Project Name: MTA Daily Ridership Analysis

Overview

This project aims to analyze **MTA daily ridership data** to identify trends in subway, bus, and commuter rail usage. The goal is to assess ridership recovery post-pandemic, understand peak travel times, and explore factors affecting transit usage. The dataset includes daily ridership counts for subways, buses, railroads, and bridges/tunnels, along with percentage comparisons to pre-pandemic levels.

The dataset includes **daily ridership counts** from 2020 onward for subways, buses, railroads, and bridges/tunnels. It is sourced from **MTA Open Data**, consisting of millions of data points aggregated from MetroCard/OMNY tap-ins and automated passenger counters.

Objectives

- Identify peak ridership hours for different transportation modes.
- Analyze subway, bus, and commuter rail ridership trends over time.
- Compare current ridership to pre-pandemic levels to assess recovery.
- Evaluate the impact of external factors (e.g., COVID-19, weather, economy) on ridership.
- Provide actionable insights for **transportation planning and policy-making**.

Scope

- Data collection and cleaning from MTA ridership records.
- Exploratory data analysis (EDA) and visualization.
- Identifying key patterns and trends in ridership data.
- Forecasting ridership trends using machine learning models.
- Developing an interactive dashboard to visualize insights.

Project Plan

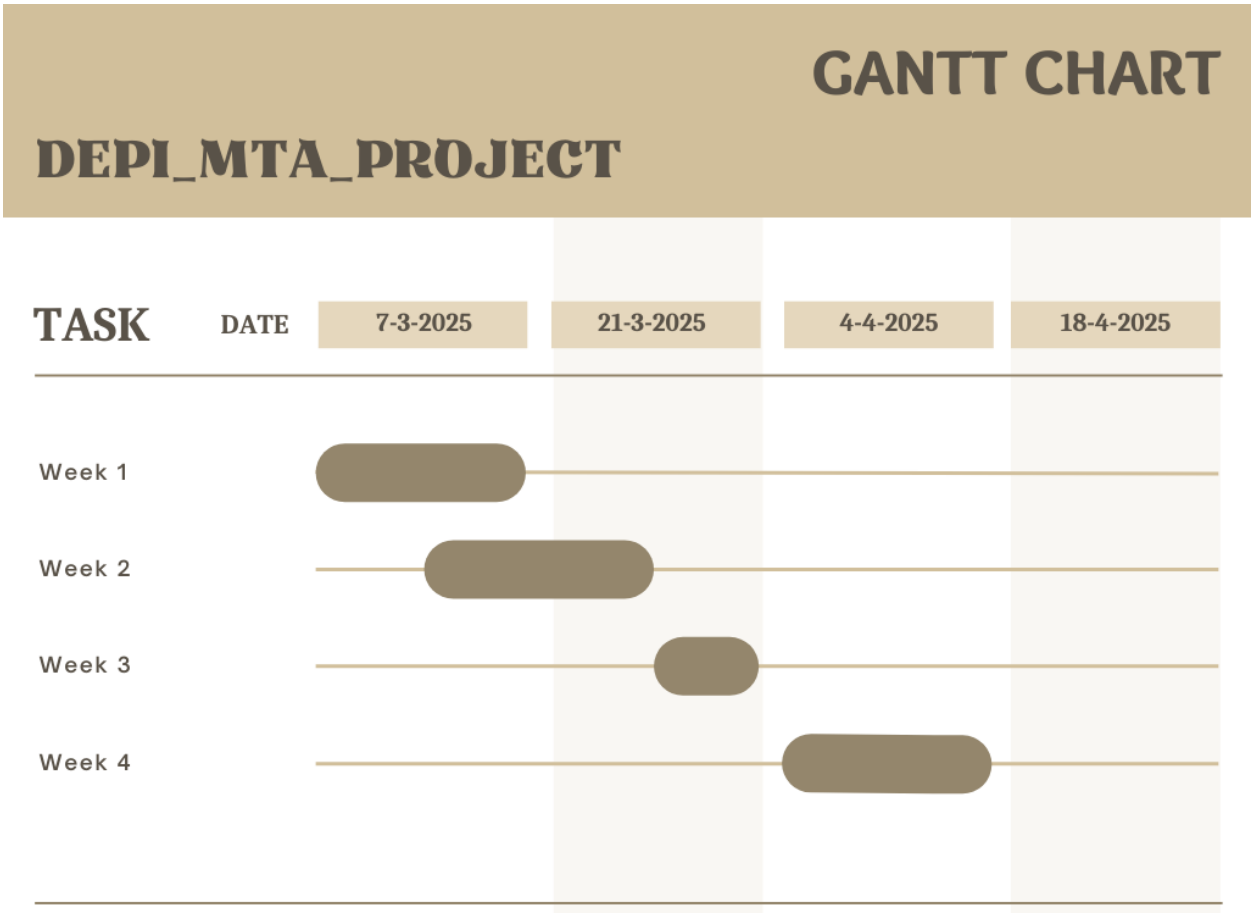
Milestones & Timeline

Milestone	Expected Completion
Data Cleaning & Preprocessing	Completed
Exploratory Data Analysis (EDA)	Completed
Data Visualization & Trend Analysis	Ongoing
Forecasting Phase	14-Apr-2025
Interactive Dashboard Development	21-Apr-2025
Final Presentation & Report	1-May-2025

Deliverables

- **Cleaned & Processed Dataset** → Ready for analysis.
- **Exploratory Data Analysis Report** → Summary of key trends.
- **Visualizations & Dashboards** → Interactive graphs to illustrate findings.
- **Forecasting Model** → Predictions for future ridership trends.
- **Final Report & Presentation** → Summary of insights & recommendations.

