
Team 14

Who actually rides the T?

Brian Shen, Lewen Sun, Jonghyeon Lee, Ajibola Falade

COSI 116A Fall 2024 – Prof. Dylan Cashman, Brandeis University

Problem Statement

Initial Question:

Who Actually Uses the T? Do more affluent people use the T more?

The idea being that richer demographics are less to utilize public transportation but the question is if that is consistent throughout Boston or even true at all. Comparing those who take the T and those who live around the T to see they are similar in demographic or not.

Data



MBTA 2023 System-Wide Passenger Survey

Spring 2024

Prepared by the Office of
Performance Management and Innovation

MBTA Passenger Survey

Age			3,579		2,436		3,809		42,227		13,792		8,715		74,558	
	Total Population	Median Age	0-9 years	%	10-17 years	%	18-19 years	%	20-34 years	%	35-59 years	%	60 and over	%		%
United States	324,697,795	38.2	39,925,147	12.3%	33,504,245	10.3%	8,631,219	2.7%	67,045,523	20.6%	104,705,706	32.2%	70,885,955	21.8%		
Massachusetts	6,850,553	39.2	726,905	10.6%	644,355	9.4%	208,160	3.0%	1,462,935	21.4%	2,258,851	33.0%	1,549,347	22.6%		
Boston	684,379	32.8	62,783	9.2%	46,220	6.8%	30,684	4.5%	237,784	34.7%	196,133	28.7%	110,775	16.2%		
Allston	19,261	27.5	409	2.1%	331	1.7%	2,359	12.2%	13,046	67.7%	2,307	12.0%	809	4.2%		
Brighton	55,297	30.8	3,170	5.7%	2,105	3.8%	1,450	2.6%	29,181	52.8%	11,485	20.8%	7,906	14.3%		
Charlestown	19,890	35.7	2,978	15.0%	996	5.0%	186	0.9%	5,603	28.2%	6,824	34.3%	3,303	16.6%		
Dorchester	126,909	33.4	15,104	11.9%	13,018	10.3%	3,478	2.7%	35,771	28.2%	38,890	30.6%	20,648	16.3%		
Downtown	18,306	33.5	1,122	6.1%	385	2.1%	2,307	12.6%	5,942	32.5%	4,923	26.9%	3,627	19.8%		
East Boston	47,263	30.6	5,319	11.3%	3,857	8.2%	1,086	2.3%	14,889	31.1%	16,270	34.4%	6,042	12.8%		
Fenway	33,488	28.3	509	1.5%	190	0.6%	8,496	25.4%	18,072	54.0%	3,981	11.9%	2,241	6.7%		
Hyde Park	38,924	39.4	4,140	10.6%	4,148	10.7%	606	1.6%	8,221	21.1%	13,392	34.4%	8,417	21.6%		
Jamaica Plain	40,867	34.8	4,232	10.4%	2,389	5.8%	674	1.6%	13,286	32.5%	13,387	32.8%	6,899	16.9%		
Longwood	5,351	20.2	8	0.1%	43	0.8%	2,597	48.5%	2,575	48.1%	65	1.2%	63	1.2%		
Mattapan	26,659	36.7	3,486	13.1%	3,072	11.5%	575	2.2%	5,582	20.9%	9,031	33.9%	4,903	18.4%		
Mission Hill	17,386	30.1	660	3.8%	625	4.7%	1,424	8.2%	8,599	49.5%	3,163	18.2%	2,715	15.6%		
North End	8,749	31.1	310	3.5%	199	2.3%	19	0.2%	5,208	59.5%	1,818	20.8%	1,195	13.7%		
Roslindale	30,021	39.8	3,412	11.4%	2,567	8.6%	555	1.8%	6,310	21.0%	11,224	37.4%	5,953	19.8%		
Roxbury	54,161	32.5	6,557	12.1%	5,289	9.8%	2,669	4.9%	15,059	27.8%	15,564	28.7%	9,023	16.7%		
South Boston	36,772	31.9	3,165	8.6%	1,496	4.1%	305	0.8%	16,937	46.1%	10,206	27.8%	4,663	12.7%		
South Boston Waterfront	4,403	34.5	138	3.1%	51	1.2%	43	1.0%	2,038	46.3%	1,546	35.1%	587	13.3%		
South End	32,571	37.1	2,421	7.4%	1,544	4.7%	360	1.1%	11,029	33.9%	10,922	33.5%	6,295	19.3%		
West End	6,619	37.8	297	4.5%	125	1.9%	141	2.1%	2,504	37.8%	2,168	32.8%	1,384	20.9%		
West Roxbury	33,526	42.8	4,066	12.1%	2,829	8.4%	319	1.0%	6,862	18.1%	11,162	33.4%	9,068	27.0%		

