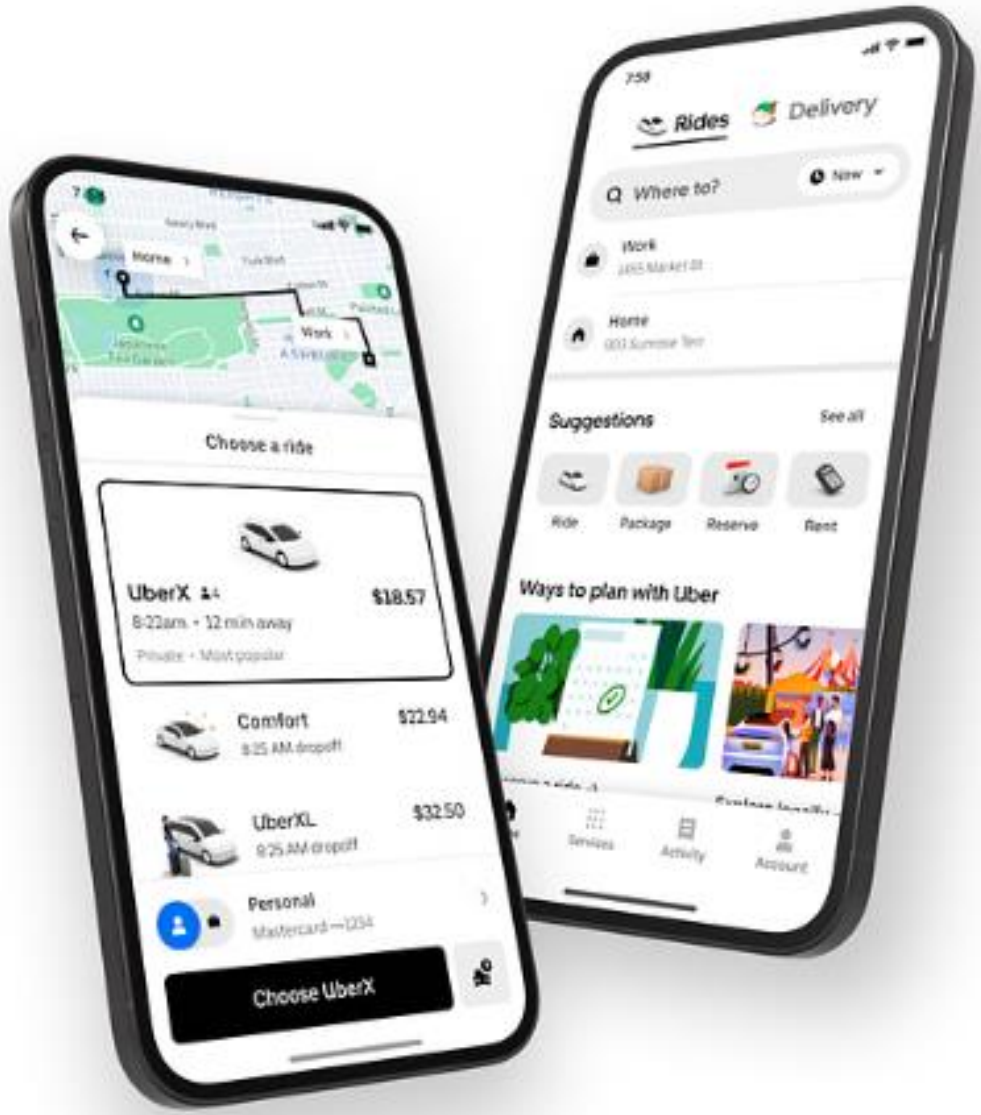
Uber Supply Demand Gap Analysis



Satyam Neelmani | satyam.neelmani@gmail.com

Analyst Profile

Linkedin

Academic Qualifications:

- Bachelors of Technology, IIT Kharagpur
- PG Diploma in Business Analytics, IIM Calcutta

Executive Academic Qualifications:

- MS in Artificial Intelligence, Liverpool John Moores University
- eMBA in Marketing, Golden Gate University, USA

Professional Experience:

- Senior Data Scientist, Advisors Client Services MasterCard, Gurgaon, India
- Client Engagement Manager, Athancare, New Delhi
- AI and Market Research Analyst, Athancare, New Delhi

Satyam Neelmani | satyam.neelmani@gmail.com

Business Problem and Data Understanding

Dara Cleaning and Feature Engineering

Exploratory Data Analysis - Insights

Recommendation

Satyam Neelmani | satyam.neelmani@gmail.com

Overview

Considering inputs from customer tickets and operations, it was identified that there are issues with customers securing trips to and from the airport. Through this analysis, we aim to identify the root cause of the problem and provide recommendations to improve the situation

