Purwadhika
Digital Technology School

NYC
Taxi & Limousine Commission

Data Analysis of NYC Taxi and Limousine Commission Record

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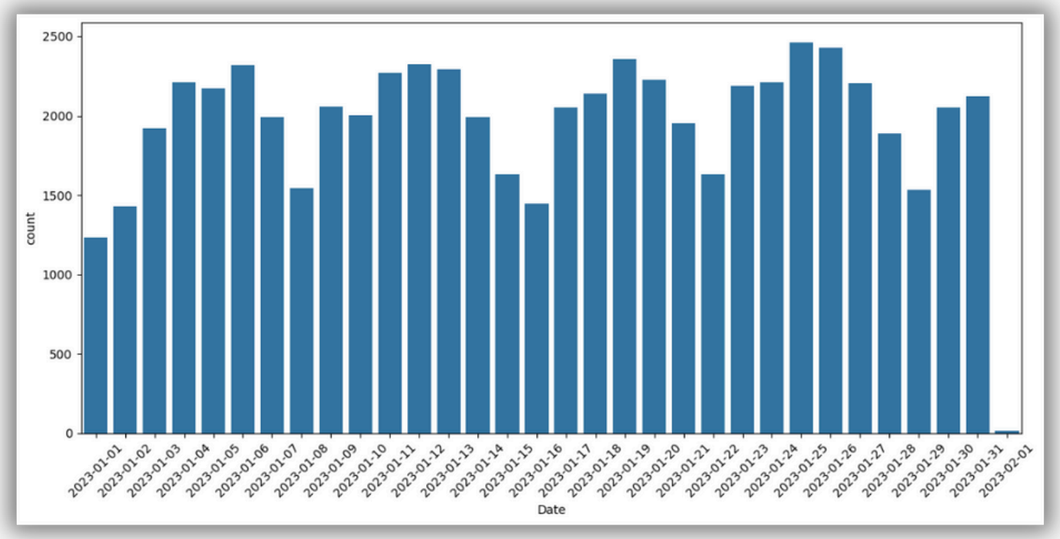
JCDS 2804-001

Project Overview

Background	*Stakeholders*	*Goals*	*Problem*
• NYC ride-hailing data shows trip and revenue concentration in a few zones. • Tipping and payment behavior vary widely across trip types and locations.	• Operations: Improve fleet distribution • Finance: Boost revenue and driver income • Product: Promote digital tipping & shared rides • Drivers: Maximize earnings fairly	• Analyze trip, payment, and tipping patterns • Identify inefficiencies and demand gaps • Recommend strategies to optimize movement and earnings	• Overcrowded zones, underserved areas • Low tips for long or cash trips • High solo ride rate → low efficiency • Limited adoption in outer boroughs

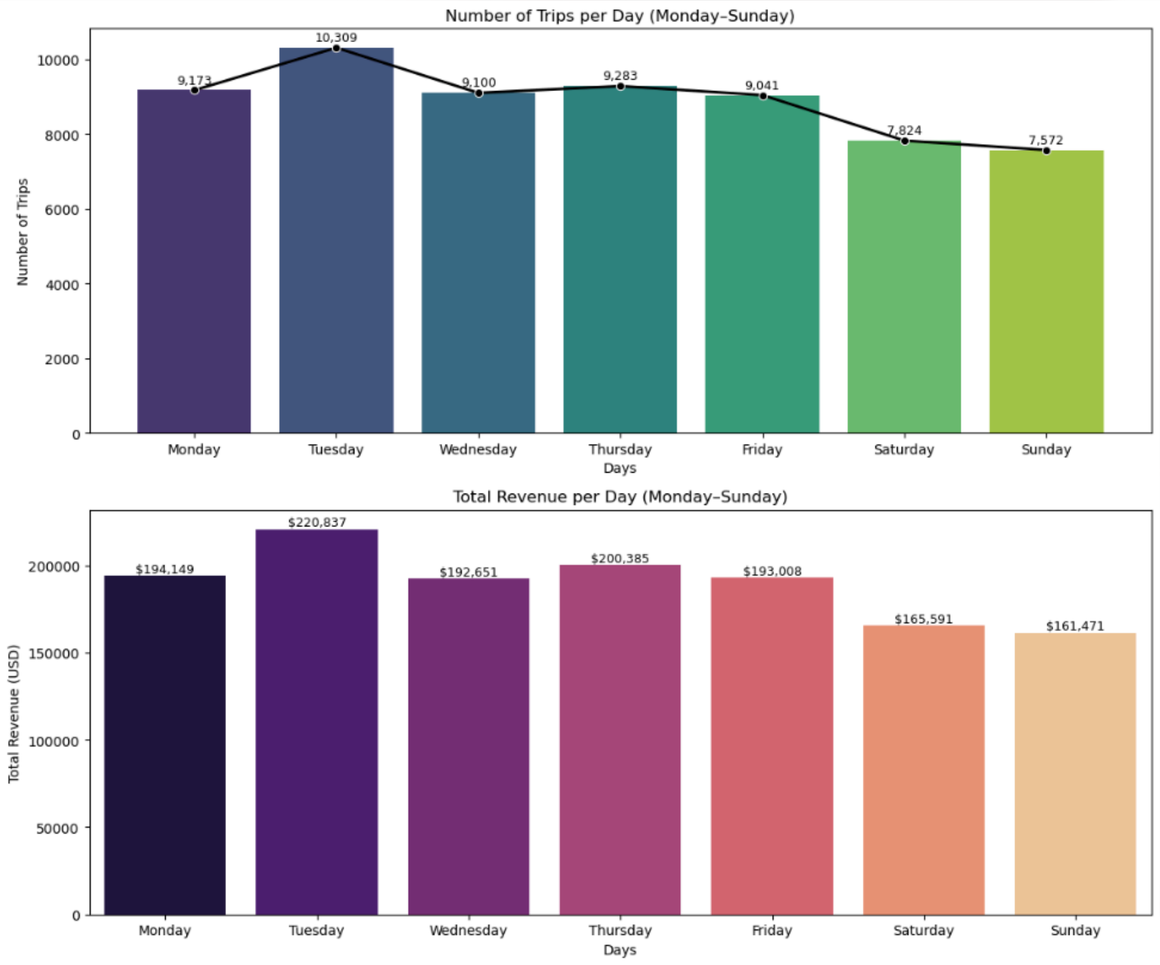
Time Scope Period

	lpep_pickup_datetime	lpep_dropoff_datetime
max	2023-02-01 03:10:05	2023-02-01 17:27:05
min	2023-01-01 00:01:31	2023-01-01 00:16:02