Boston Census

MBTA Gated Station Entries

MBTA OPMI
Massachusetts geoDOT

Summary

This file contains the count of gated station entries for any station with service for the last two years up to the most recent month that is available. The data is updated on a one- to two-month delay. See MBTA Gated Station Entries - Historical for data by year from 2014 to present.

[View Full Details](#)

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Details

Dataset
Table

Showing 25 of 2,212,984 rows

	service_date	time_period	stop_id	station_name	route_or_line	gated_entries
	10/31/2024, 12:00 AM	(00:00:00)	place-alfcl	Alewife	Red Line	8
🔍	10/31/2024, 12:00 AM	(00:00:00)	place-andrw	Andrew	Red Line	6
▼	10/31/2024, 12:00 AM	(00:00:00)	place-aпорт	Airport	Blue Line	35
🔍	10/31/2024, 12:00 AM	(00:00:00)	place-aqucl	Aquarium	Blue Line	52
☆	10/31/2024, 12:00 AM	(00:00:00)	place-armnl	Arlington	Green Line	44
🔍	10/31/2024, 12:00 AM	(00:00:00)	place-asmnl	Ashmont	Red Line	4
🔍	10/31/2024, 12:00 AM	(00:00:00)	place-bbsta	Back Bay	Orange Line	58
	10/31/2024, 12:00 AM	(00:00:00)	place-bmmnl	Beachmont	Blue Line	9
	10/31/2024, 12:00 AM	(00:00:00)	place-bomnl	Bowdoin	Blue Line	17

MBTA Gated Entries

Compiling Data

Age					
	Total Population	Median Age	0-8 years	%	10-17 years
United States	324,697,795	38.2	39,925,147	12.3%	33,504,245
Massachusetts	6,850,653	39.2	726,905	10.6%	644,355
Boston	684,379	32.8	82,780	9.2%	48,220
Allston	19,261	27.5	409	2.1%	331
Brighton	55,297	30.8	3,170	5.7%	2,105
Charlestown	19,890	35.7	2,979	15.0%	895
Dorchester	126,809	33.4	15,104	11.9%	13,018
Downtown	18,306	33.5	1,122	6.1%	385
East Boston	47,263	30.6	5,319	11.3%	3,857
Fenway	33,486	29.3	609	1.8%	190
Hayden Park	38,924	39.4	4,140	10.6%	4,148
Jamaica Plain	40,867	34.8	4,232	10.4%	2,389
Longwood	5,351	20.2	8	0.1%	43
Mattapan	26,659	36.7	3,496	13.1%	3,072
Mission Hill	17,386	30.1	660	3.8%	825
North End	8,749	31.1	319	3.6%	199
Roslindale	30,021	39.8	3,412	11.4%	2,997
Roxbury	54,161	32.5	6,557	12.1%	5,289
South Boston	36,772	31.9	3,165	8.6%	1,496
South Boston Waterfront	4,403	34.5	139	3.1%	51
South End	32,571	37.1	2,421	7.4%	1,544
West End	6,618	37.8	297	4.5%	125
West Roxbury	33,526	42.8	4,006	12.1%	2,829

