Deliverable 3

Transit Performance - Team C

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Transit Performance

- Public transit provides vital access to jobs, services, etc in cities like Boston
- Historically, some communities are underserved by public transit due to inequitable planning
- This analysis examines MBTA bus performance and census demographics in Boston
- Goals are to identify service disparities and see if they disproportionately affect marginalized groups
- Focus on MBTA data and neighborhood-level census demographics in Boston
- Key questions:
  - What are the end-to-end travel times for different bus routes?
  - Are there noticeable disparities in on-time performance between routes?
  - What are the demographics of communities served by each route?
  - Do any service disparities appear to adversely impact disadvantaged groups?
- We use basic data science techniques such as APIs, data cleaning, and mapping to gather results
- Aims to provide insights into service inequities and guide investments to improve equity
- Public transit equity has implications for social justice, mobility, sustainability in diverse cities

Extension Proposal

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Extension Pitch	*With our original topic, we analyzed MBTA trip data and Boston census data to draw conclusions about service disparities in different neighborhoods. For our extension, we will analyze potential disparities in Bluebike availability by neighborhood, and determine if there are enough stations to meet potential demand from different communities.*
Rationale	*After analyzing availability of MBTA bus data, it is important to consider alternative transportation options. Bluebikes are a public option that people can rent at an affordable price.*
Questions for Analysis	*We are curious about the number and locations of different stations, whether they are dispersed evenly throughout the city and/or concentrated in areas of high-population density, or if there are some areas with a lack of stations. H*
Datasets & Sources	*Bluebikes Stations - https://s3.amazonaws.com/hubway-data/current_bluebikes_stations.csv* *Blue Bikes Comprehensive Trip Histories - https://s3.amazonaws.com/hubway-data/202310-bluebikes-tripdata.zip*
Data Visualizations	*Proposed graphs include:* ● *Map of locations of each station within Boston area* ● *Bar graphs of number of stations per neighborhood* ● *Clustering of stations and/or trip data*
Additional Information	*Information on Bluebikes data - https://bluebikes.com/system-data* *Example references:* ● *https://cambridge-intelligence.com/geospatial-data-visualization-regraph-redwoodjs/* ● *https://www.chaossearch.io/blog/blue-bikes-data-dive-part-1*

Extension Project Questions

Some of the questions we're considering for our extension project include:

- How accessible are Blue Bike stations?
- How many rides are made with Blue Bikes, and where do they start?
- Which neighborhoods have more access to Blue Bikes, and which ones have less?
- What are the demographics of people who have access to Blue Bikes vs. those who do not?
- Are the areas where people have less access to Blue Bikes the same as those where people have less access to MBTA buses?
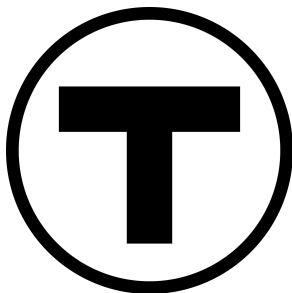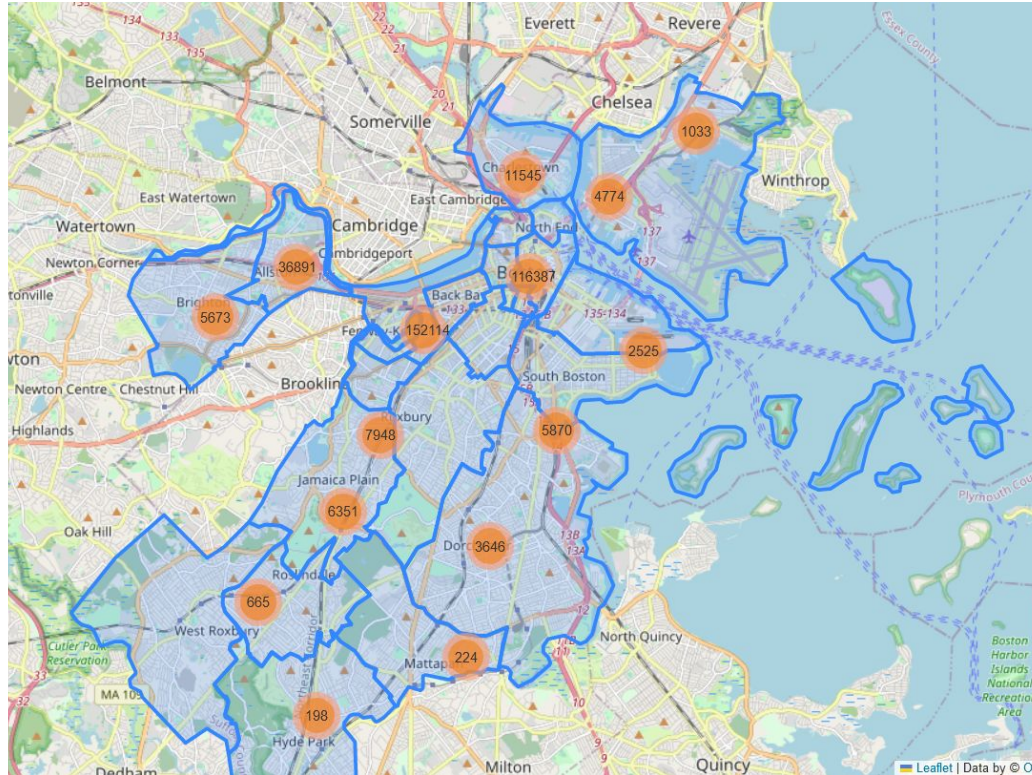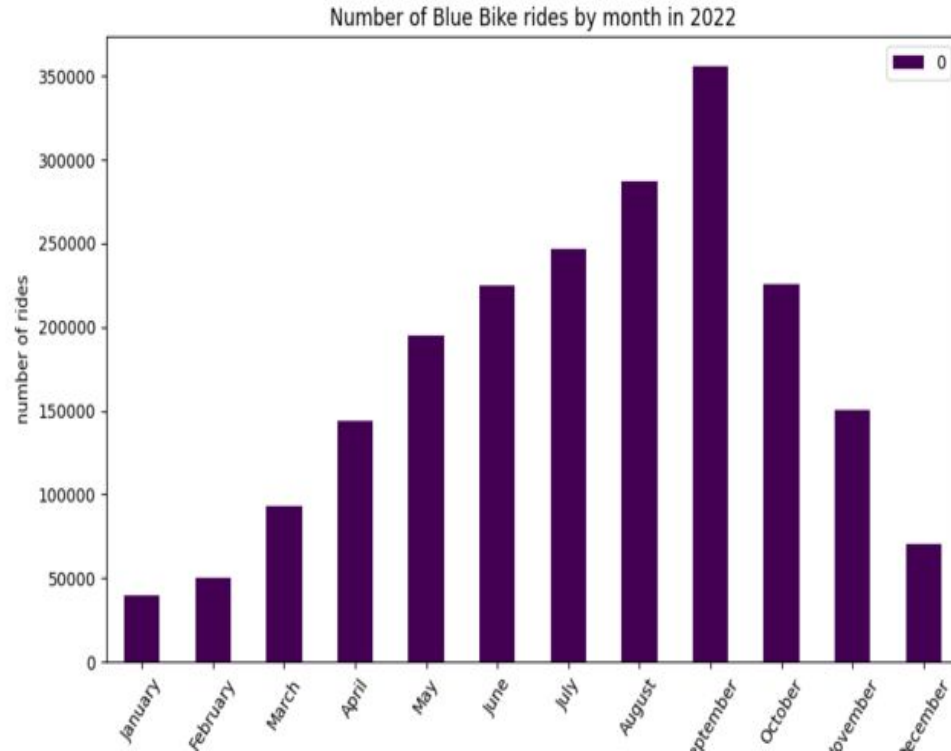
Locations of Blue Bike Stations
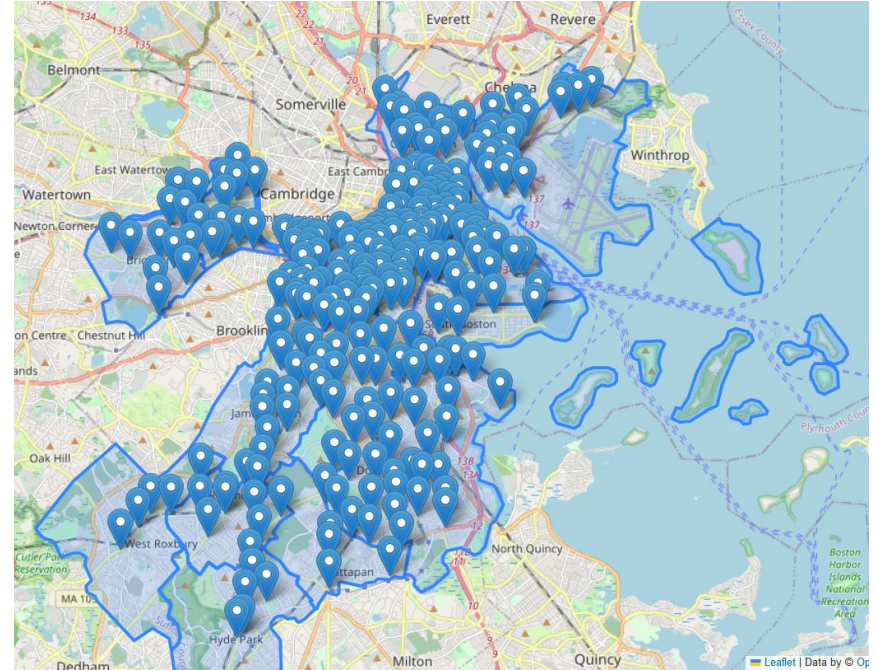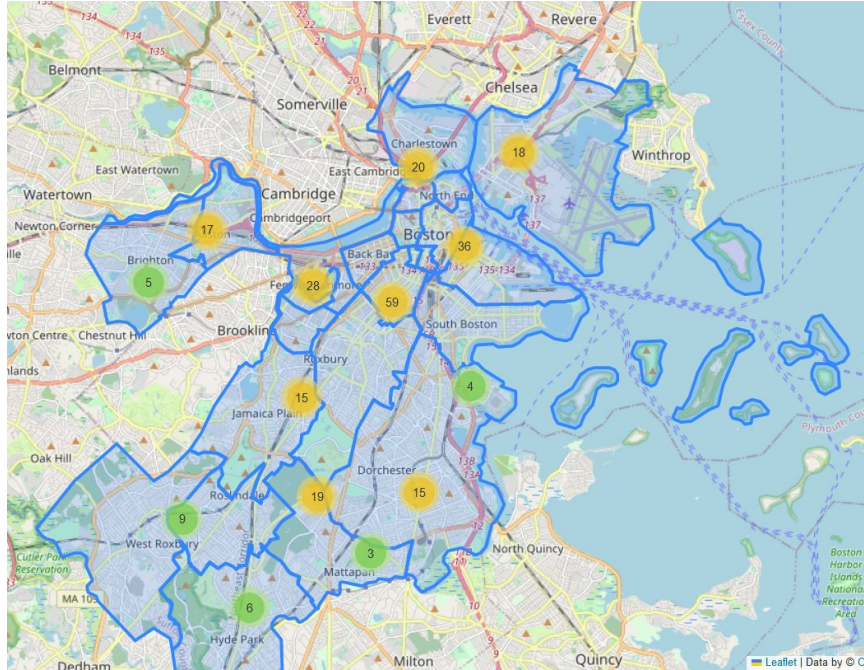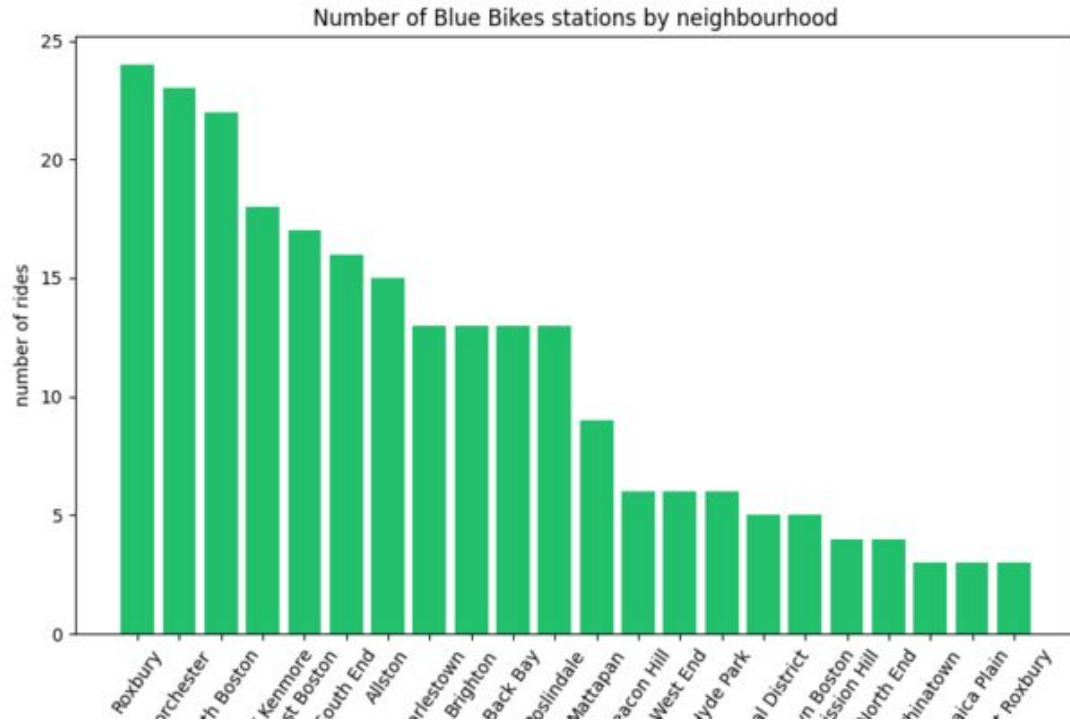
Locations of Blue Bike Rides