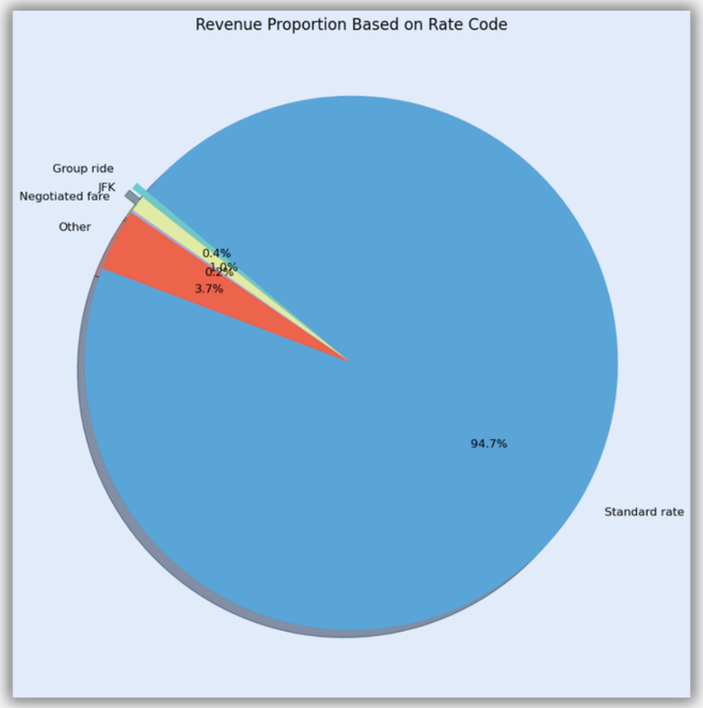


The Data available are within 1 month period of ****January 1st 2023 - February 2nd 2023*****

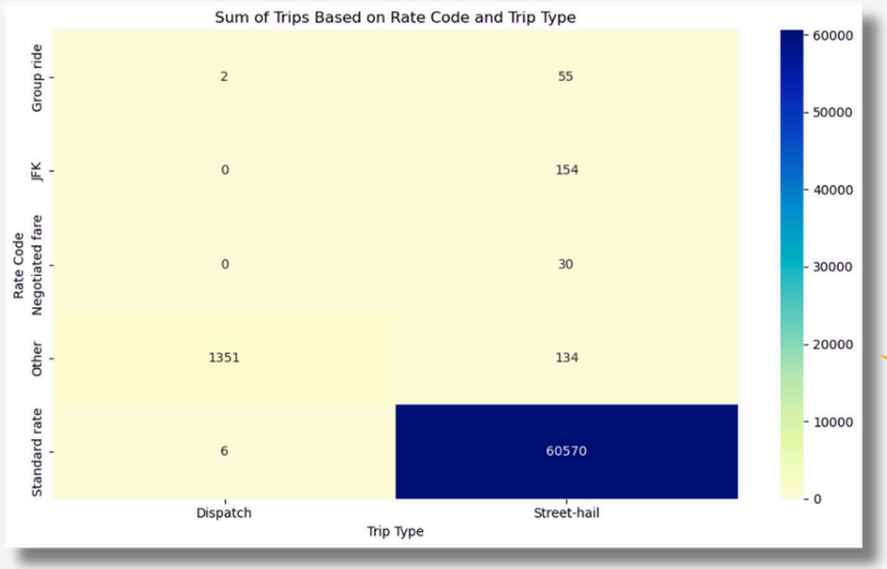
- There's a recurring wave-like pattern in the count — some days drop below **1500** and others peak above **2300.**
- This might reflect a weekday vs. weekend pattern, operational cycles, or user behavior.



- **Weekdays** are busier: Both in terms of trip volume and revenue generation.
- **Tuesday** is the peak day: Highest demand and earnings.
- **Weekends** are less active: Fewer trips and lower total revenue — possibly due to reduced commuting or business travel.