0-18_raw	19-34_raw	35-60_raw	65+_raw
73,429,392	75,676,742	104,705,706	70,885,955
1,371,260	1,671,095	2,258,851	1,549,347
109,003	268,468	196,133	110,775
740	15,405	2,307	809
5,275	30,631	11,485	7,906
3,974	5,789	6,824	3,303
28,122	39,249	38,890	20,648
1,507	8,249	4,923	3,627
9,176	15,775	16,270	6,042
699	26,568	3,981	2,241
8,288	8,827	13,392	8,417
6,621	13,960	13,387	6,899
51	5,172	65	63
6,568	6,157	9,031	4,903
1,485	10,023	3,163	2,715
509	5,227	1,818	1,195
5,979	6,865	11,224	5,953
11,846	17,728	15,564	9,023
4,661	17,242	10,206	4,663
189	2,081	1,546	587
3,965	11,389	10,922	6,295
422	2,645	2,168	1,384
6,895	6,381	11,182	9,068

Handled:

- Mismatched data
- Missing data
- Messy Data

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2 Allston,3.84,79.98,11.98,4.20,740,15405,2307,809
3 Back Bay,6.57,47.22,27.52,18.69,1169,8398,4893,3323
4 Beacon Hill,8.93,47.31,26.33,17.43,862,4564,2540,1682
5 Brighton,9.54,55.39,20.77,14.30,5275,30631,11485,7906
6 Charlestown,19.98,29.11,34.31,16.61,3974,5789,6824,3303
7 Dorchester,22.16,30.93,30.64,16.27,28122,39249,38890,20648
8 Downtown,8.23,45.06,26.89,19.81,1507,8249,4923,3627
9 East Boston,19.41,33.38,34.42,12.78,9176,15775,16270,6042
10 Fenway,2.09,79.33,11.89,6.69,699,26568,3981,2241
11 Hyde Park,21.29,22.68,34.41,21.62,8288,8827,13392,8417
12 Jamaica Plain,16.20,34.16,32.76,16.88,6621,13960,13387,6899
13 Longwood,0.95,96.65,1.21,1.18,51,5172,65,63
14 Mattapan,24.64,23.10,33.88,18.39,6568,6157,9031,4903
15 Mission Hill,8.54,57.65,18.19,15.62,1485,10023,3163,2715
16 North End,5.82,59.74,20.78,13.66,509,5227,1818,1195
17 Roslindale,19.92,22.87,37.39,19.83,5979,6865,11224,5953
18 Roxbury,21.87,32.73,28.74,16.66,11846,17728,15564,9023
19 South Boston,12.68,46.89,27.75,12.68,4661,17242,10206,4663
20 South Boston Waterfront,4.29,47.26,35.11,13.33,189,2081,1546,587
21 South End,12.17,34.97,33.53,19.33,3965,11389,10922,6295
22 West End,6.38,39.96,32.75,20.91,422,2645,2168,1384
23 West Roxbury,20.57,19.03,33.35,27.05,6895,6381,11182,9068
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Raw Sheet

