Uber Supply-Demand Gap
CASE STUDY

SUBMISSION

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Business Objective

- The aim of analysis is to identify the root cause of the Uber problem (i.e. cancellation and non-availability of cars)
- Recommend ways to improve the situation.

Limitations :

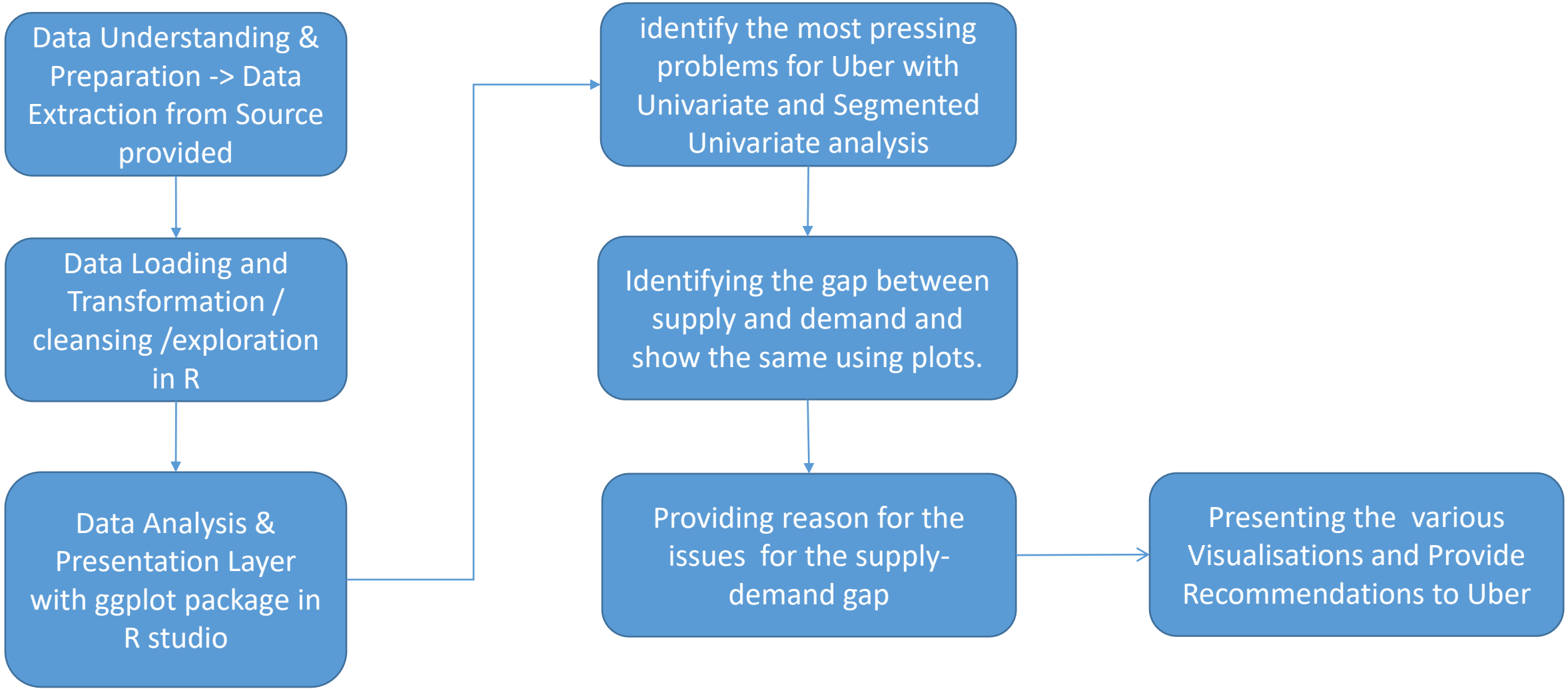
Data provided is between only two pick up points and there is a lack of trip wise continuity.

Understanding the data

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

Problem solving methodology



Analysis: Assumptions/Data Cleansing

• Standardizing date format separator form "/" to "-" converting into standard R date-time format "2016-07-11 11:51:00". But seconds granular level is not required in the assignment analysis.

•Data set has NA values in Drop timestamp & driver id when trip status is No Cars Available, and Drop timestamp is NA when trip status is Cancelled.

•Created derived variables day, hour, minutes, trip time from the available columns.

•Time slots variable are created between the hours: 00 to <05, >=05 to <=9, >=10 to < 14 (2 PM), >=14(2 PM) to <17 (5PM,>=17(5 PM) to <=21(9PM), >21

•Demand = number of cab requests done. Trip completed + Trip cancelled + Cabs unavailable

•Supply = Number of cab availability. Only trip completed is considered as supply. Trip cancelled / cab unavailability cases did not consider as part of supply for Analysis. Logically Trip Cancelled means Uber has the supply but Requests is not Served for the customer by the driver so there is a gap between "# of requests" and "Requests fulfilment."

