

Final Project Report

The Next Stop for the MBTA:

is the transportation authority improving or declining?



Description

The MBTA completes hundreds of thousands of trips every week. With such high ridership, it has the important responsibility of making sure riders get to their destination on time. Delays and shutdowns can cause time to be wasted waiting for trains or taking less efficient transportation. To find out if the MBTA subway lines are improving or declining, this project will look at a variety of metrics: ridership, service alerts, headways, and prediction accuracy.

This project features five graphs of MBTA subway line data spanning 2020 to 2026. It contains a brief description and analysis of the graphs, and a closing section that examines the trajectory of the MBTA based on the measured metrics.

Datasets

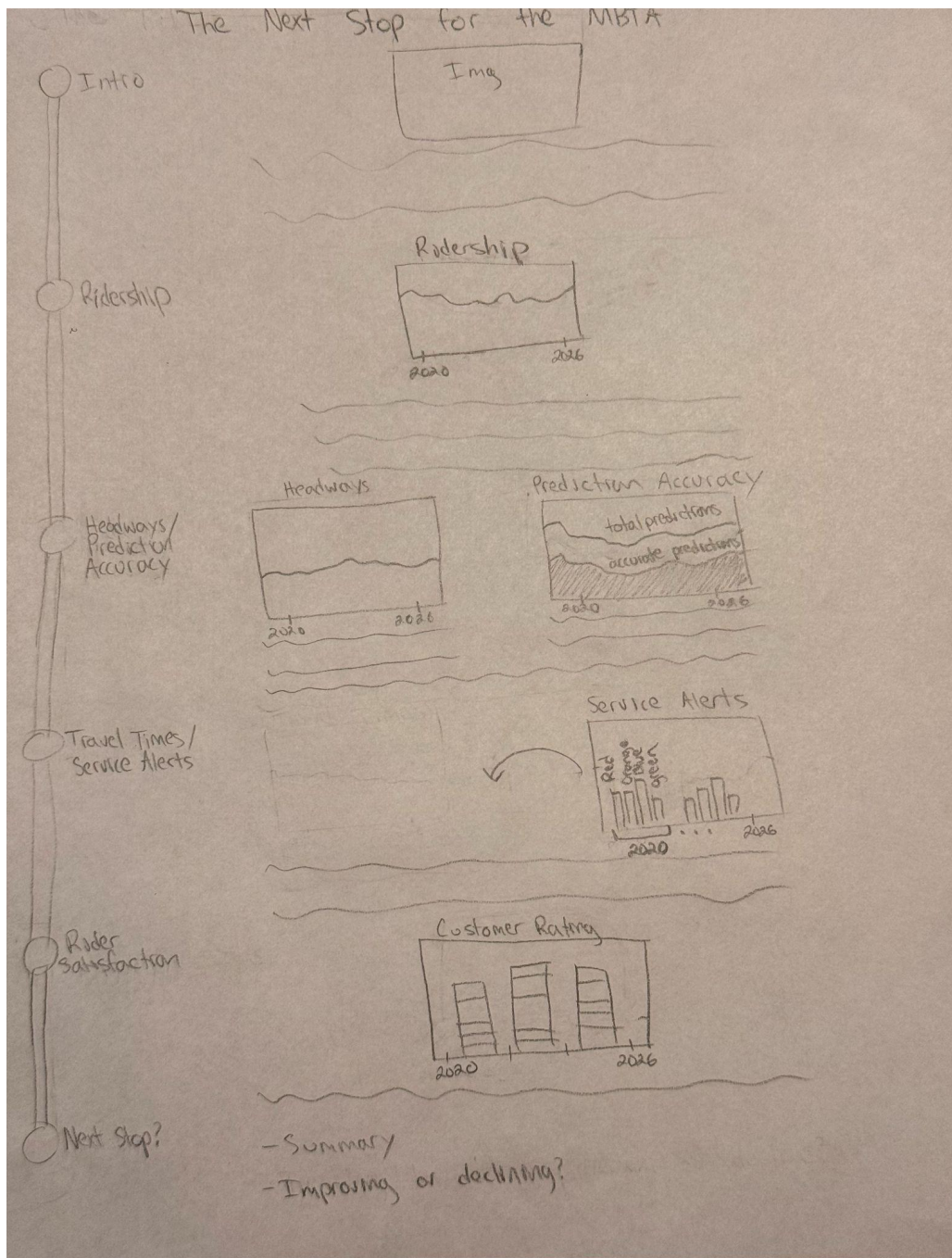
This project uses data obtained from the MBTA Open Data Portal. Through this portal you can access data about the MBTA such as ridership, headways, and service alerts. The following are the datasets used for this project:

Ridership	2020-2026
Headways	2020-2026
Service Alerts	2020-2023 , 2024-2026
Rapid Transit and Bus Prediction Accuracy Data	2020-2026
Customer Satisfaction	2020-2026

The data is available for download as CSV files, with some containing over 100 million values. To get the relevant data points out of this, I created a Python script that scanned over relevant columns. The script also tallied up totals and saved the information in a new file. To facilitate working with the data with JavaScript, partway through the data processing, I used the `json` library to make the Python script output its data in JSON format. Since some data had already been collected and saved in plaintext format, I used Claude Code to convert some of the plaintext data into JSON format. After data processing and tallying, the result was five JSON files containing filtered, month-by-month data for each of the previously listed datasets.