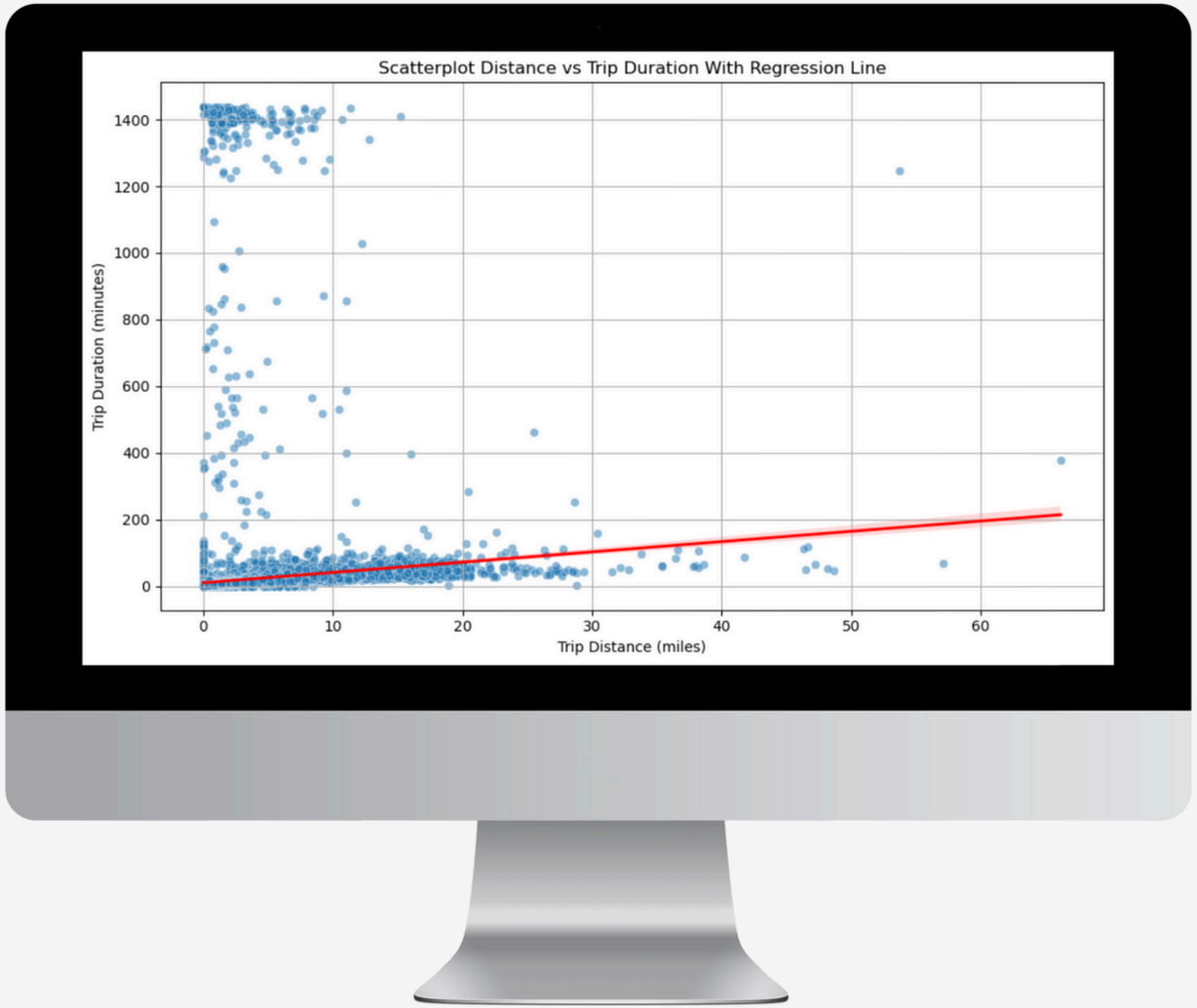


The Standard rate brings in the most total revenue because it has very high volume, but each trip is low in value.

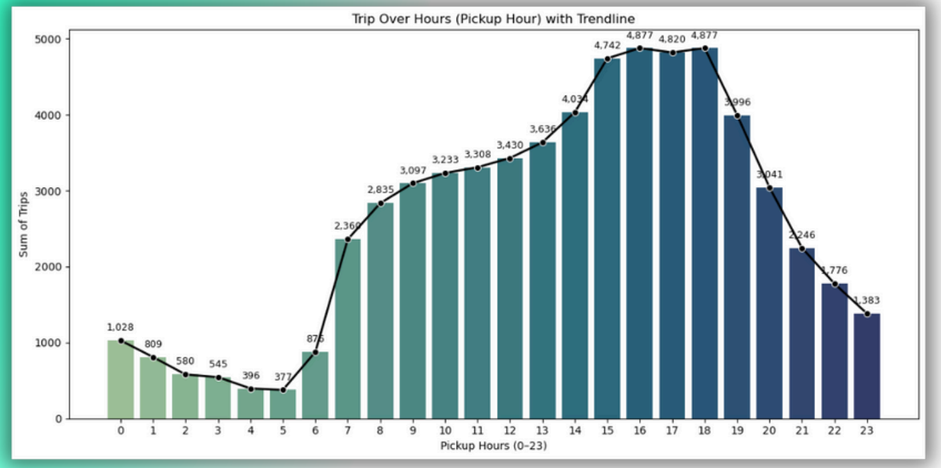


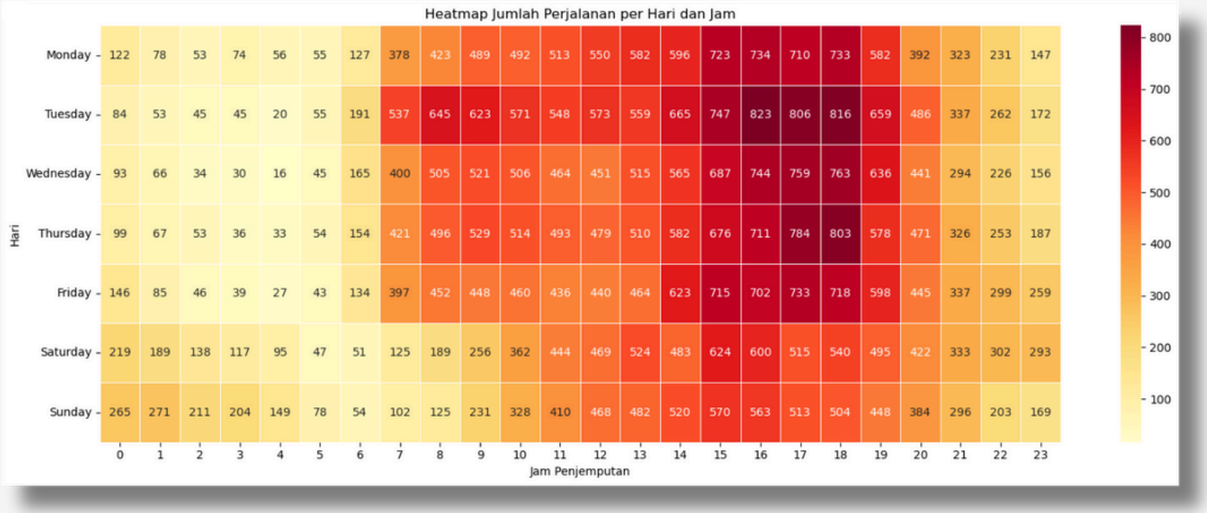
60,570 trips came from Standard rate via Street-hail — this is the overwhelming majority of all trips.
Only 6 Standard rate trips came from Dispatch — so almost all Standard trips are hailed on the street.