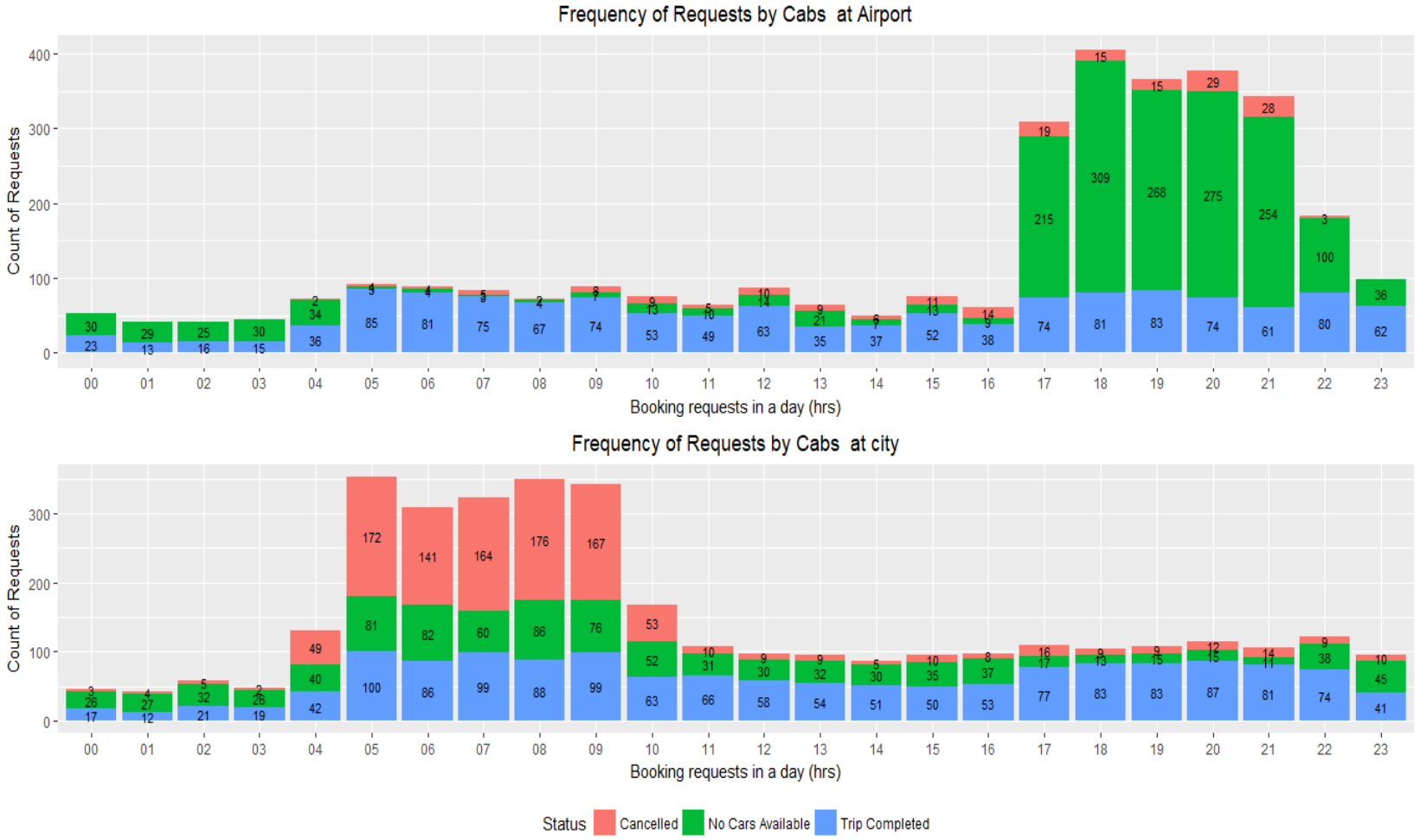
Data Analysis

• There are 6745 records with 6 variables with 5 days of data from Uber between July 11 2016 to July 16 2016 . Request.id is unique column in the dataset.

•There are no Blank Values.

