UBER SUPPLY-DEMAND GAP

ASSIGNMENT SUBMISSION

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Uber's most pressing problems

From the data provided by Uber for trips between the city-airport, We can identify the below distribution of Trip Statuses. We observe that **approximately 60%** of the trip requests either get cancelled or fail because of no cars available. This would be costing Uber a hefty amount of money.

Frequency of Cab Requests by Status
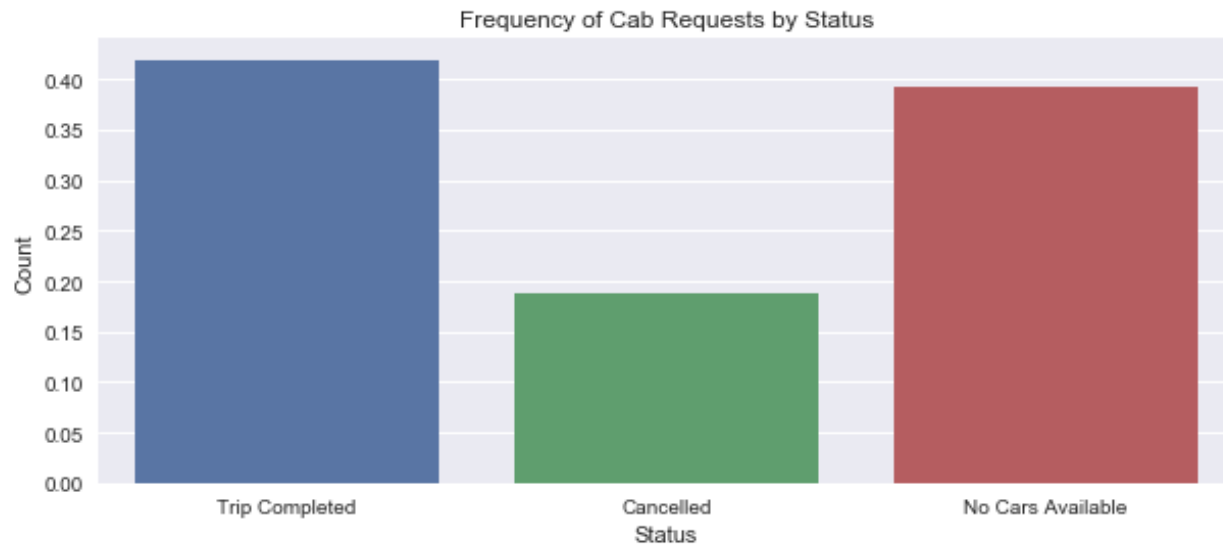
Journey	Status	Request %
Airport - City	Cancelled	2.94%
	No Cars Available	25.40%
	Trip Completed	19.67%
City - Airport	Cancelled	15.80%
	No Cars Available	13.89%
	Trip Completed	22.30%

Based on the distribution of cab requests, we can observe that this issue exist across both Airport and City pickups.

For pickups from airport, **No cars available is the most prominent problem.**

For pickups from city, **Cancelled cabs is the more prominent problem.**

Further analysis was done to identify what **timeslot** in each of the pickup point is seeing a major **supply-demand gap.**

Inspecting the dataset

Post reading the dataset, the first step was to identify any missing values and correcting the data types of the respective columns. **The timestamp columns required to be converted to timestamp formats**.

Looking at the **missing values** within the dataset, the Driver id column and the Drop Timestamp column have a few missing values. However, on further inspection, we observe that these missing values are corresponding to request where no cab was available or the driver had cancelled the request (in the case of the Drop Timestamp column). Hence **no treatment was required for missing values**.

Post this, **a derived metric** was created from the Request Timestamp column where we extracted the hour value of the timestamp

Next, **univariate analysis** was performed on identify the most prominent hours where booking requests were made in a day


From the above plot, we can deduce that majority of the bookings were made from **5am - 9am in the mornings** and **5pm - 10 pm in the evenings**

Bookings by Timeslots

In order to identify what parts of the day observed the most number of booking requests, the following hour-wise breakdown for an entire day was considered:

- Mid-Night: 0-4 hrs   - Late Morning: 10-12 hrs   - Evening: 17-20 hrs
- Early Morning: 5-9 hrs   - Afternoon: 13-16 hrs   - Night: 20-23 hrs