Total Number of Bike Rides in 2022

Blue Bike Station by Neighborhood
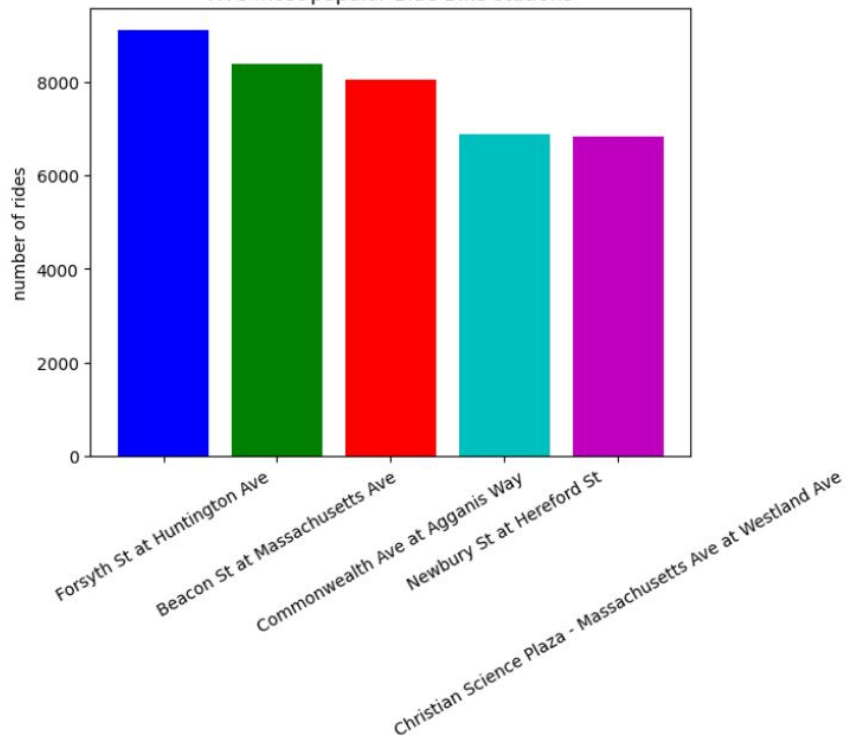
Total Number of Bike Rides by neighborhood