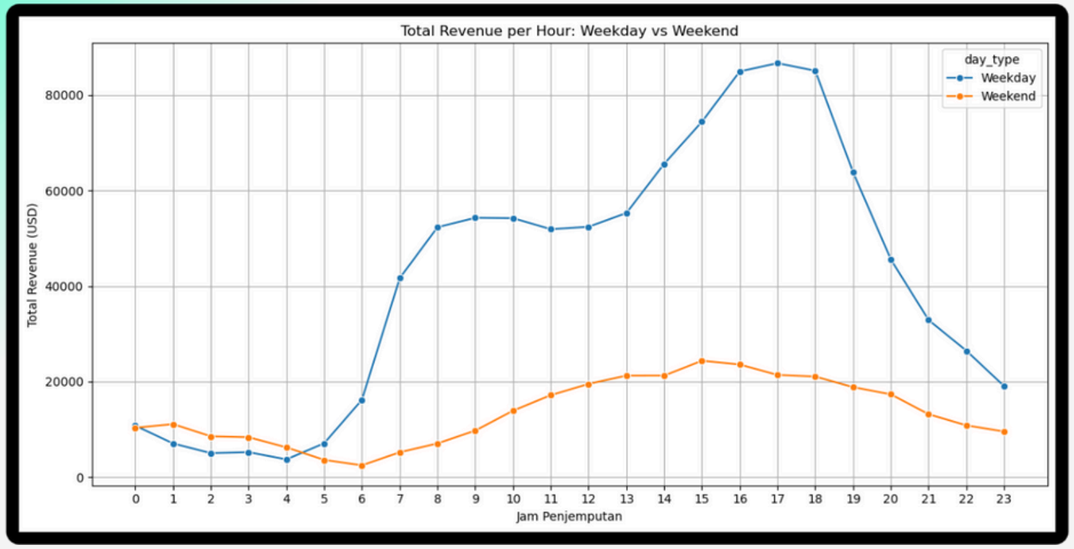
Coefficient Pearson Correlation: 0.658



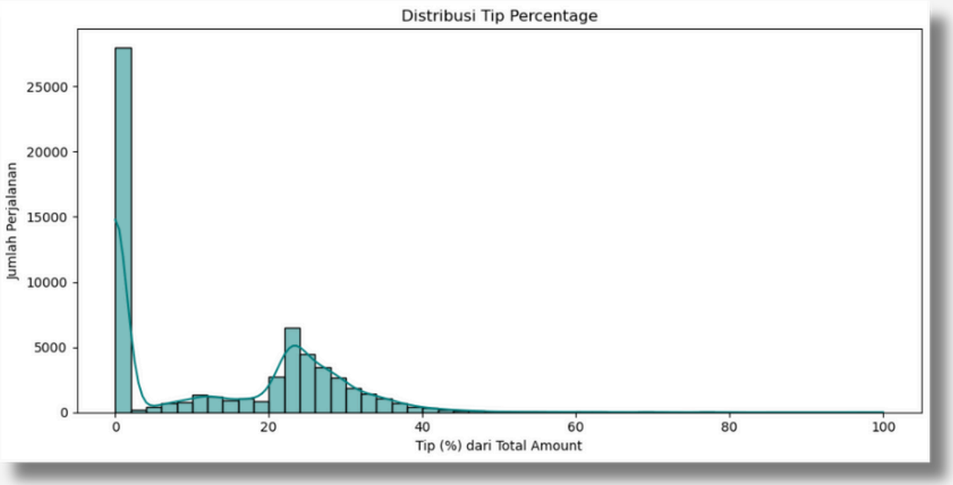
- Distance and duration are positively related, but not tightly — probably due to varied traffic, wait times, or data noise.
- There are significant outliers with unusually long durations for short trips, which may need further investigation or cleaning.
- The regression line helps quantify the trend, but real-world factors (traffic, stop time, etc.) introduce a lot of variability.