Business Risk	➢ Fluctuations in demand due to cancellations and non-availability of cars pose a significant business risk, affecting revenue streams and operational efficiency. ➢ Inefficient management of cancellations and non-availability issues can lead to customer dissatisfaction, brand erosion, and loss of market share, amplifying the overall business risk.
Tasks	➢ Data Cleaning and Formatting ➢ Prepare a report with recommendation that can be presented to the client
Dataset	There are six attributes associated with each request made by a customer: ➢ **Request id**: A unique identifier of the request ➢ **Time of request**: The date and time at which the customer made the trip request ➢ **Drop-off time**: The drop-off date and time, in case the trip was completed ➢ **Pick-up point**: The point from which the request was made ➢ **Driver id**: The unique identification number of the driver ➢ **Status of the request**: The final status of the trip, that can be either completed, cancelled by the driver or no cars available

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Features Set Generated for Analysis

Driver Idle Time Calculation	As this dataset contains information only with respect to trips made to and from the airport, and the discrepancy with respect to registering information for certain trips [For example for numerous Driver ID's the city to airport is registered on the 11th and the subsequent trip is again registered as city to airport on 12th]. Considering the scope of our analysis, driver idle time at the airport is not calculated as calculating idle time with missing information will generate misleading insights.
Request Time	For the scope of our analysis, we can group the request time stamps into 24 distinct groups (0-23 hours) relating to when the request
Request Hour	For the scope of our analysis, we can group the request time stamps into 24 distinct groups (0-23 hours) relating to when the request was initiated by the customer. For example, any request generated between 14:00:01 to 14:59:59 will be assigned the request hour attribute 14. This will facilitate swift grouping and analysis.
Time Slots	The 24 distinct request hour attributes have been grouped into 5 time slot categories to study the supply and demand variations through different parts of the day. This grouping is not hard-coded and is open to the interpretation of the analyst. For the analysis; 5am to 10am-Morning Peak Hour, 10am to 2pm-Late Noon, 2pm to 6pm- Early Evening, 6pm to 11pm-Late Evening Rush and 11pm to5am-Night-Midnight
Demand Definition	Demand is defined as the total number of service requests received within a given period
Supply Definition	Supply refers to the total number of service requests for which the trip status is completed

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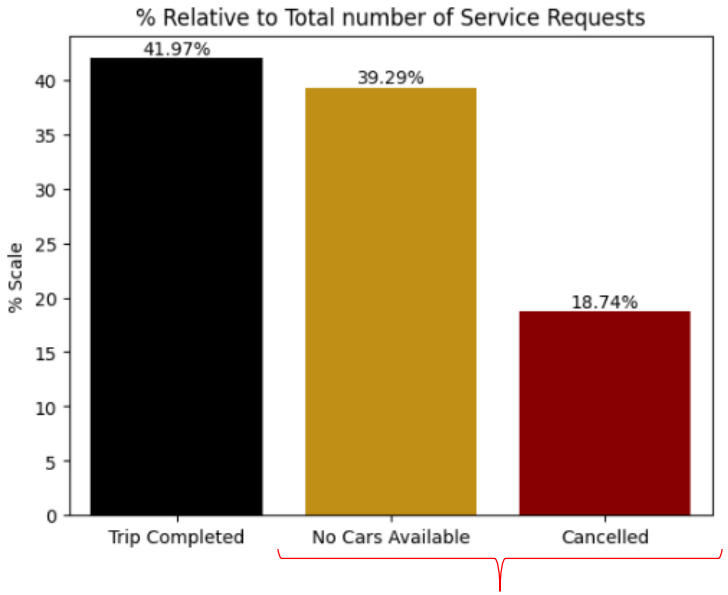
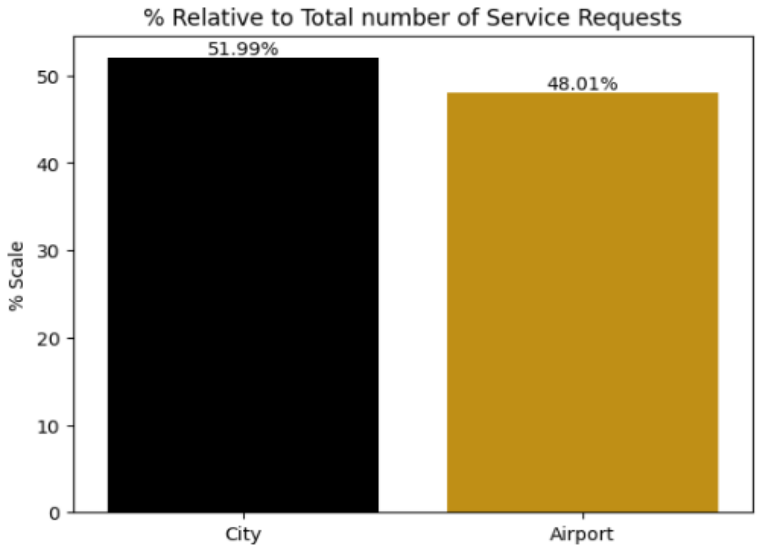
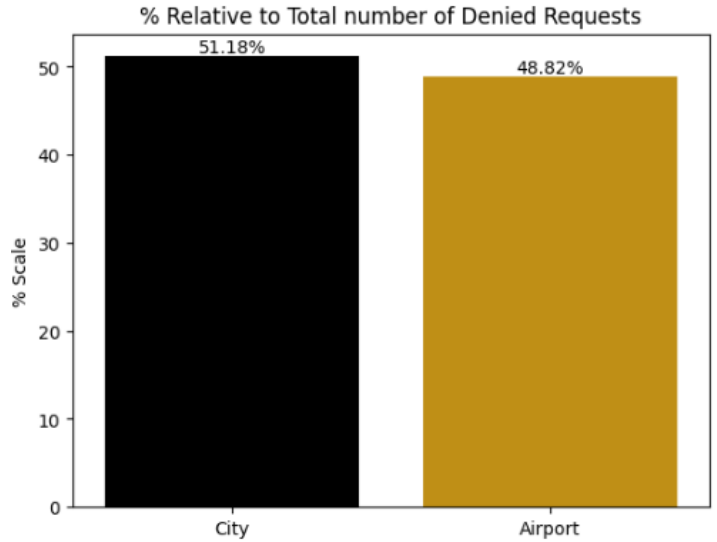
Identifying Pressing Problems