Blue Bike rides in 2022 by neighbourhood
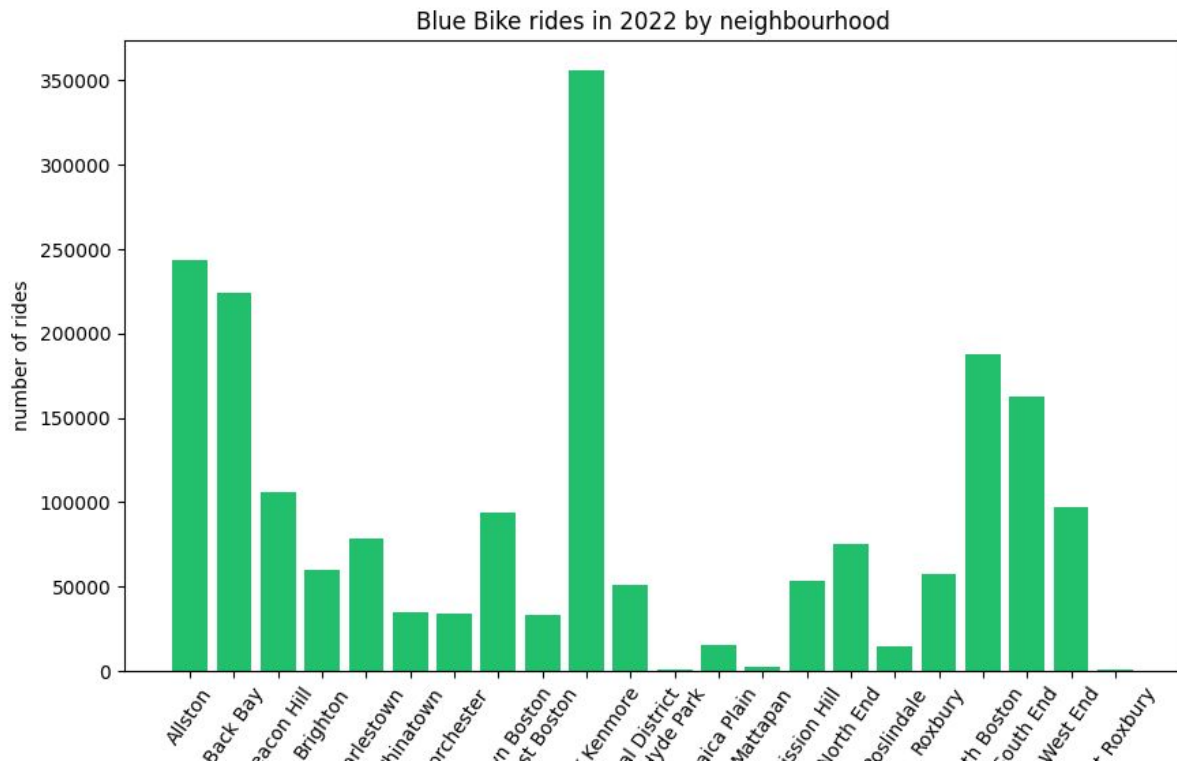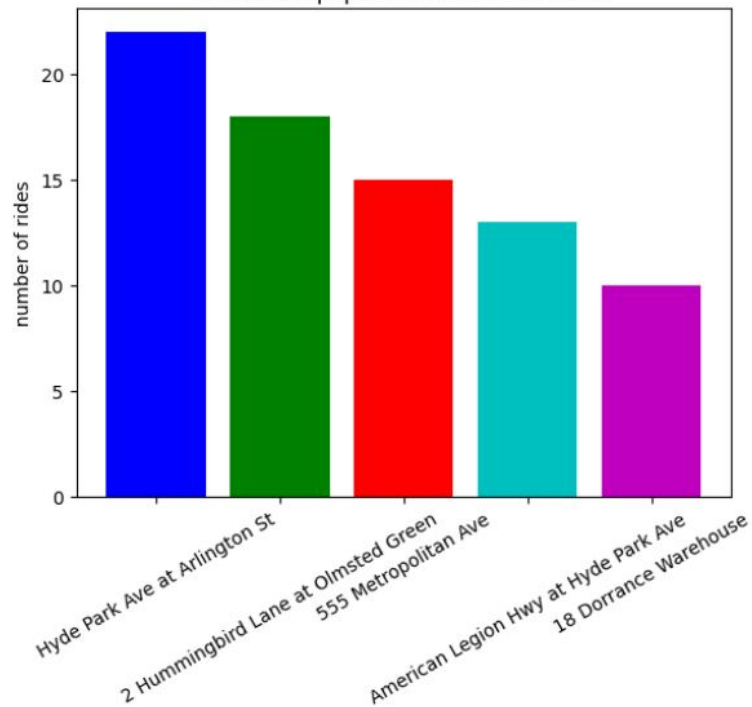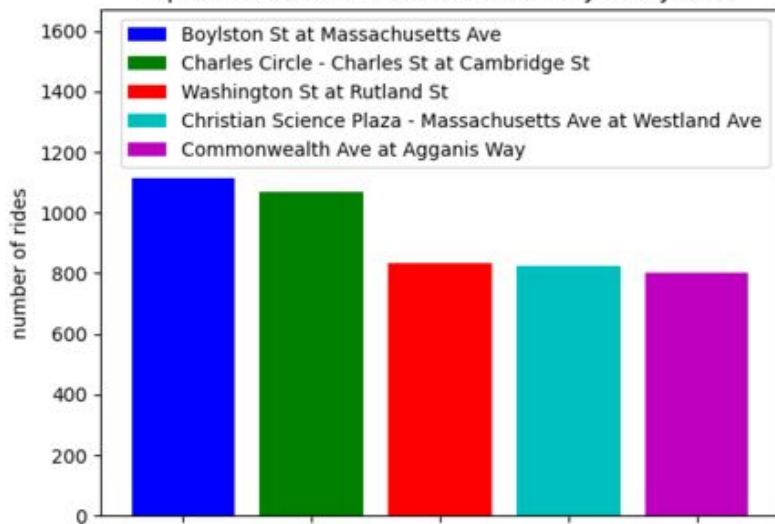
Most and least popular Blue Bike stations