Binned Sheet

Cleaned CSV

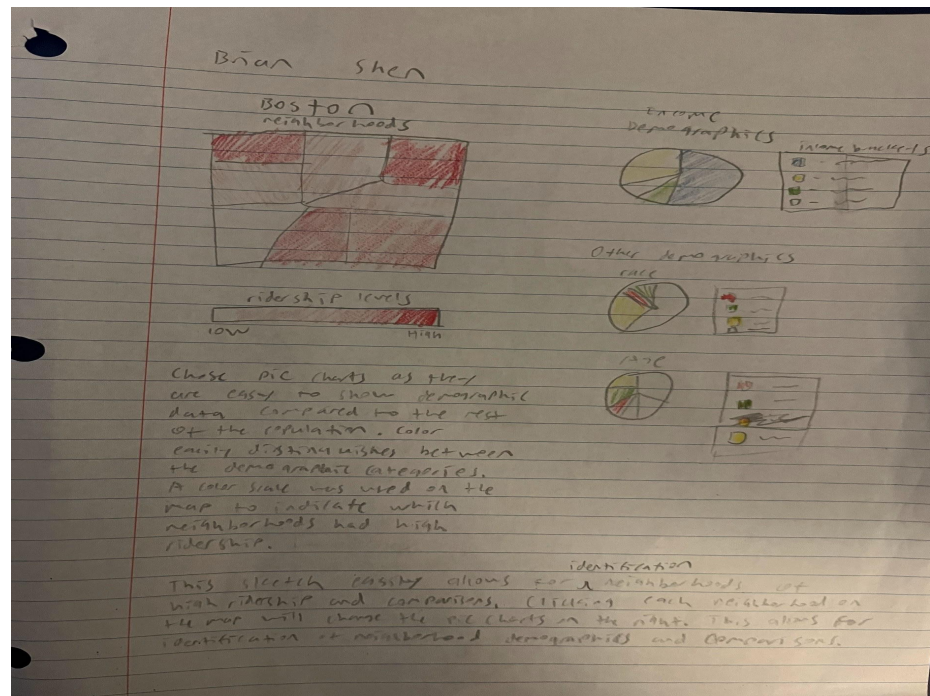
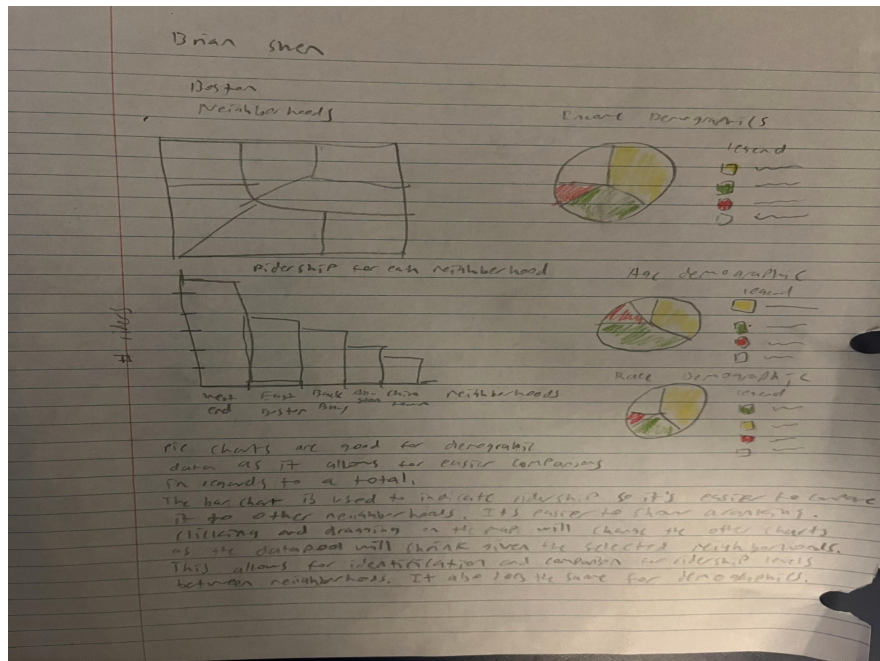
Compiled GeoJSON