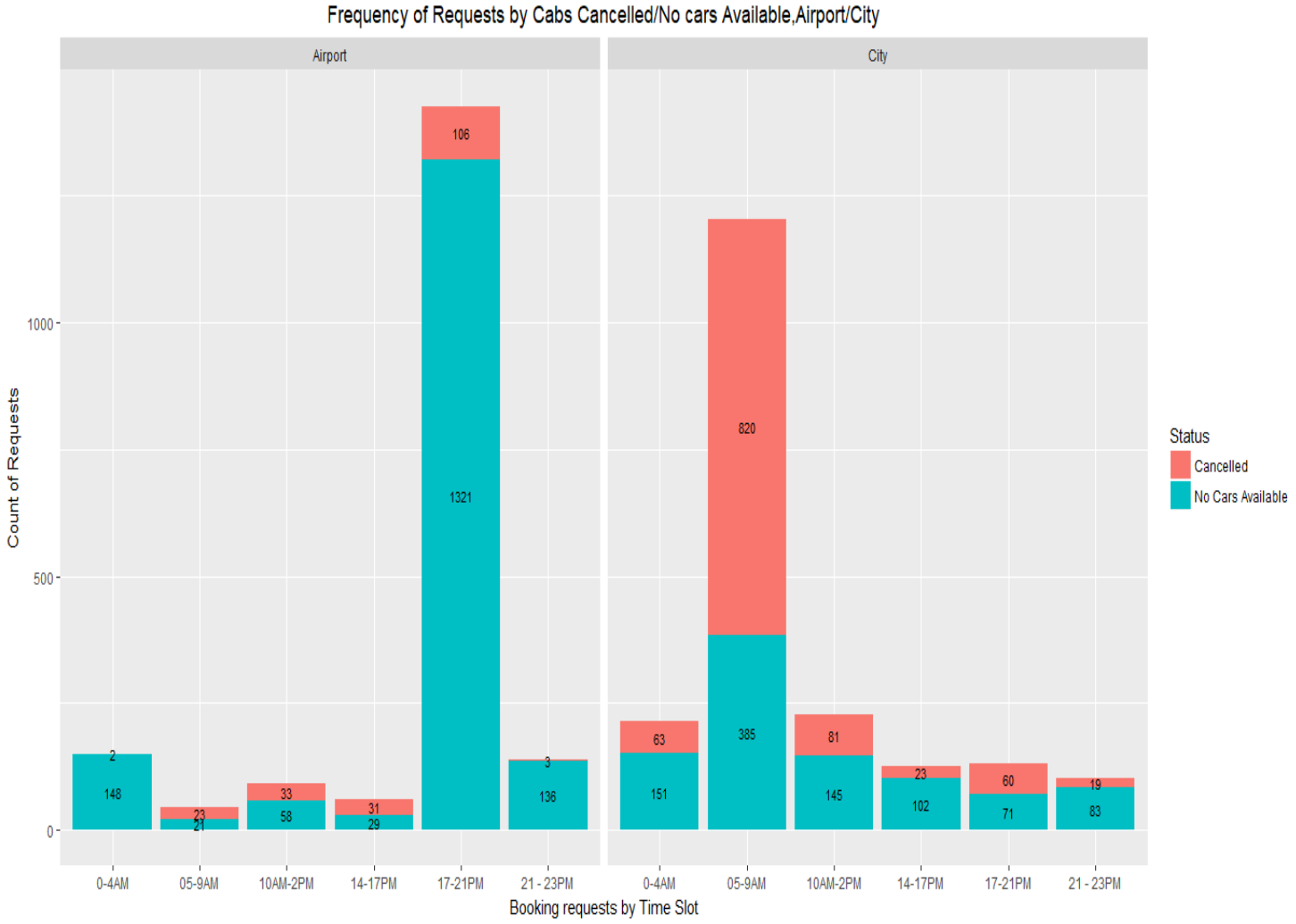
•There are NA but as per logic these are fine to keep as is.

Plot 1: Frequency of requests by cabs at Airport/City



- Number of requests from Airport to City between 5 PM to 9 PM(Peak Time) is high.
- Number requests from City to Airport between 5 Am to 10 AM(Peak Time) is high .
- But Cancellation and No cars Availability during these peak hours is more than the trips completed at pick up points.

Plot 2: Frequency of requests by cabs at Airport/City by time slot



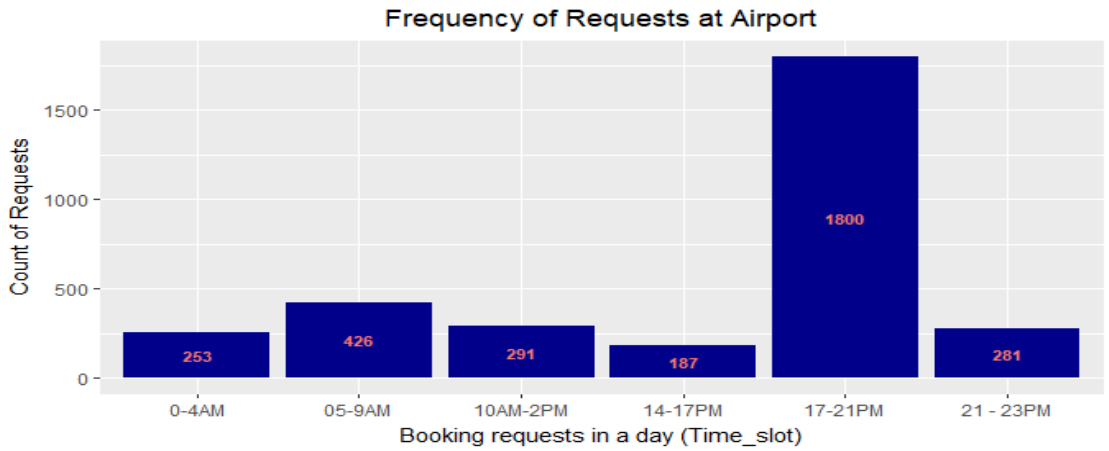
Plot 2.

