

ARTG 5330 SPRING 2023 FINAL PROJECT

# Riding The Rails:

A Visualization Of The MBTA Subway  
& Lightrail Ridership Patterns

By Jane Effanga

April 18, 2023

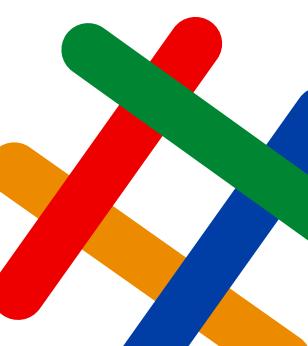


# Introduction

- "**Riding the Rails**" explores ridership patterns of the Massachusetts Bay Transportation Authority (MBTA) using data from the MBTA Subway and Light Rail Transit Ridership dataset for 2019–2022, obtained from MassDOT Mobility Dashboard.
- **Goal:** Create interactive visualizations to understand MBTA subway ridership patterns in Boston.
- **Dataset:** Contains daily ridership data by station and subway line for the Greater Boston area.
- **Additional data:** GeoJSON file of Boston neighborhoods and station coordinates for spatial visualization and analysis.

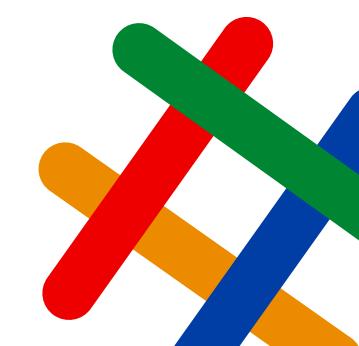
# Project Demo

[Launch Website](#)





# Key Design Decisions

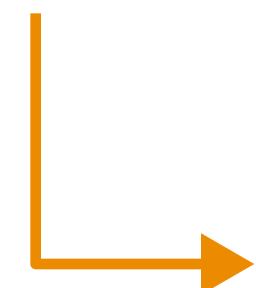


# Exploratory Data Analysis

## Data Collection and Preparation:

- Compiled the dataset provided on MassDOT for each of the 64 stations into a single CSV file
- Manually compiled the longitude and latitude coordinates and neighborhood for each station
- Filtered out stations that fell outside of the Boston area for map-based visualizations

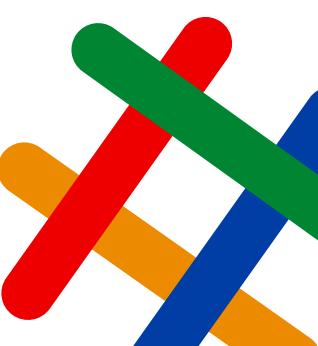
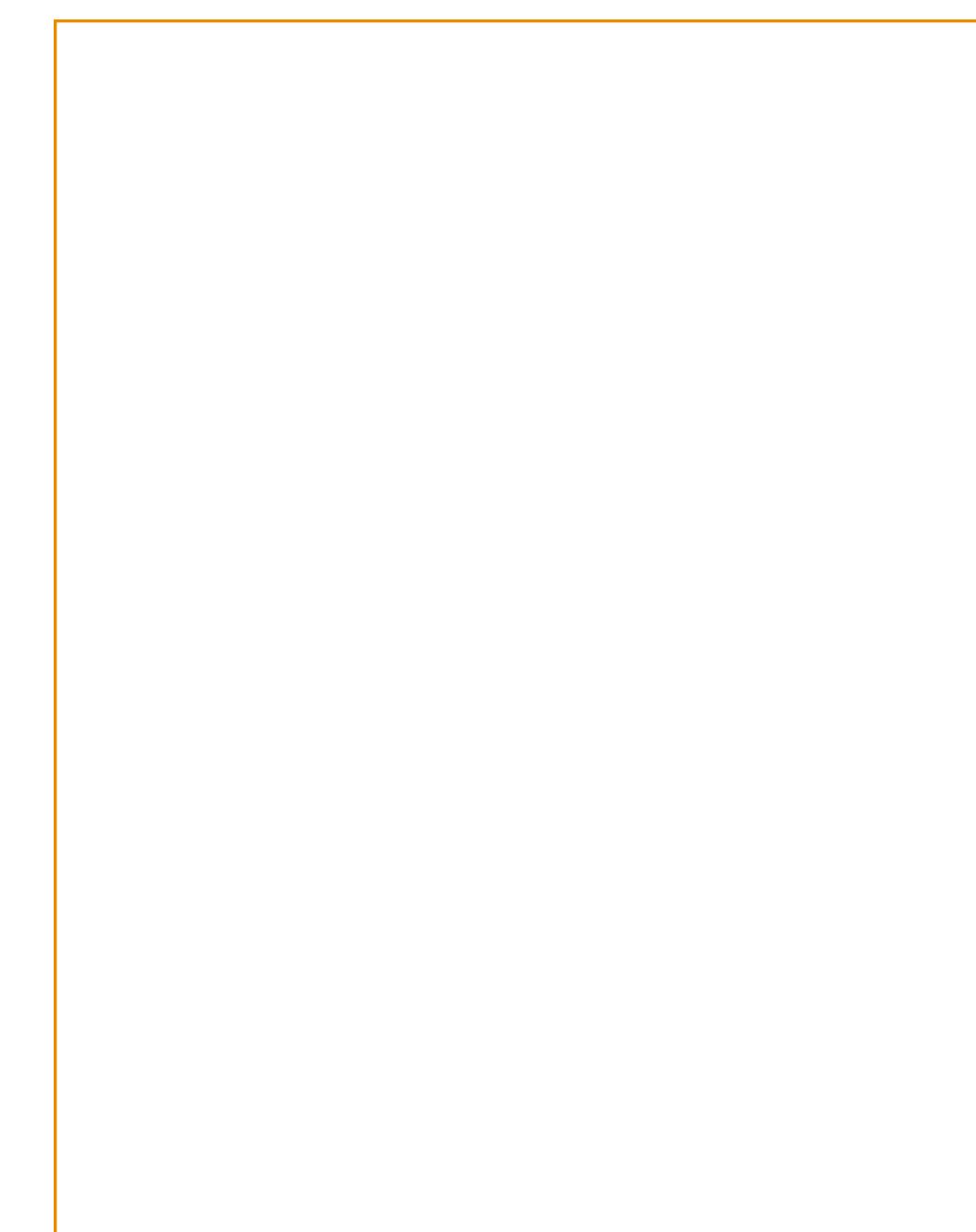
MassDOT dataset



