

# DATA SCIENCE TASK

I have divided the dataset into 3 major parts

- Long Distance
- Point To Point
- Hourly Rental

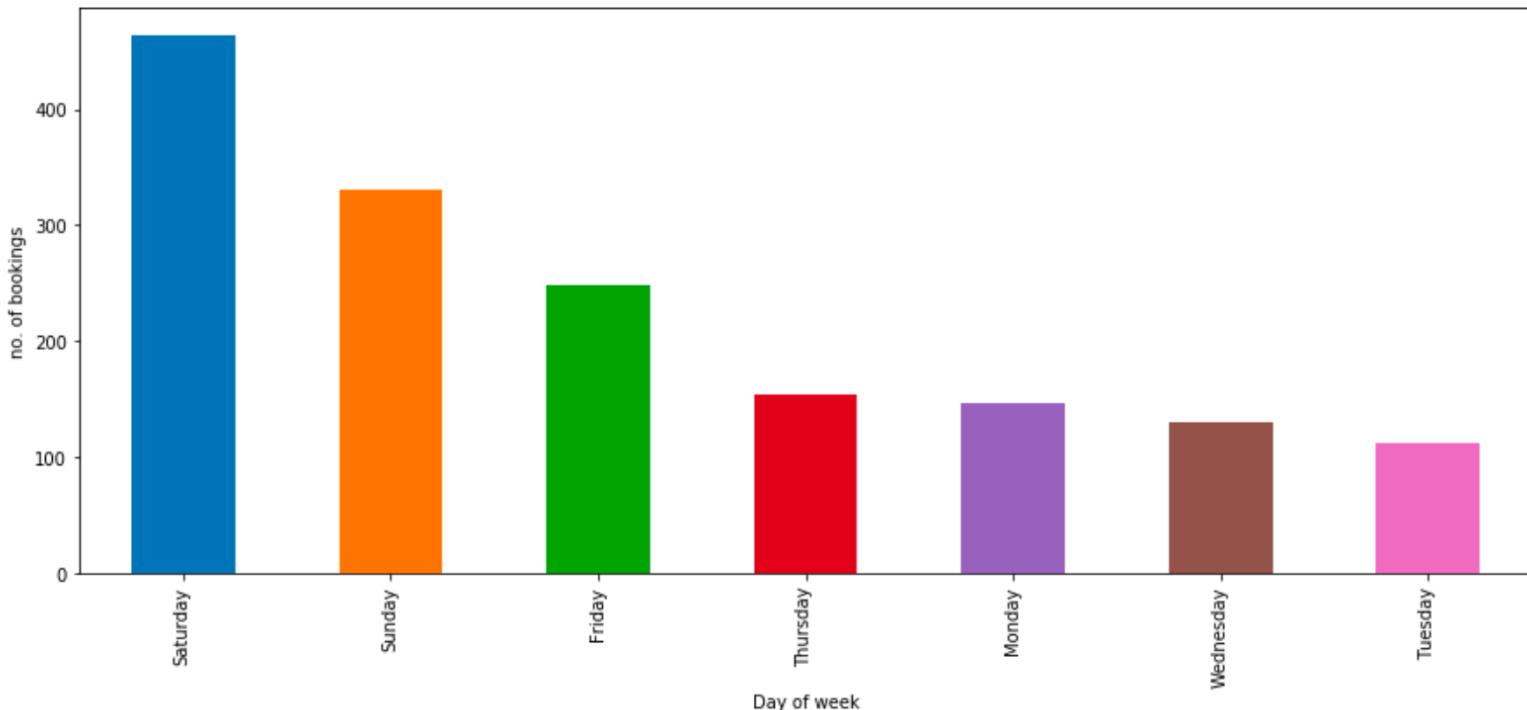
## LONG DISTANCE ANALYSIS

(All the graphs for the variation of traffic with the time are not shown here only the most significant ones are shown rest of them are shown in the Jupyter notebook)

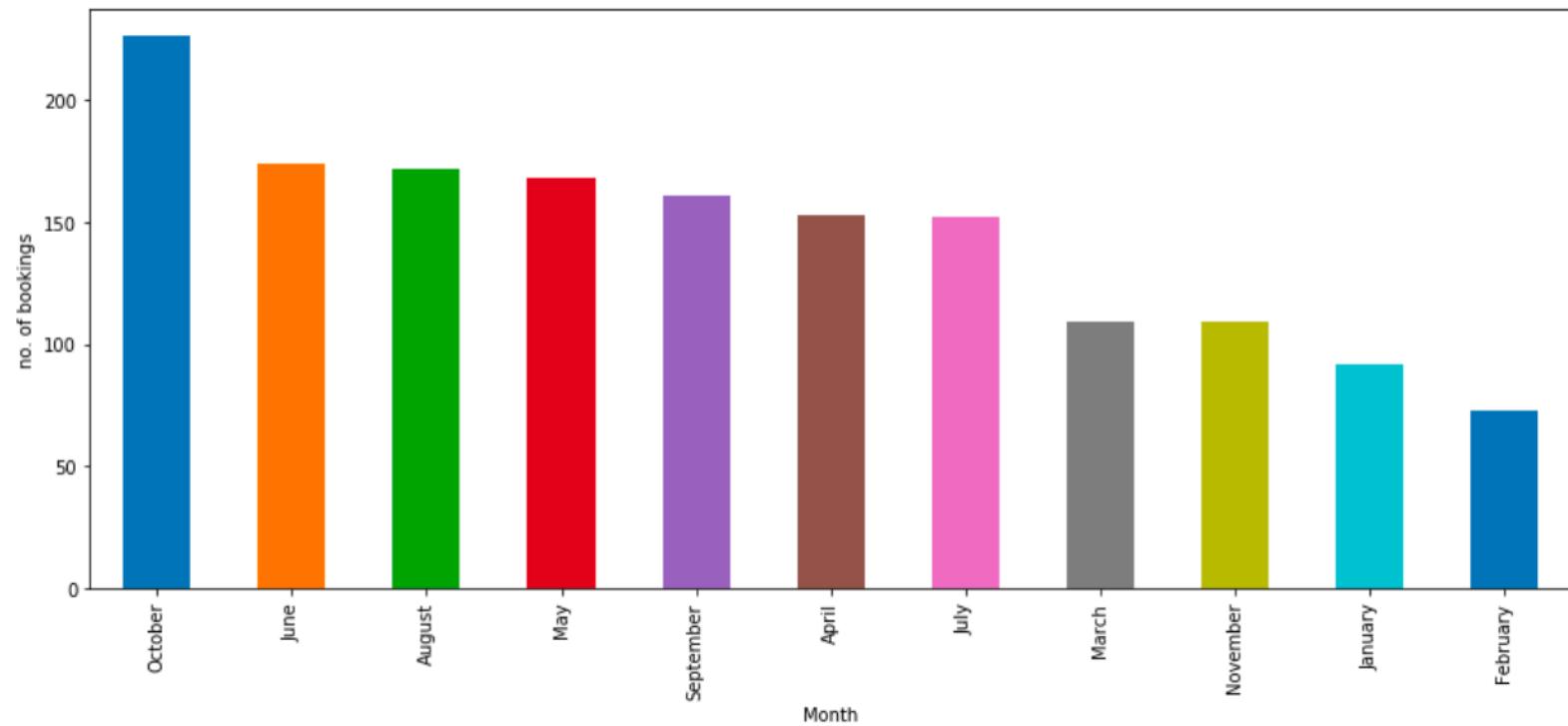
In the long distance bookings we saw 1589 bookings all the bookings are done in the year of 2013.

In order to analyse the data I added the features like which day is the booking happening, which month is it and which year is it all these features are derived from the “from-date” feature.

### OverAll Days/Months Analysis-

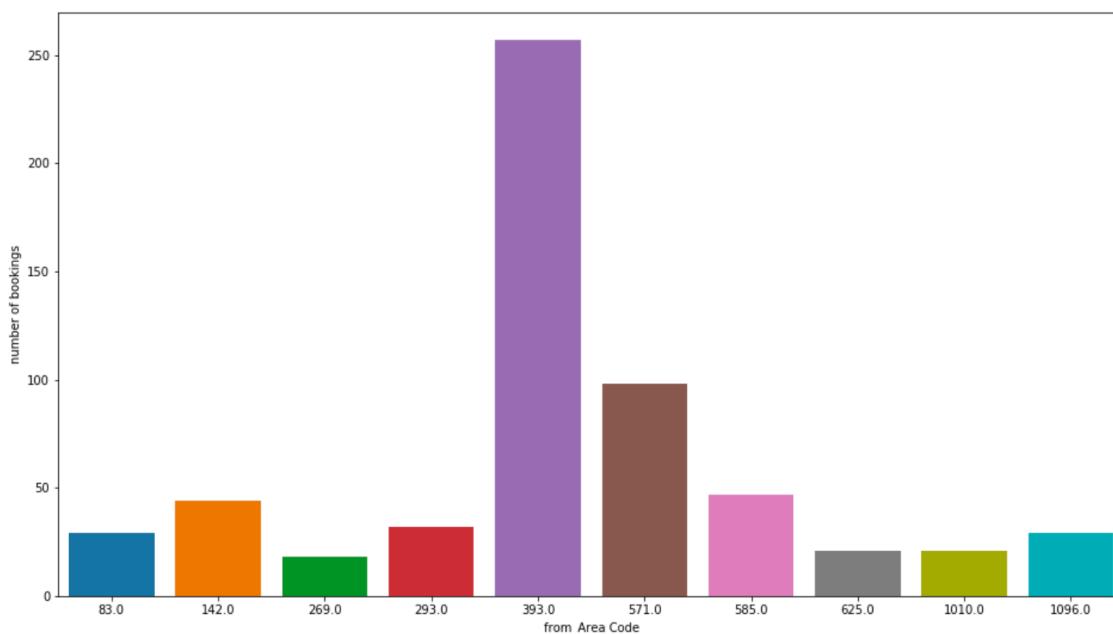


Now from the given graph above we can see that the most number of bookings for the long distances are done on Saturday.