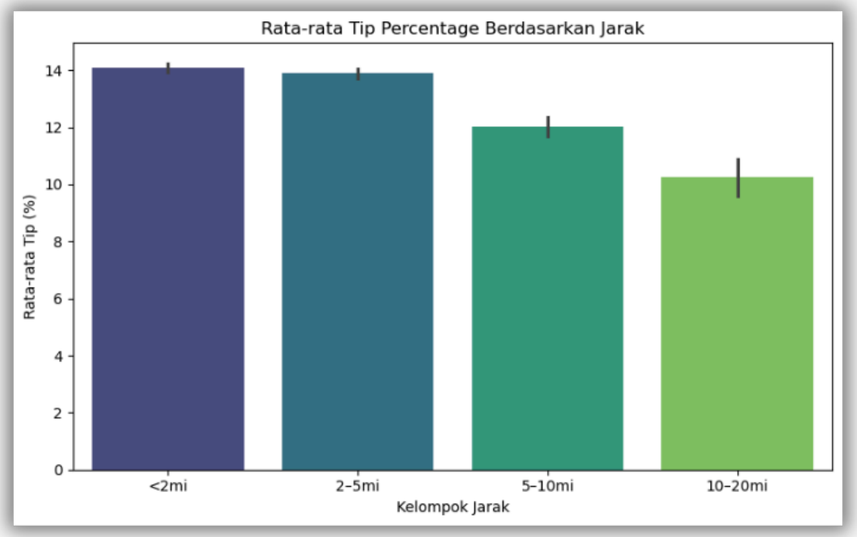


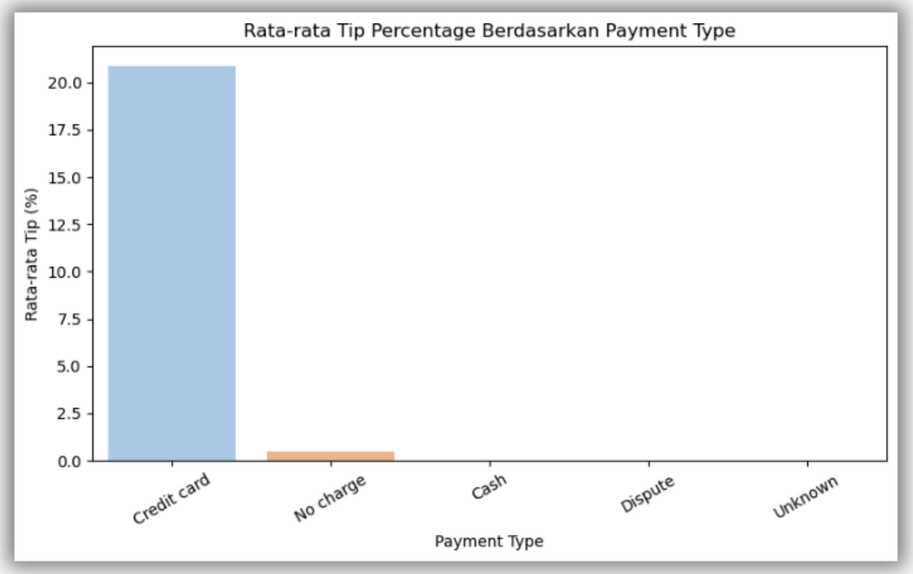




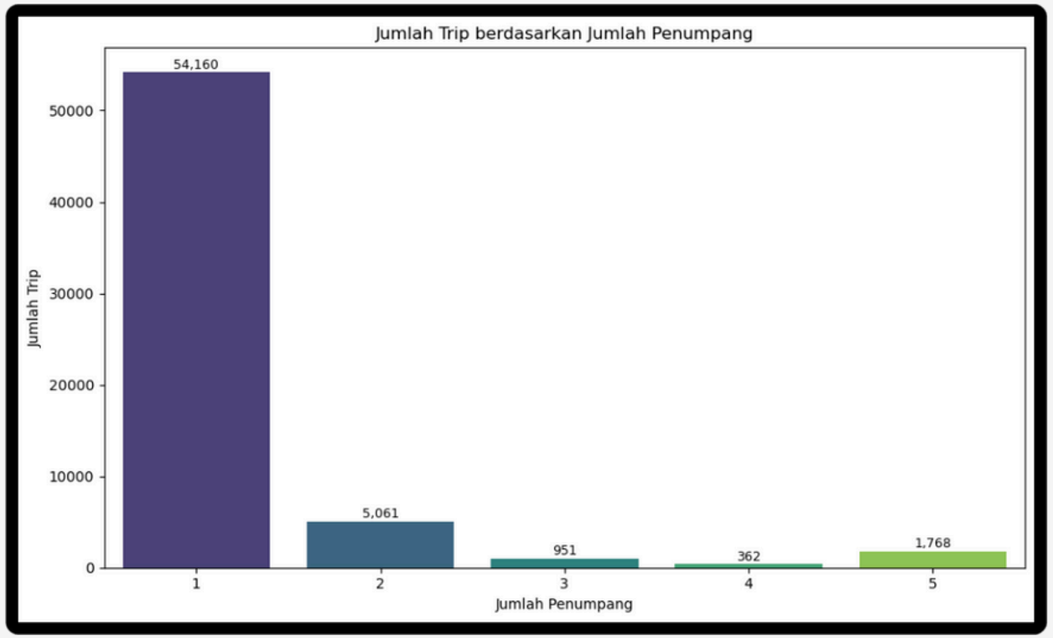
- Tuesday to Friday afternoons (15:00–18:00) are the busiest hours of the week.
- Weekend trips are more spread out, with higher activity early in the morning than weekdays.
- The heatmap confirms a strong link between trip demand and daily human activity cycles (commuting, leisure, night out).
- This data can inform driver scheduling, pricing strategy, and maintenance planning.