Excel functions

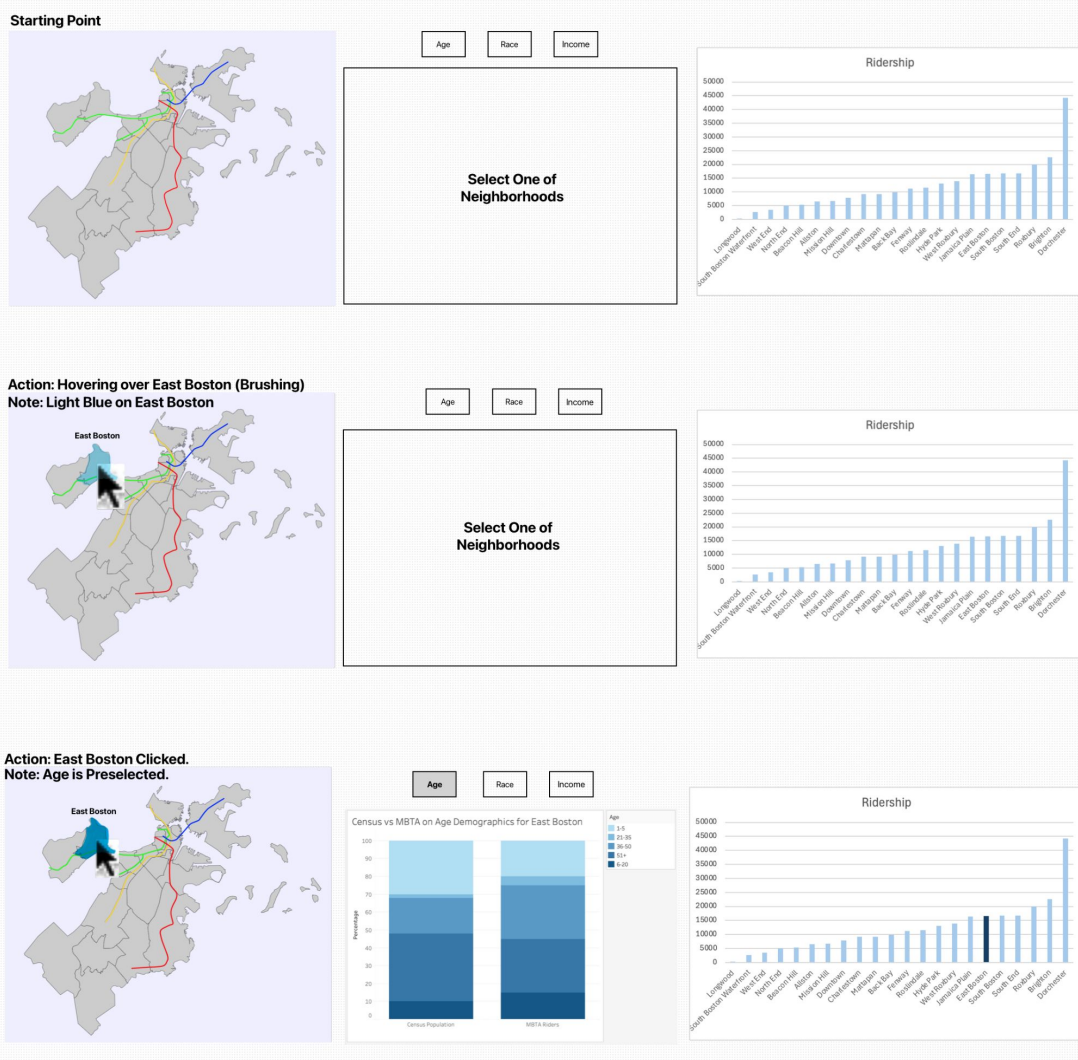
getcsv.py

getgeojson.py

Sketches



- Map of Boston and its neighborhoods
- Click on each neighborhood to see its demographic breakdown for its population and MBTA riders
- Demographic breakdown represented by stacked bar charts
- Simple bar chart to show ridership of each neighborhood