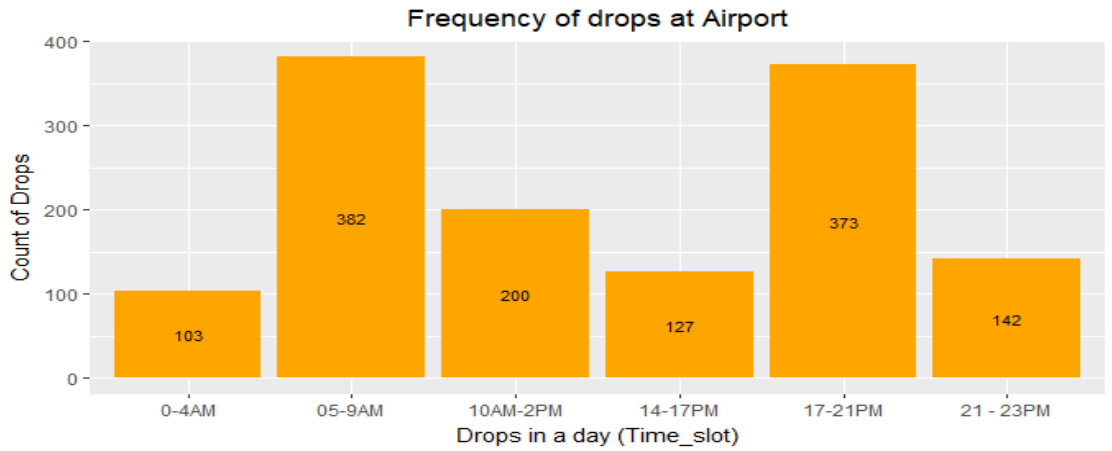
- This Chart clearly shows huge demand deficiency between peak hours at Airport and City both. at Airport there are no Cabs Available (between 5PM to 9 PM) and high Cancellation At City Between 5 AM to 9 AM.
- So At Airport Cars Unavailability is major issue and Cancellation at City during peak hours.