Top 5 Most And Least Used of Bikes Station in Jan 2022
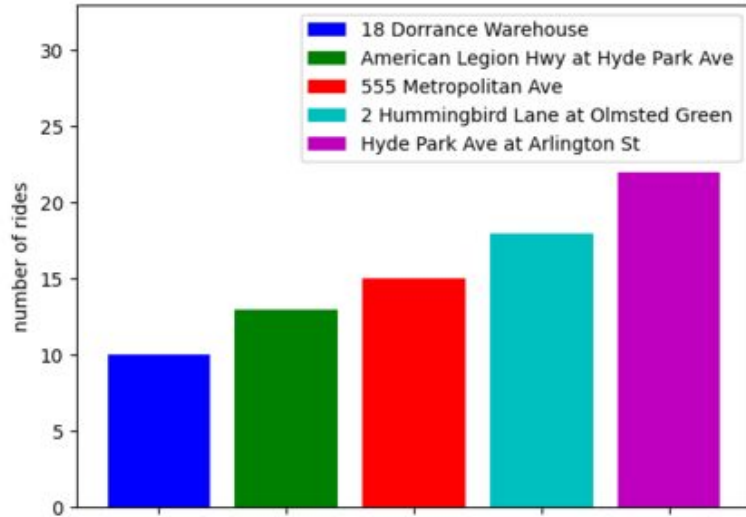

Top 5 most used Blue Bikes stations in January 2022

- Boylston St at Massachusetts Ave
- Charles Circle - Charles St at Cambridge St
- Washington St at Rutland St
- Christian Science Plaza - Massachusetts Ave at Westland Ave
- Commonwealth Ave at Agganis Way

