data, empowering users to explore and comprehend various aspects of air travel within the country during that specific year. The data for this dashboard was sourced from Kaggle and comprises three primary datasets: flights, airlines, and airports. The Flights dataset furnishes details about individual flights, including information such as arrival times, departure times, scheduled durations, airline affiliations, and flight numbers. The Airport dataset offers insights into airports, including their geographical locations. Lastly, the Airlines dataset provides essential IATA codes for the airlines operating within the United States.

The dashboard comprises three distinct tabs, with the **"Graphs"** tab serving as a comprehensive repository of information pertaining to airline performance. This tab features a combination of static and dynamic charts. The static chart offers insights into the average arrival and departure performance for each of the 14 airlines across all airports. In contrast, the dynamic charts provide users with the ability to explore monthly delay trends for specific airlines, examine the reasons behind delays for a chosen airline, and access a list of the top airports with the highest total delays for the selected airline. Users can customise the number of airports displayed (5, 10, 15, or all) using the **"Number of Airports to Display"** filter. For user convenience, all charts within the dashboard have been generated using Plotly, a tool selected for its ability to simplify the process of downloading charts as PNG images. Users can effortlessly obtain a chart image by clicking on the camera icon that appears when hovering over a chart. Moreover, the charts offer a highly interactive experience, enabling users to perform actions like zooming in, zooming out, and highlighting specific data points through features such as box selection. This interactivity enhances the usability and exploratory capabilities of the charts.

Note: In all charts, a positive data point indicates a delay (departure or arrival delay) and a negative data point generally indicates an early arrival.

In the dashboard's **"Map"** tab, users can visually analyse vital air travel statistics for the entire country. These statistics encompass the total flight count, the percentage of flights experiencing arrival delays, the percentage of flights experiencing departure delays, and the percentage of cancelled flights. Moreover, it includes a choropleth map that effectively portrays these statistics at a state-by-state level. Users can apply filters by using the **"Select Month"** filter to narrow down the data by specific months or view it for the entire year. Moreover, there is an option to download the dataset used to create the map, enabling users to access and analyse the data independently.

The **"Data Summary"** section serves as a valuable resource for users seeking insights into the datasets that underlie this dashboard. It offers comprehensive information about the datasets used in creating the dashboard, allowing users to familiarize themselves with the various codes used in the visualizations and filters. Furthermore, users can directly download these datasets from the dashboard. This functionality proves especially useful in providing data access to individuals who may not have direct access to the original datasets, facilitating independent analysis, particularly when the dashboard is hosted on a remote server.

Appendix: Sources and References

Plotly Functions Usage:

- **Source**: Plotly Documentation
- **Description**: Used for creating interactive charts and graphs in the interface.

Choropleth Map Design Reference:

- **Source**: YouTube Tutorial
- **Description**: Referenced for designing the choropleth map to visualise geographical data.

Dashboard Template Creation:

- **Source**: Shinydashboard Documentation
- **Description**: Used to structure the dashboard layout and tabs.

Download Button Implementation:

- **Source**: Shiny Documentation
- **Description**: Implemented the download button for exporting data.

Filters Implementation:

- **Source**: Stack Overflow Post
- **Description**: Provided guidance on creating interactive filters.

Value Box Creation Reference:

- **Source**: Shinydashboard Documentation
- **Description**: Used for creating value boxes to display key statistics.

Data Table Creation Reference:

- **Source**: DT Documentation
- **Description**: Used to create and customise data tables.

Dataset Source:

- **Source**: Kaggle - Flight Delays Dataset
- **Description**: Source of the datasets used in the interface for analysis.

Map Tab Idea Reference:

- **Source**: https://github.com/yyeva022/dashboard_flight
- **Description**: Source of idea for the map tab design.