

Module 8 - Uber Supply-Demand Gap case study

Analysis of trips to and from the airport

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Problem Statement

On covering trips traveling to and from the airport

- There is demand for ride hailing service for travelling to and from the airport with the riders submitting trip Requests on the app.
- However, though there are trip requests by the riders, the drivers supplying the ride service may cancel the request of riders, or there may not be sufficient drivers to cover the request submitted. In these situations, the supply demand gap happens and Uber loses out on its revenue.
- Hence, we shall identify the root cause of the problem (i.e. cancellation and non-availability of cars) and recommend ways to improve the situation. Analysis of the situation has been carried out to present the client the root causes and possible hypotheses of the problem and ways to improve them

Data Understanding

Uber Request Data

- The Uber Request data of records of each request made by a customer with the following metrics available for our analysis:
 1. Request id: Unique identifier of the request
 2. Time of Request: The date and time at which customer made the trip request
 3. Drop-off time: The drop-off date and time, in which the trip was completed
 4. Pick-up point: The point from which the request was made (City/Airport)
 5. Driver id: The Unique Identification number of the Driver
 6. Status of the request - Final status of the trip - (Trip completed/Cancelled/No Cars Available)

Data Understanding

Assumptions

- It is assumed that each request is by one rider at one particular time. Multiple attempts to request would be added into single request id.
- It is assumed that the driver is not made aware of the pick up point and destination at the point of accepting the trip. Therefore automatically assuming that the trip cancellation is done after accepting the trip. The driver didn't want to take on the job after seeing the pickup point and the destination

Data Understanding

New Metrics derived for our analysis

- Request Time Of Day - Categorised the time of the day for analysis of the request time into 5 slots as per normal city daily activities: 'early morning' hours when city sleeps, 'morning' rush hours of starting the day, 'noon' when there's lunch and finishing of work, 'evening' rush hours of finishing work and returning home, and 'late evening' of late night-outs and ending the day:
 - Early Morning of 0000-0600, Morning: 0600-1200, Noon: 1200-1700, Evening: 1700-2100, Late Evening: 2100-2400
- Trip duration - for analysis of the trips completed, to analyse for the duration of the average trip, the trip duration of has been created by:
 - Finding out the time difference between Drop-off time and Trip request time

Data Analysis

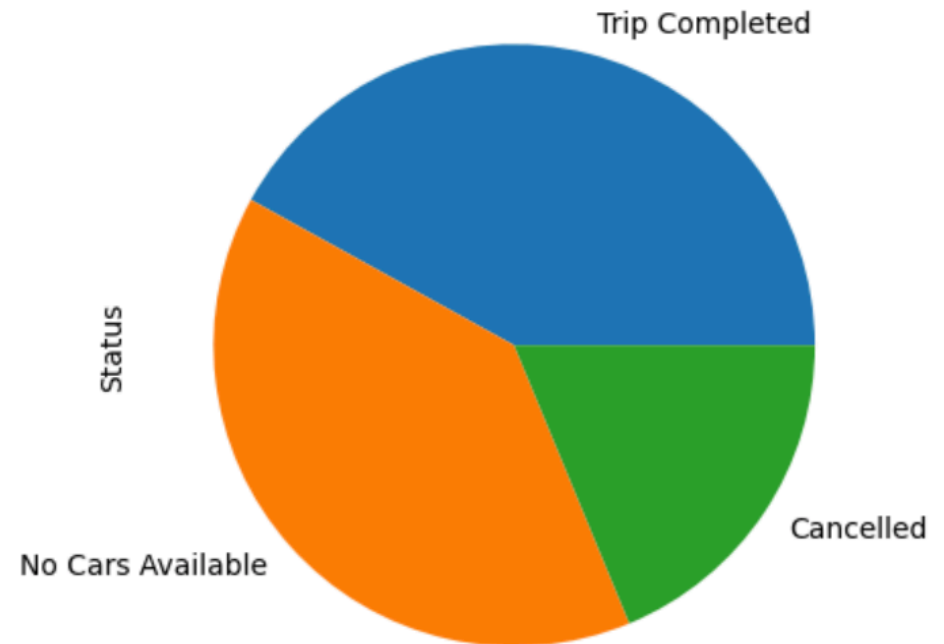
Structure

- Identify Supply-Demand Gap - demand and supply defined with numbers
- Understanding the demand - Percentage of trips by time slots, and pickup point, Time Duration of each trips made
- Understanding the supply and the supply-demand gap
- Possible Explanations to the supply-demand gap issues
- Recommendations to solve the problems

