Uber Supply Demand Gap Problem

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Problem Statement

To analyze the supply demand gap caused by no cars available or rides cancelled by Uber drivers when moving from City to Airport or vice versa. What are the possible reasons for that and ways to remediate them.

Dataset Available To Us

Request ID	Pickup point	Driver ID	Status	Request timestamp	Drop Timestamp
619	Airport	1.0	Trip Completed	11/7/2016 11:51	11/7/2016 13:00
867	Airport	1.0	Trip Completed	11/7/2016 17:57	11/7/2016 18:47
1807	City	1.0	Trip Completed	12/7/2016 9:17	12/7/2016 9:58
2532	Airport	1.0	Trip Completed	12/7/2016 21:08	12/7/2016 22:03
3112	City	1.0	Trip Completed	13-07-2016 08:33:16	13-07-2016 09:25:47
3879	Airport	1.0	Trip Completed	13-07-2016 21:57:28	13-07-2016 22:28:59
4270	Airport	1.0	Trip Completed	14-07-2016 06:15:32	14-07-2016 07:13:15

The Dataset has 5 fields :

- Request ID – Unique travel ID
- Pickup Point – Airport or City
- Driver ID – Unique Driver ID
- Status – Trip Completed/ No Cars Available / Cancelled
- Request Timestamp – Time at which ride was requested
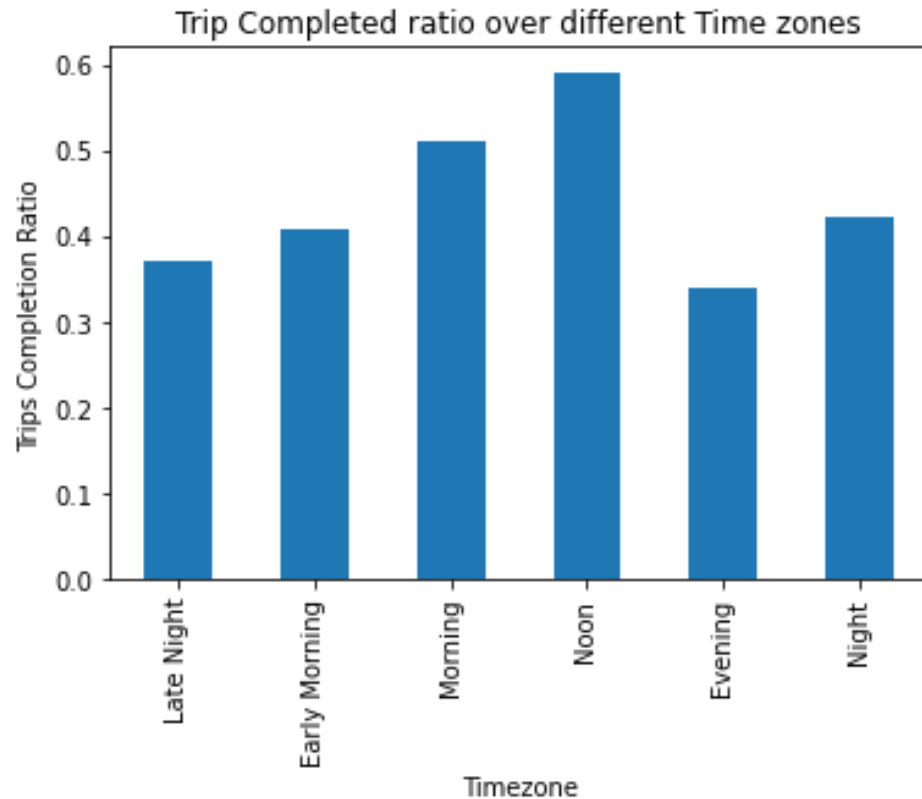- Drop Timestamp – Time at which ride is completed

Modified and Improvised Dataset

Request id	Pickup point	Driver ID	Status	Request timestamp	Drop timestamp	Duration	Timezone
619	Airport	1.0	Trip Completed	2016-07-11 11:51:00	2016-07-11 13:00:00	69.000000	Morning
867	Airport	1.0	Trip Completed	2016-07-11 17:57:00	2016-07-11 18:47:00	50.000000	Evening
1807	City	1.0	Trip Completed	2016-07-12 09:17:00	2016-07-12 09:58:00	41.000000	Morning
2532	Airport	1.0	Trip Completed	2016-07-12 21:08:00	2016-07-12 22:03:00	55.000000	Night
3112	City	1.0	Trip Completed	2016-07-13 08:33:16	2016-07-13 09:25:47	52.516667	Early Morning

Request and Drop timestamp are in uniform format while Duration and Time zone fields have been added.