Now from the above graph we can see that the bookings are specifically high in the month of October because the amount to tourists visiting Bangalore increases because the season becomes quite good during winters.

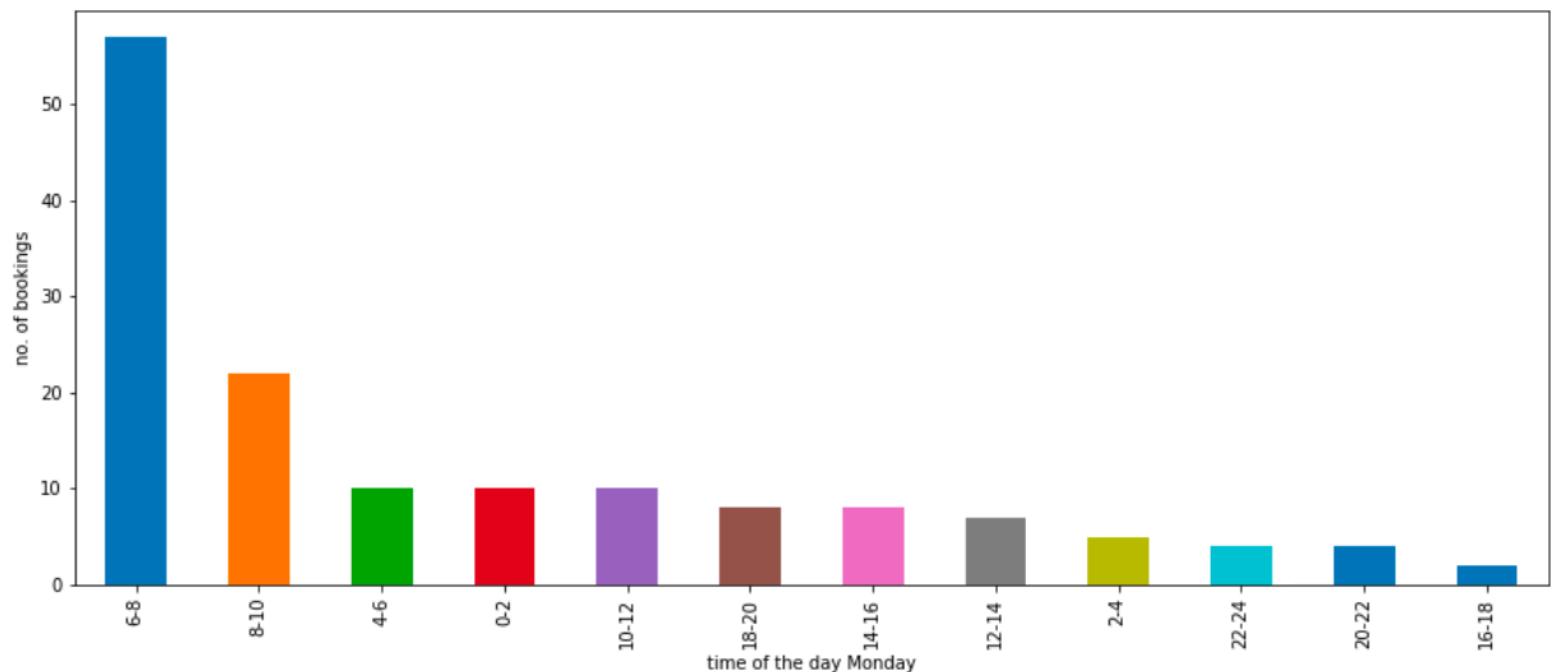
## Overall Area wise analysis-



Now from the above graph it can be seen that the area coded **393(International Bangalore Airport)** has the most number of bookings.

The reason behind this is that the airport is approximately 35km from the city and due to which most of the tourists coming to Bangalore tend to take the long journey.

## Monday Analysis-

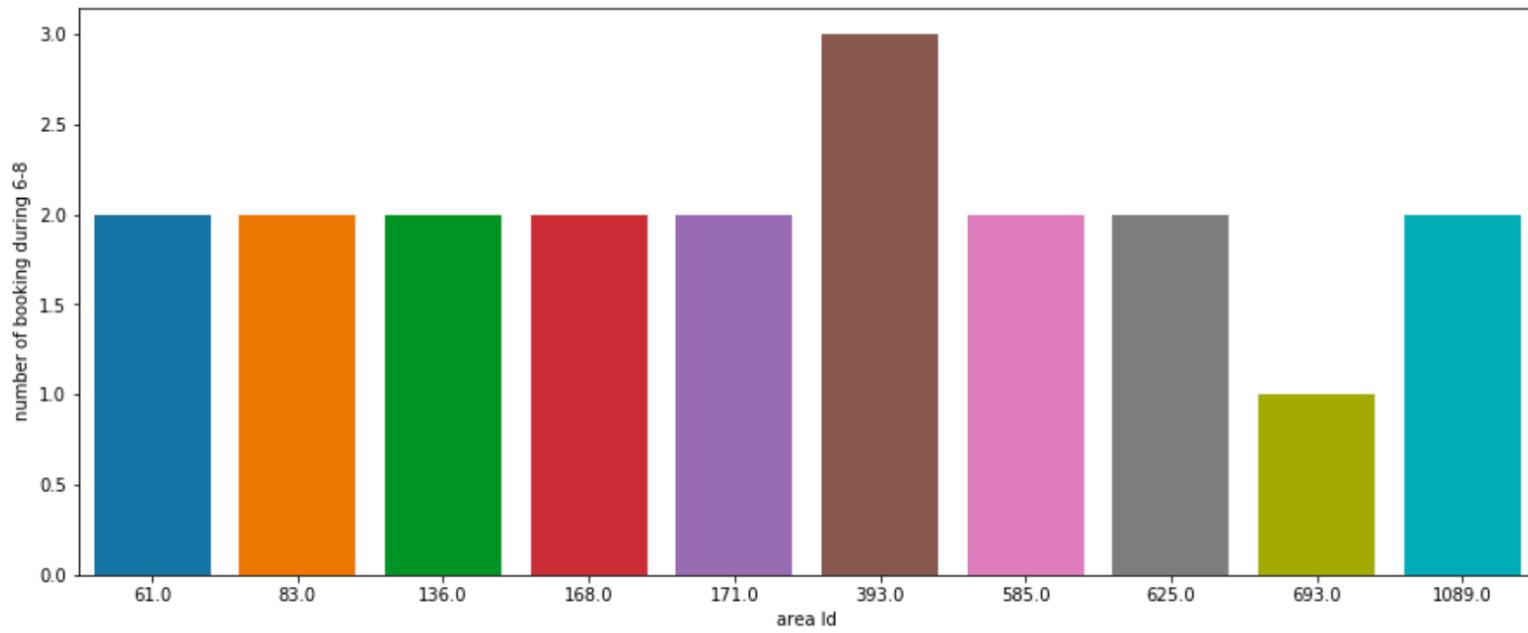


It can be seen from the above graph that the most number of bookings happen during the time period from 6-8 A.M.

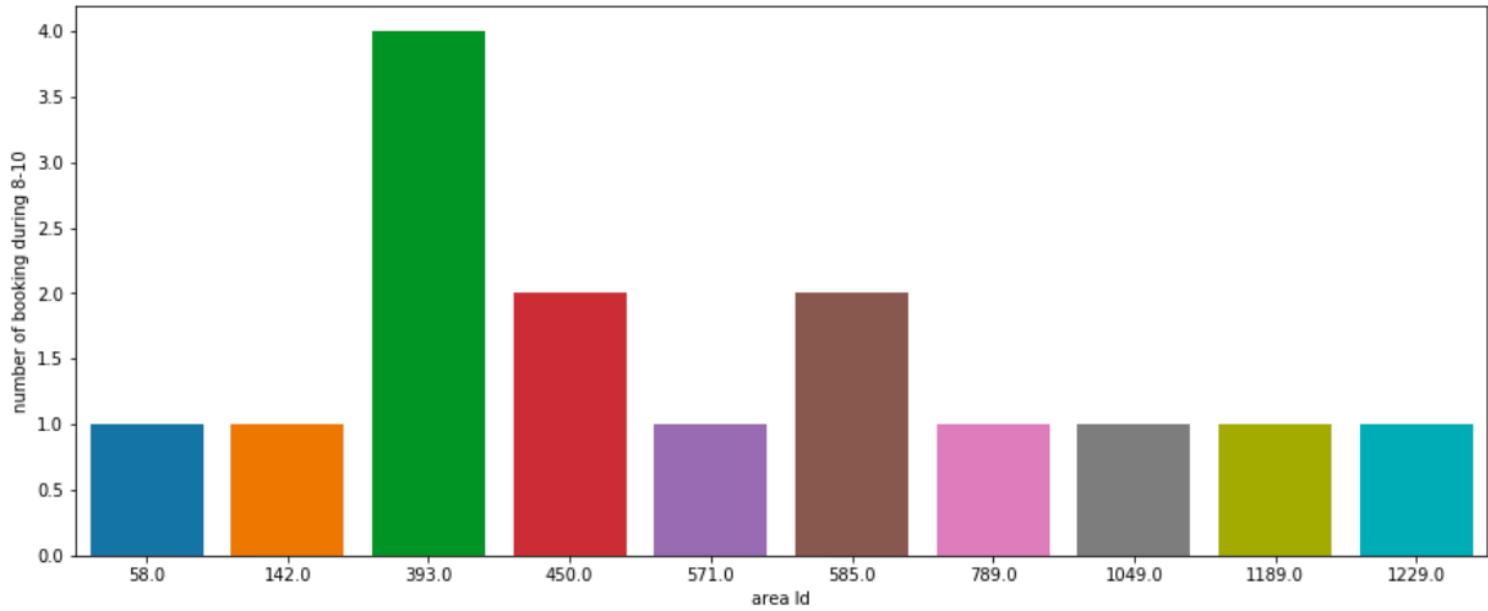
## Analysis of traffic for different hours of the day on Monday