Paper Sketches and Prototypes

Prototype sketch:



Technologies, Development and Deployment

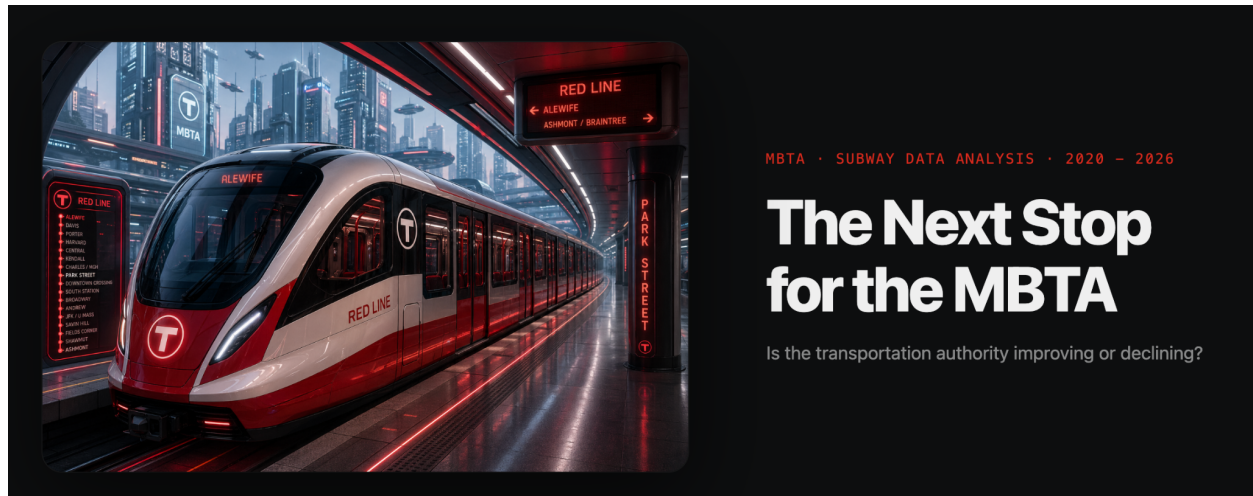
This project used the following technologies:

- Python w/ minimal pandas
- HTML & CSS
- JavaScript w/ [Chart.js](#)
- Claude Code
- Hosted with GitHub Pages

Development Process

I downloaded the csv files from the MBTA Open Data Portal and created a Python script to work with the data. I used the script to parse the csv files and tally up relevant fields, such as getting columns that tell the date, the color of the line, and the measured value. The script outputs the tallied data into a file. Some of the outputs were in JSON format, and others were in plaintext, and later converted to JSON using Claude Code. Then, I created a basic layout of the webpage including the ChartJS graphs. I used Claude Code to add the JSON file data to the graphs, to set up the final design of the webpage, add a Red Line-inspired progress bar, and add button functionality and interactivity to the graphs. The project is hosted using GitHub Pages.

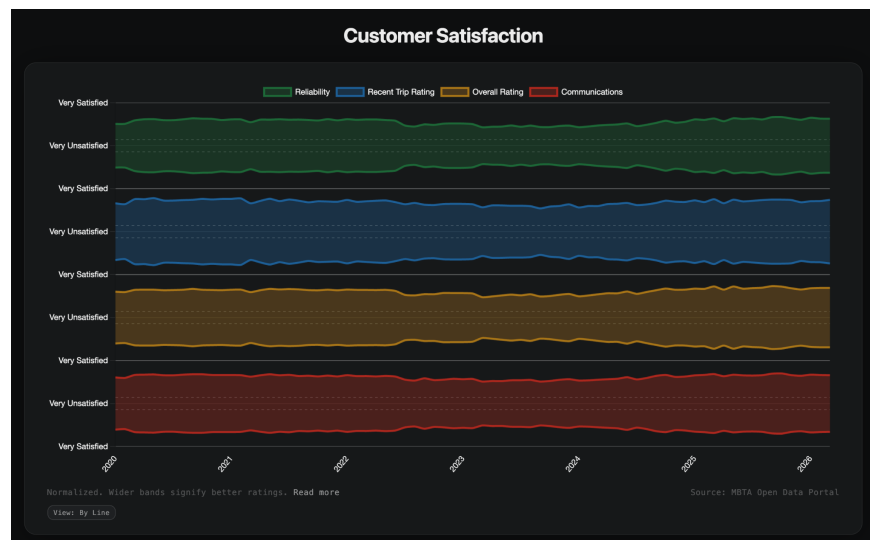
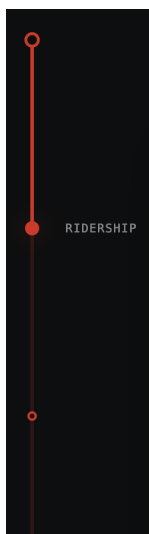
Final Product



The webpage includes a title/introduction section to give some information about the MBTA and what this project is about. On the left of the page is a Red-Line-inspired navigation bar (image bottom left), where each station is a section on the webpage. On the upper right there is a button to swap the colors for colorblind-friendly ones. The first graph encountered is a line chart displaying the ridership from 2020 to 2026. The next two charts are headways and alerts, both of which have data for each subway line, and the option to display the data as an average of all lines combined. Next is prediction accuracy which can display the number of accurate/innaccurate predictions, or toggled to show the percent accuracy of their predictions over time. The final graph is the customer satisfaction graph. This graph displays the average customer rating based on responses to four questions. It can also be toggled to display combined rating.

[Webpage](#)

[Code](#)



References

MBTA Blue Book Open Data Portal <https://mbta-massdot.opendata.arcgis.com/>
Futuristic Red Line Image - ChatGPT
Coding Assistance - Claude Code