Data Analysis

The Supply Demand Gap

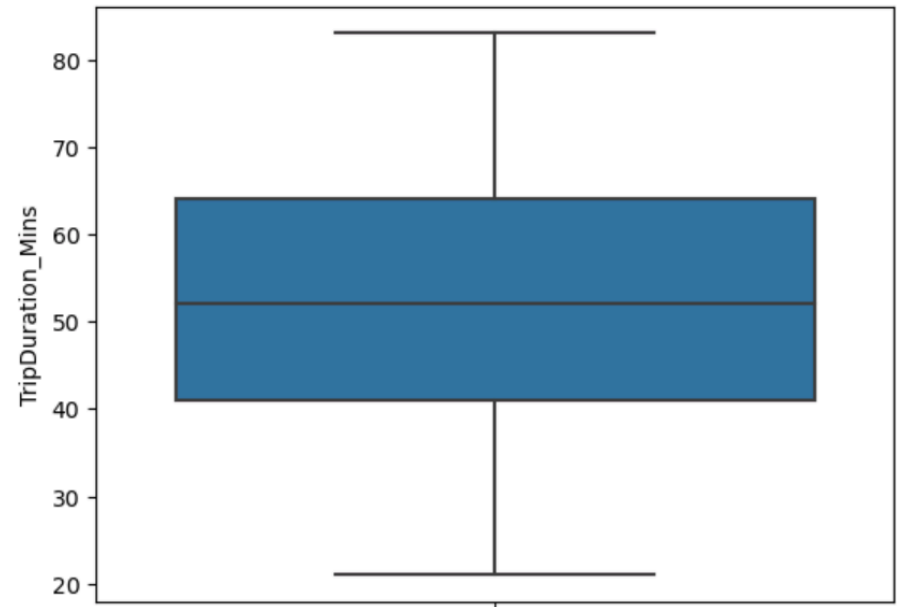
- Demand for 42% of the requested trips were met, as 2,831 trips were completed
- Unmet demand of 58% (3,914 trips) of the requested trips, due to the following issues:
 - 39% to No Cars Available (2,650 trips)
 - 19% to trips Cancelled by the drivers (1,264 trips)



Data Analysis

Understanding the Trip

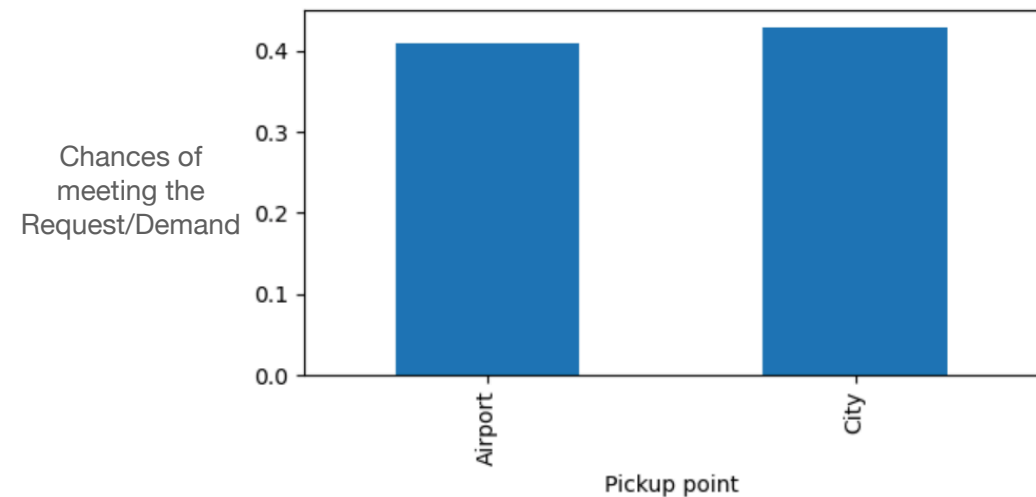
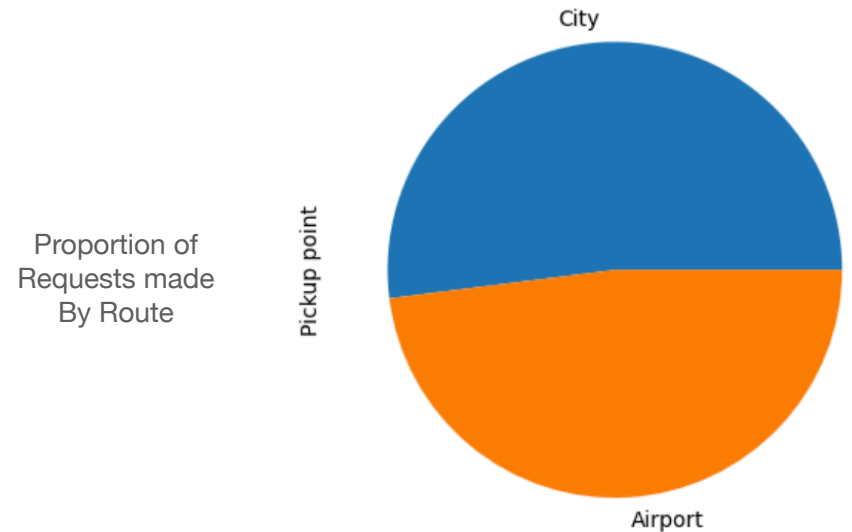
- By Trip Duration (City-Airport or Airport-City)
 - One-way generally takes 52 mins
 - As per the Driver ID, there are only 300 Drivers



