UBER SUPPLY-DEMAND GAP

ASSIGNMENT

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PROBLEM STATEMENT

- Customers of Uber(Cab service) face a problem of cancellation of request by the driver or non-availability of cars. For this assignment, only the trips **to and from the airport** are being considered.
- If these are the problems faced by customers, these very issues also impact the business of Uber. If drivers cancel the request of riders or if cars are unavailable, Uber loses out on its revenue.
- In this assignment, we address the problem Uber is facing (**i.e. cancellation and non-availability of cars**) and recommend ways to improve the situation.

INPUT PARAMETERS AVAILABLE FOR ANALYSIS

1. **Request id**: A unique identifier of the request
2. **Time of request**: The date and time at which the customer made the trip request
3. **Drop-off time**: The drop-off date and time, in case the trip was completed
4. **Pick-up point**: The point from which the request was made
5. **Driver id**: The unique identification number of the driver
6. **Status of the request**: The final status of the trip, that can be either completed, cancelled by the driver or no cars available

PROCESS OF ANALYSIS

- **STEP 1:**

Data inspection	Inspecting the structure and size of data, looking at unique values
Data Cleaning	Finding out the fraction of missing values, Checking if removing rows with null values is necessary
Data Manipulation	Converting the time stamps to suitable date-time format. Extract the hour from the request time stamp Checking if the input data is during weekend or weekday

- **STEP 2:**

1. Split the data frame into two data frames according to the pick up point (City or Airport)
2. We create a plot " Frequency distribution of all the Uber Bookings" to show the various status on the basis of hours
3. Create two plots to show the Count of each status for 'city to Airport' and 'Airport to city seperately for each hour.
4. Also create another column 'Total' which stores the total requests.

plot the percentage of completed trips to Request ratio

5. Identify the drivers who have cancelled greater than 10 times

- **STEP 3**

1. Compute the Demand and Supply Gap for each of the Pick up points
2. Plot the Gap for each of the time zones

ANALYSIS: CITY TO AIRPORT

Following are the outcome of trip status analysis:

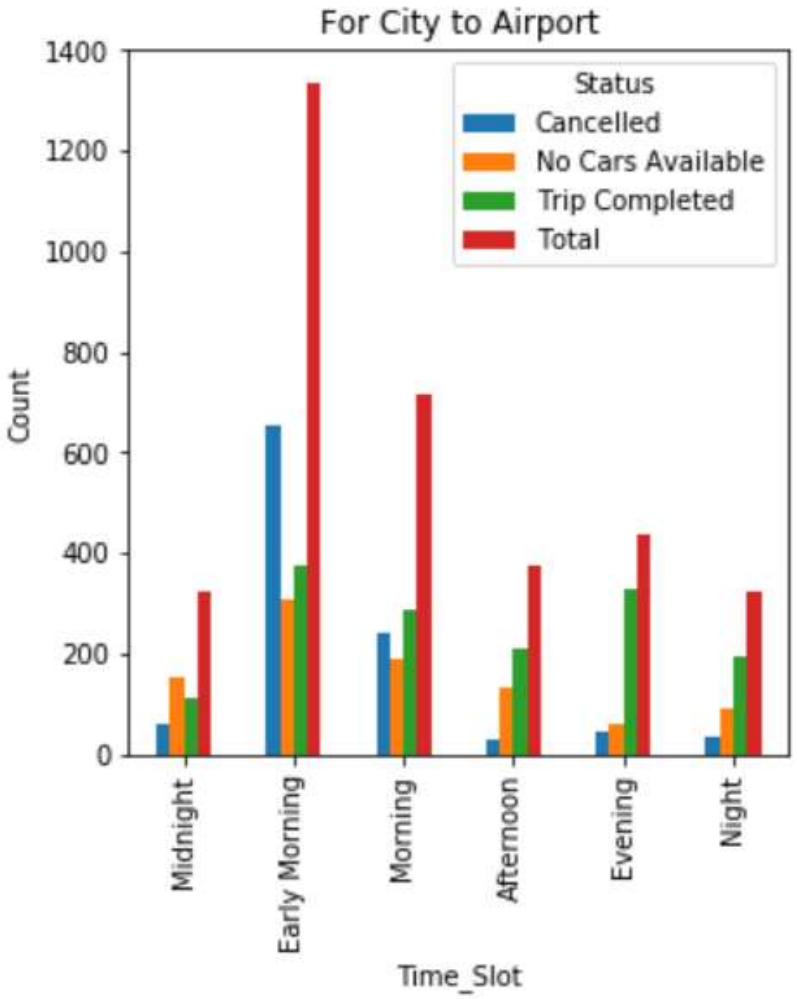
I. Cancellations are the highest in the early morning and morning time zones at the city pickup points.