Timeline



📝 Task Assignment & Roles

Task	Assigned To
Data Cleaning & Preprocessing Using SQL	Galal Eldeen Mohamed, Momen Haitham
Data Cleaning & Preprocessing Using Python	Sarah Emad
Data Analysis Using Python	Tasneem Mohsen

Forecasting using Machine Learning	Sarah Emad, Tasneem Mohsen
Visualization Dashboard using Power BI	Fatma
Visualization Dashboard using Tableau	Alyaa Ibrahim

📊 Key Performance Indicators (KPIs)

Metric	Success Indicator
Peak Ridership Hours Identified	Determine the busiest travel hours.
Subway vs. Bus vs. Commuter Rail Trends	Compare ridership across transit modes.
Pre vs. Post-Pandemic Recovery Rate	Assess recovery percentage since COVID-19.
Forecast Accuracy for Ridership Trends	Measure prediction accuracy for future trends.
Interactive Data Visualization Completed	Ensure clear, insightful, and interactive graphs.

🔍 Stakeholder Analysis

Stakeholder	Role in Project	Importance
MTA Operators	Improve scheduling & capacity planning	High
Passengers	Understand transit trends & recovery	High
Urban Planners	Optimize public transport systems	Medium
Financial Analysts	Assess revenue impact of ridership changes	Medium
Government Agencies	Policy-making for public transit	Medium

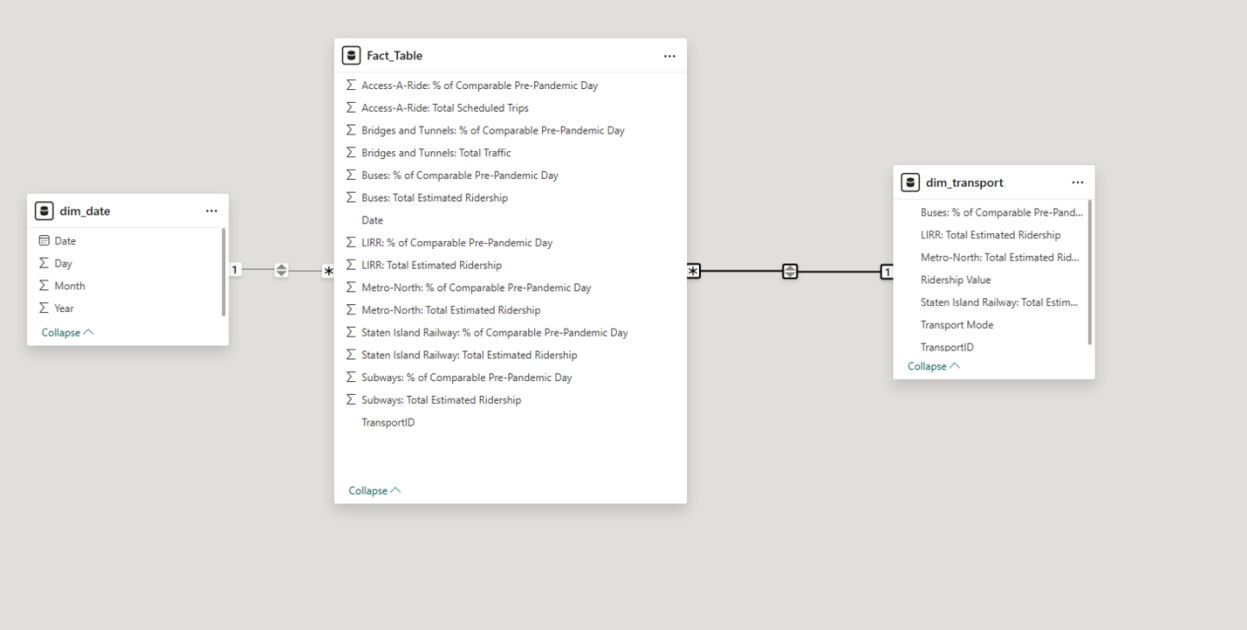
Data Modeling & System Design

- **Data Sources:** MTA Daily Ridership dataset (CSV format).
- **Technologies:** Python (Pandas, Matplotlib, Seaborn, Plotly), SQL, Power BI, Tableau.
- **Data Processing:** Cleaning, handling missing values, and transformation.
- **Visualization Tools:** Power BI, Tableau, and Python.
- **Machine Learning Models:** Time Series Forecasting (Prophet, ARIMA, or XGBoost).

Final Deliverables by 1-May-2025

✅ **Cleaned Data & Exploratory Analysis Report**
✅ **Interactive Dashboard (Power BI / Tableau)**
✅ **Predictive Model for Ridership Forecasting**
✅ **Final Report & Presentation**

Data Modeling



This project will provide **data-driven insights** to improve MTA's transit operations and aid in policy-making for a better public transportation experience. 🚆📊