Kovai.co — Public Transport Passenger Journeys Forecasting

1. **Project Overview**

   Daily Public Transport Passenger Journeys by Service Types

2. **Insights from data**

	Local Route	Light Rail	Peak Service	Rapid Route	School	Other
count	1918.000000	1918.000000	1918.000000	1918.000000	1918.000000	1918.000000
mean	9891.395203	7195.446298	179.581335	12597.213243	2352.694995	42.937956
std	6120.715714	3345.616428	156.532738	6720.494557	2494.766306	41.761911
min	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25%	3044.500000	4463.500000	0.000000	6383.000000	0.000000	14.000000
50%	11417.000000	7507.000000	193.000000	13106.500000	567.500000	39.000000
75%	15517.500000	10008.250000	313.750000	17924.750000	4914.000000	67.750000
max	21070.000000	15154.000000	1029.000000	28678.000000	7255.000000	1105.000000

From above,

Insight 1:

1) **Highest among all transport types:**

   Rapid Route with Mean usage: 12,597 daily users

So , from this ,

"Rapid Routes" are the **most used service**, even more than Local Routes and Light Rail. So if you're planning service expansion, **focus more on Rapid Route** — that's where the crowd is"

Insight 2:

1) **School services are extremely seasonal**

   Median (50%) = 567 — but **25% of days = 0 passengers!**

So , from this ,

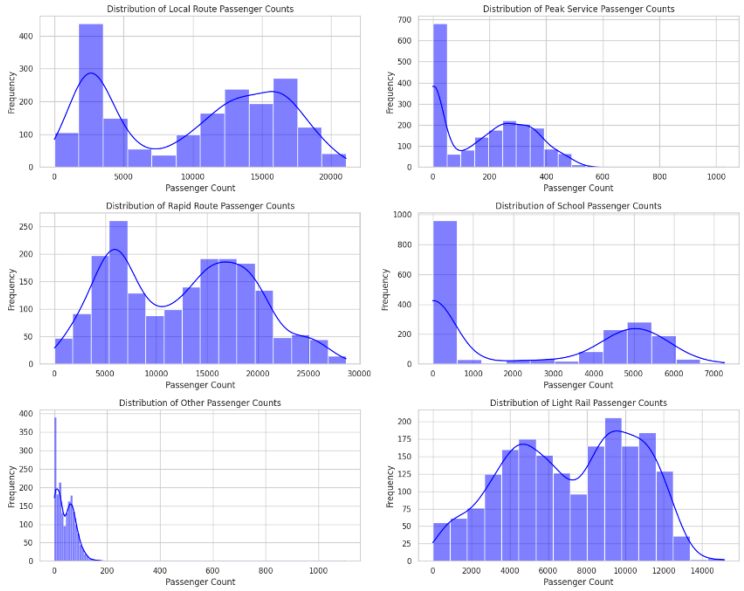
" School services are **not uses throughout year** — they drop to 0 frequently (holidays or non-school days). These are **purely academic-calendar-based services**."

Insight 3:

1) Light Rail has very steady usage, Standard deviation is only ~3,345, which is **low compared to Local/Rapid Routes**

So , from this ,

" Light Rail usage is **consistent** — less spiky than buses. This shows it's reliable and maybe used for fixed-work purpose.