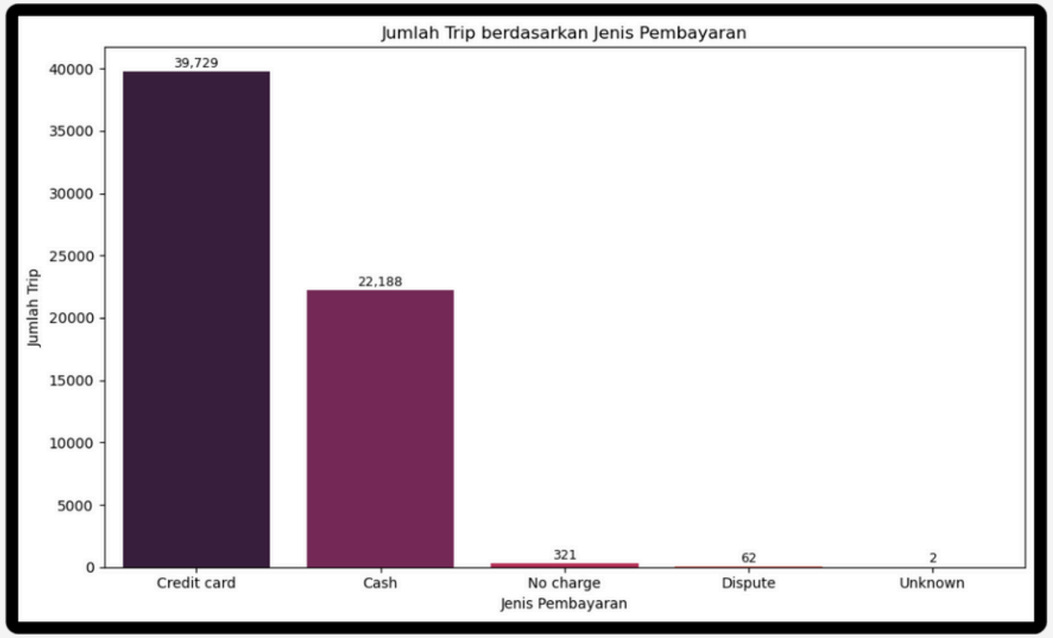




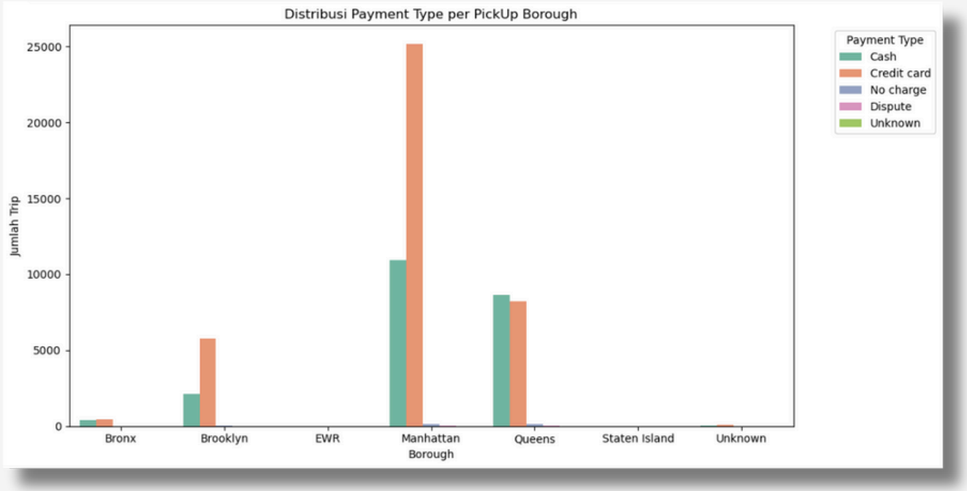
- Tipping is often low or non-existent, but when given, it's commonly around 20–25%, likely influenced by app defaults.
- Short trips receive higher tip percentages than longer ones.
- Tipping is strongly linked to credit card usage — other payment methods rarely result in tips.

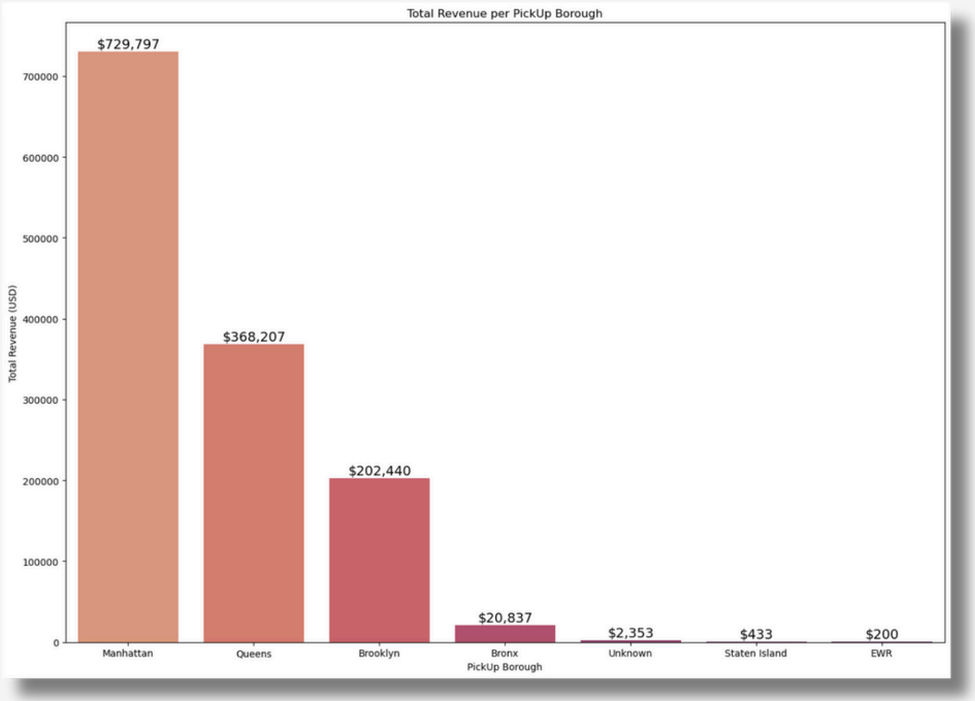


The majority of trips involve a single passenger, indicating that services are primarily being used for individual transport, rather than group rides.