58% Customers were denied service

58% of all customers requesting trips either to or from the airport are denied service either due to

- requests being cancelled by drivers **(18.7%)** or
- no cars available at the time of booking **(39.3%)**

Out of total pick up request, **52%** pick up requests are from City and **48%** pickup requests are from Airport.
Service requests denials from City pick up are **2.4% higher** than Service requests denials from Airport pick up

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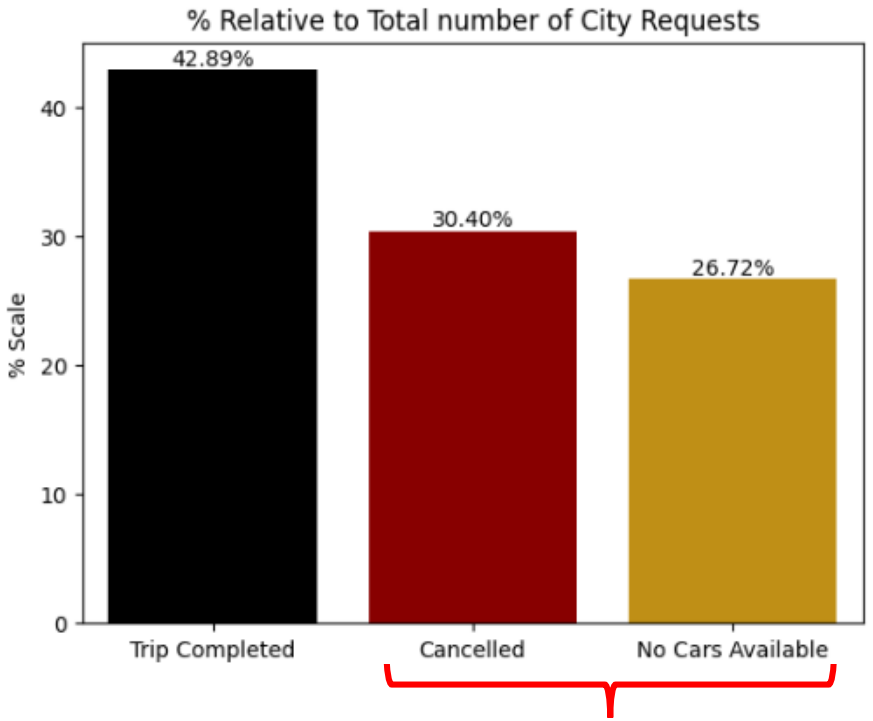
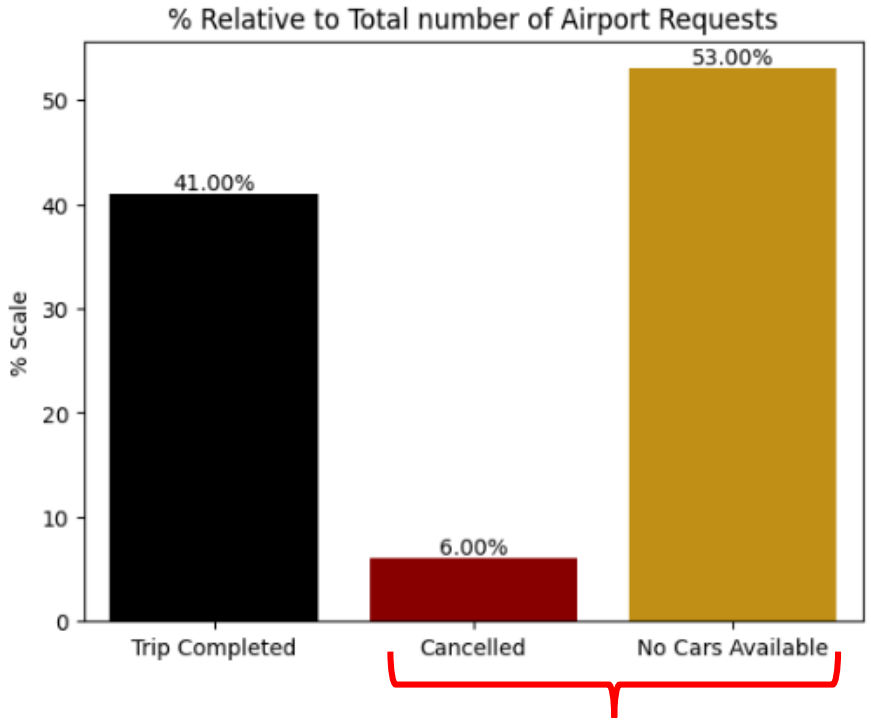
Identifying Most Problematic Type of Request