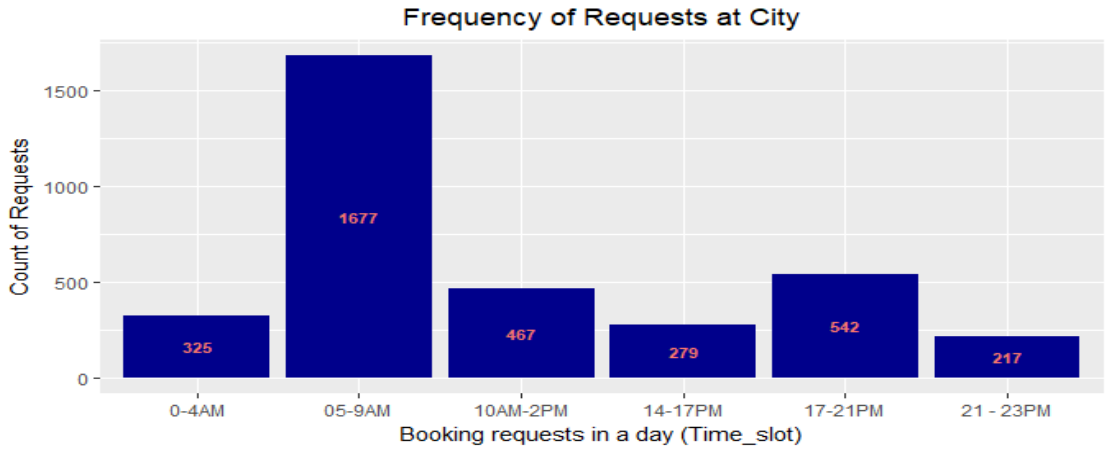
Plot 3: Gap between supply and demand

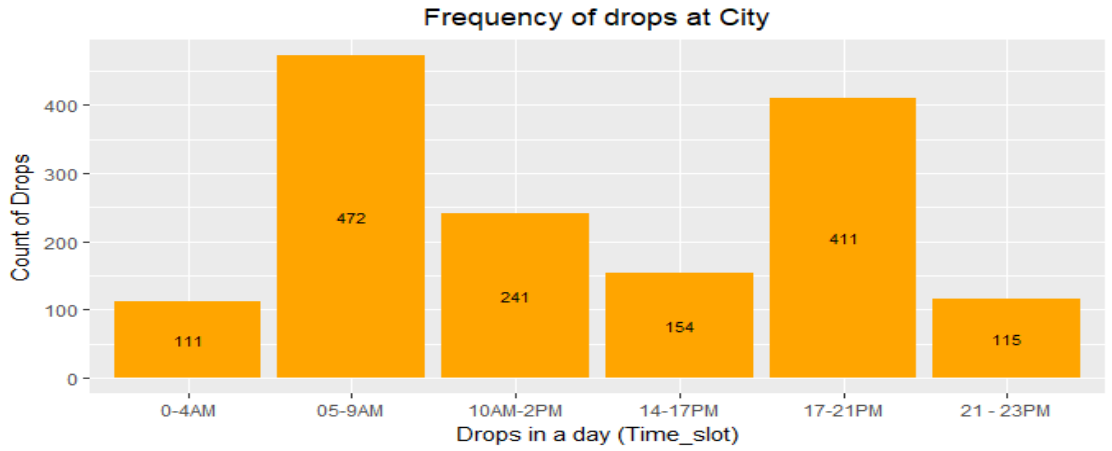
- Plot 3 : This chart helps to analyse the hourly data when the highest gap exists on Cancellations & No cars available scenarios.

