BSc. CSDA

Sreyan Sukla

Mapping the Pulse of a City: Traffic and Transit Trends(Bangaluru)

Data Analytics(GUVI HCL)

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Github: https://github.com/sukla2003/Guvi-Data-Analytics-Internship-Project---3-.git

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Introduction

Bengaluru Metro, also known as Namma Metro, plays a vital role in the city's public transport system. This project analyzes ridership trends and ticket usage patterns using real-world datasets to gain actionable insights into passenger behavior and urban mobility.

Objective

- Analyze daily, weekly, and monthly ridership trends
- Identify the most popular ticket types among passengers
- Highlight peak travel days and busiest periods
- Present insights through interactive visualizations and dashboards
- Support strategic decision-making for metro planning and operations

Dataset Description

01

Source

Namma Metro ridership dataset (Bengaluru)

02

Time Period

Covers multiple months of ticketing & ridership data

03

Key Columns

`record_date` – Date of ridership

`total_smart_cards`, `stored_value_card`, `passes`

`total_tokens`, `total_ncmc`, `qr_tickets`

`total_ridership` (calculated)

Methodology

Data Collection

Bengaluru Metro ridership dataset (CSV file).

Data Cleaning &Preparation

1. Standardized column names.
2. Converted date fields to datetime format.
3.Created derived features (Month, Week, Weekday)

Exploratory Data Analysis

1. Identified daily, weekly, and monthly ridership trends.
2.Calculated busiest day & most popular ticket type.

Visualization

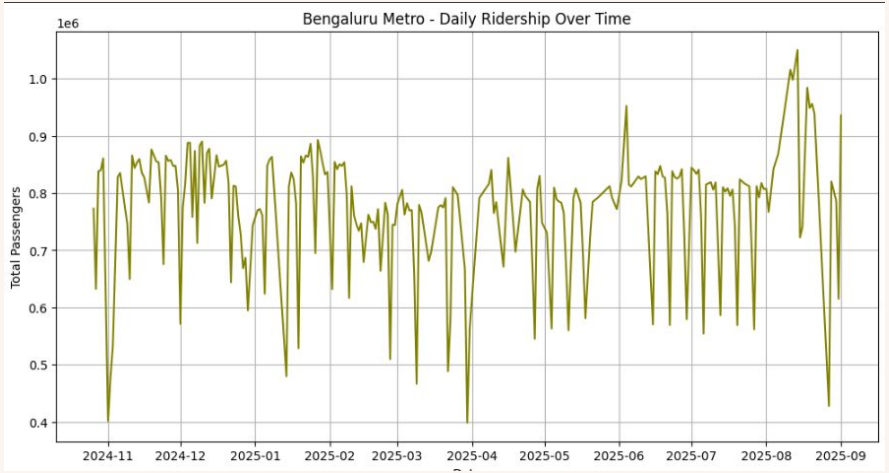
1.Created interactive plots (line, bar, pie).
2.Built heatmaps for detailed ridership analysis.
3.Combined visuals into an interactive dashboard.

Dashboard Creation

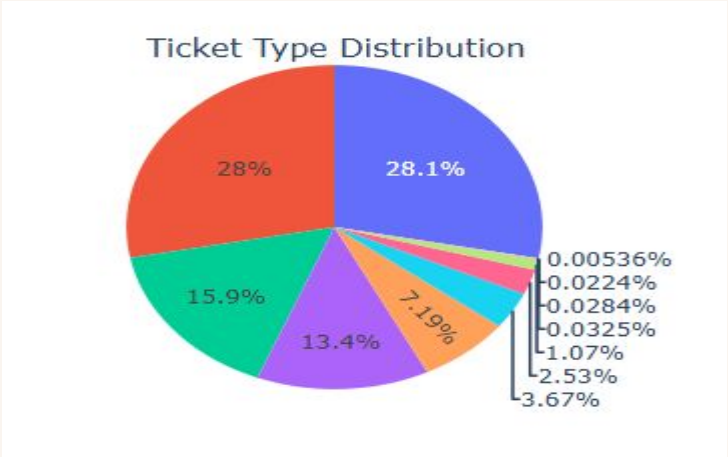
1.Used Plotly with dark theme.
2.Added interactivity with buttons & filters.
3.Designed Power BI–style card layout.

Exploratory Data Analysis(EDA)

Daily & Weekly Trends: Identified fluctuations in Ridership patterns.