On analysing the breakdown of cab requests from different pickup points at different parts of the day (**bivariate analysis**), the following trend was observed:
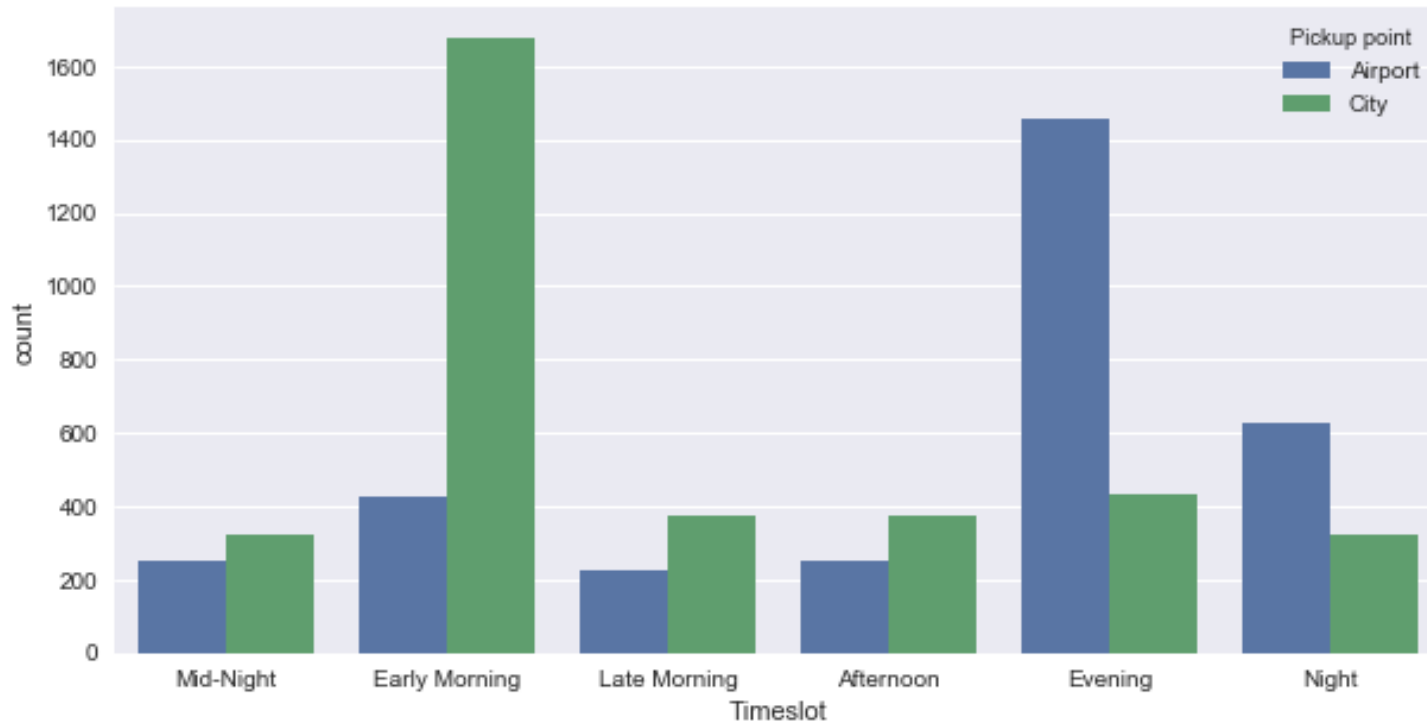
It is evident that **majority of booking requests from city-airport is observed during Early Mornings** and **majority of bookings requests from airport-city is observed in the Evenings**

Cancellations and Cab Unavailability by Timeslots

As identified in the first slide, the pressing problem that Uber is facing is regarding cab cancellations and unavailability of cabs.