Plot 4 : Demand Vs Supply at Airport/City by Time Slots

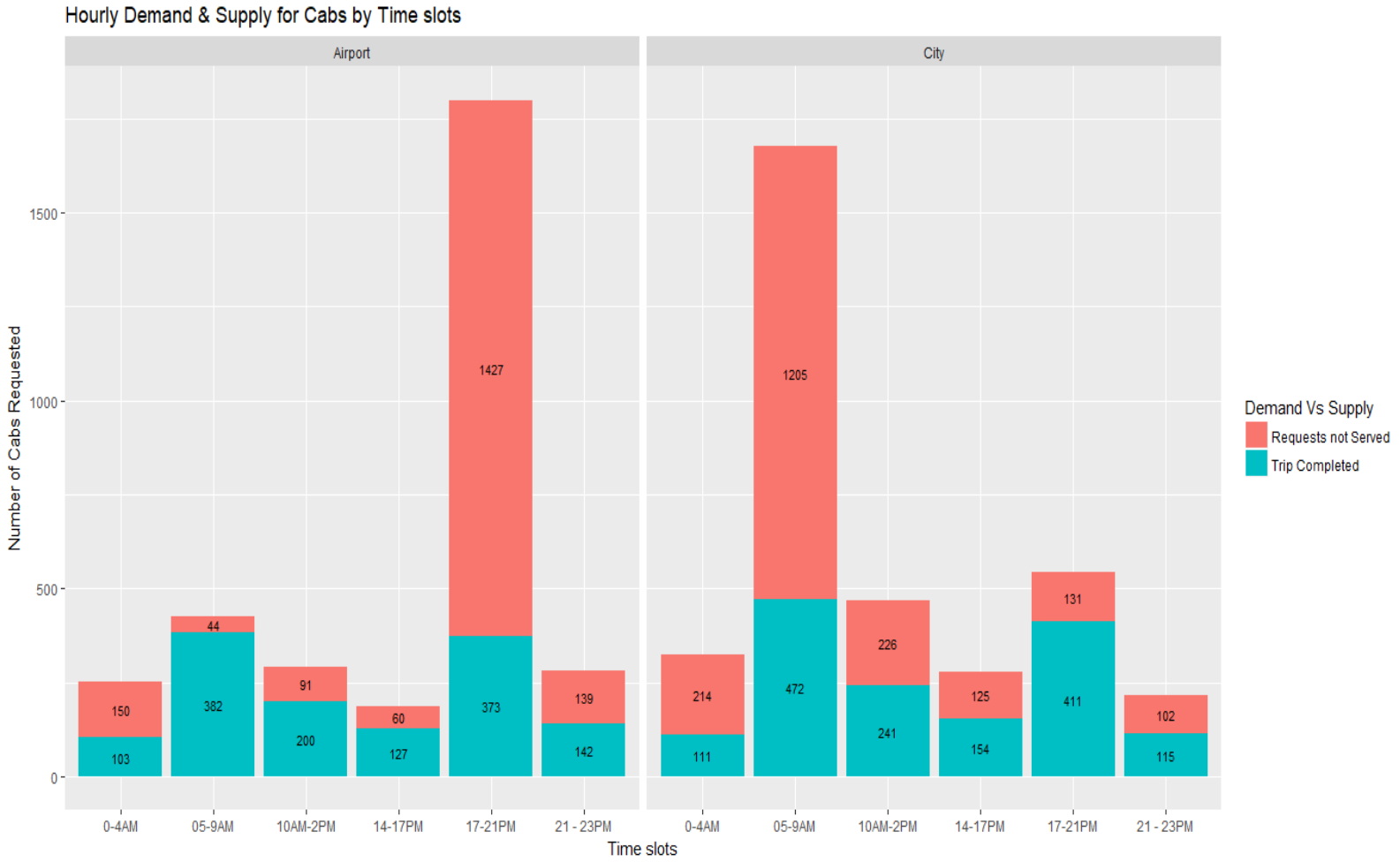








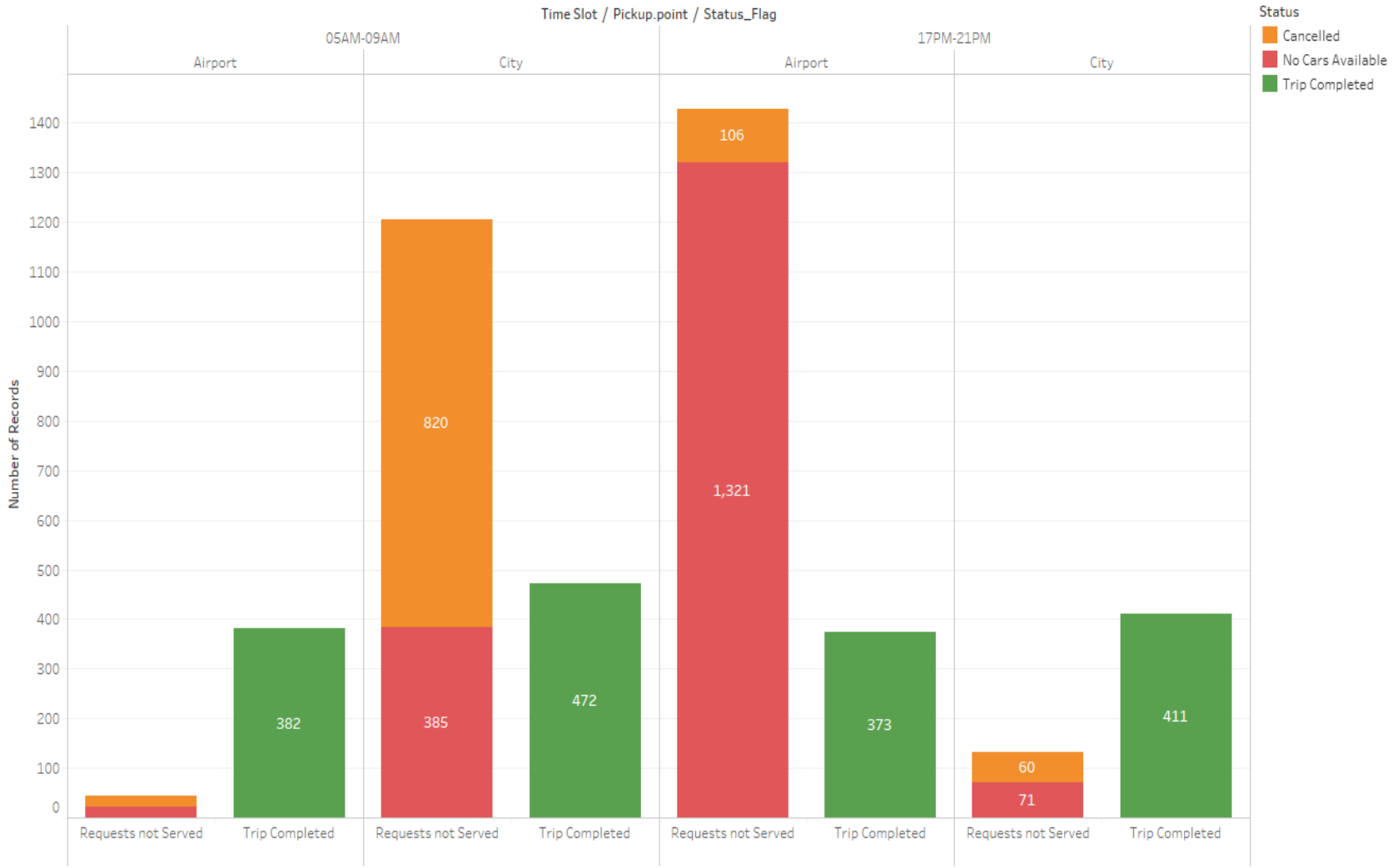
Plot 5: Gap between supply and demand



Plot 5 : Find the time slots when the highest gap exists

- cancellation and no cars availability scenarios are causing the main gap in peak hours.
- Time slots when the highest gap exists are between 5 PM to 9 PM at Airport and 05AM to 9 AM at City.