I have divided the whole day into two hours interval since pasting all the graphs in here would be quite cumbersome I would be analysing the top 2 performer from the above graph i.e. 6-8, 8-10.

Rest all the graphs for the further analysis are in the Jupiter notebook named `long_distance_analysis`.

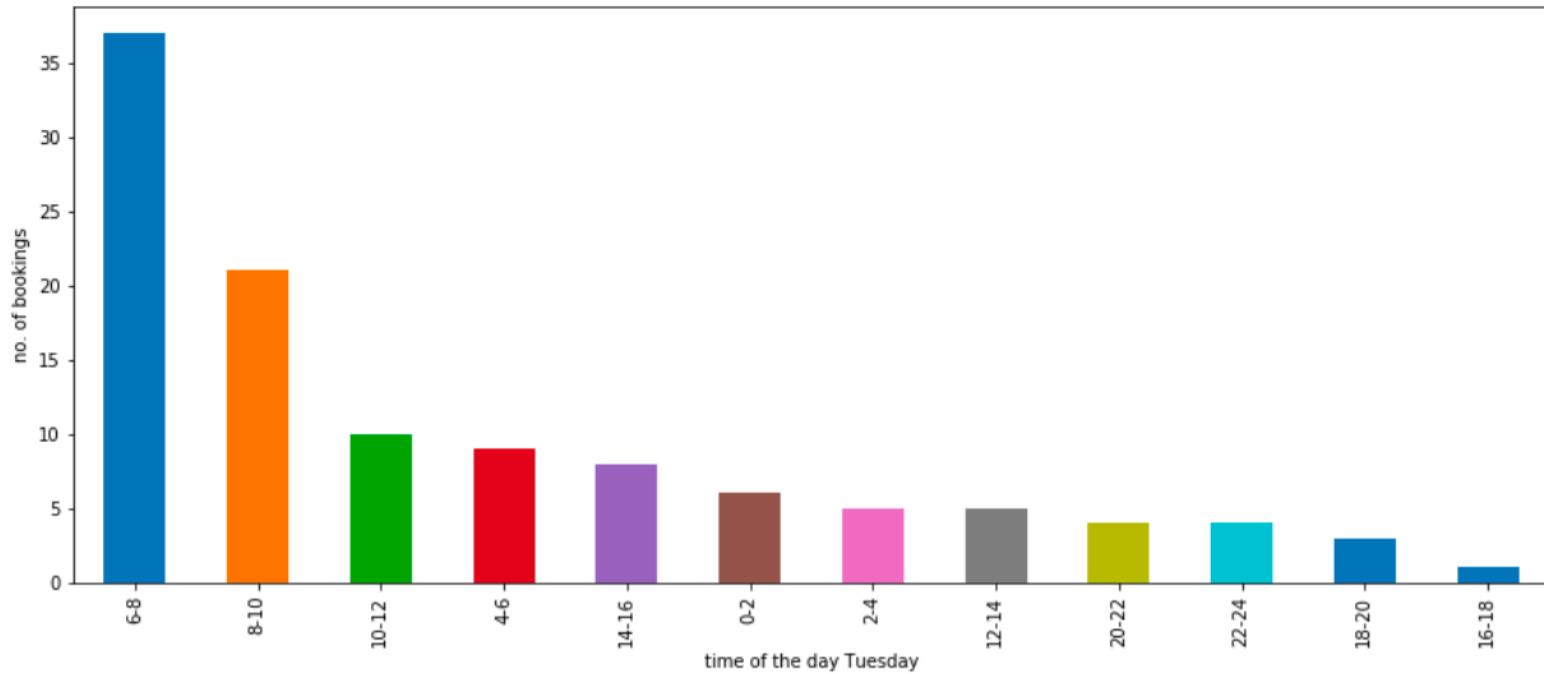


Here it can be seen that the area 393 that is international air port out performs all the other locations but it is also worth noting that the number of bookings are very less that is the maximum number of bookings are only 3. During 6-8 the bookings are distributed among areas and not concentrated.



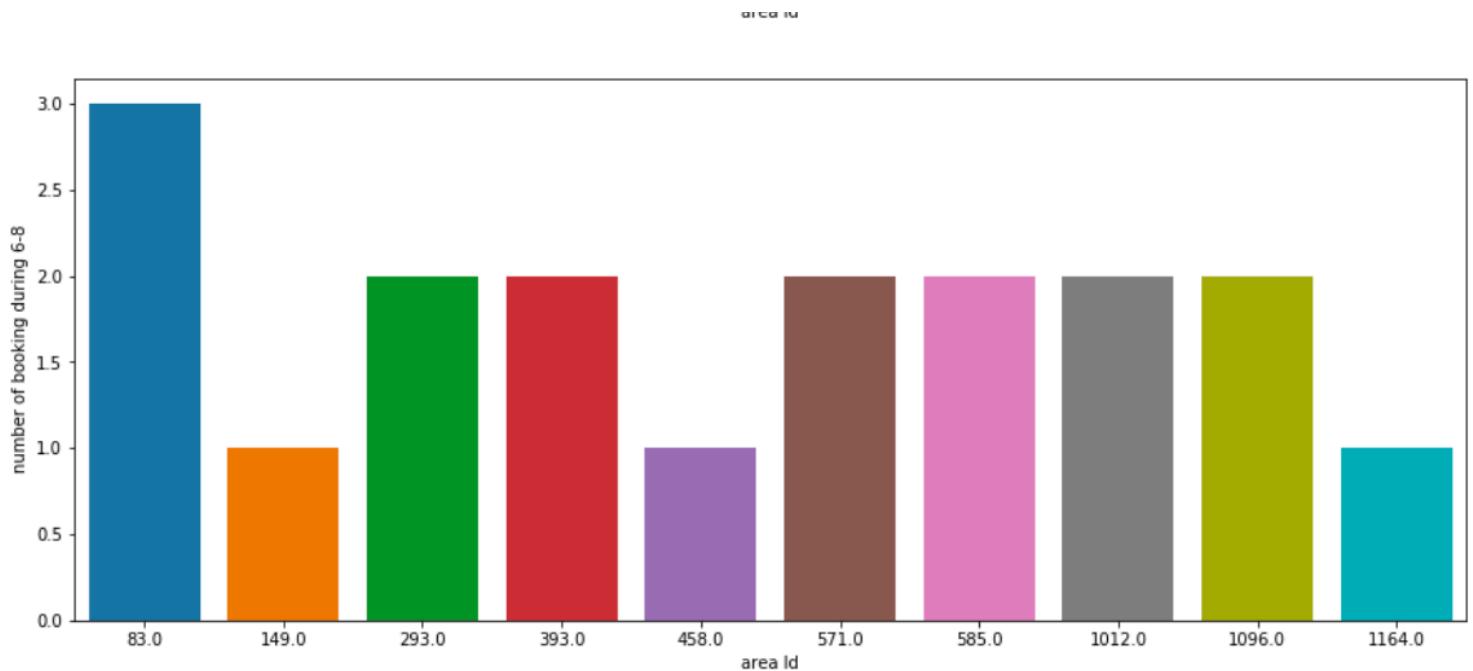
During 8-10 we can see that the bookings from the area 393 that is the **international airport** and the area 585 ie named **majestic** from area 585 bookings increased because it has a bus station and the inflow of buses increase from 8-10 A.M.