Data Analysis

Understanding the supply demand gap 1

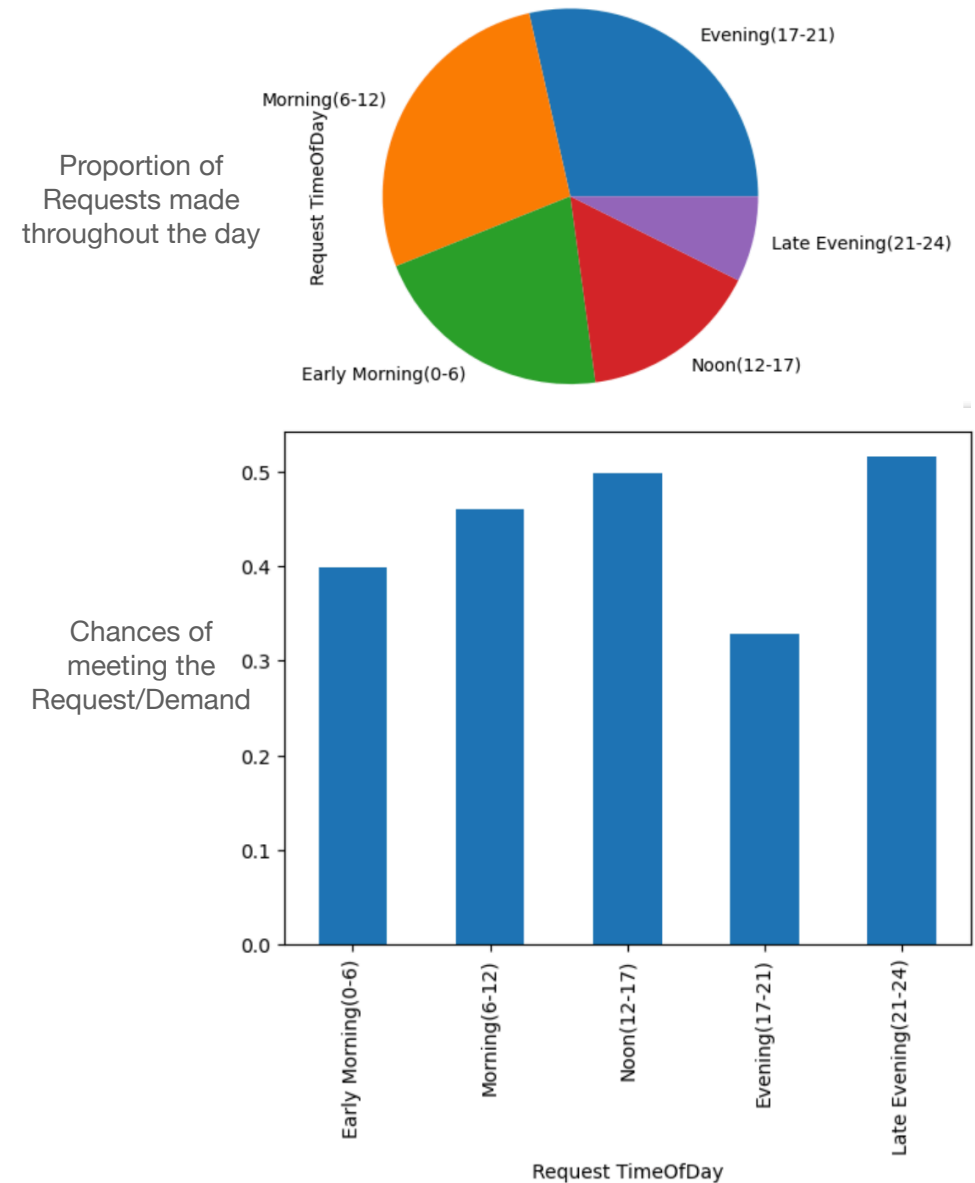
- By route
 - 52% of requests were City to Airport trips, 41% of these requests were met, 59% unmet
 - 48% of requests were Airport to City trips, 43% of these requests were met, 57% unmet
- Unmet demand of 58% across the two route of Airport to City and City to Airport