Plot 6: Gap between supply and demand

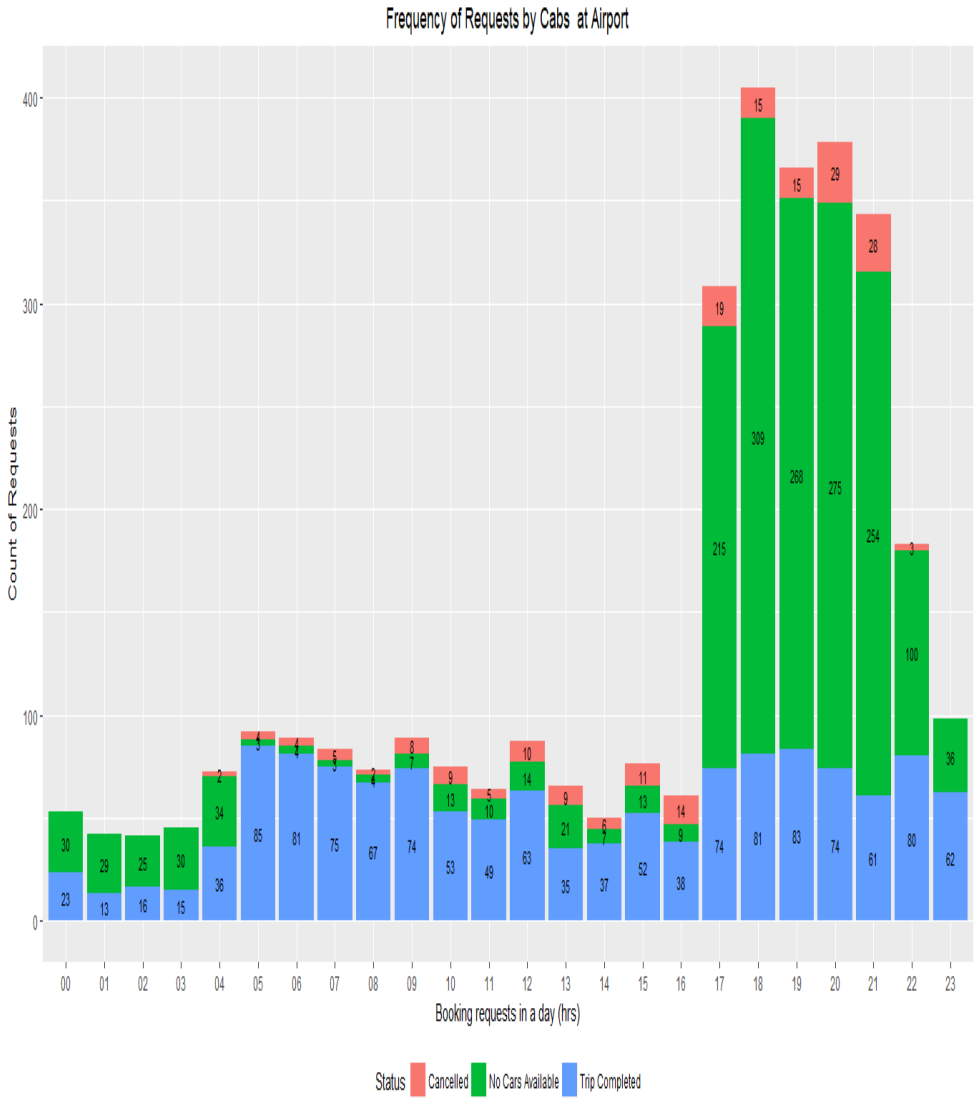


Plot 6 : Find the time slots when the highest gap exists

- cancellation and no cars availability scenarios are causing the main gap in peak hours.
- Time slots when the highest gap exists are between 5 PM to 9 PM at Airport and 05AM to 9 AM at City.
- In this plot clearly it states airport-city (Cars Availability) gap is the most severe in the identified time slots than City to Airport(on Cancellations) during the Peak Hour so Uber has to work with Taxi agencies to add the more cabs to address the gap during evening peak hours.

