

Deliverable 3

Boston Bus Transit Performance

Team E: Taesung Yoon, Jin Young Bang, Minh Le, Katie Rimey, Duc Minh Nguyen

Motivation

Public transportation plays an important role in the quality of life for residents in Massachusetts and Boston in terms of economic development, the environment and equity.

Goal

To better understand the impact of bus performance on Boston residents.

Extension Proposal

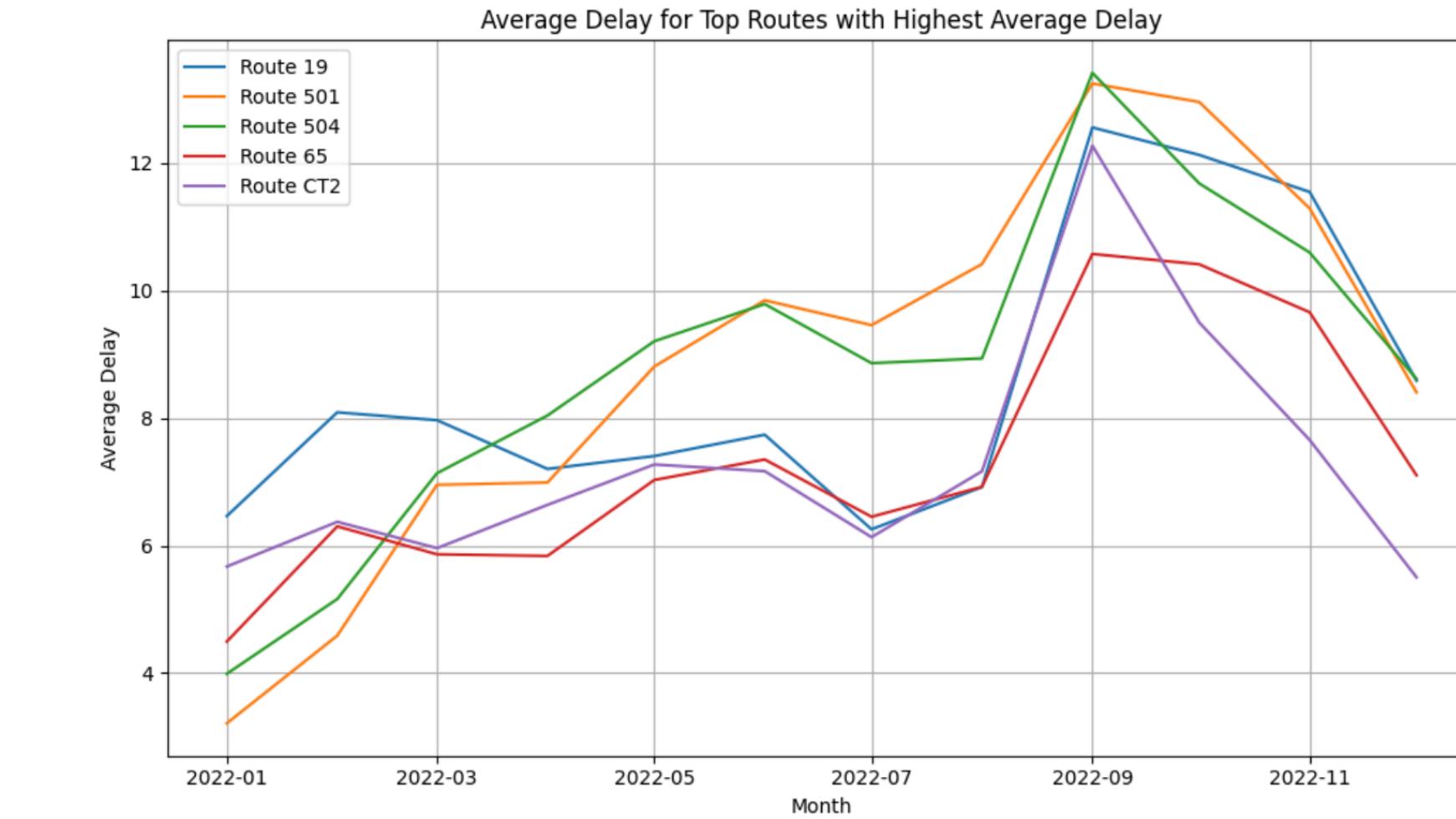
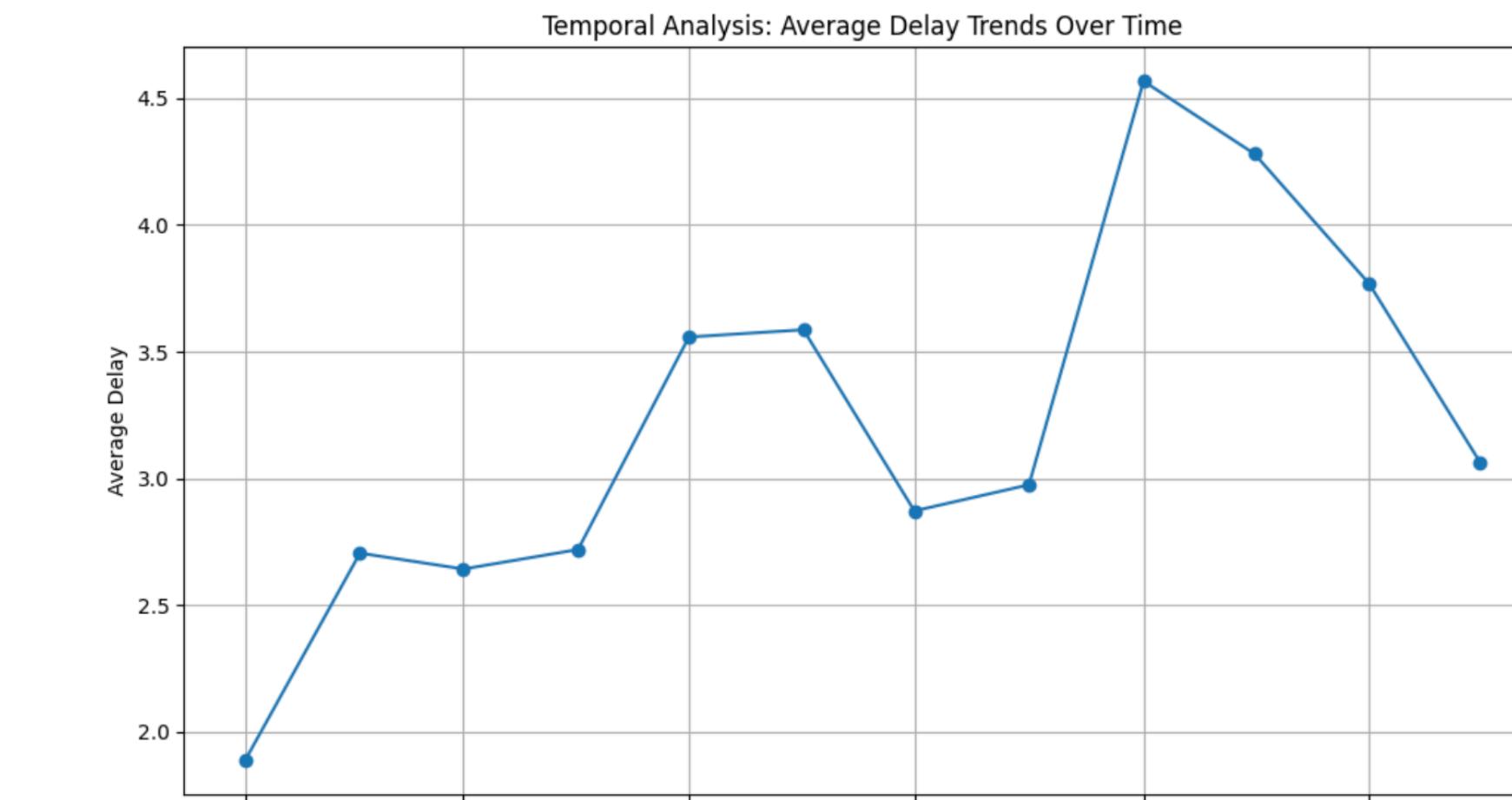
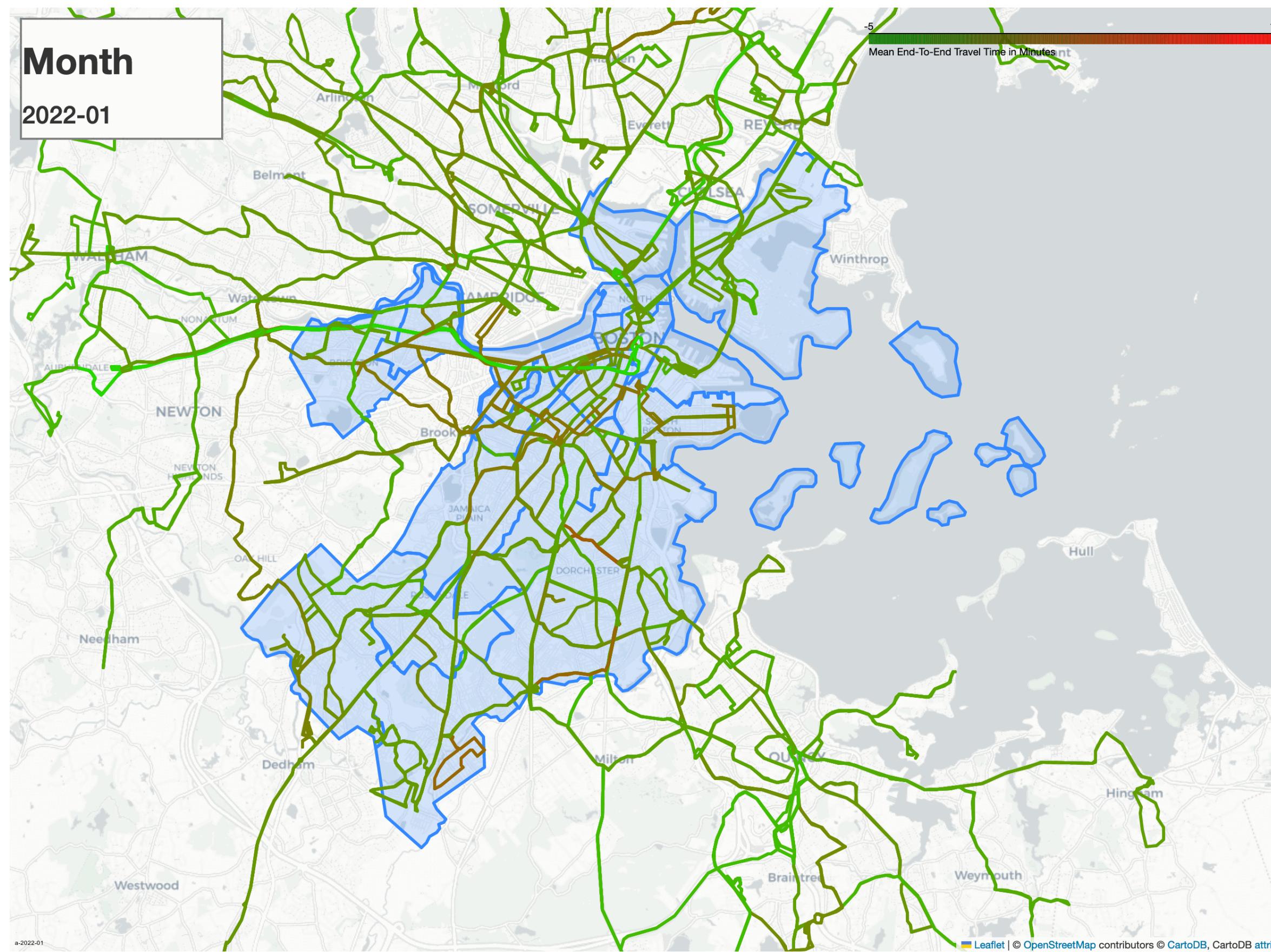
| | |
|--------------------------------|---|
| Extension Pitch | To explore the impact of seasonal times and rush hours on transportation patterns. By scrutinizing data across weekdays, weekends, and specific times a longer time frame we seek to uncover nuanced insights that can inform urban planning and traffic management strategies. |
| Rationale | Understanding variations in transportation patterns during rush hours and seasonal changes is crucial for optimizing urban mobility. This extension provides an opportunity to reveal hidden trends within the dataset, aiding in resource allocation and infrastructure enhancements. |
| Questions for Analysis | <ul style="list-style-type: none">• How do travel patterns differ during rush hours and non-rush hours?• Are there distinct variations between weekdays and weekends? Holidays vs Non-Holidays?• What trends emerge during different times of the days?• How do external factors like weather impact transportation during these periods?• Are there differences in delays/travel times for different months? |
| Data Sets & Sources | We will use the existing transportation dataset and process our data for the entire year of 2022, incorporating timestamps, days of the week, and weather conditions. Supplementary data on events, Boston holidays, or public transportation schedules may also be considered. |
| Data Visualizations | Hourly/Monthly Traffic Heatmap (GIF Animations); Weekday vs Weekend Chart; Line Graph of Delay Times over different month (Time-Series Analysis); |
| Additional Information | Consideration of external factors, like weather and local events, will provide context for observed trends. Collaboration with transportation authorities and experts will contribute to actionable insights for urban planners and policymakers. |