## Tuesday Analysis-

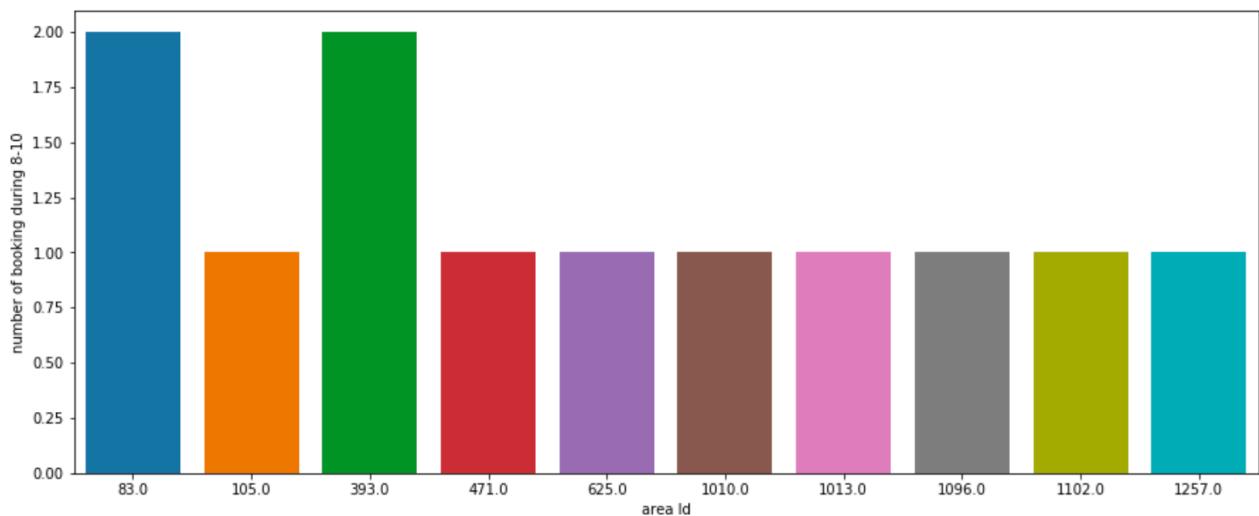


Following the same pattern as that of Monday the number of bookings are highest from 6-8

## Analysis of traffic for different hours of the day on Tuesday

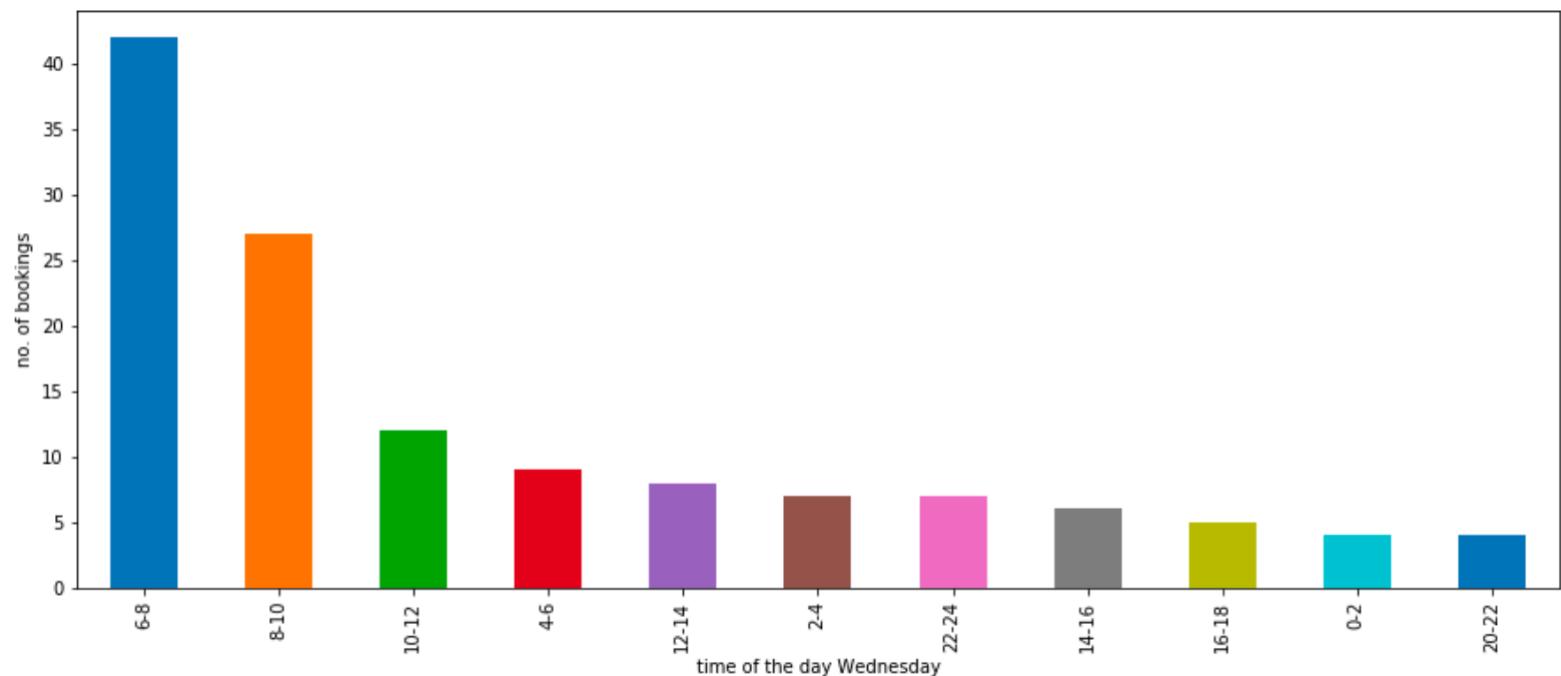


From the above graph of bookings from 6-8 we can see a new area code named **83** and there are same number of bookings that is the number of bookings are well distributed but they are less. Area 83 is **Bellandur** and this area has recently got a boom in the real estate market. Since population has recently increased hence number of bookings are high



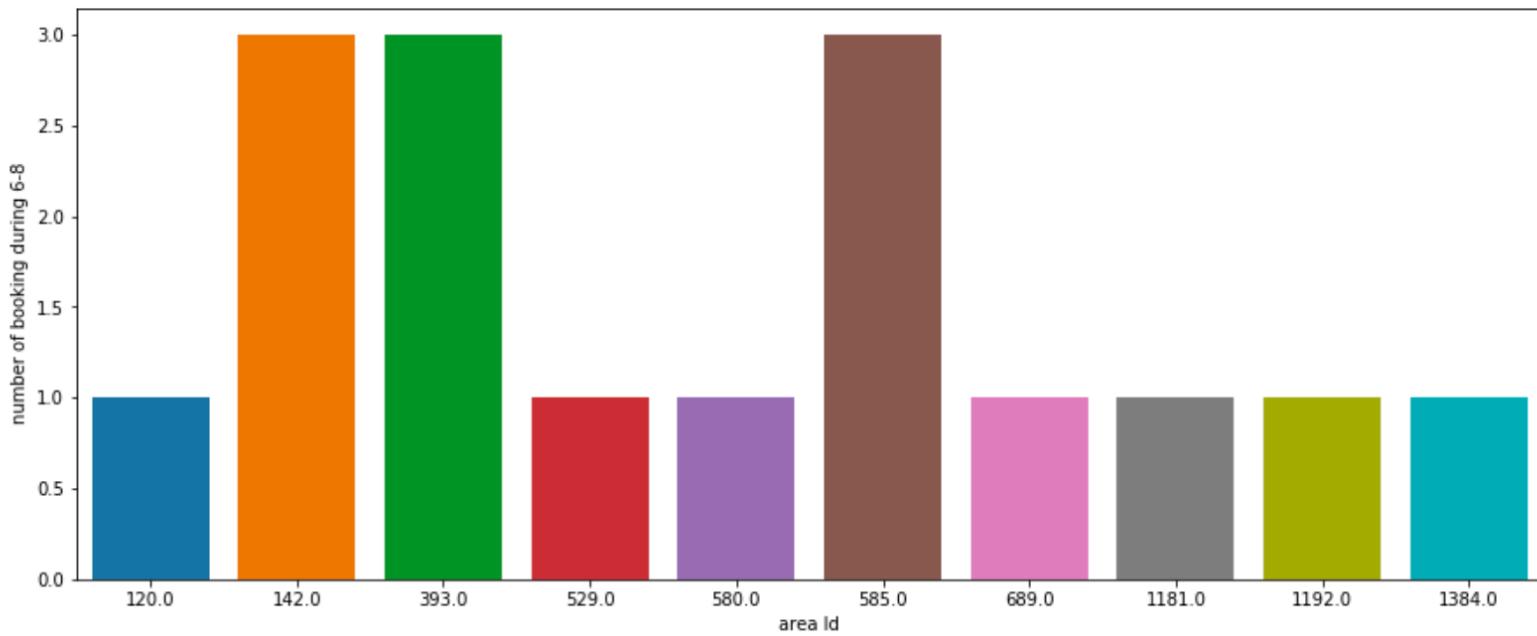
From the above graph it can again be seen that the two highest performer are Bellandur and international airport.