On analysing the breakdown of cab requests from different pickup points, at different parts of the day, for each of the above mentioned cab request statuses (**multivariate analysis**), the following trend was observed:
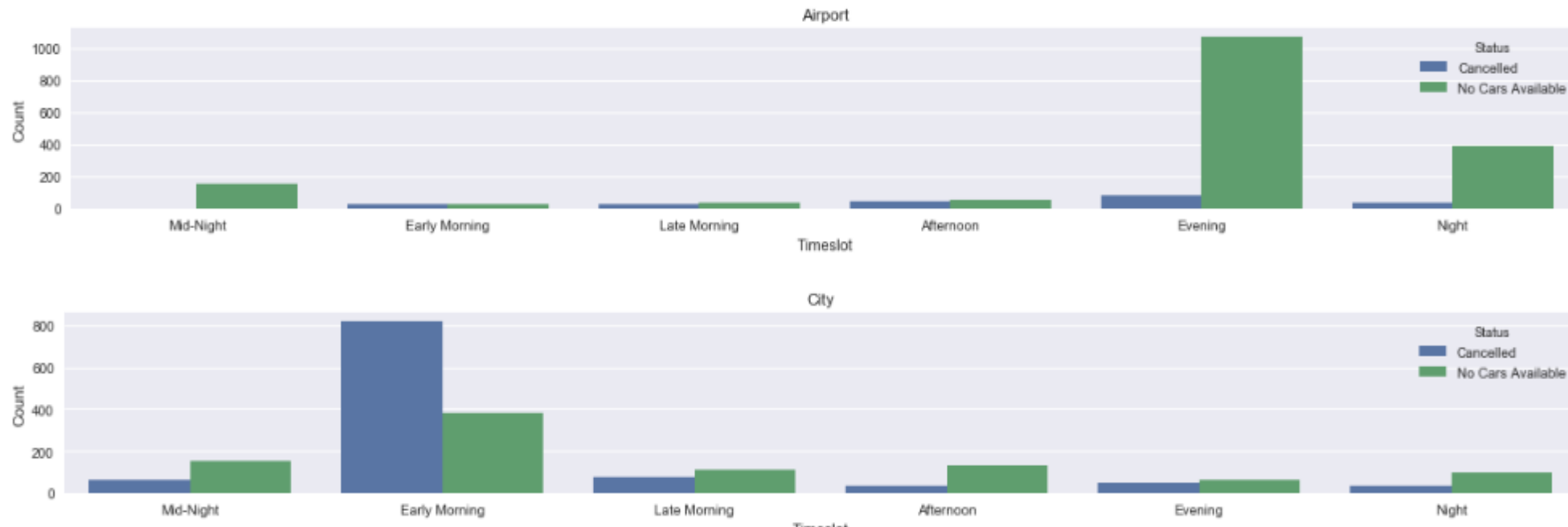
From the above plots, it is evident that the most problematic timeslots for requests is:

- **Evenings**: mainly because of **unavailability of cabs in the airport**

- **Early Mornings**: mainly because of **drivers cancelling cab pickups from the City**

Supply-Demand Gap Analysis

The gap between supply and demand basically refers to the gap that exists in terms of how many cabs are requested by users and the number of cabs that are actually available at any point of time. Based on our data, we can consider the trips where status was "Trip Completed" as data where the demand was met by the supply. In case where the status was "Cancelled" or "No cars available", this is where demand exceeds supply
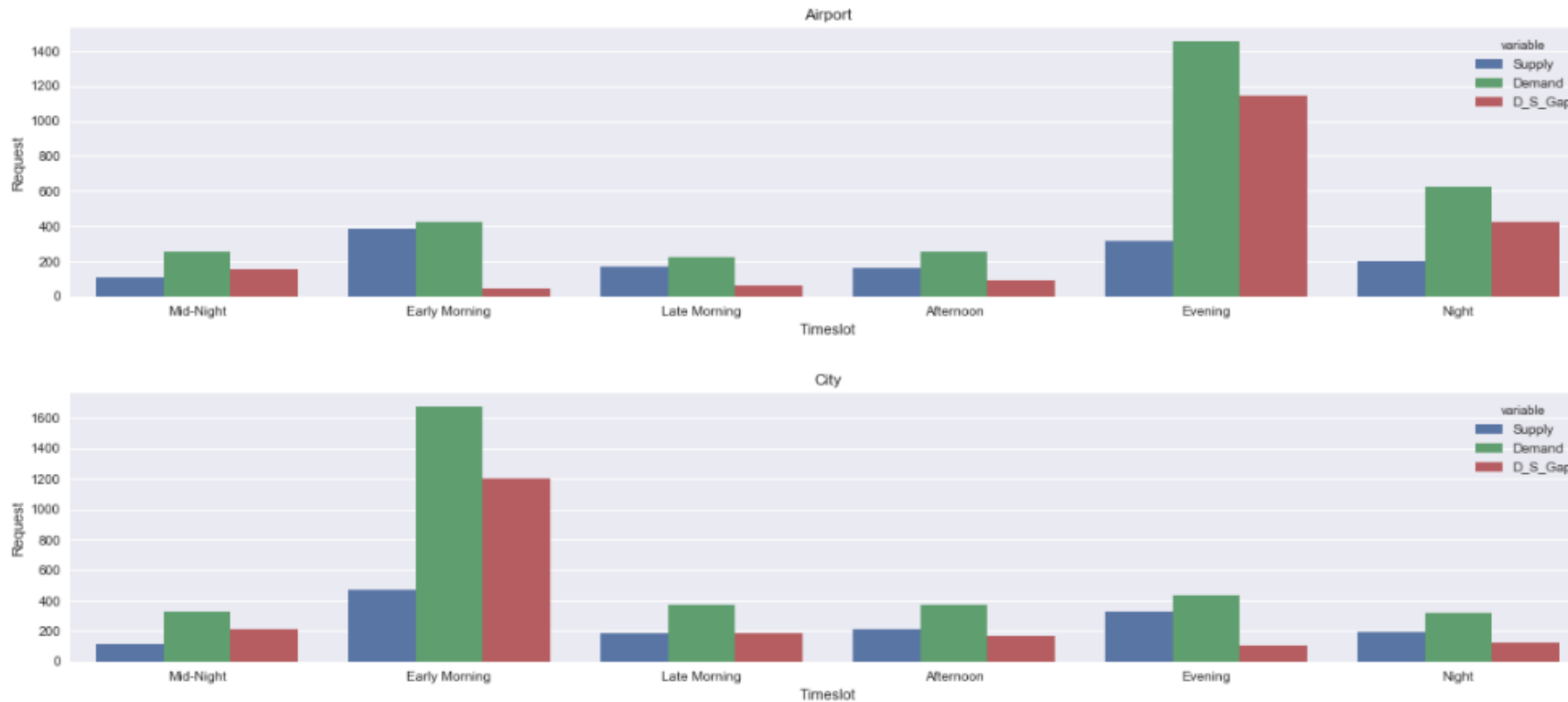
Looking at the Supply-Demand gap analysis, we can observe that:

 - The major gap in supply-demand for cabs from the Airport exists in the **Evening** (59.9% of the entire day's supply-demand gap in the Airport)

 - The major gap in supply-demand for cabs from the City exists in the **Early Morning** (60.2% of the entire day's supply-demand gap in the City)

Supply-Demand Gap Reason

Based on the analysis above, we observe that the major gap in supply-demand for cabs from Airport-City exists in the **Evening** and for the City-Airport route exists in the **Early Morning.**

The major issue with cab pickups from the Airport to City is **unavailability of cabs.** This could be due to:

1. The fact that the airports are usually far away from the city, any cabs in the airport would only be getting customers for people arriving from the airport. The frequency of cab requests in the airport would therefore be low, and hence the **wait-times for drivers in the airport would be relatively quite high.** As a result, the driver would miss out on lots of potential bookings he would otherwise get in the city, which is probably why there is the problem of unavailability of cabs in the airport.

2. Another reason could be lack of/expensive parking spaces which discourages drivers from waiting in the airports.

3. There could be a case where the cab driver who has accepted the cab request in the city has to travel quite some distance just to the pickup location of the user, hence he would be inclined to cancel the cab.

The major issue with cab pickups from the City to Airport is **cab cancellations.** This could be due to 2 major reasons:

1. The distance between the city to the airport is high, hence the driver would have to spend a large amount of time on 1 journey. The amount of time spent on that journey could instead be utilized for multiple trips within the city itself

2. The trip from City-Airport would mean that the driver would have to find his next fare from someone in the airport. This would in turn mean that he would have to potentially wait for quite some time before he gets a cab request from there. This would be the reason why a driver would cancel the cab request from the city to airport

Recommendations

- Within the city, Uber should look into **positioning its supply (cabs) in areas where the cab requests are high** – this would mean that there are enough cabs in an area that a user is trying to book, hence the chances of a cab accepting the request would increase, which **would ensure that the user doesn't switch apps**

- They should increase cab fares or provide extra incentives for pickups from Airport to encourage drivers to make the long journeys from the city to airport

- Provide separate Uber Parking Zones in the airport where Uber drivers have the freedom to park their cars without any additional parking fares

- Set minimal cancellation fees for the drivers to ensure that drivers don't unnecessarily cancel cabs every now and then

- There could be a case where the cab driver who has accepted the cab request in the city has to travel quite some distance just to the pickup location. Uber could consider providing incentives to these cab drivers to ensure that they are inclined to travel this extra distance to the pickup location in the city.

- Scheduled bookings would help solve the issue of supply-demand gap. If a user has the opportunity to schedule his trip to/from the airport, Uber will have prior knowledge on the user's intent of taking a ride, and hence they have enough time to accommodate the user in a cab to ensure they don't lose out on that customer