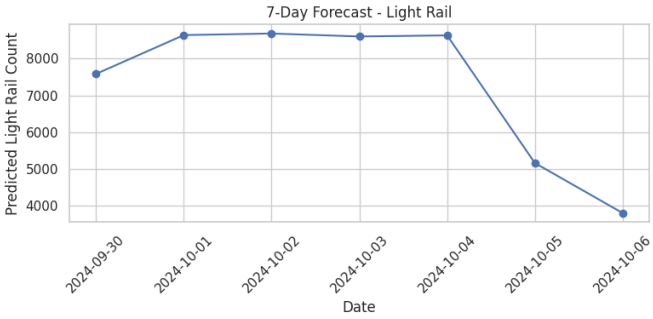


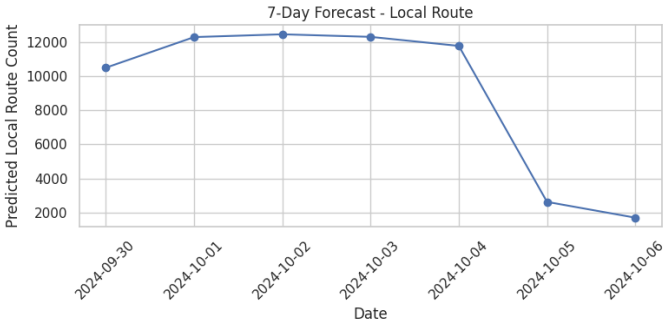
3.Forecasting Approach

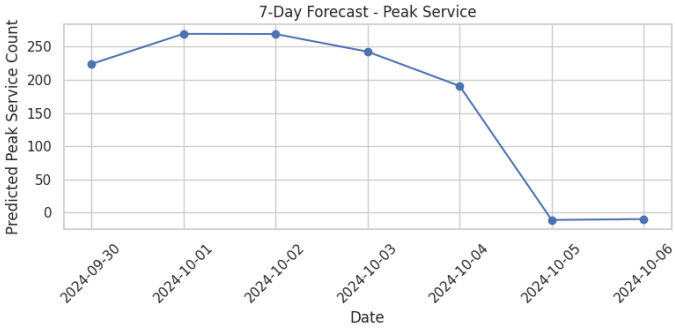
Algorithm: Facebook Prophet

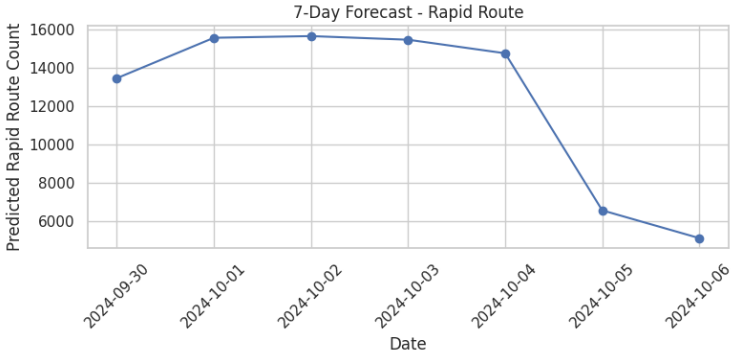
We used **Facebook Prophet** to forecast passenger numbers for the next 7 days across all routes — Local Route, Light Rail, Peak Service, Rapid Route, and School services.

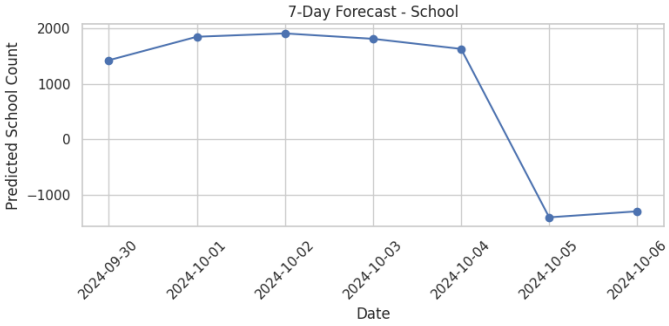
for example, “Light Rail is forecasted to have 7,500–8,200 passengers per day.”
Prophet captures **daily and weekly travel patterns** (like higher weekday traffic and lower weekend usage) automatically.
It also accounts for **sudden increases or drops**, making the forecasts realistic even if past data has changes or gaps.
This approach helps provide **actionable and reliable insights** that can assist in scheduling, planning, and improving transport services.


7-Day Forecast - Light Rail
Predicted Light Rail Count
8000
7000
6000
5000
4000
2024-09-30
2024-10-01
2024-10-02
2024-10-03
2024-10-04
2024-10-05
2024-10-06
Date


7-Day Forecast - Local Route
Predicted Local Route Count
12000
10000
8000
6000
4000
2000
2024-09-30
2024-10-01
2024-10-02
2024-10-03
2024-10-04
2024-10-05
2024-10-06
Date


7-Day Forecast - Peak Service
Predicted Peak Service Count
250
200
150
100
50
0
2024-09-30
2024-10-01
2024-10-02
2024-10-03
2024-10-04
2024-10-05
2024-10-06
Date


7-Day Forecast - Rapid Route
Predicted Rapid Route Count
16000
14000
12000
10000
8000
6000
2024-09-30
2024-10-01
2024-10-02
2024-10-03
2024-10-04
2024-10-05
2024-10-06
Date


7-Day Forecast - School
Predicted School Count
2000
1000
0
−1000
2024-09-30
2024-10-01
2024-10-02
2024-10-03
2024-10-04
2024-10-05
2024-10-06
Date

What is Facebook Prophet ?

Prophet is a forecasting method that looks at past data trends and patterns to predict future values. It is good at handling things like:

- Changes over time (increasing or decreasing trends)
- Weekly patterns (like more passengers on weekdays than weekends)
- Special events or holidays (which might change normal passenger numbers)

It works by breaking down the data into these parts and combining them to make predictions.

How I Used It

1. I prepared the data by renaming the date column to 'ds' and the passenger counts to 'y' — this is what Prophet needs.
2. I trained the Prophet model on the historical data for each transport service (like Light Rail, Local Route).
3. I asked Prophet to predict the passenger counts for the next 7 days.
4. Finally, I plotted the predicted numbers on a graph to see how passenger counts might change day by day.

Important Settings I Used

- Prophet automatically detects trend changes (like sudden increases or decreases in passengers).
- It uses weekly seasonality, meaning it understands patterns repeat each week.
- I didn’t change many settings, I used the default parameters because they work well for general forecasting.

CONCLUSION:

Using Prophet, I was able to forecast future passenger numbers simply and clearly. This helps understand what to expect in the next week and can assist in planning transport services better.