57% of City Customers were denied service



59% of Airport Customers were denied service

- Taxi drivers are not accepting rides for airport from city. Hence cancellation rate in city are higher which also become a prominent cause for no taxi available at Airport when customer request for it.
- Overall, customer service request denials are **2% higher** in airport than city pick up.

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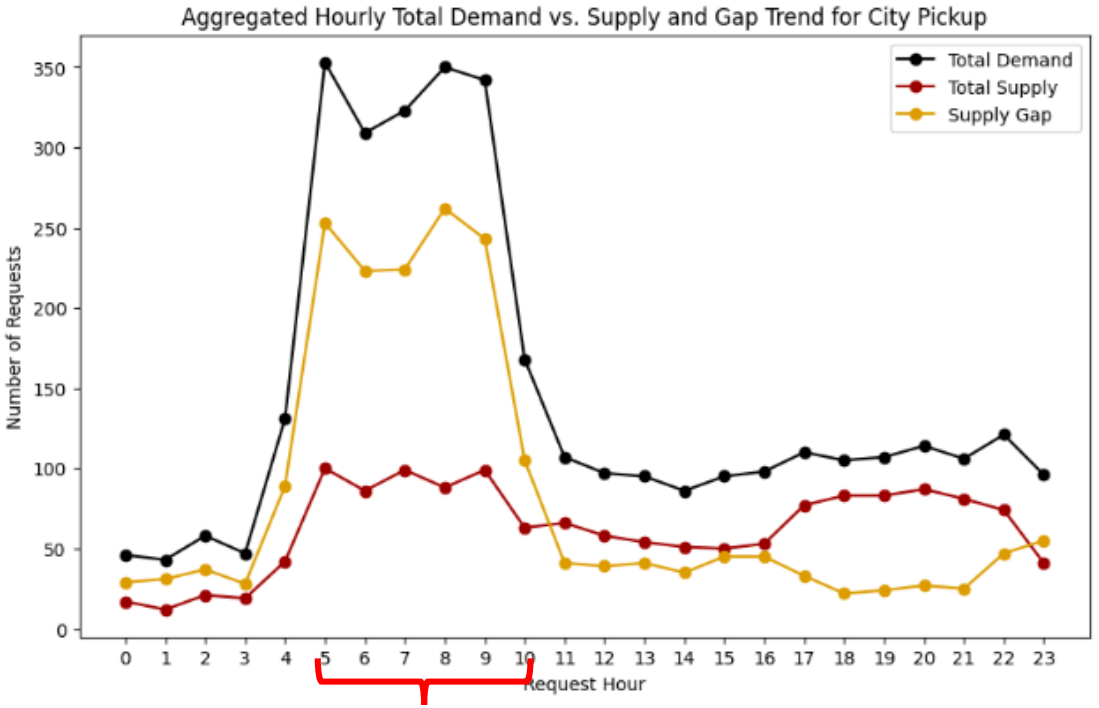
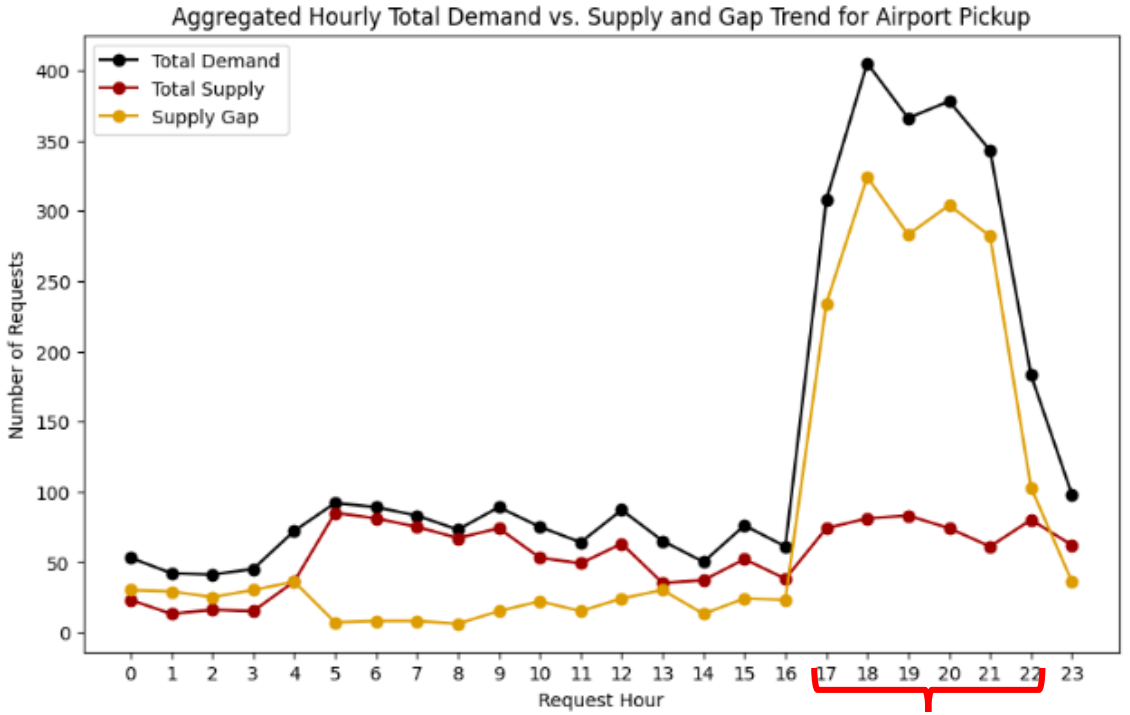
Hourly Gap Between Supply and Demand