II. There are no significant number of cancellations during the remaining time zones.

III. No cars available scenario is more in the early
morning and morning time zones (4-8 and 8-12 hours).

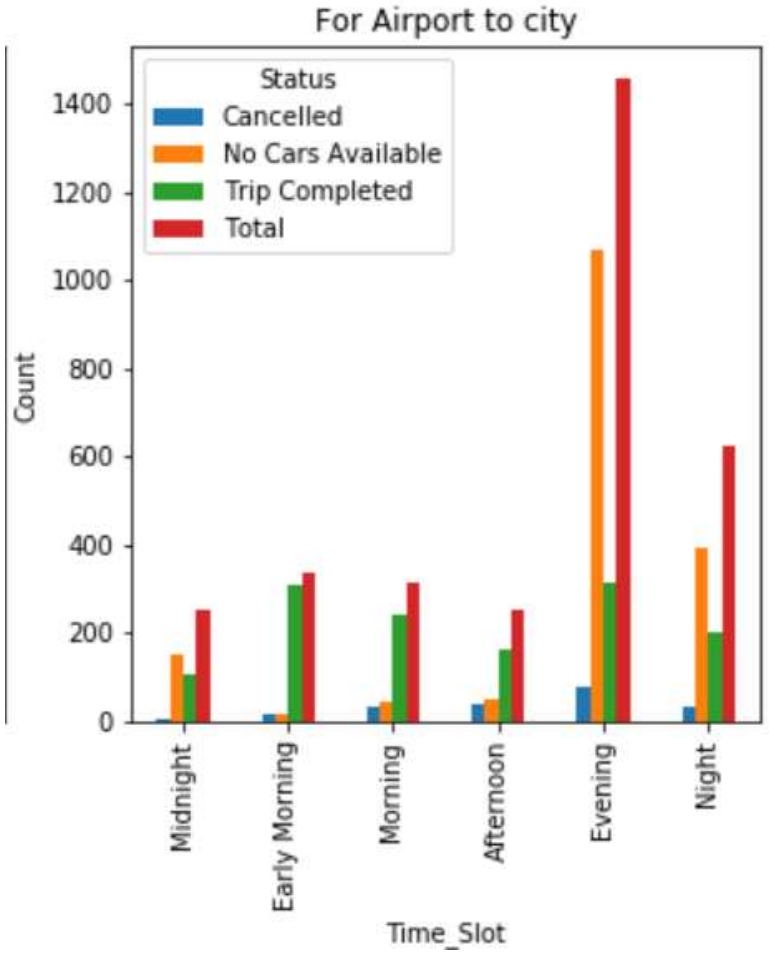
IV. Non-availability of cars in the afternoon, night
and late night time zones are around 100.