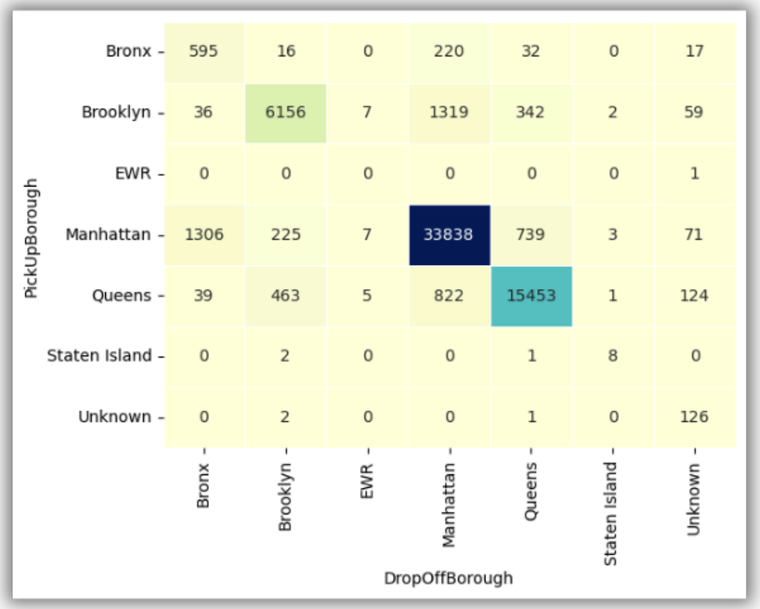


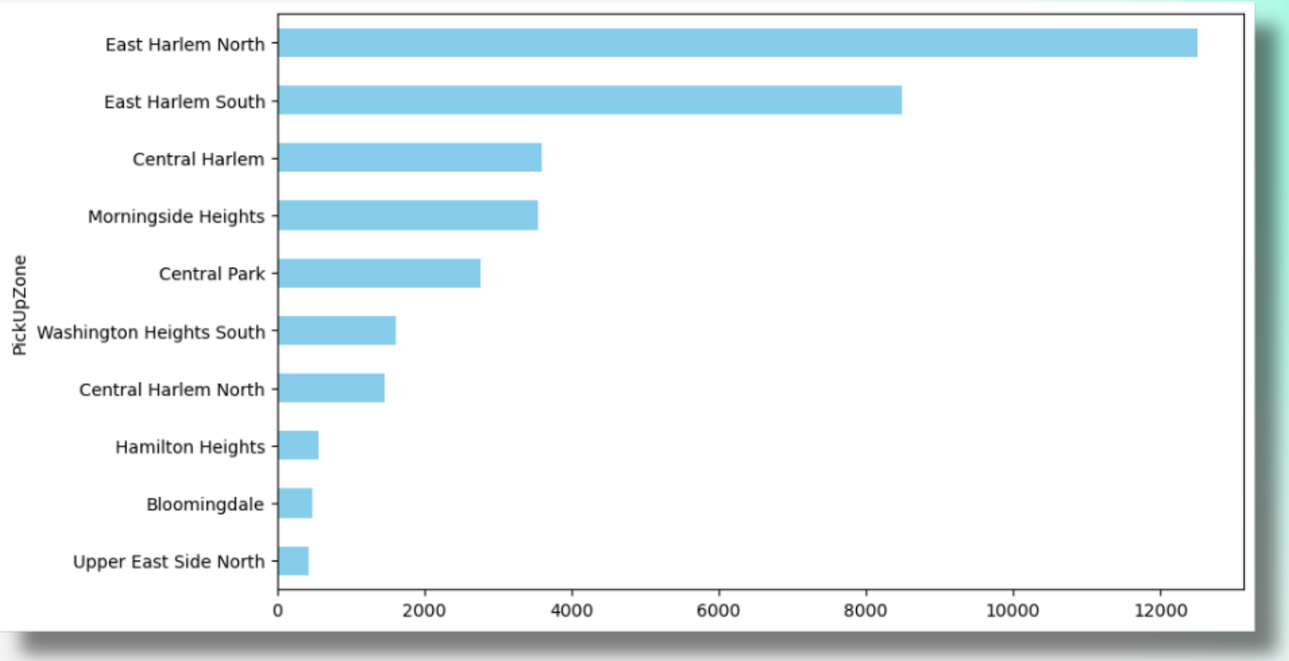
While credit cards are the most popular payment method, cash is still used in a substantial portion of trips. Other methods like ***"No charge"*** and ***"Dispute"*** are rare and may represent edge cases or anomalies.



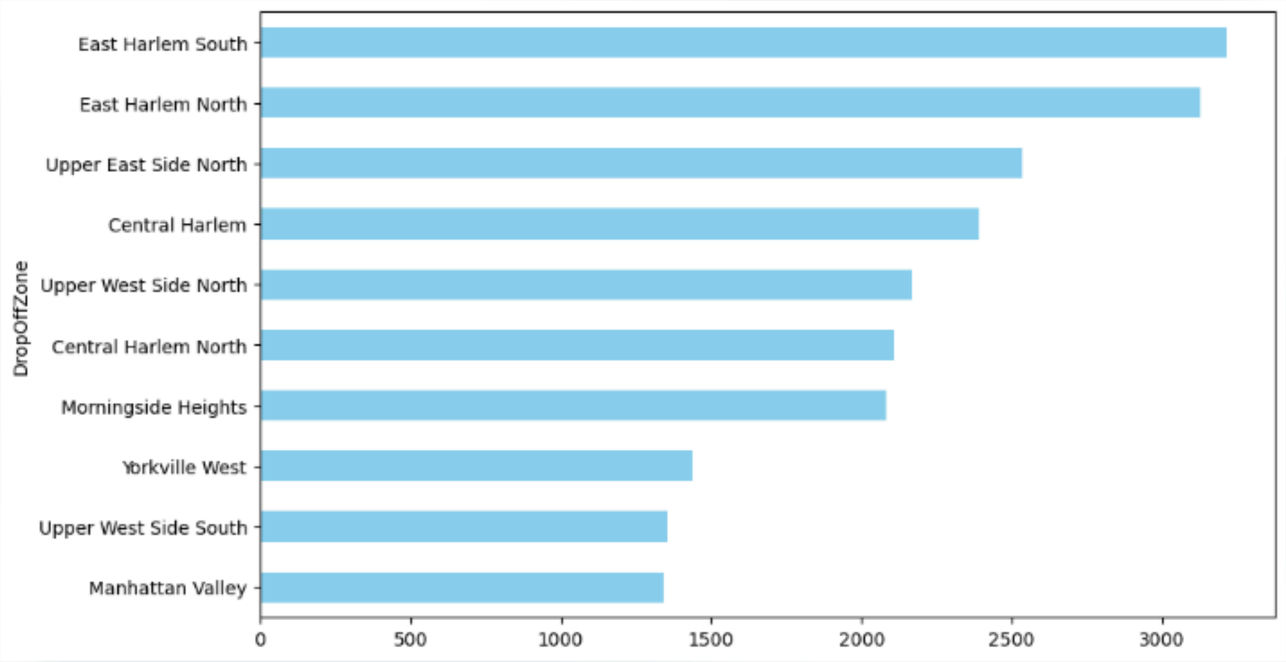


- Manhattan dominates in both trip volume and revenue, largely driven by credit card payments, which are associated with higher average fares and tipping.
- Brooklyn and Queens are secondary hubs, with more balanced payment types, suggesting mixed customer behavior (possibly more locals).
- Credit card usage correlates with higher revenue, reinforcing earlier insights that digital payments play a crucial role in monetization.
- Other boroughs have minimal contribution, suggesting limited service reach or low demand in those areas.