Top 5 least used Blue Bikes stations in January 2022

- Blue Hill Ave at Havelock St
- American Legion Hwy at Cummins Hwy
- Morton St at Gallivan Blvd
- 2 Hummingbird Lane at Olmsted Green
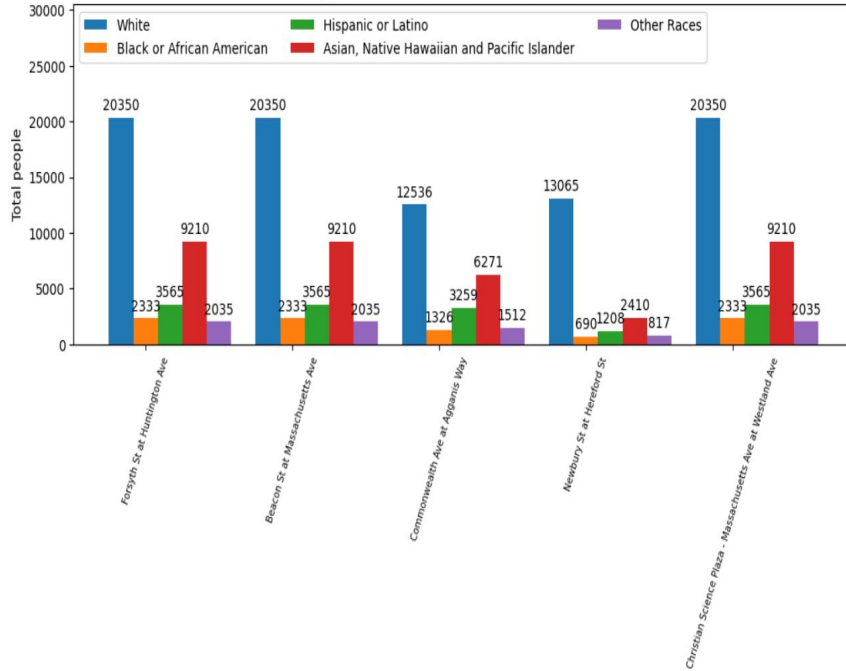- Four Corners - 157 Washington St

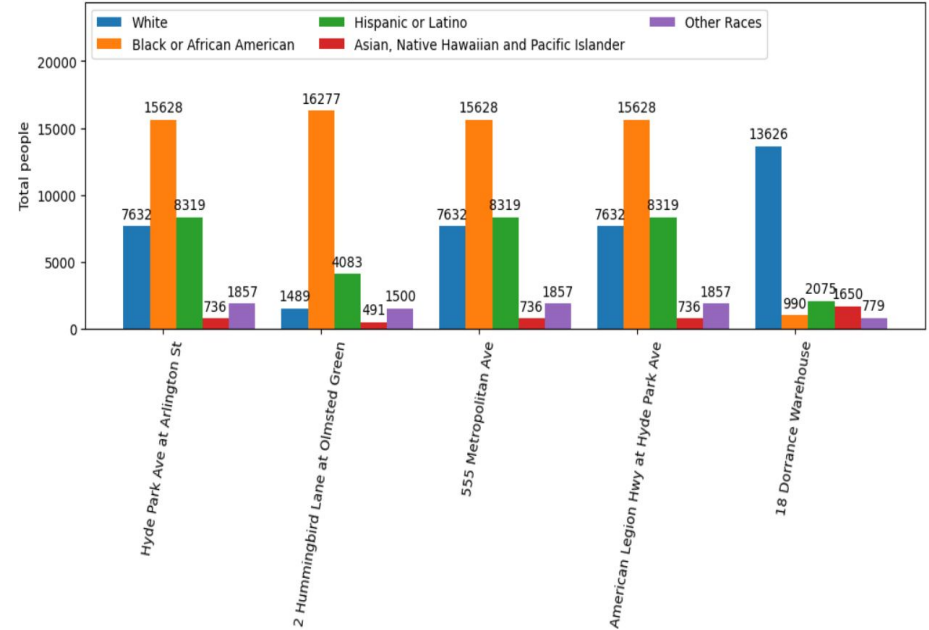Top 5 Most And Least Used of Bikes Station in Sep 2022

Population Distribution for Most/Least Used Stations
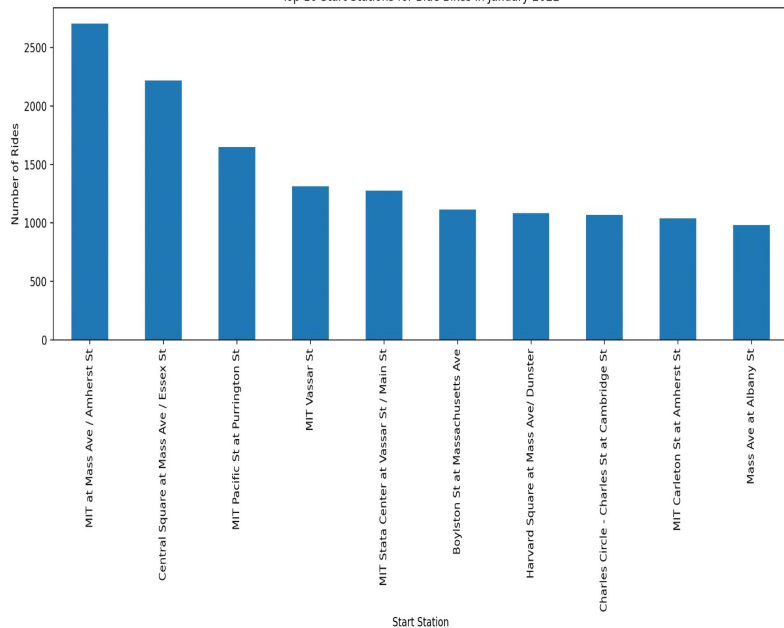