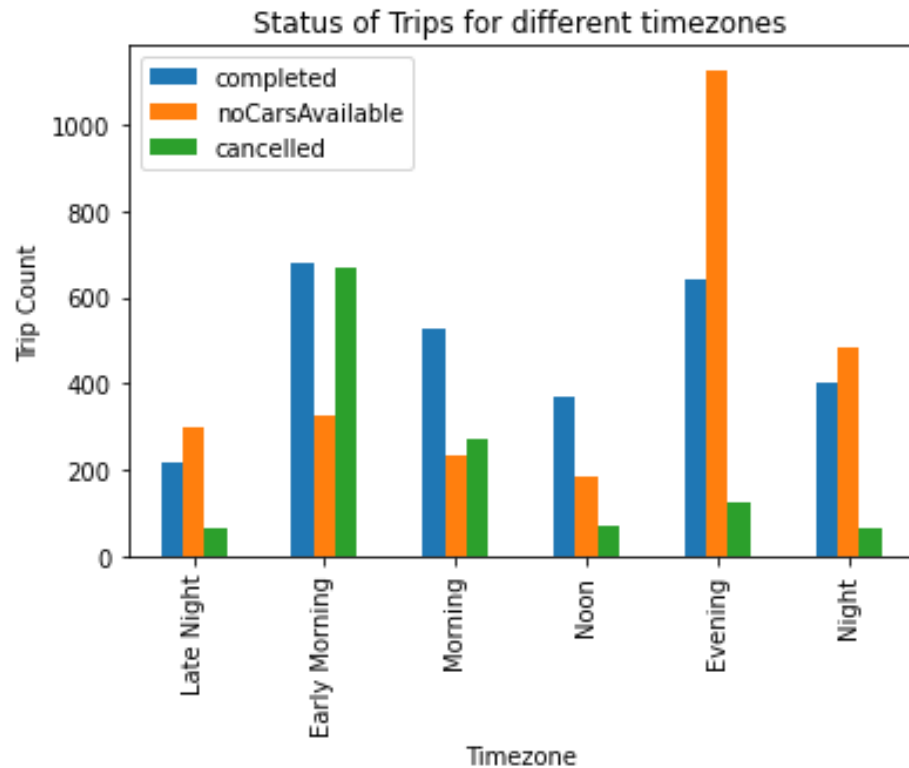# Trip Completion Ratio Over Different Time zones