Creating our visualization

JSON files containing neighborhood/station data

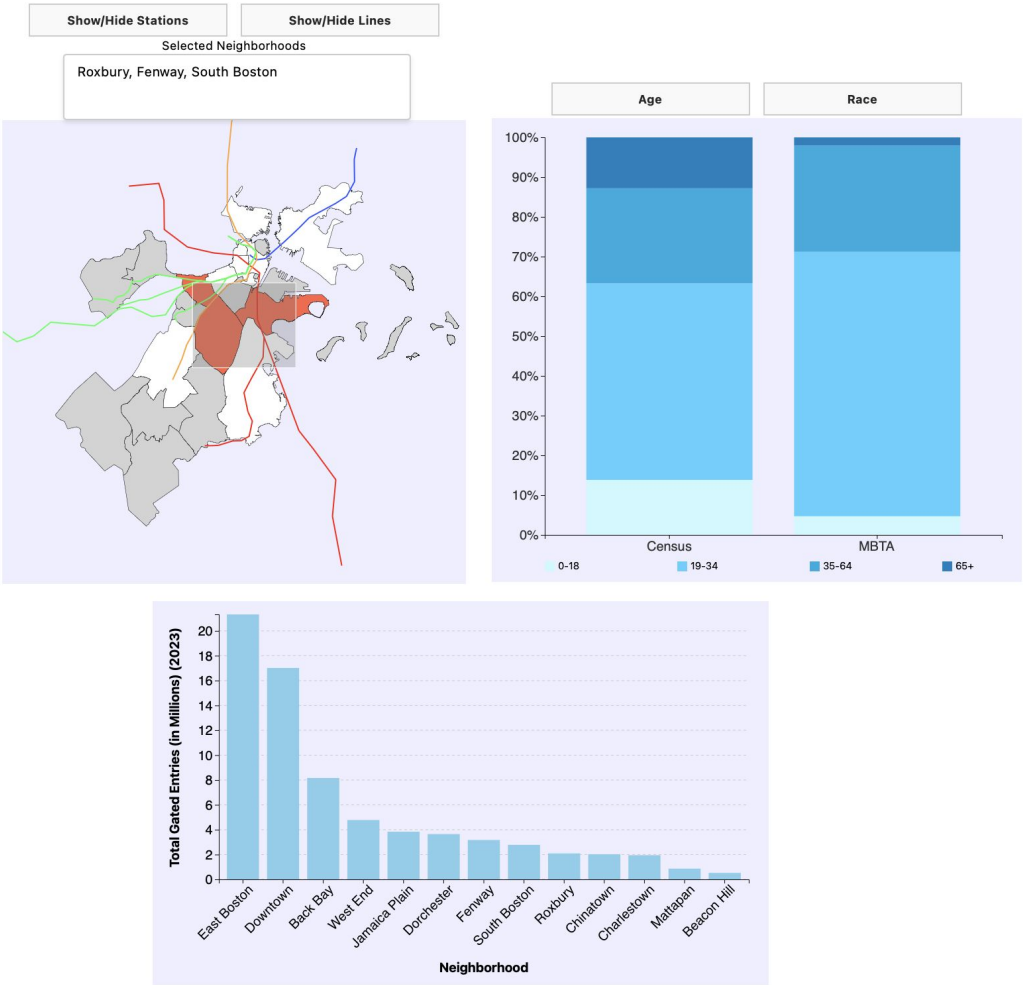
Python/Pandas to clean/compile data

JavaScript/D3 to create the visualization

ChatGPT to help with coding intricacies and table formatting

Peer Feedback for revisions/pivots

Final Visualization



Conclusion

Summary of Findings:

- Our interactive visualizations provide insights into MBTA ridership patterns and neighborhood demographics.
- Key neighborhoods like East Boston and Downtown exhibit significantly higher ridership, while others like Roslindale lack data due to the absence of MBTA stations.
- Fenway is the only neighborhood with a higher % of young adult (19-34) demographic compared to the MBTA.

Impact:

- These tools bridge the gap between data and public understanding, offering users a dynamic way to explore ridership and demographics.
- The project demonstrates the potential of visualization in driving data-informed decisions for urban planning and transit management.