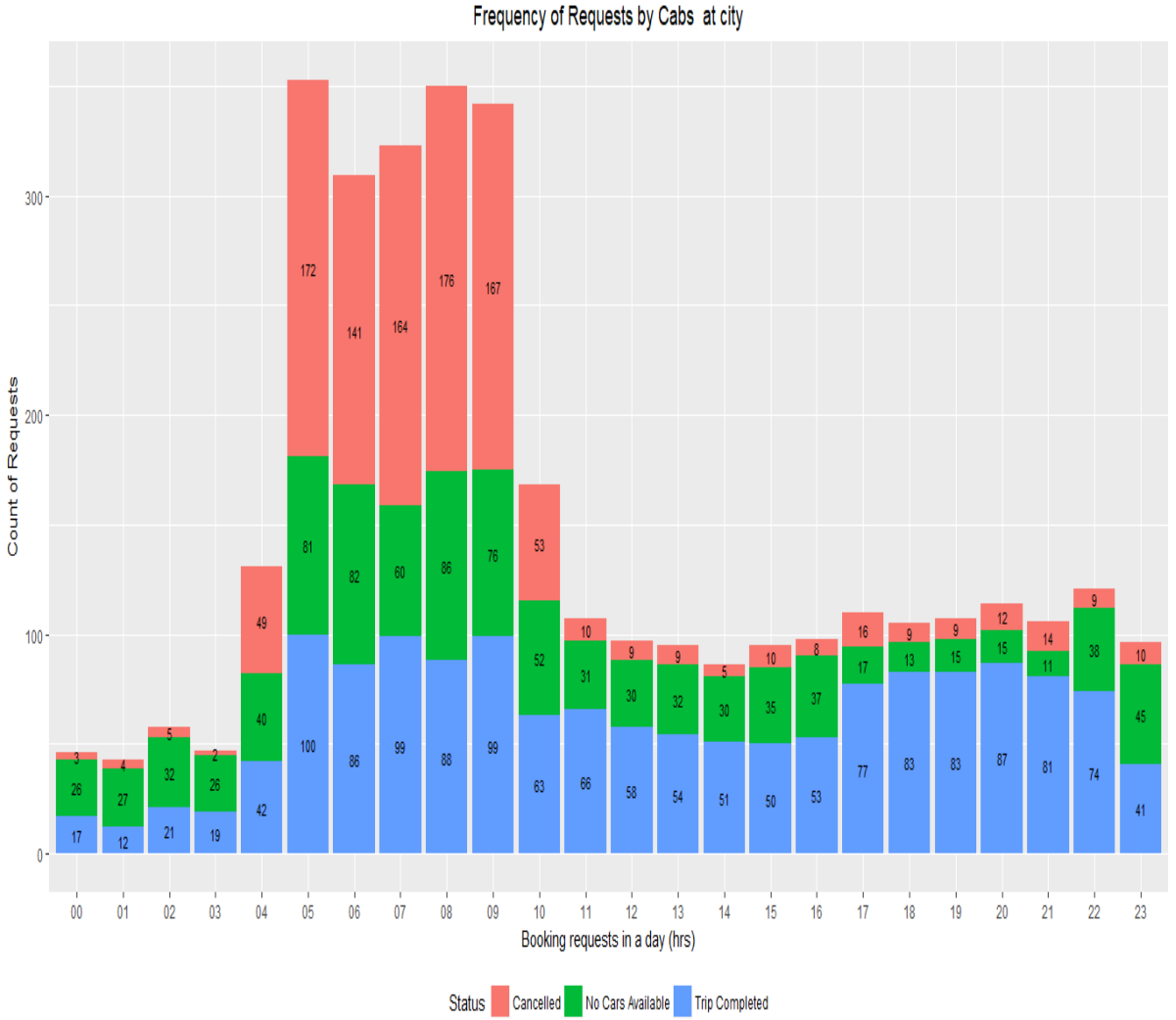
No Cars Available at Airport

- As visualized in plot there is rapid increase “no cars available” cases from 5:00 pm to 9:00 pm and there is sharp increase demand of cabs From the Airport during Evening Peak Hour.
- On an average a trip from Airport to City 52 mins.
- As visualized in plot 1(slide 7) there is a gap in Demand and Supply of Cabs at the Airport.
- This Sharp increase in demand during peak evening hour , because very less drops at airport from the city during this time slot, leads Lesser numbers of cars availability at airport. Drops at airport between 5 PM to 9 PM are symmetric so Uber needs to improve cabs availability.



Trip Cancellations at City

- As visualized, in plot there is a steep increase in cancellation trips from 4:00am to 10:00 am.
- On an average a trip from the city to the airport takes 53 mins.
- As visualized in plot no 1 1(slide 7) there is high demand of cabs from the City during 4:00am to 10:00am.Therefore if drivers are asked to accept the trip to airport there are ample chances, that they might have to wait at the airport for a long period of time before they get a new trip.
- The Supply and Demand gap in peak morning hours is very high and is indirectly forcing cab drivers to cancel the trips to Airport So Uber has to encourage drivers with incentives to Airport trips during Peak Morning hours.



Recommendation

- Increasing Cabs Availability will surely help in ensuring availability of cabs during peak hours.
- Provide/Increase the Incentives to cab drivers if their wait time is more than 30 min at Airport.
- Uber should analyse the arrival and departure of flight timings from the Airport and share with Cab drivers for the peak hours based on the previous week request data.
- Uber also need to negotiate with Airport Authorities to have their parking slots near Airport Exit gates.

<u>For trip cancellation:</u>

- Drivers can be incentivised to carry out trips between 4:00am to 10:00 am from city to Airport.
- Drivers can also be compensated for their waiting time for above period.
- Need to Identify why Cancellations are more from Driver side by selecting top 10 drivers with highest cancellations ,This will help to decide on incentives.

<u>For ”No cars available”:</u>

- Promote the drivers/cabs which are near by to Airport by providing real time statistics to take the trips to Airport.
- Also cabs which are away can also be informed before hand and incentivised suitably for reaching airport for taking trips.

Thank You