

Team Abstract

Team: IC25060

Team Members:

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Title:

Analyzing and Forecasting WMATA Ridership Trends

Summary:

Our project aims to analyze ridership trends of the Washington Metropolitan Area Transit Authority (WMATA) using open data from WMATA. Our objective is to understand historical ridership patterns, assess WMATA's post-pandemic recovery, compare its performance with other metro systems, and develop a predictive model for future ridership growth. Data from Federal Transit Administration will be used to compare ridership with WMATA.

First, we start with short-term ridership trends, visualizing weekly cycles and seasonal fluctuations over the past year (September 2023 – September 2024). Then, we extend the analysis to a multi-year perspective (2020–2025), we identify significant shifts in ridership patterns, particularly the impact of the COVID-19 pandemic and subsequent recovery trends. A comparative study with other U.S. metro systems helps evaluate WMATA's ridership relative to its peers, highlighting potential strategies for ridership growth and recovery.

Lastly, we develop a predictive model to forecast future ridership, including factors like seasonality, weekday effects, and potential external influences like weather conditions. Also, we plan to predict ridership growth based on successful strategies observed in other metro systems, and recommend to enhance WMATA's ridership recovery.

Through this project, we aim to provide actionable insights that can help transit agencies optimize operations, improve service planning, and enhance commuter experience in the post-pandemic era.

Data Sources:

- WMATA: <https://www.wmata.com/initiatives/ridership-portal/Metrorail-Ridership-Summary.cfm>
- Federal Transit Administration: <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>
- Weather API (work in progress)

Methodology:

- Mainly work with Python.
- For exploratory analysis, we visualize trends for ridership and time data.
- For prediction model, we use simple models like regression for forecasting.
- Might use Excel lightly to check data.