## Wednesday Analysis-



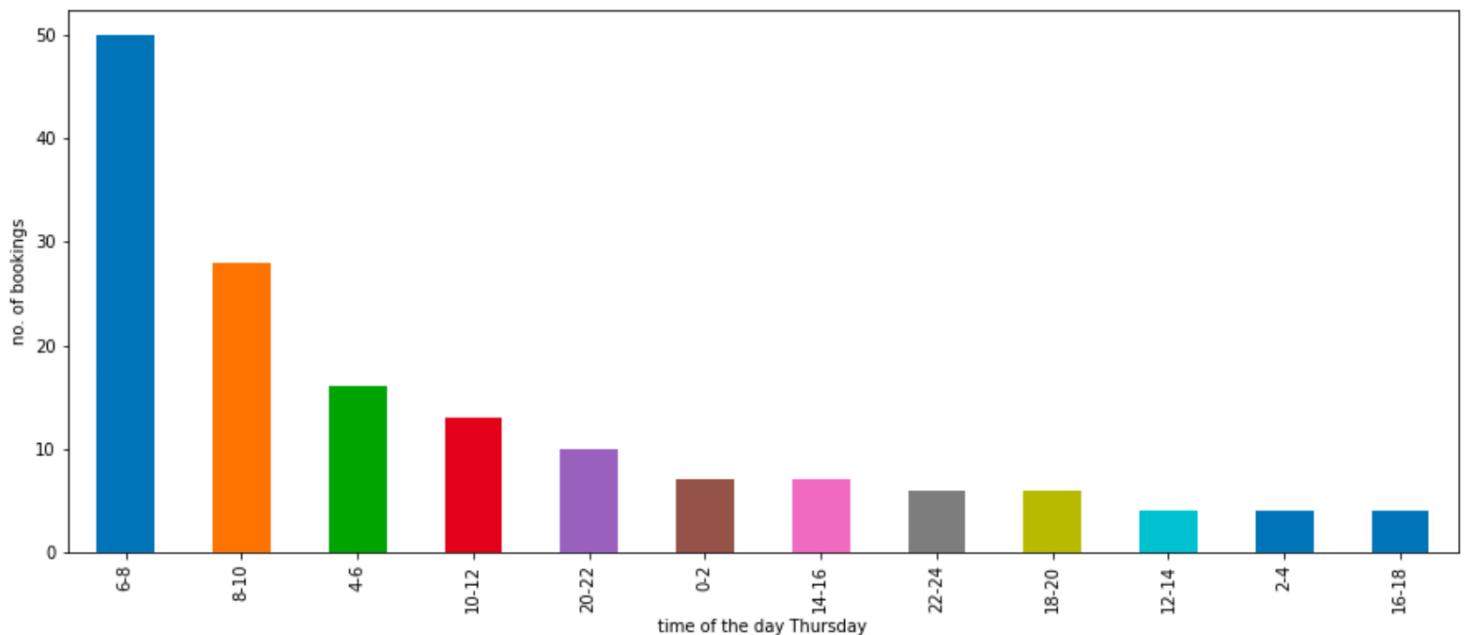
It can be seen from the above graph that most number of bookings happen from 6-8 in the morning

### Analysis of traffic for different hours of the day on Wednesday



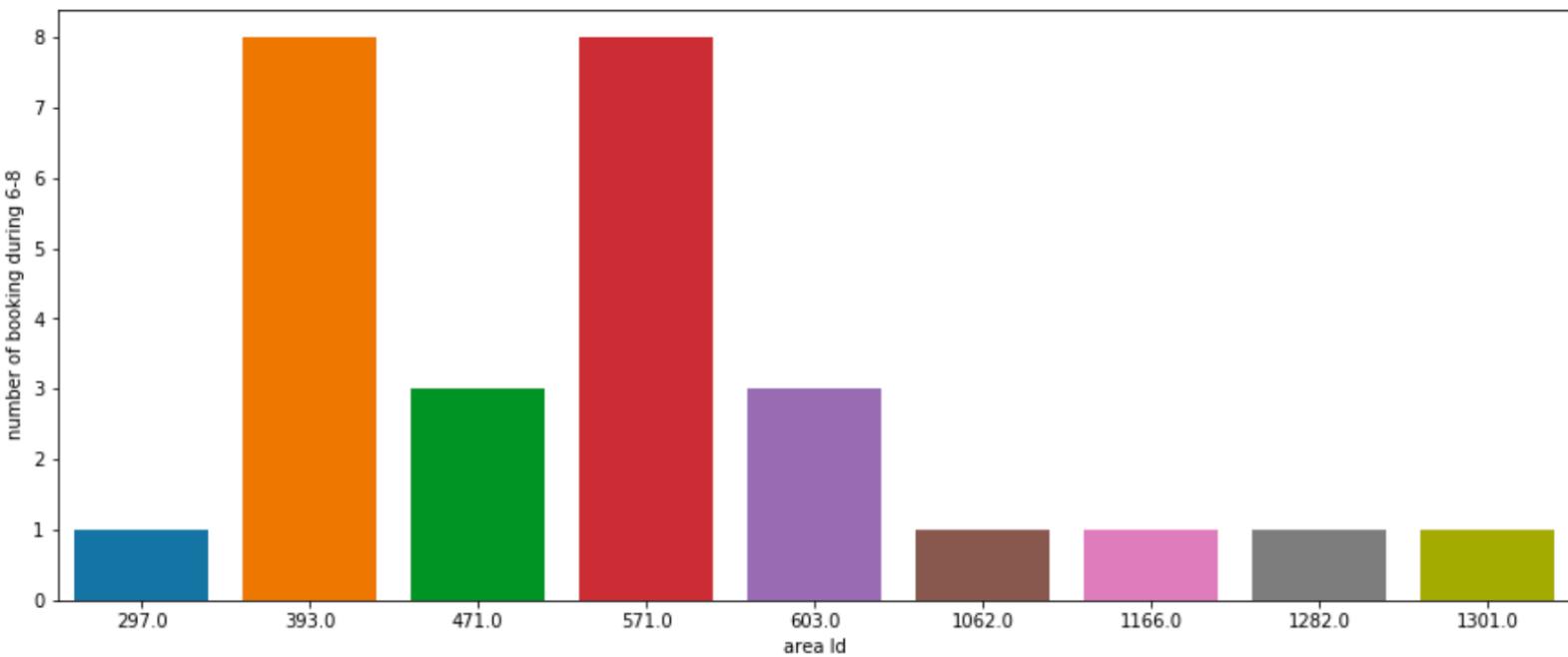
Here the most number of the bookings come from the **international airport** that is **393** bookings also come from **majestic bus stop** and on Wednesday we see a new area of booking that is 142 this is the **BTM Layout** since it is 11 km away from the city hence all the rides from here count as the long rides.

### Thursday Analysis-

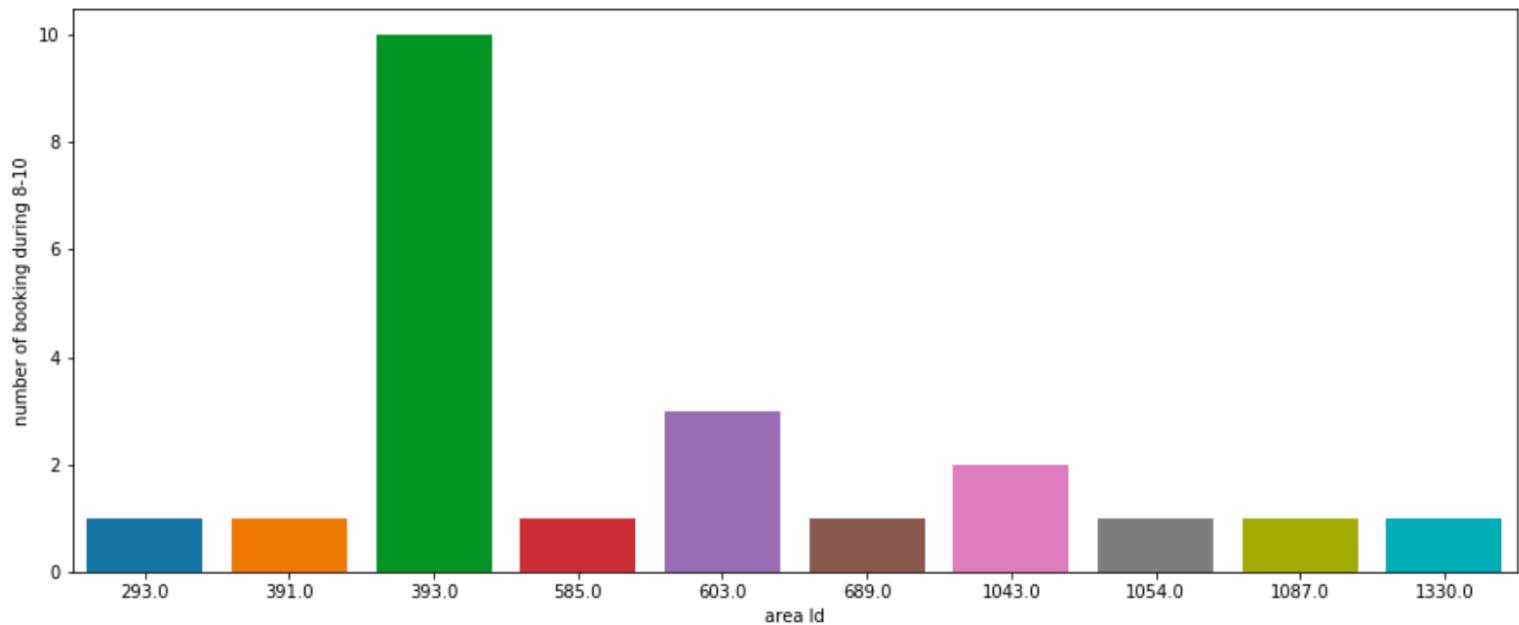


Same week day trend can again be seen in the Thursday that is most number of bookings come during the time period from 6-8 A.M.