V. At the city pickup points, the least number of non-availability of cars reported are in the evening.

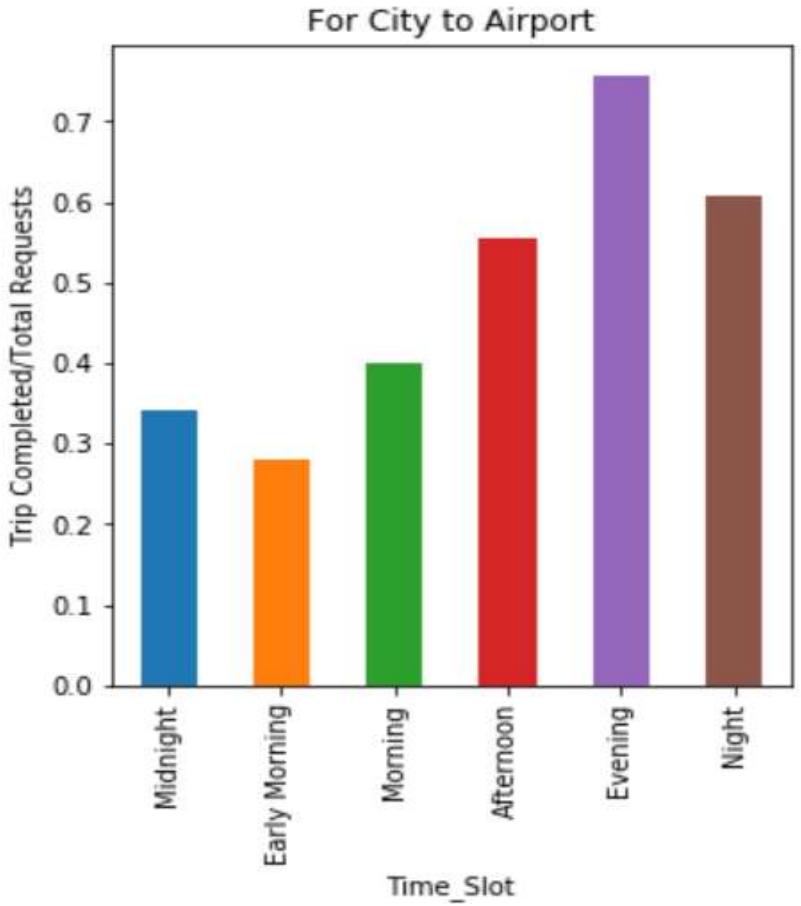


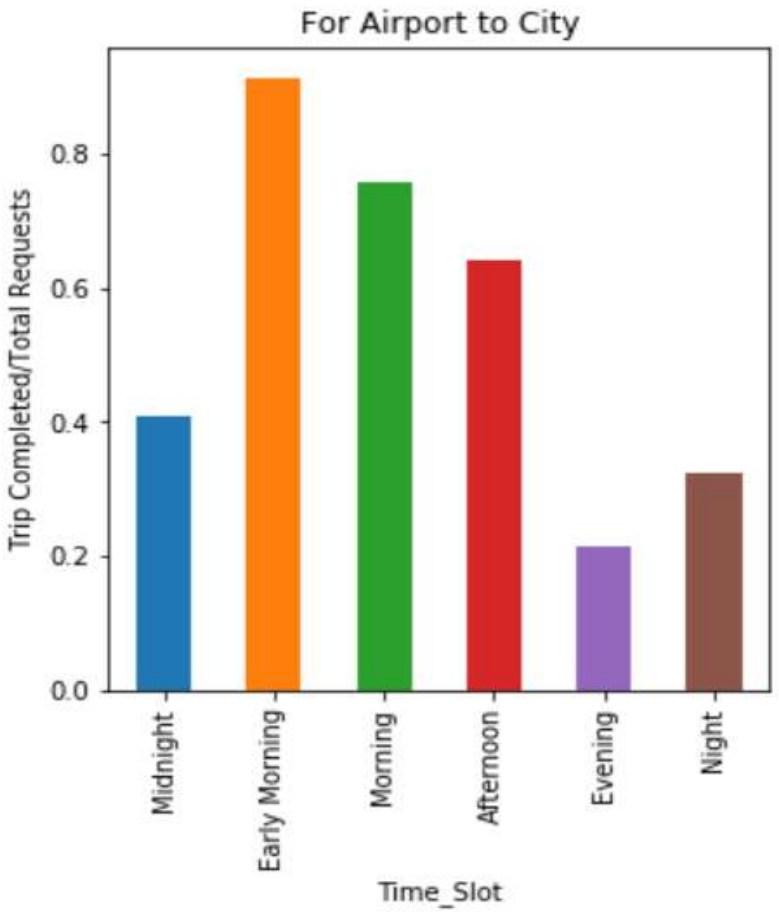
ANALYSIS: AIRPORT TO CITY

I. There are no significant amount of cancellations at the airport pickup points in the early morning and morning time zones.
II. Bar plot show that there are nearly zero cancellations at midnight.
III. The highest number of cancellations are made in the evening and night.
IV. No cars available scenario is more in the evening and night time zones (16-20 and 20-24 hours).
V. Non-availability of cars are higher at late night than in the morning and afternoon time zones.