Extension Project Base Questions

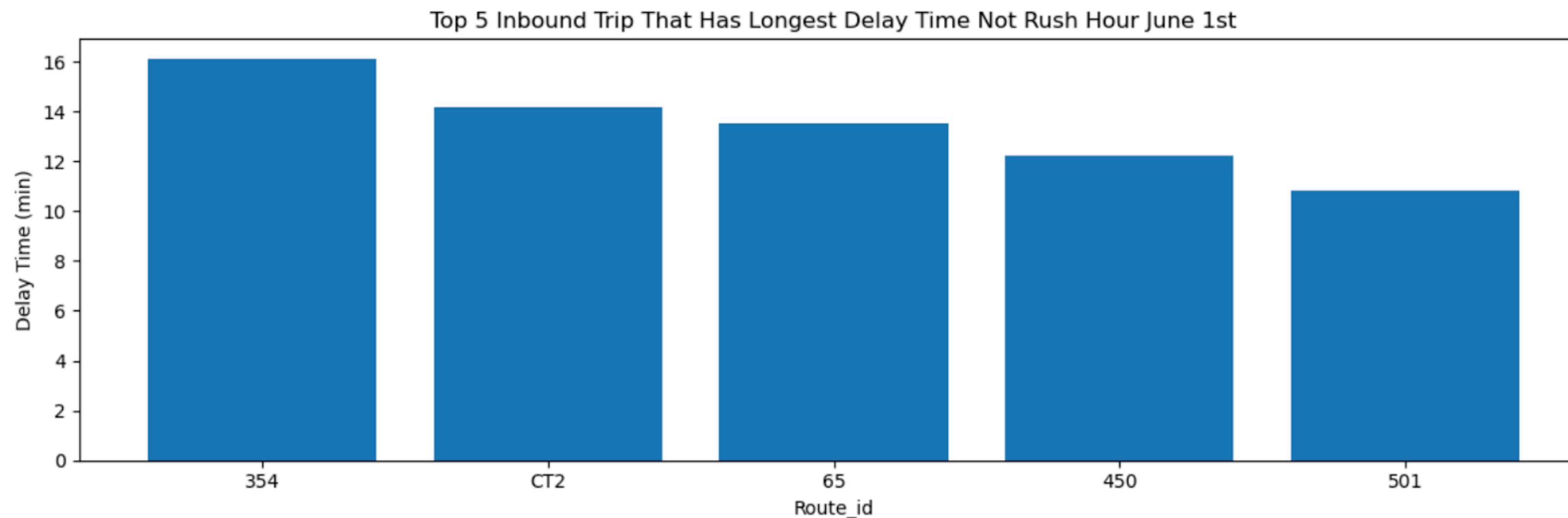
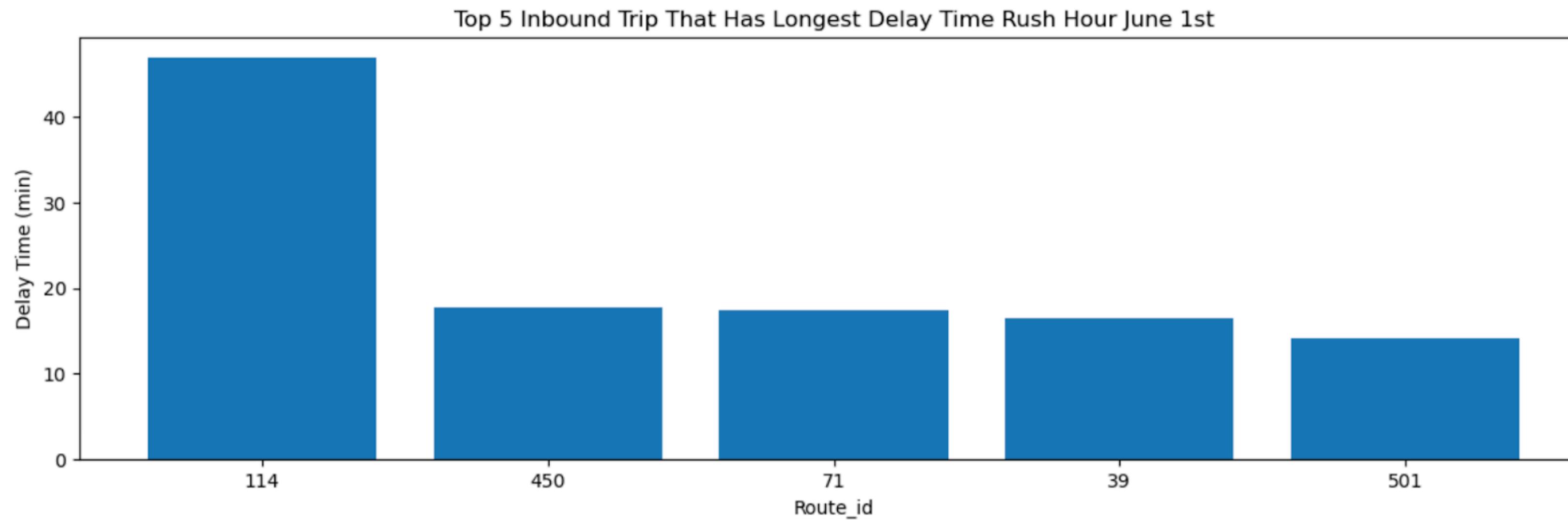
Some base questions we wanted to explore were:

- Are there differences in delay times for different months?
- How do travel patterns differ during rush hours and non-rush hours?
- Are there distinct variations between weekdays and weekends? What about holidays vs non-holidays?
- How do external factors like weather impact transportation during these periods?

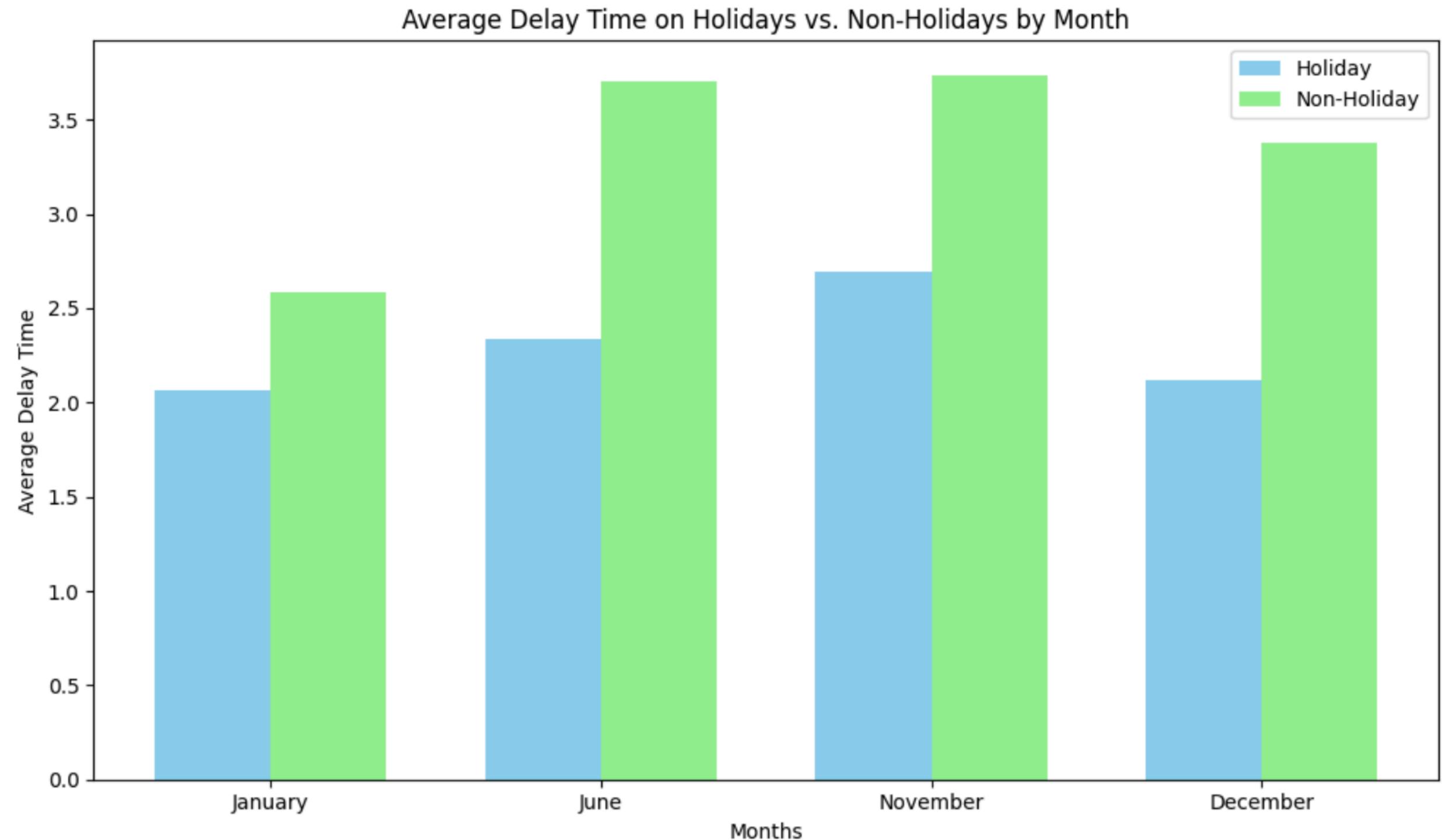
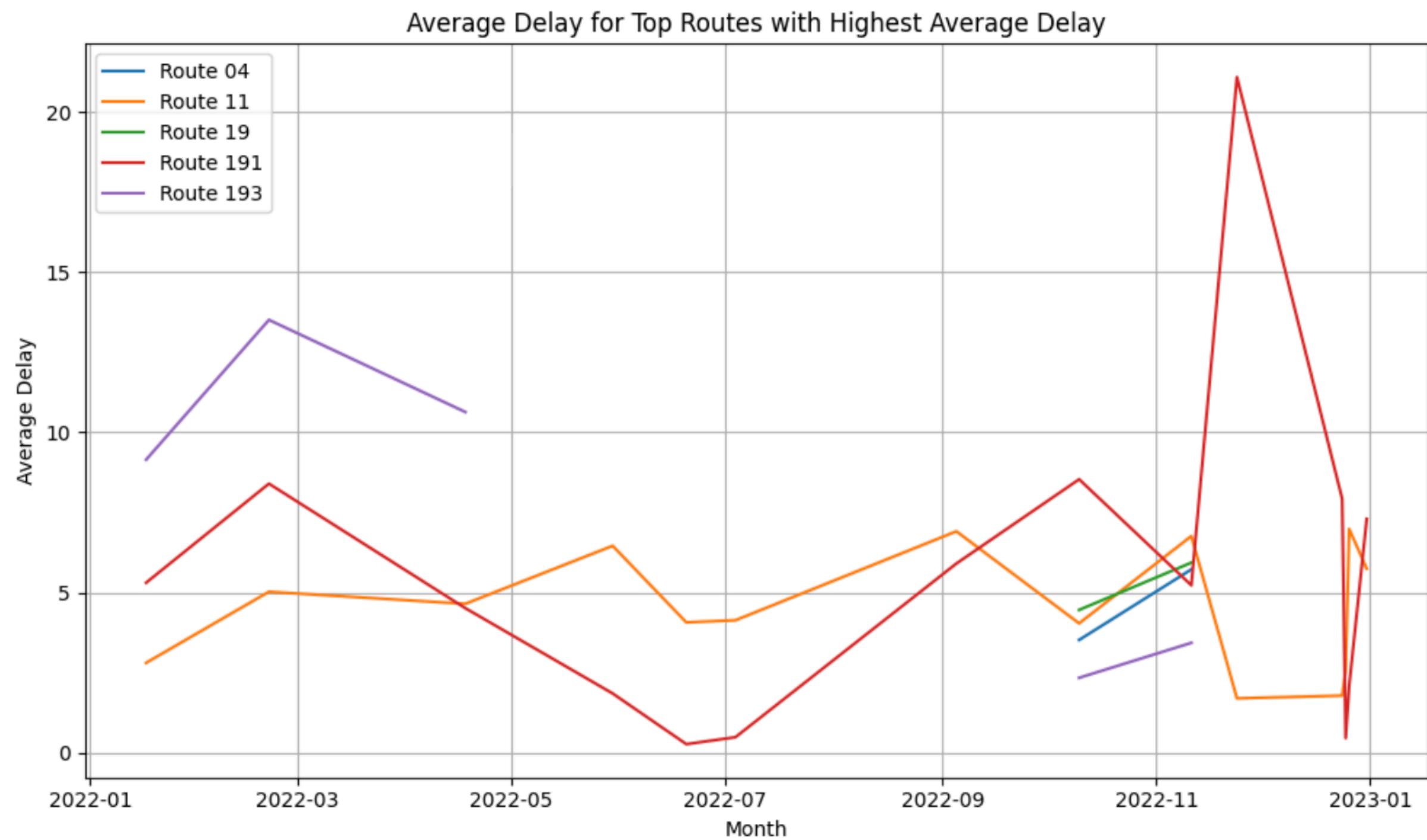
Differences in Delay Times in Months