This graph shows that in Early Morning i.e. from 4:00-9:00 and in evening i.e. at 16:00 - 21:00 there are less success rates. This might be because those are peak hours where people go and return from work
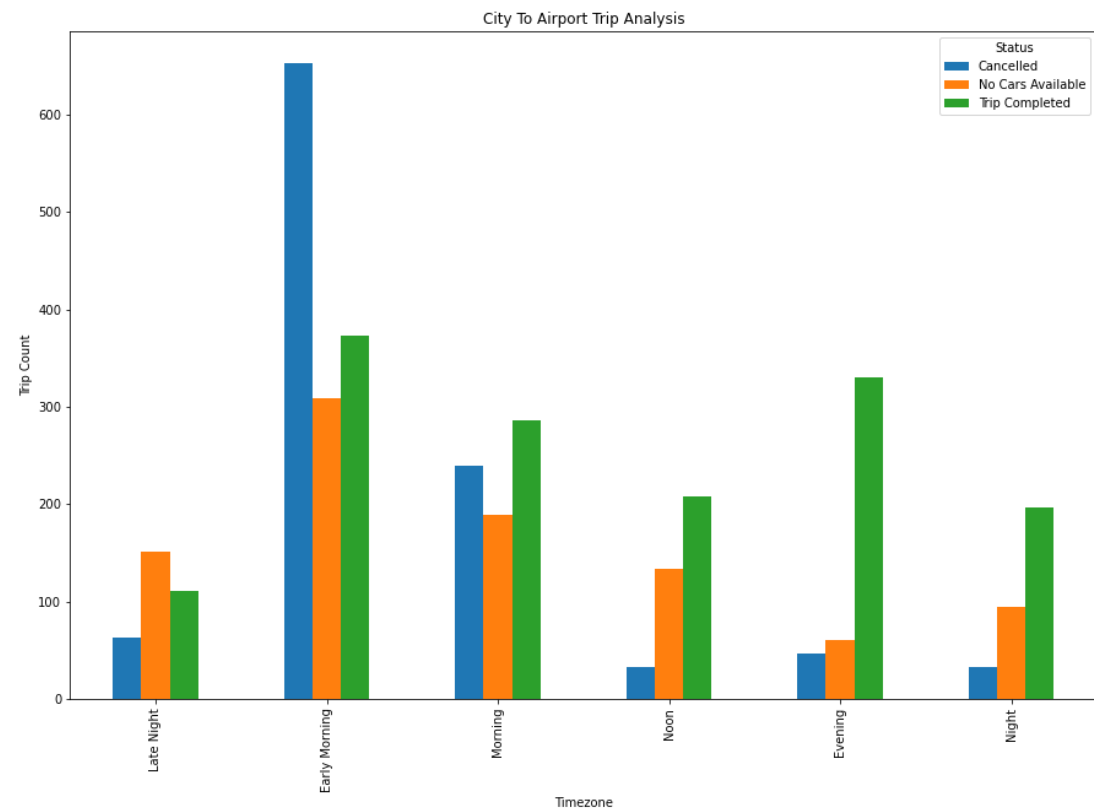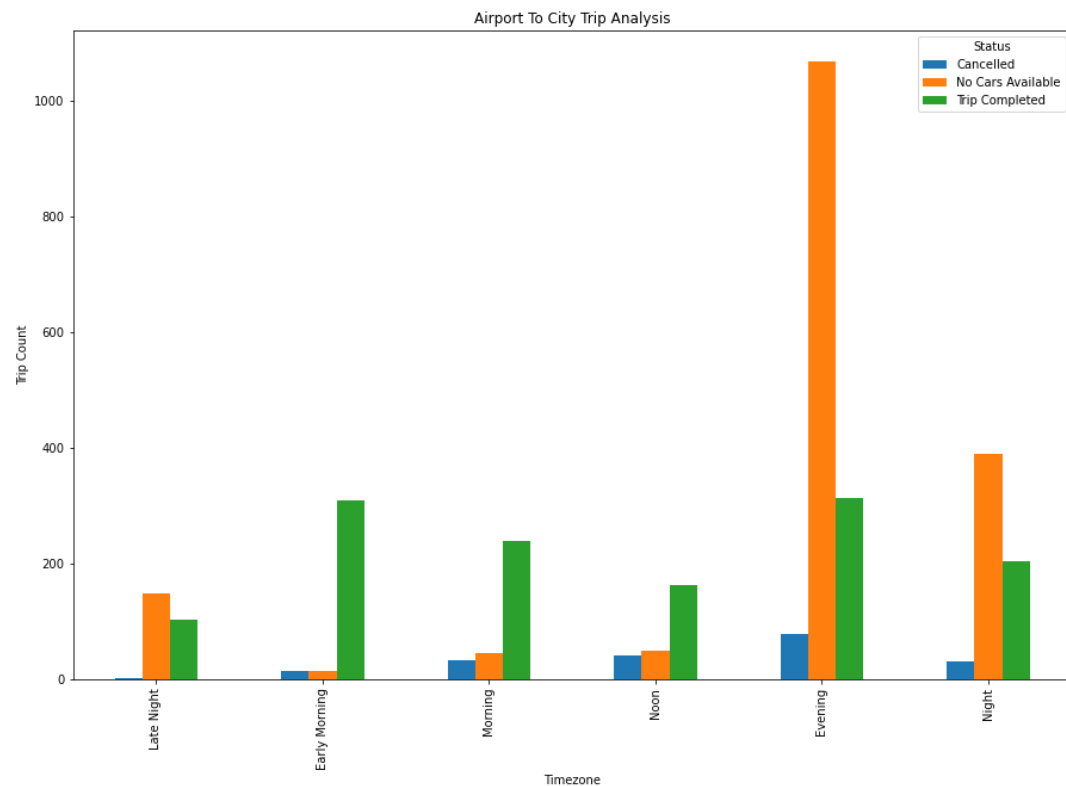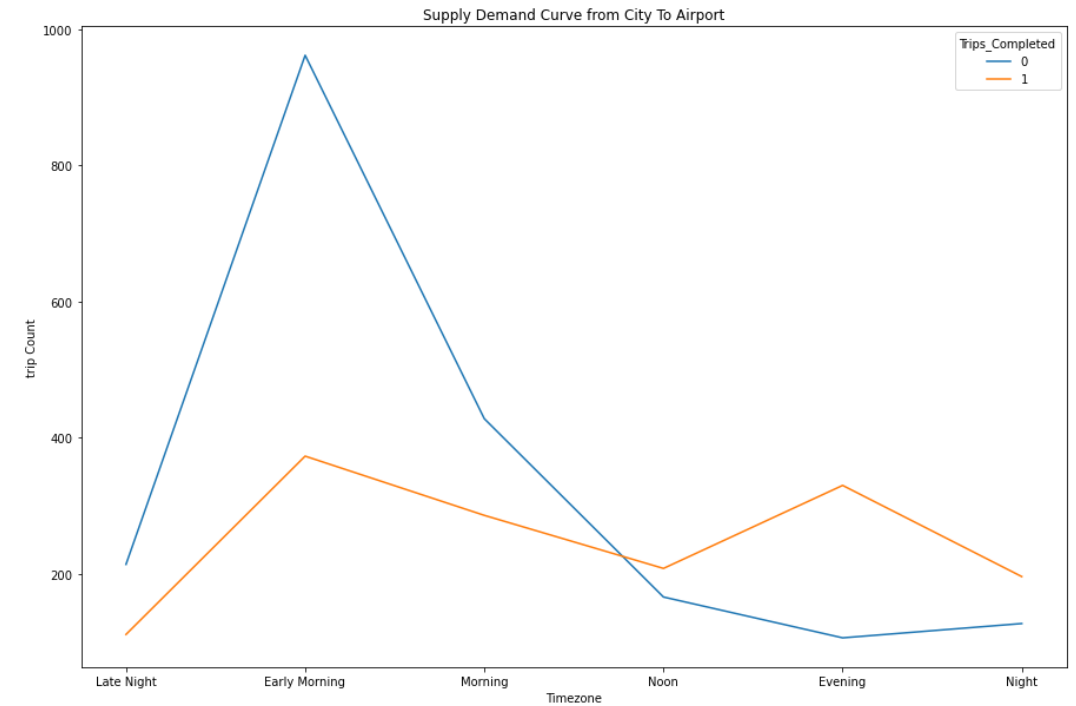
Count of Trips for each Time zone and Status