ANALYSIS





CITY TO AIRPORT :
Percentage of completed trips is least during Early morning highest during Evening

AIRPORT TO CITY :
Percentage of completed trips is least during Evening, highest during Early morning

ANALYSIS

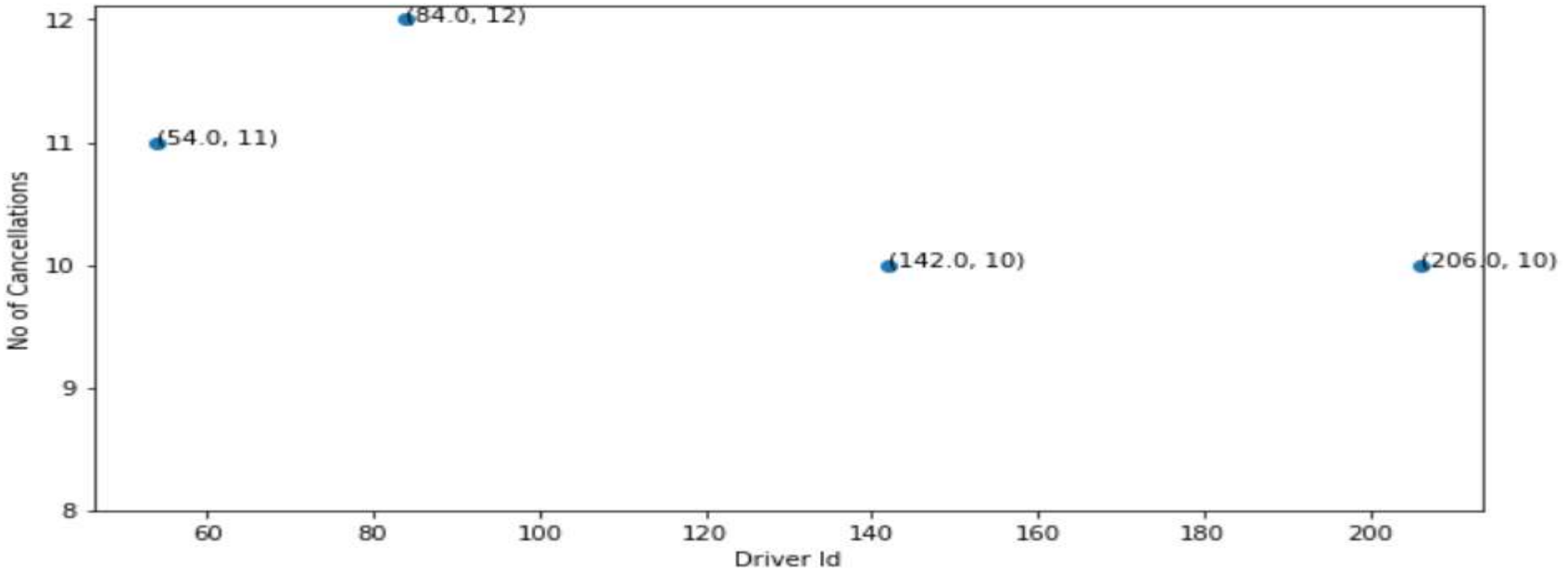


Figure: The above figure shows the scattered plot of “Drivers” with greater than 10 cancellations

- DRIVER ID : **84, 54, 142 and 206 have greater than 10 cancellations.**
- For Driver ID 84, most of the cancellations happened 12th July
- For Driver ID 54 most of the cancellations happened during early morning and odd hours
- Uber should contact the drivers for the reason for the cancellation and solve the issue.

SUPPLY DEMAND GAP
PICK UP POINT: CITY

Status Time_Slot	Cancelled	No Cars Available	Trip Completed	Total	ratio	Gap
Midnight	63	151	111	325	0.341538	214
Early Morning	653	309	373	1335	0.279401	962
Morning	239	189	286	714	0.400560	428
Afternoon	32	134	208	374	0.556150	166
Evening	46	60	330	436	0.756881	106
Night	33	94	196	323	0.606811	127