Data Analysis

Understanding the supply demand gap 2

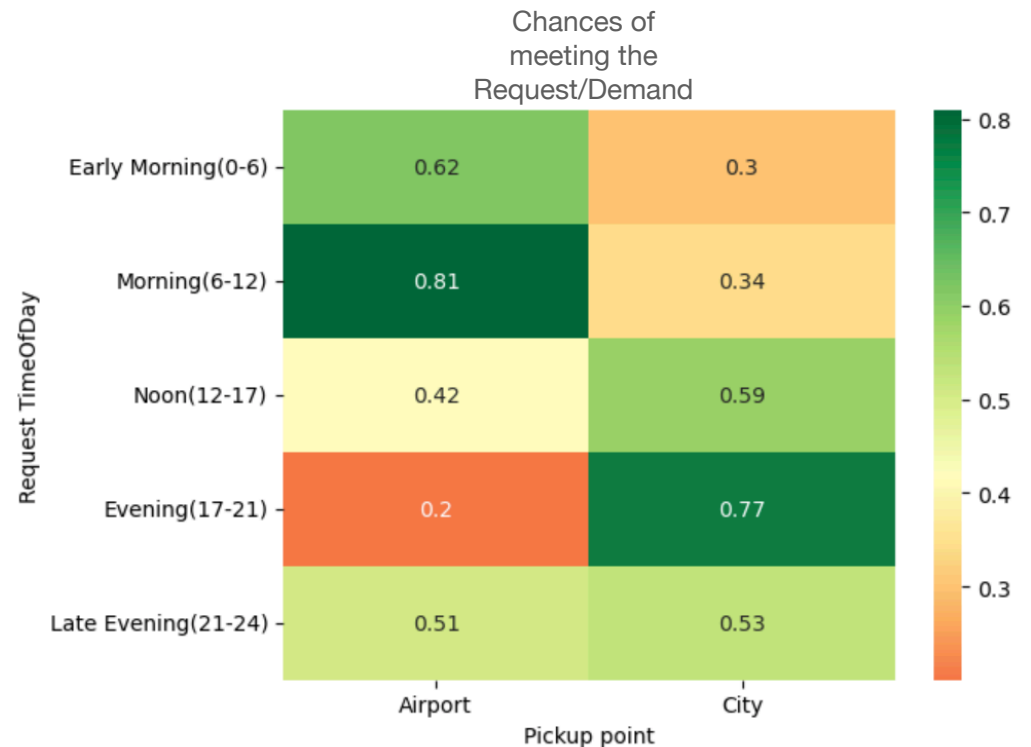
- By Time of The Day
 - 21% of requests were in Early Morning, 40% of Early Morning requests were met, 60% unmet
 - 28% in Morning, 46% of requests were met, 54% unmet
 - 15% in Noon, 50% of requests were met, 50% unmet
 - 29% in Evening, 33% of requests were met, 67% unmet
 - 7% in Late Evening, 52% of requests were met, 48% unmet
- Throughout the day, supply demand gap is consistently high, with the highest in the Evening time with 67% demand unmet.
- This signifies the shortage of drivers taking on the City/ Airport route any time in the day