48% of City Pick up request comes from 5am to 9am



61% of Airport Pick up request comes from 5pm to 10pm

- Morning Hours from 5am to 9am city pick up has a sudden surge in demand.
- Airport pick up has sudden surge in demand in Evening hours from 5 pm to 10 pm.

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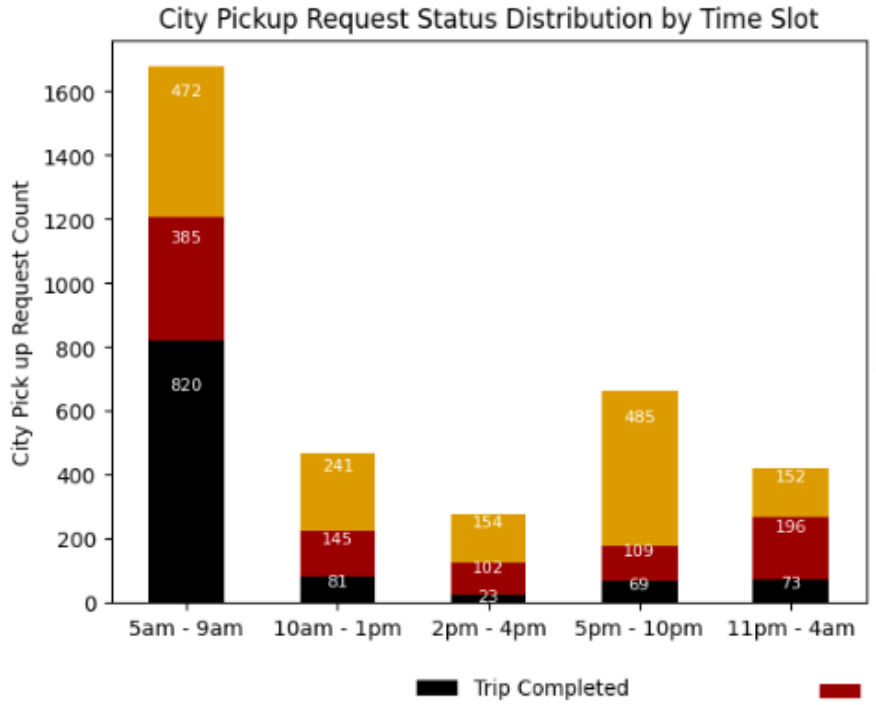
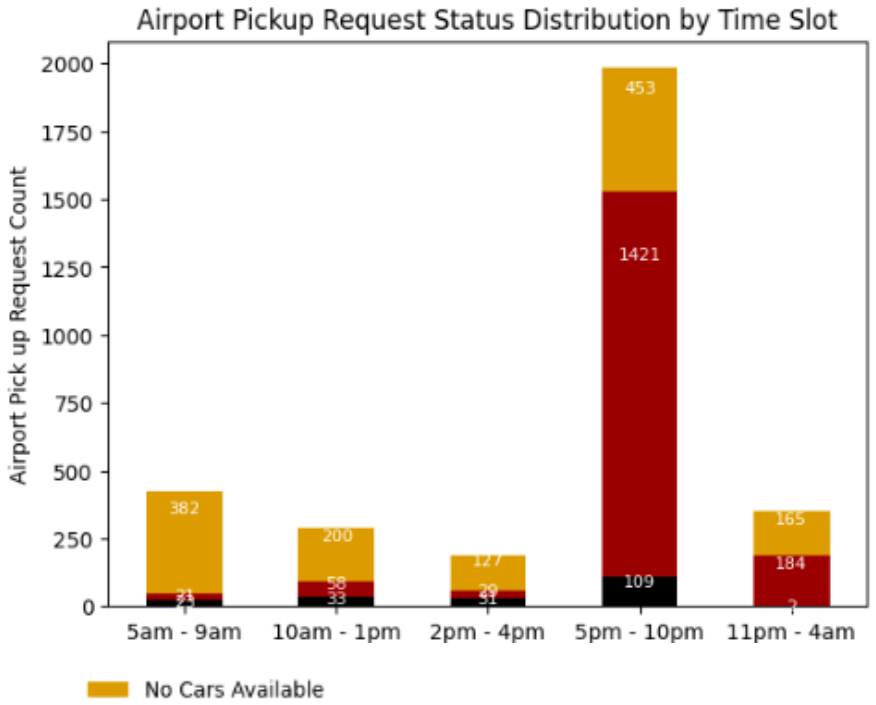
Identifying Most Problematic Time-Slot





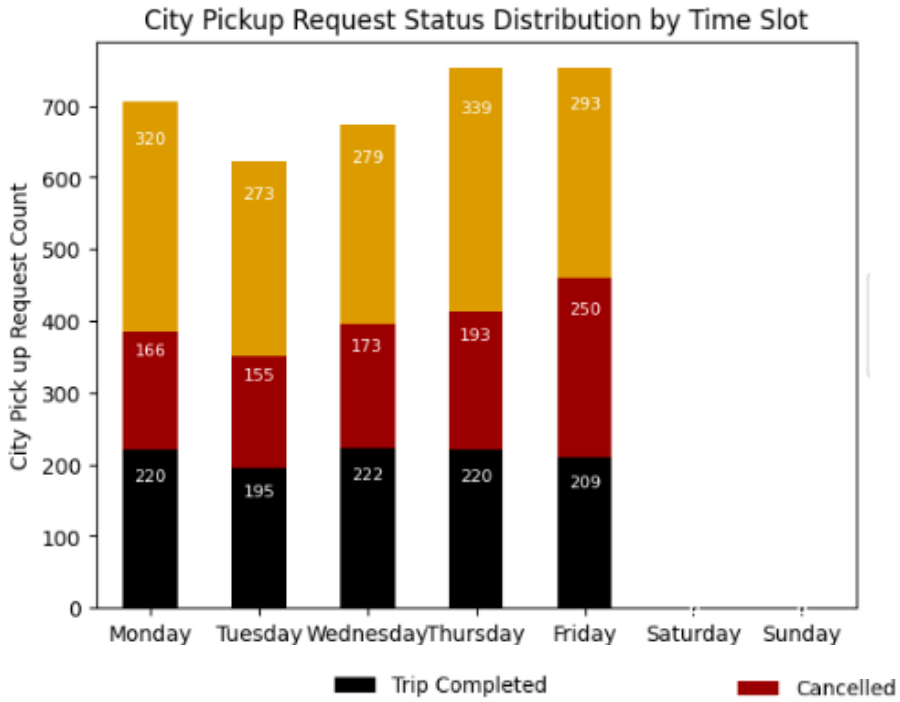
Problem Prognosis:

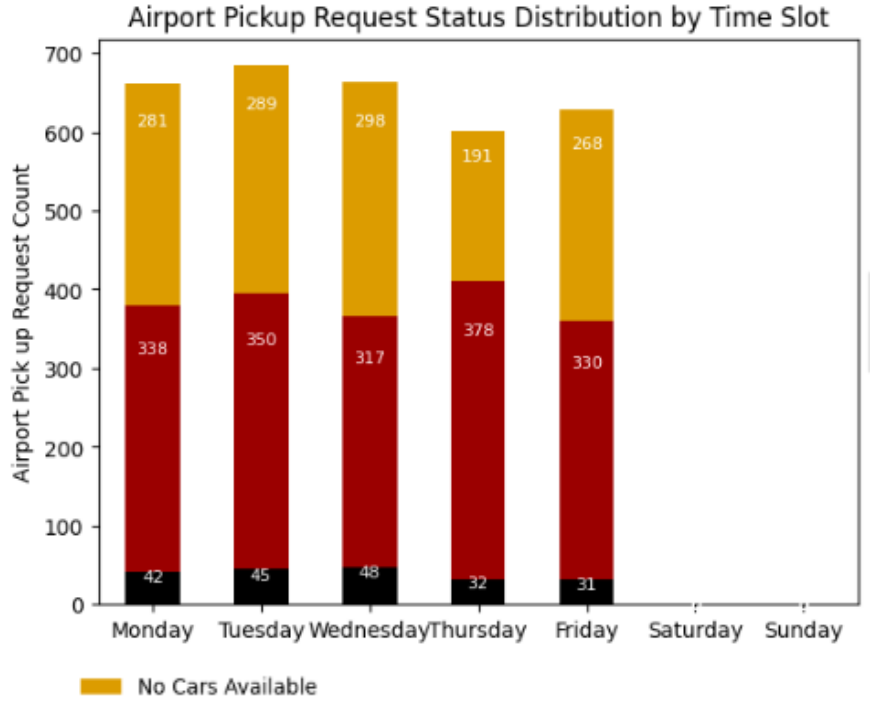
- **The Morning Peak Hour [5am to 9am] Timeslot shows excessively high number of customer requests for taxi, cancelled by the driver. This mainly impacts customers booking a taxi from the city to the airport. This forms our prognosis for relevant business Problem1.**

- **The Late Evening Rush [5pm to 10pm] Time slot shows excessively high number of customer requests denied due to lack of organic flow, i.e. No cars available. This mainly impacts customers booking a taxi from airport towards the city. This forms our prognosis for relevant business Problem2**

Satyam Neelmani | satyam.neelmani@gmail.com

Identifying Most Problematic Weekday





Data not available for Saturday and Sunday.

- City and Airport pickup request denials are invariant to weekdays.
- There is no different nature for any particular day, hence slicing the data on weekday basis is not significant in our analysis.

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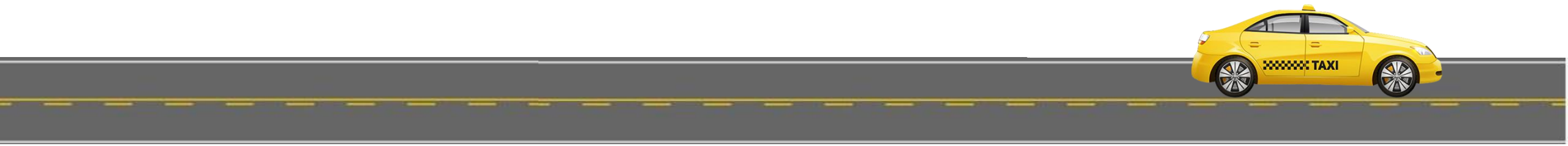

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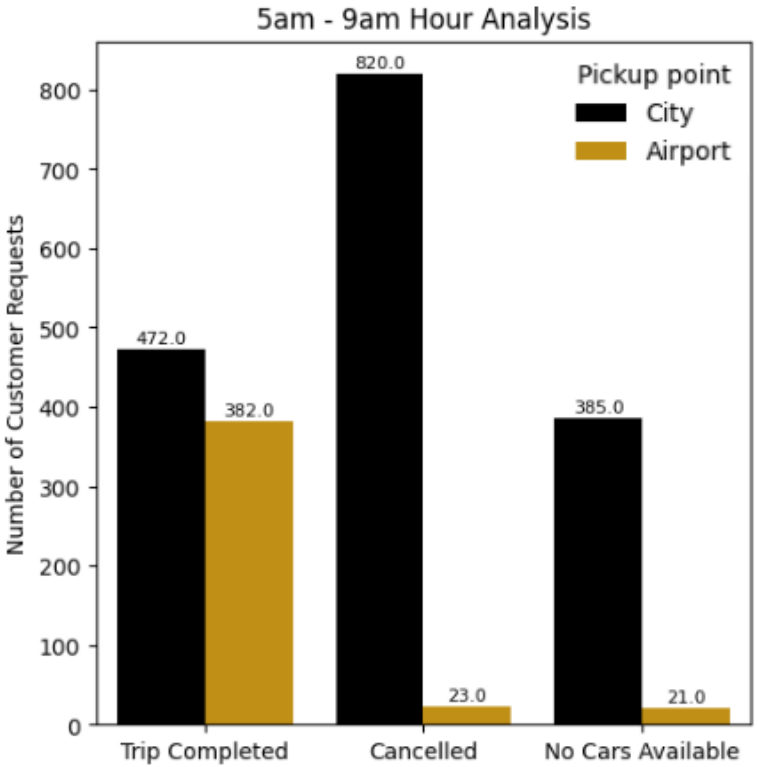
High number of city pickup requests cancelled in morning peak hours