- Intra-borough travel is the dominant pattern, especially within Manhattan, Queens, and Brooklyn.
- Manhattan acts as the central hub, receiving the highest number of cross-borough trips.
- Staten Island and EWR have minimal taxi trip activity in this dataset, possibly due to distance, transit alternatives, or data capture limitations.



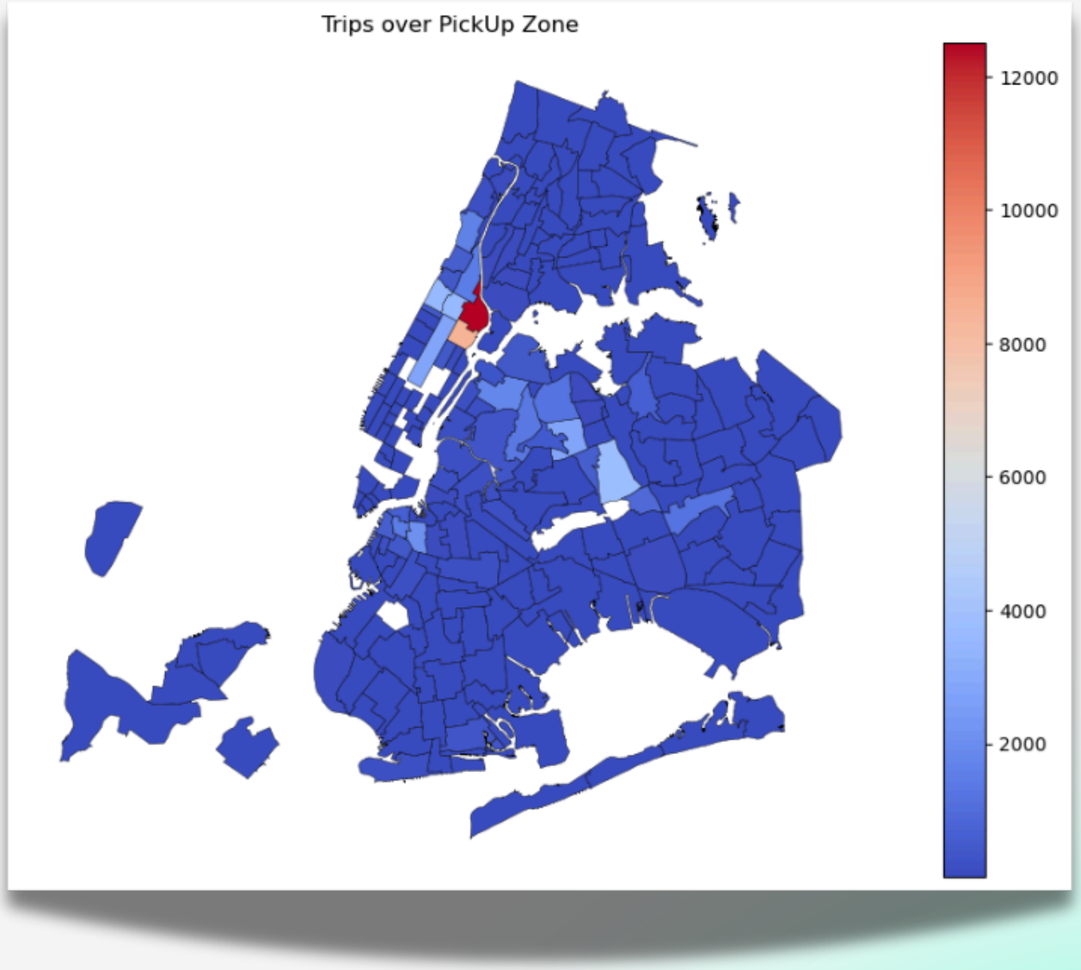
- East Harlem (North & South) is a major hub for both pickups and drop-offs, suggesting it's a core operational zone — possibly due to:

  - High population density

  - Limited public transportation

  - High reliance on taxis/rideshare

- Other key areas like Central Harlem, Morningside Heights, and the Upper East/West Sides show significant drop-off traffic, indicating diverse travel patterns.



- East Harlem North is the epicenter of pickup activity in NYC for this dataset.
- Manhattan overall — especially upper and central regions — dominates ride-hailing demand.
- Outer boroughs show far lower pickup volumes, suggesting potential service gaps or different transportation habits.

Conclusion

1. Trip Volume & Patterns

- Most trips are solo rides (1 passenger), highlighting a preference or necessity for individual travel.
- Trips peak in the afternoon (3–6 PM) across all days, especially Tuesday to Friday.
- Weekdays have higher trip volume and revenue than weekends.
- East Harlem North and South are the top pickup zones, showing extreme concentration of ride demand.
- Most drop-offs occur within the same borough as the pickup, especially within Manhattan, Queens, and Brooklyn.

2. Revenue Insights

- Manhattan generates the highest revenue by far (~$730K), followed by Queens and Brooklyn.
- Credit card payments dominate in revenue, thanks to their direct link to tipping and fare tracking.
- Shorter trips tend to receive higher tip percentages, while longer trips receive lower proportional tips.

3. Payment Behavior

- Credit card is the most used and most profitable payment type, heavily linked to tipping behavior.
- Cash trips are still significant but rarely include tips.
- Digital tipping (via credit card) peaks at preset percentages like 20–25%.

4. Geographic Distribution

- Manhattan is the operational hub — central for both trip volume and revenue.
- East Harlem is the highest pickup zone, suggesting concentrated demand in specific neighborhoods.
- Staten Island and EWR are rarely used zones, suggesting limited coverage or demand.

THANK YOU!