### Analysis of traffic for different hours of the day on Thursday

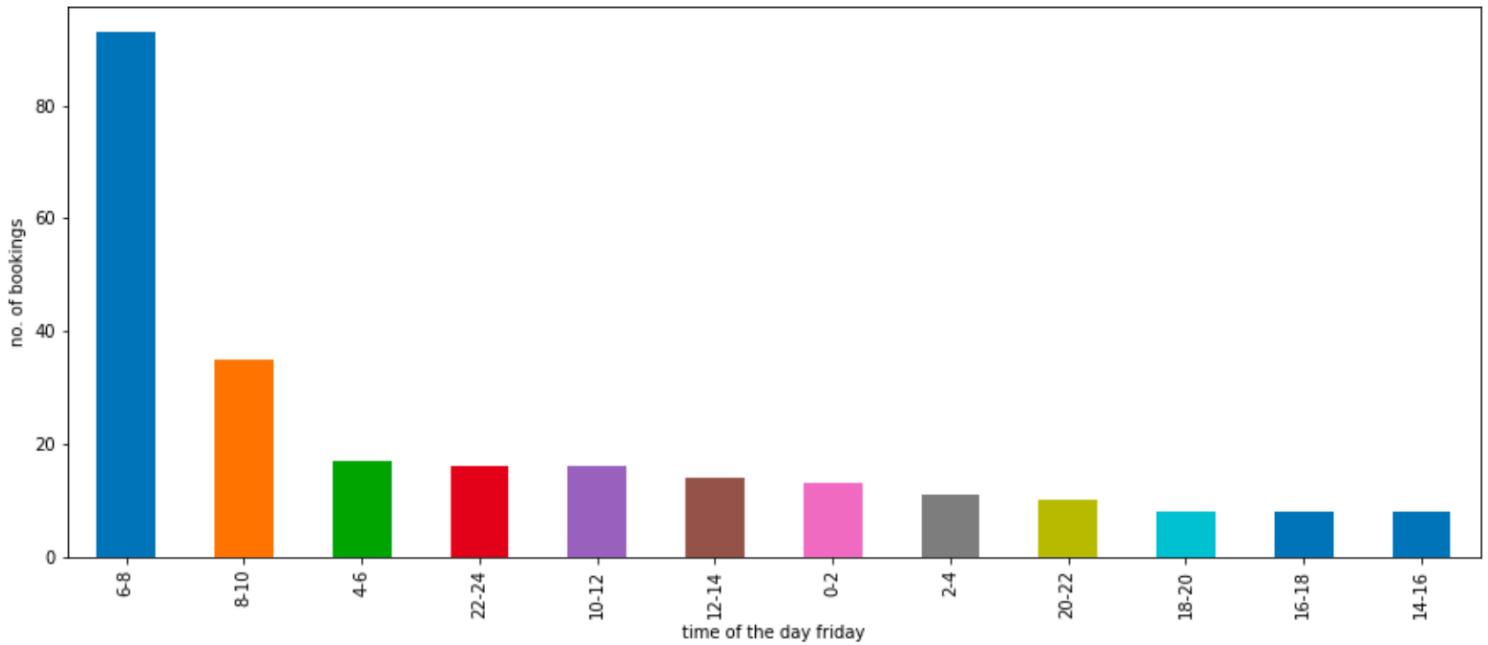


We can see that the most number of bookings come from the **international airport** and also from the area code 571 which is **Marathahalli** it is a major bus stop for long distance buses.



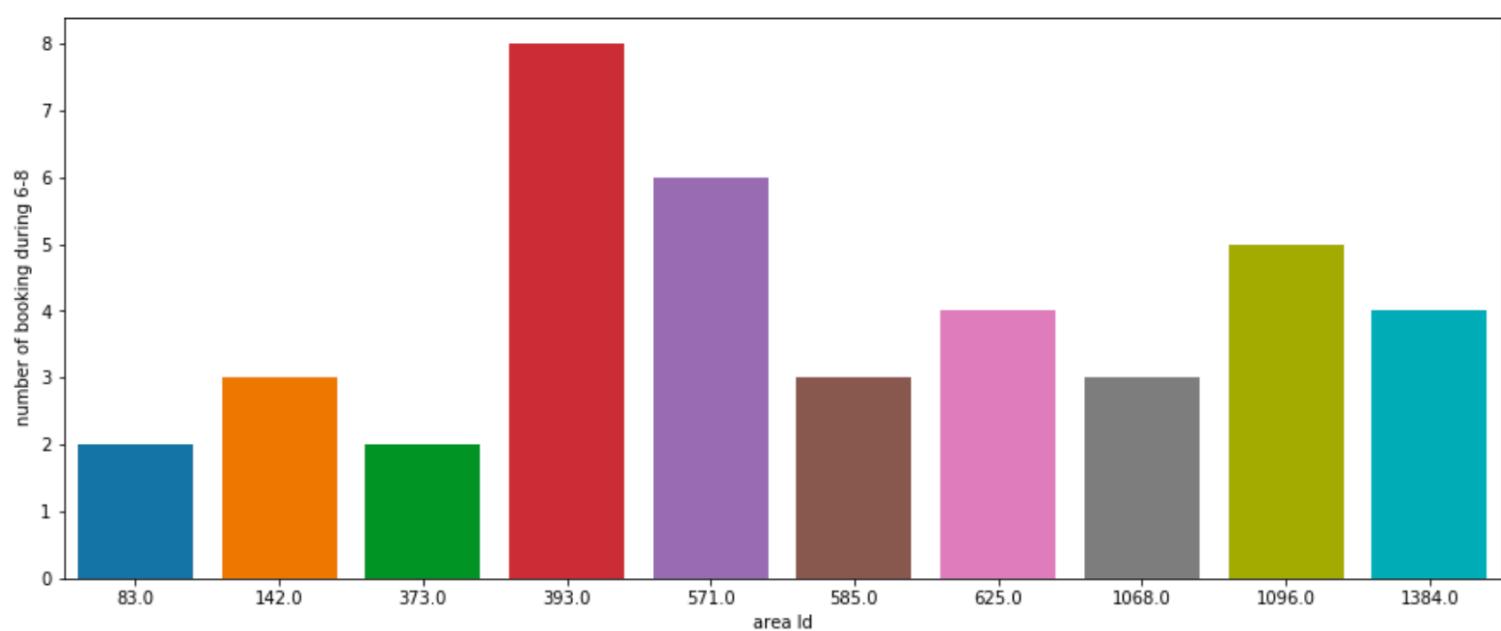
We can see that the bookings are concentrated in the international airport area.

## Friday Analysis

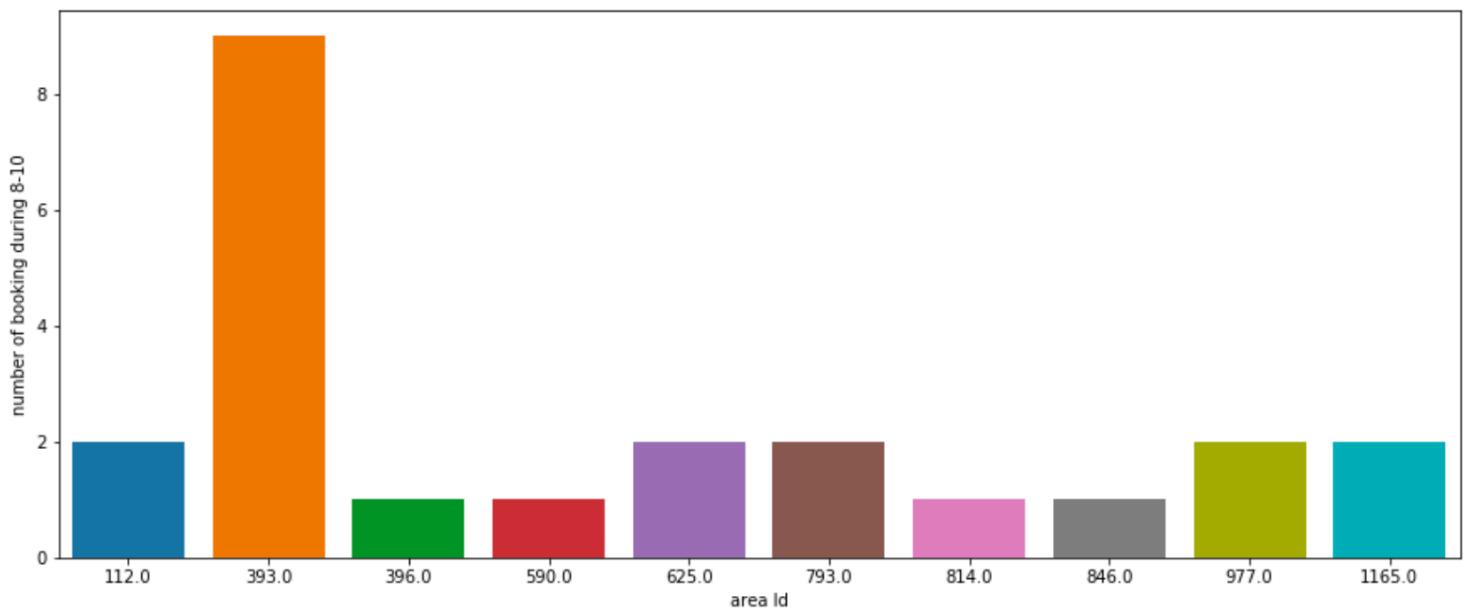


Same week day pattern is observed in here the maximum number of bookings come from 6-8 A.M.