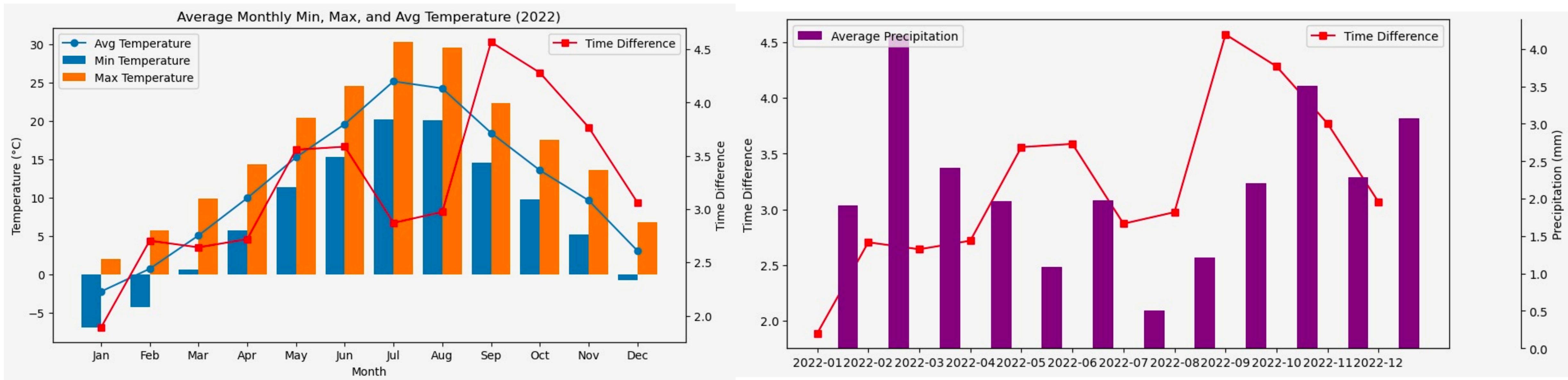
Rush Hour vs Non-Rush Hour



Holidays vs Non-Holidays



Weather-related Analysis



Challenges & Limitations

Data Limitations / Lack of Data:

- Getting historical weather data from external public APIs
- We wanted to explore other potential predictors/features that could influence delays, but was not able to find any

Scope of Analysis

- Although we extended our scope to the entirety of 2022, analyzing other years could provide more insight into answering our questions

Contributions

Taesung Yoon: Created map visualizations and animations (GIF) to see trend in bus delays over months; Visualized weather-related data comparing it to traffic trends

Jin Young Bang & Duc Minh Nguyen: Created helper export functions for bus delays to be used on other analysis; Explored and processed data for Holidays vs. Non-Holidays; Created time-series visualizations for Holiday and times in months vs delays; Created Deliverable Presentation and Final Report Draft

Minh Le & Katie Rimey: Currently conducting EDA and analysis on weather-related data (temperature, precipitation, etc) to find correlations with bus delay times; Created pre-visualizations on the topic