Figure 1: Gap of all time zones

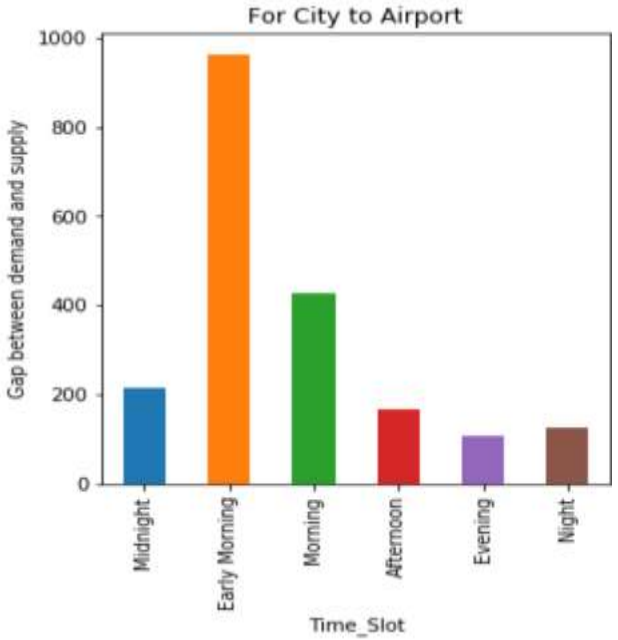


Figure 2: Gap between demand and supply

Gap = Demand - Supply
= Total requested trips – Trips Completed

•It observed that Gap is highest during early morning with a difference of ‘962’
• The next highest is during morning with ‘428’
•The least Gap is during morning with ‘106’

SUPPLY DEMAND GAP
PICK UP POINT: AIRPORT

Status Time_Slot	Cancelled	No Cars Available	Trip Completed	Total	ratio	Gap
Midnight	2	148	103	253	0.407115	150
Early Morning	15	14	308	337	0.913947	29
Morning	32	44	239	315	0.758730	76
Afternoon	40	50	162	252	0.642857	90
Evening	78	1067	312	1457	0.214139	1145
Night	31	390	203	624	0.325321	421

Figure 1: Gap of all time zones

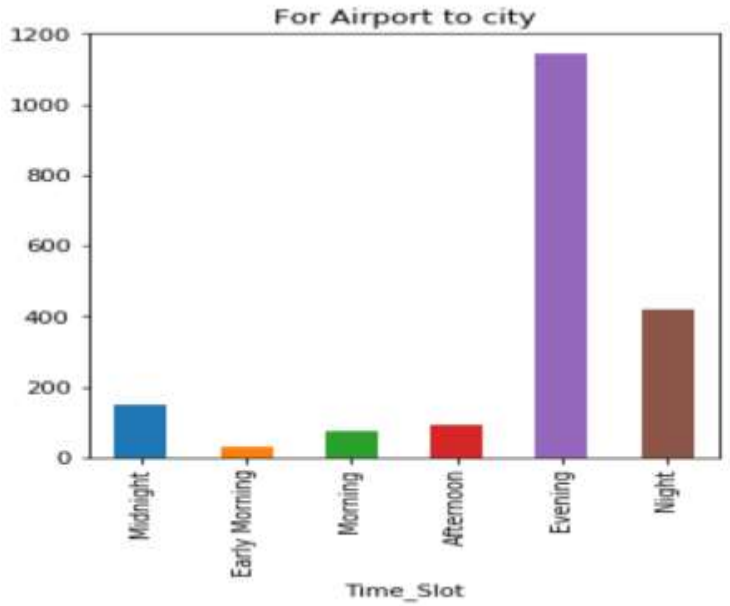


Figure 2: Gap between demand and supply

Gap = Demand - Supply
= Total requested trips – Trips Completed

•It observed that Gap is highest during Evening with a difference of ‘1145’
• The next highest is during Night with ‘421’
•The least Gap is during Early morning with ‘29’

ROOT-CAUSE ANALYSIS

- There is a **low demand of Uber cars** in the Morning/Afternoon at the Airport so the Drivers who drive to the Airport in the morning will have to remain idle till the Evening. And hence their idle time will be around 10 hours which is highly uneconomical to them. This is the reason why they Cancel the request to the Airport in the Mornings. Hence maximum cancellations are seen around this time.
- Whereas there is a **huge demand of Uber cars** at the Airport in the Evening. But since the inflow is less than the Demand, the requests are rejected with no availability of cars
- The trips whose ETA is 15 minutes to the location due to non-availability of cars leads to an **increased possibility for the trip to be cancelled** also due to large number of bookings made in peak hours of traffic.

RECOMMENDATIONS

- Customers having a flight to catch will be willing to pay extra for a ride if they have no other option available.

  Hence, Uber can reduce the gap of demand and supply at the airport in the evening by **implementing surge pricing** so that any requests which are made in the evening from the Airport will be priced at 2X or 3X of the normal Price depending on the gap.
- **Good incentives can be offered to drivers** especially in peak hours to handle cancellation scenario especially for high traffic zone or for

  short distance trip.
- **Increasing the number of cabs** in the time zones where there is a huge supply and demand gap will be helpful to overcome the situation.
- **Drivers can accept shorter trips within the city** and in areas around the airport to utilize the idle time effectively.
- As part of CSR, **Uber can collaborate with the Central government** to regulate traffic and ensure organised transportation.