## Analysis of traffic for different hours of the day on Friday

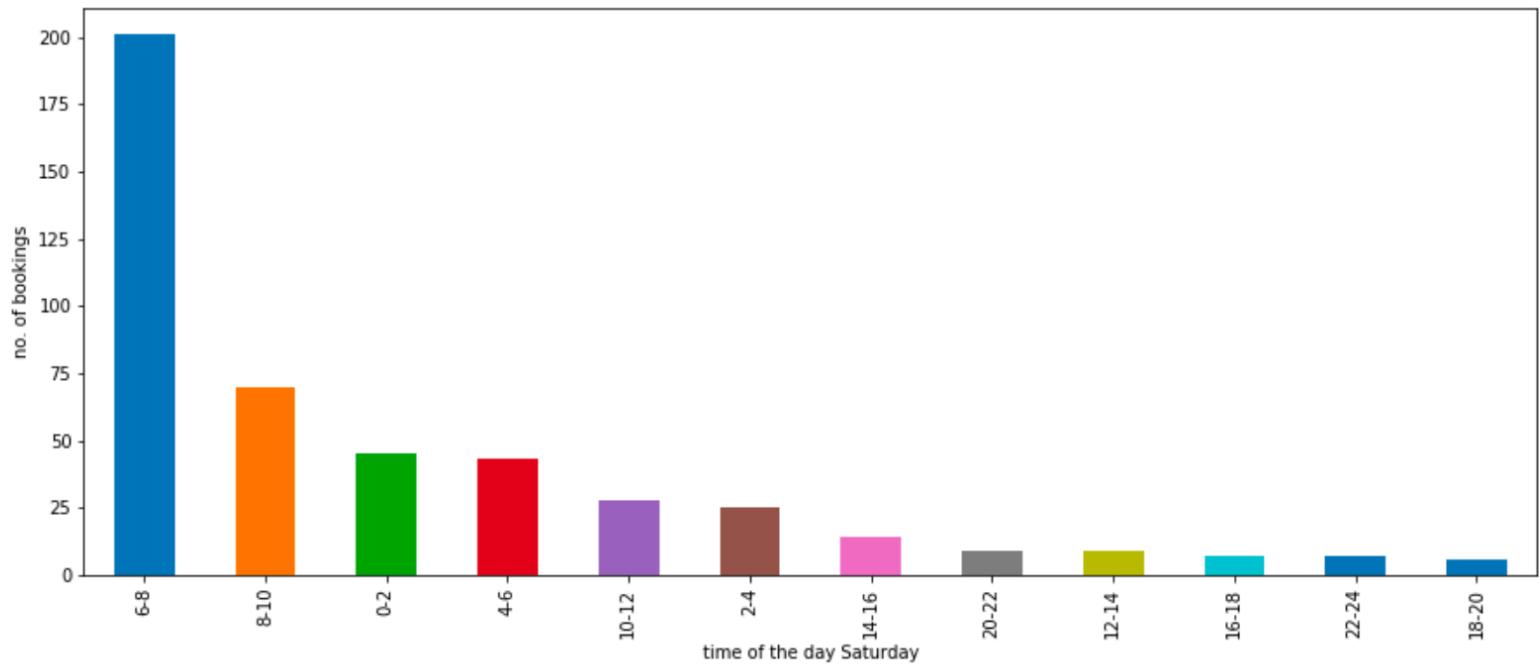


Quite opposite to the above trend here the traffic is concentrated in areas like **International Airport(393)**, **Marathahalli(571)**, **Murugeshpalya(625)** which was old IT hub.



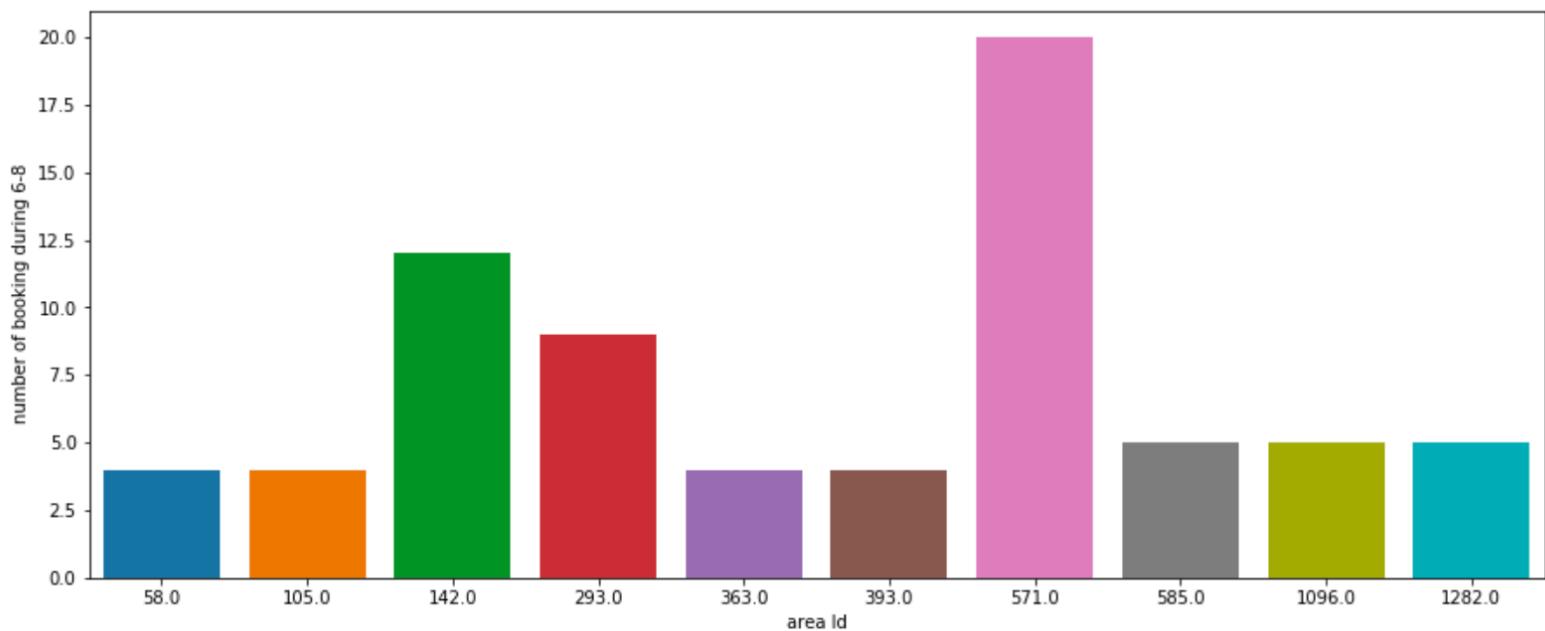
From the above graph we can see that from 8-10 only major bookings come from **International Airport Area**.

## Saturday Analysis-

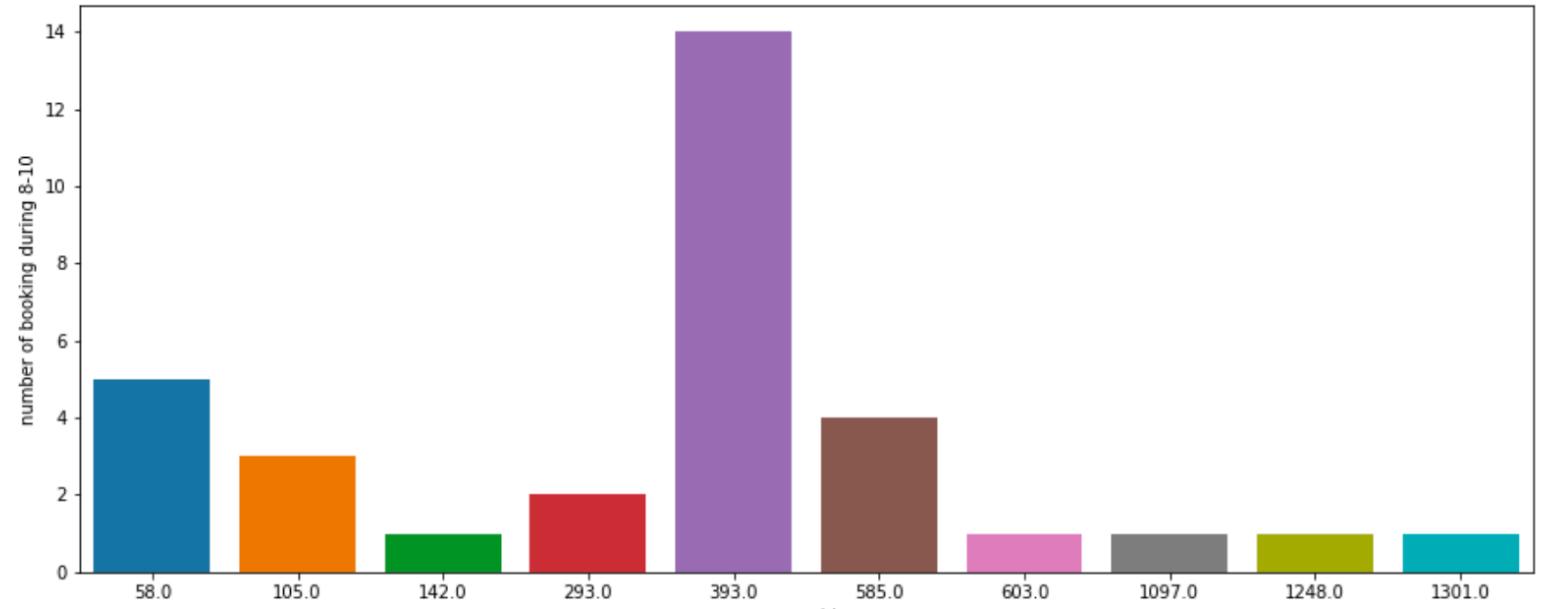


Number of bookings from 6-8 are quite high as opposed to the normal week day bookings the amount of bookings are high since the number of residents of Bangalore are also going out on vacation and tourists also increase.