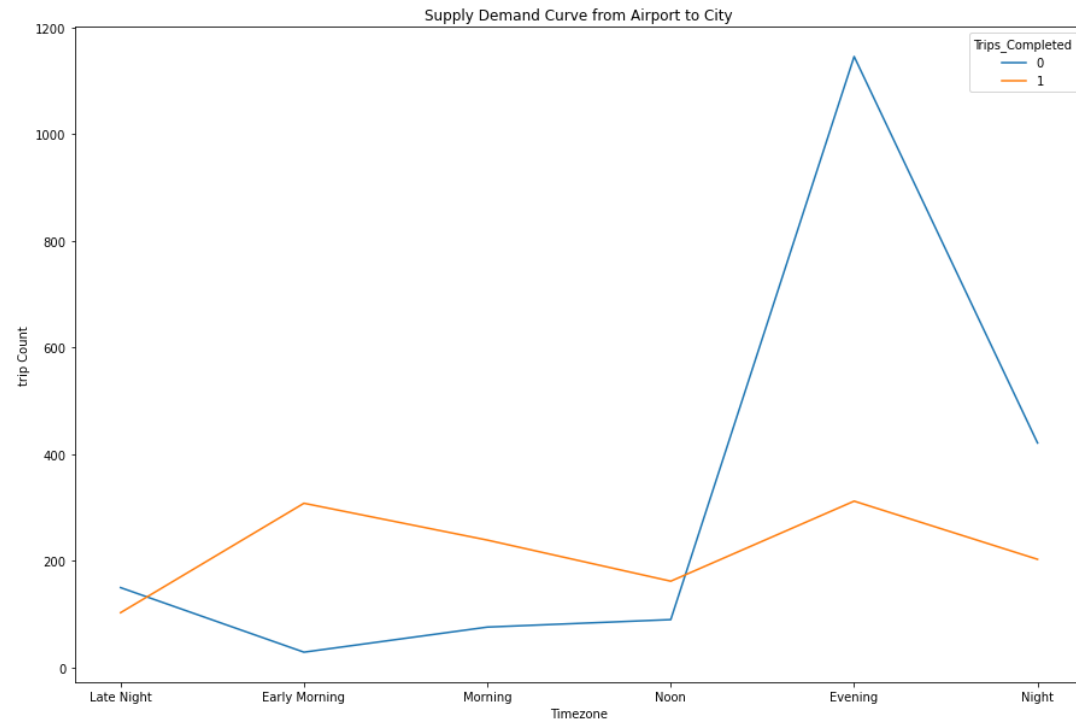This graph shows that in Evening i.e from 16:00 - 21:00, the number of requests are high but the cars that are not available are also high. The situation is not so good in night as well. While in Early Morning and Morning, drivers tend to cancel rides a lot

