Project 3 Group 15:

Interactive Visualizations of Online Food Orders

Introduction

In this project, we aimed to analyze demographic trends in online food orders using a dataset sourced from Kaggle. Our primary goal was to create an interactive visualization dashboard and map that would allow users to explore these trends through various filters. We utilized a Flask backend to manage API requests and handle data querying, while the frontend was built using Plotly and Leaflet in JavaScript. This project provides insights into how gender, marital status, and other demographic factors influence online food ordering behavior.

Data Cleaning and Database Creation

The dataset was initially provided as a CSV file and needed minimal cleaning, as it was already well-structured. The only modifications required were renaming some of the columns for clarity and dropping irrelevant columns such as "Order Feedback." After cleaning, the dataset was converted into an SQLite database. This step was crucial for efficiently querying the data within our Flask application and generating the necessary visualizations.

Color Design Considerations

For the visual design, we chose a color palette featuring light and fresh blues and greens. These colors were selected to align with the theme of "fresh food," creating a visually appealing and cohesive experience for the user. The color scheme not only enhances the aesthetic of the dashboard but also helps in distinguishing between different data elements effectively.

Website Architecture

Our website is structured into five main pages:

1. **Homepage**: Provides an overview of the project and research questions.
2. **Dashboard**: Displays various visualizations, allowing users to filter data based on gender and marital status.
3. **Map**: Showcases the geographic distribution of orders, with filters for occupation.
4. **About Us**: Offers background information about the team and the project.
5. **Works Cited**: Lists the sources and tools used in the project.

This structure ensures that users can easily navigate through the site and access the information they need.

Dashboard Design Concepts

The dashboard features three key visualizations:

1. **Bar Chart of Education**: Displays the education levels of individuals, with the ability to filter by gender and marital status.
2. **Donut Chart of Employment**: Shows the distribution of different occupations among the dataset, also filterable by gender and marital status.
3. **Violin Plot of Age**: Illustrates the age distribution across different genders and marital statuses.

These visualizations are designed to provide a comprehensive overview of the demographic trends in online food ordering.

Answering the Research Questions

The dashboard allows us to explore several research questions:

1. **Is there a difference in education level based on gender and marital status?**
    - The bar chart reveals that single individuals tend to have a higher education level compared to their married counterparts.
2. **Does gender or marital status relate to occupation?**
    - The donut chart indicates that single individuals are more likely to be students and are less likely to be self-employed compared to married individuals.
3. **What is the distribution of ages for different genders and marital statuses?**
    - The violin plot shows that the distribution of ages is not significantly affected by marital status or gender.
4. **Does an individual's location and occupation indicate their level of education?**
    - The map visualization, filtered by occupation, shows no clear connection between location and education level.

Bias and Limitations

The dataset is based on a single city in India, which limits the generalizability of our findings. Additionally, the dataset lacks information on how and when the data was collected, which could introduce biases. The available categories and response options are also limited, potentially overlooking other relevant factors.

Conclusions and Reflection

Through our analysis, we discovered several trends:

- **Single individuals tend to have a higher level of education.**
- **Single individuals are more likely to be students and are less likely to be self-employed.**
- **The distribution of ages does not appear to be influenced by marital status or gender.**
- **There is no evident connection between an individual's location and their education level.**

These findings provide valuable insights into the demographic factors influencing online food ordering behavior. However, the scope of the dataset limits the conclusions we can draw. The analysis is specific to a single city, and the lack of detailed data collection information means these trends might not hold true in different contexts. This project has underscored the importance of considering data limitations and context when interpreting results. Moving forward, expanding the dataset and exploring additional factors could yield a more comprehensive understanding of the demographic trends in online food orders.