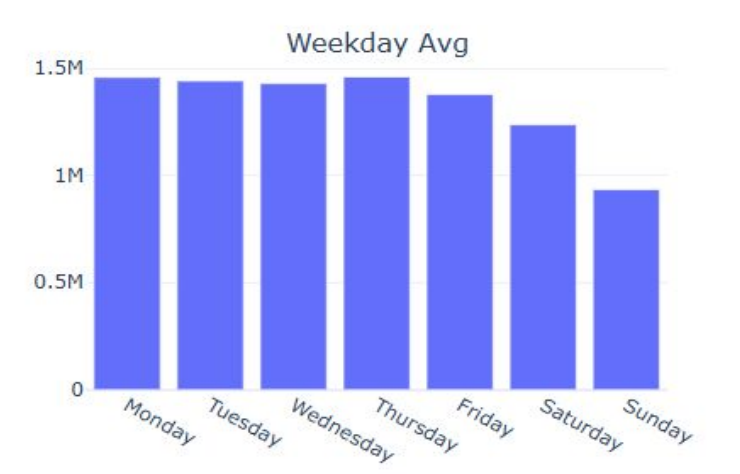


Ticket Usage: Compared Smart Cards, Tokens, QR tickets and Passes.

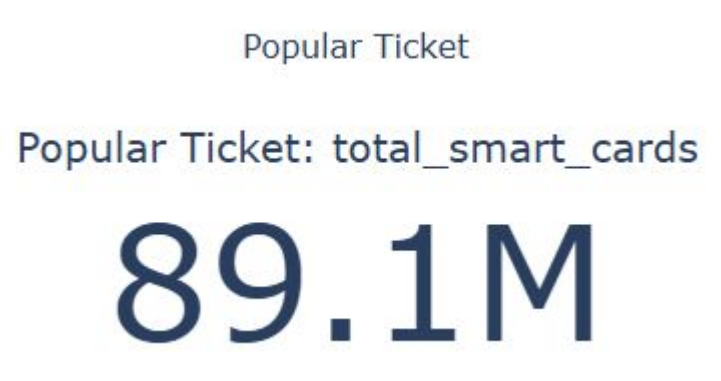


Exploratory Data Analysis(EDA)

Peak Insights: Weekdays had higher Riderships than Weekends.



Growth Analysis: Increasing adoption of smart card ticketing observed.



Exploratory Data Analysis(EDA)

Seasonal Patterns: Certain Months Showed Consistent Spikes in Usage.

INSIGHTS & INTERPRETATIONS

Busiest Day Identified

Bangaluru Metro

Peak Ridership recorded on {14th August, 2025}, reflecting festival/holiday impact.

Weekly Trends

Metro Traffic

Strong Weekday Traffic with Friday Showing Maximum Footfall.

Ticket Preference

Smart Card

Smart card Dominates Usage, but QR tickets are gradually growing.
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INSIGHTS & INTERPRETATIONS

Heatmap Insights

Peak Hour Rush

Morning (8-10 AM) and Evening (6-8 PM) are consistent peak hours.

Growth Observation

Graph

Monthly ridership showa a clear upward trend, indicating higher adoption of metro services.

Challenges Faced

Data Quality Issues: Missing/incorrect entries in ridership logs required cleaning.

Column Standardization: Inconsistent column names and formats across datasets.

Time Parsing: Converting date-time formats (DD-MM-YYYY) for accurate trend analysis.

Visualization Overlaps: Adjusting layout to prevent charts from overlapping (weekly trend & pie chart).

Scalability Challenge: Dashboard complexity increased as more KPIs and visuals were added.

Interactivity: Ensuring button controls worked smoothly with multiple charts.

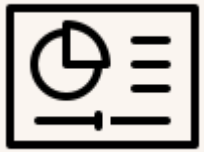
Conclusion

The Bengaluru Metro Ridership Dashboard successfully transforms raw ticketing data into actionable insights. By analyzing daily, weekly, and monthly trends, the dashboard highlights travel patterns, busiest periods, and popular ticket types. It empowers decision-makers with a clear, interactive, and visually appealing platform to monitor performance, optimize operations, and plan future strategies for sustainable urban mobility.

References

Dashboard Inspirations:

Power BI and modern BI dashboards.



Tools and Libraries:

1.Python (Pandas, Plotly, Matplotlib, NumPy)
2.Jupyter Notebook

Dataset:

Namma Metro Ridership Dataset(Bengaluru Metro).

Supporting Material

Reports on Urban mobility and metro operations.

Q & A

- Feel free to ask any questions.
- Contact: sreyan_2312res659@iitp.ac.in

Thank You

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