Data Analysis

Understanding the supply demand gap 3

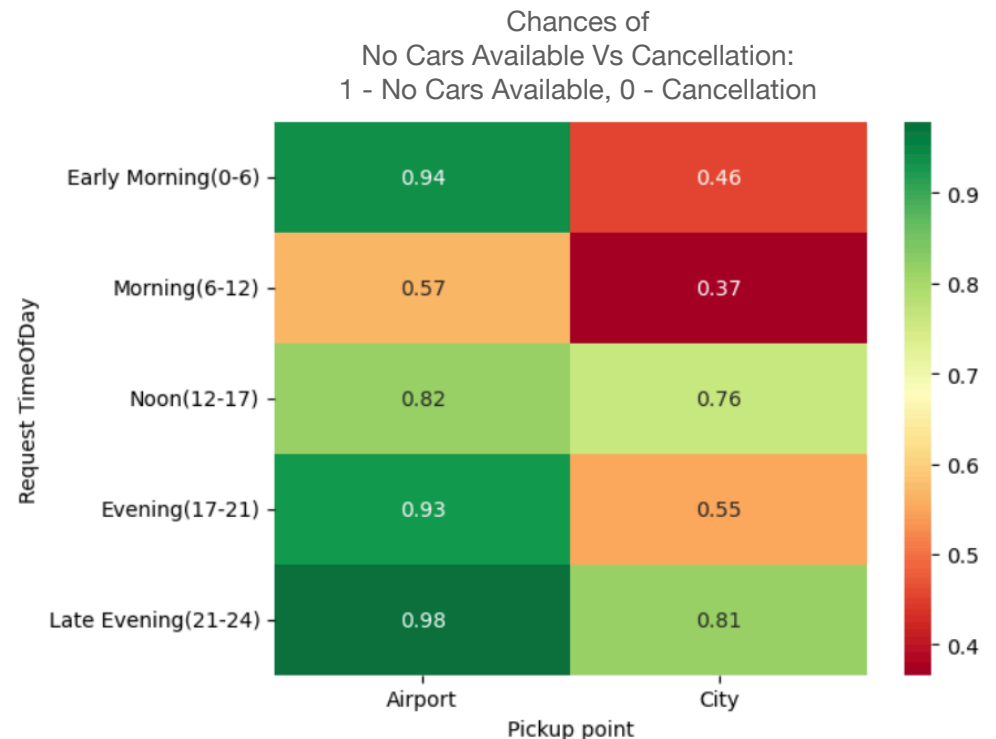
- By carrying out multivariate analysis, we can make the following observations:
 - In the early morning to morning periods, there is increased gap of 70% and 66% respectively for City to Airport route
 - From noon to evening periods, the increased gap switched to Airport to City route with 58% and hefty 80% respectively for Airport to City
 - In the Late Evening, the gap seems similar.
- The pattern we can see here is that, the pickup from the airport to drop off in the city seems favourable in the morning, and pickup from the city and drop off at the airport seems favourable in the noon-evening time.



Data Analysis

Understanding the Supply Shortage

- By carrying out multivariate analysis on the gap of when the trip was either cancelled or no car available, we can make the following observation:
 - There is generally high percentage of No Cars Available from the airport, but higher chance in the following times:
 - Early morning from the airport
 - Non to Late evening from the Airport
 - There is higher percentage of Cancellation for trips going from the City to Airport, but higher in the following times:
 - Early morning to
- The pattern we can see here is that, the significant reason for gap for Airport to City trips is due to No Cars Available. There are increased number of cancellation for City to Airport trips, as the drivers may prefer to take trips that are going to another city location than the Airport



Data Analysis

Explanation for the Supply Demand Gap.

- With only 300 drivers, there is unmet demand of 58% across the two route of Airport to City and City to Airport.
- Throughout the day, supply demand gap is consistently high, with the highest in the Evening time with 67% demand unmet. This signifies the shortage of drivers taking on the City/Airport route any time in the day
- The pickup from the airport to drop off in the city seems favourable in the morning, and pickup from the city and drop off at the airport seems favourable in the noon-evening time. ,
- Significant reason for gap for Airport to City trips is due to No Cars Available. There are increased number of cancellation for City to Airport trips, as the drivers may prefer to take trips that are going to another city location than the Airport. The possible reasons is airport being much further than another city location and didn't want to handle the extra procedures of queuing at the airport

Data Analysis

Recommendations

- With highest supply demand gap for Airport to City route due to No Cars Available, Ride Sharing services can be offered, as everyone is going to the same destination of City.
- More incentives can be offered to City to Airport trips as most of the cancellations are for that route as the drivers may have to go through extra procedures for that trip such as traffic and queuing to get to the airport.