Pick Up Point Analysis

These two graphs show that from Airport To city we have high shortage of drivers in evening while going from City to Airport lots of drivers cancelled their rides in morning

Supply Demand Curves

With these plots we estimated that for each time zones, the supply demand gap, we found that while going from City to Airport, there is high gap in early morning, while from Airport to City, in evening we have quite a difference
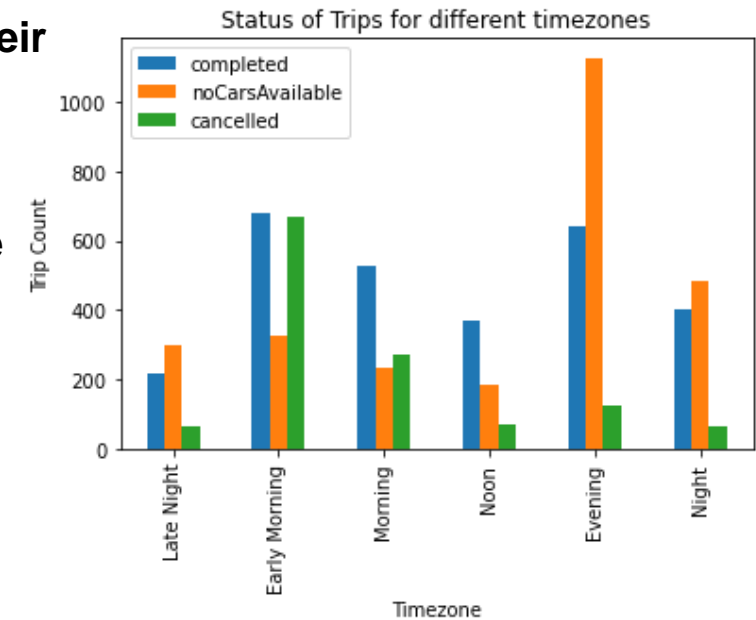
Possible Hypothesis for Supply demand Gap

We can observe from the plotted graphs, that the lowest completion ratio is in Morning and Evening. The main cause of this is simply because people go to their and work and return to their work, at that moment there is quite a shortage of cars or cancelled rides.

We can see from City to Airport there are lots of cancelled rides in morning. The possible reason might be as the demand from Airport to City is less in morning, so the drivers have to travel with no passengers or very less number of passengers. So the driver cancels the ride in morning

Same goes with Airport to City, there are chances that lots of flights are coming to Airport, so there are many travellers from airport to city , but the number of cars available are pretty less.

Possible Solution

As we have discussed the number of cancelled rides are more from City to Airport in morning, possible solution is to increase surge pricing, so that drivers would get fair pay for the rides from City to Airport and they can compensate for the losses while coming from Airport to City.

In the second scenario, we can see that there is huge shortage of cars in airport and abundance supply in City, so there is need to place more drivers in Airport or engage more vehicles at the time of evening at airport.