Manually compiled dataset



newData Array



# Exploratory Data Analysis

- Conducted exploratory data analysis to identify patterns and trends in the ridership data

## Insight Discovery

- Discovered interesting insights with the impact of COVID-19 on ridership patterns
- Observed a steep decline in total ridership after 2019, with ridership only starting to recover in 2022 but still below the 2019 benchmark

# Narrative Visualization Strategy

- Answering key questions with the visualization to guide the viewer
  1. How does ridership on different subway lines compare, and how has it changed over time?
  2. Which MBTA stations are the busiest, and how does their ridership compare to other stations?
  3. How does MBTA ridership vary by neighborhood
- Using multiple visualizations to provide a comprehensive understanding of the MBTA ridership patterns
- Incorporating a spatial visualization and analysis to provide a deeper understanding of the geographic distribution of ridership across the city.
- Incorporating interactive and exploratory visualization elements to allow users explore the data and draw their own insights (such as tooltips, dropdown menu, zoom)

# Visual Encodings & Data Models

## Dataset Type

- Tabular (GeoJSON, CSV)

## Attribute Types

- Stations (Nominal)
- Date (Quant-Interval)
- Ridership (Quant-Ratio)
- Neighborhoods (Nominal)
- Lines (Nominal)

ridership.csv

boston\_neighborhoods.geojson

station\_location.csv

# Visual Encodings & Data Models

## Visual Encodings

### Color, size, and position

#### Bubble Map:

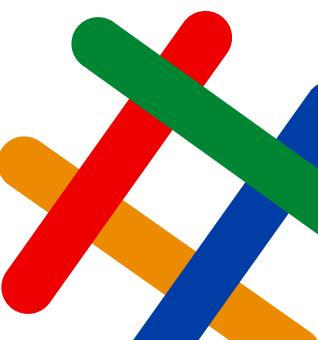
- **Position:** Showing the location of each station on the map to provide a clear spatial understanding of ridership patterns across the city
- **Size:** Using the size of the circle on the bubble map to represent the ridership of each station. Larger circles indicate higher ridership
- **Color:** Using the line colors to indicate the subway lines with the maximum ridership at each station

#### Bar Chart:

- **Size:** Using the height of the bars to indicate the ridership of the different subway lines
- **Color:** Using the distinct colors of the subway lines to help viewers distinguish between them easily

#### Choropleth Map:

- **Color:** using color gradient to represent the ridership levels in different neighborhoods of Boston



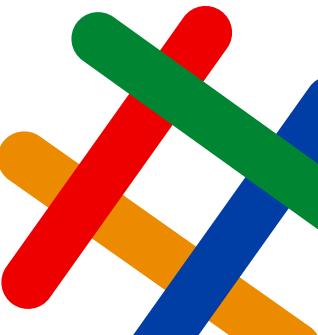
# Future Considerations

Some potential future considerations could be:

- **Seasonal variations:** Exploring how ridership varies by season across these different years.
- **Multi-modal analysis:** Expanding the analysis beyond the subway system to include other modes of transportation, such as buses, commuter rail, and ferries to give a more comprehensive picture of transportation patterns in the Greater Boston area.

## **Q&A + Feedback Session**

---



# Thank You!

*For Riding...*