Population Distribution for Most Used Stations
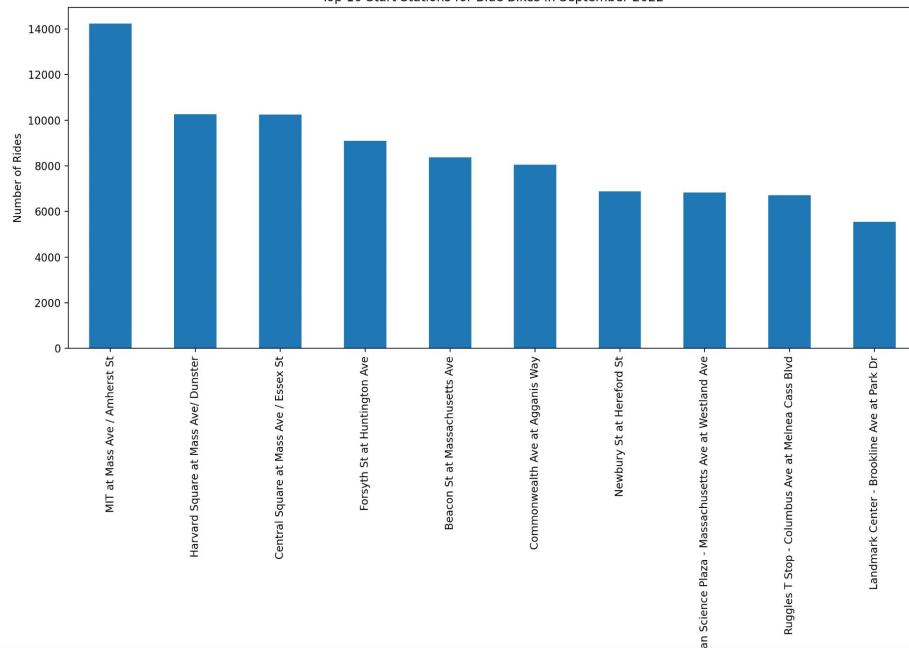
Population Distribution for Least Used Stations

Top 10 Start Station for 2022 Jan and Sep

Challenges & Limitations

Data Limitations:
- Inconsistencies and gaps in the MBTA and Bluebike datasets may have affected the accuracy of our analyses.
- Limited historical data availability restricts our ability to analyze long-term trends in transit service and usage.

Analytical Constraints:
- The complexity of public transit systems makes isolating specific factors for service disparities challenging.
- Our analysis primarily focused on quantitative data, potentially overlooking qualitative aspects like rider satisfaction or community feedback.

Scope of Study:
- The study was confined to the Boston area; hence, findings may not be generalizable to other cities or regions.
- Certain relevant factors, such as socioeconomic variables and urban planning policies, were outside the scope of this analysis.

Conclusions so far

Significant Insights:
- Our analysis highlights notable disparities in MBTA bus services across different Boston neighborhoods.
- Preliminary findings suggest these disparities disproportionately affect marginalized communities, highlighting social justice concerns in urban mobility.

Bluebikes Analysis:
- The extension study on Blue Bike availability reveals potential gaps in alternative transportation options in Boston, with some neighborhoods showing less access to these services.

Data-Driven Approach:
- Utilizing comprehensive data analysis techniques, we have mapped and visualized transit disparities effectively, offering a clear view of the current state of transit equity in Boston.

Implications for Policy and Planning:
- These findings can inform policy decisions and planning strategies, emphasizing the need for equitable transit solutions.
- Our study underscores the importance of inclusive transit planning to ensure fair access to all city residents.

Contributions

Patrick, Eason - Analysis and Visualizations of Blue Bike data

Munir, Chandrahas and Manushi - Deliverable presentation and final report preparation.