Demand - Supply gap for morning peak hour is most severe for city pickup request being cancelled

Reason :

- There are significantly more outgoing flights than incoming flights during the morning to noon hours. For a driver who makes a trip from the city to the airport has to inadvertently wait for a longer duration to receive a return trip request.
- Consequently this will lead to increase in driver idle time, which could have been utilized for other trips if he chose not to accept a city to airport request during morning hours.
- In some cases the driver might have to return back to the city without a customer, therefore incurring a loss and waste of fuel. This might be the reason contributing to the high number of city-airport requests cancelled by the driver contributing to the large supply and demand gap.

Recommendations to Uber:

- Increasing the profit margin for drivers making trips from the city to the airport during Morning Peak Hours thereby encouraging the driver to take up more city-airport trips during this timeslot.
- Surge pricing, by increasing the rate charged to the customer we can increase the revenue generated instead of changing the profit margin with normal prices. The benefit of the surge charge can be passed on to the drivers making this trip.
- Maintaining transparency with respect to the surge charging of customers during Morning Peak Hours

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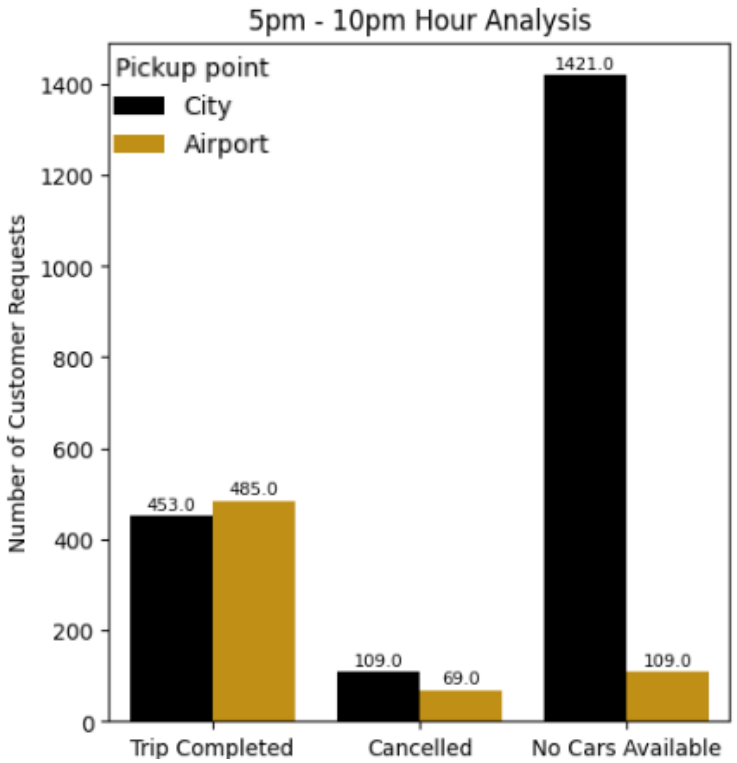
High number of airport pickup requests declined in evening peak hours



Demand Supply gap for late evening hours is most severe for airport pickup request due to cab shortage

Reason :

- There are significantly more incoming flights than outgoing flights during the late evening rush hours. This may be due to the high number of international flights landing during the late evening to night time.
- Therefore, there is significant reduction in natural supply of taxi's to the airport during the late evening rush hour.
- This imbalance leads to a surge in the demand for cars from customers desiring to leave the airport.
- The increased demand and insufficient supply contributes to the significant supply-demand gap at the airport during the late evening rush hours.

Recommendations to Uber:

- Encourage ride-sharing or Taxi pooling for customers leaving the airport during the late evening rush hours. This will improve the number of customers serviced through fewer supply of taxis.
- Surge Charge the customer for late evening trips from the airport to encourage more drivers to initiate a trip toward the airport during the late evening rush hour.
- Maintaining transparency with respect to the surge charging of customers during late evening rush hours.

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Thank you