### **Analysis of traffic for different hours of the day on Saturday**

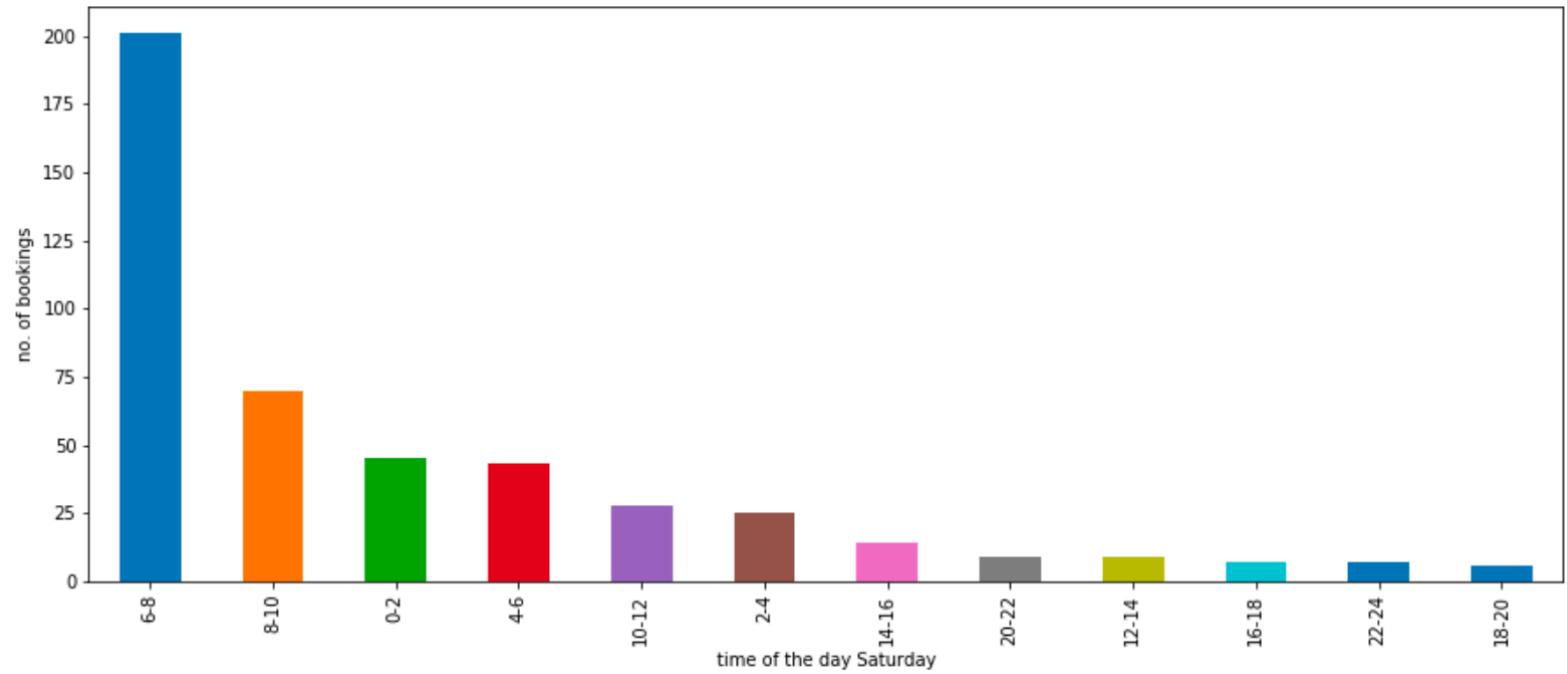


New areas of bookings have emerged **Marathahalli(571), BTM layout(142)** in this graph no bus station or airport can be seen because it many of the Bangalore residents are also going out for weekend.



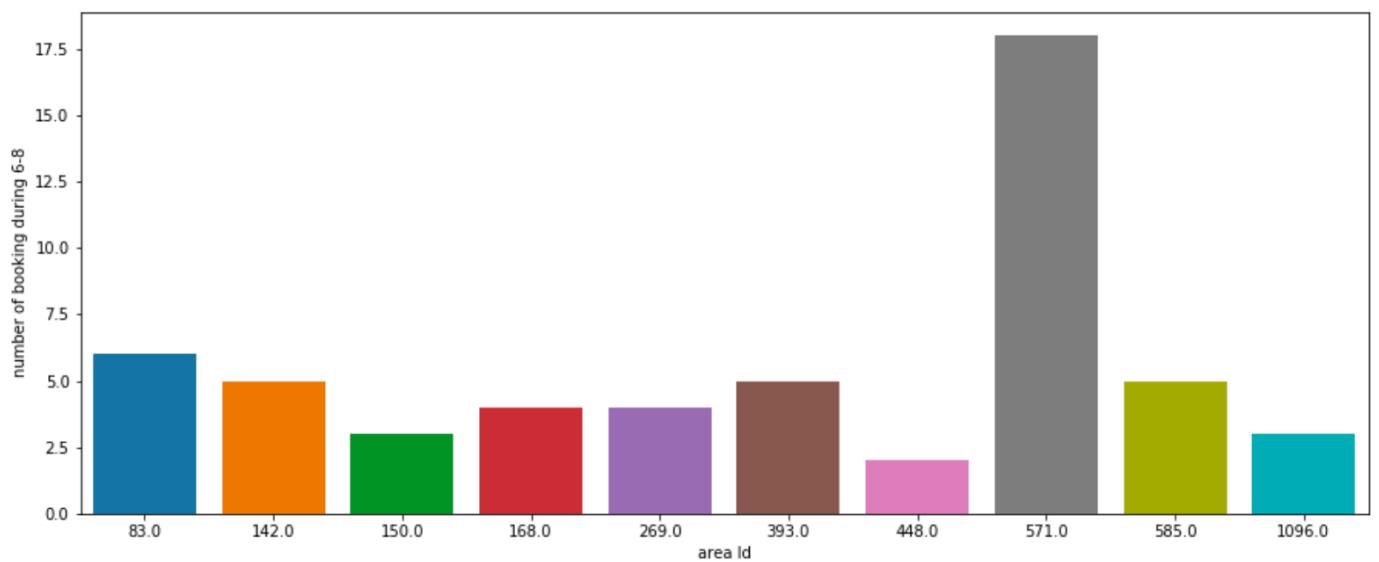
From the above graph it can be seen that the bookings from the airport again increase.

## Sunday Analysis-

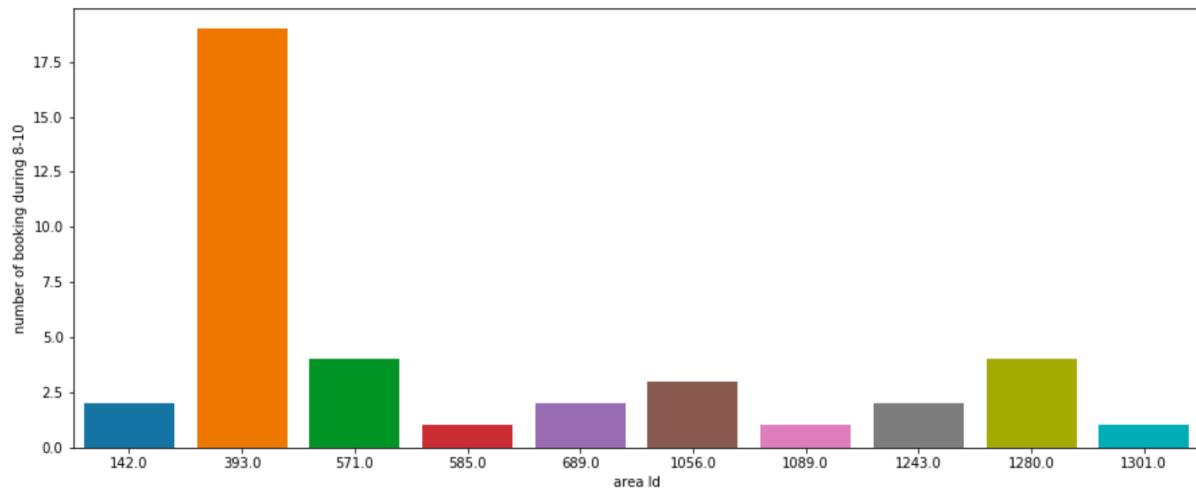


Same weekend Pattern Can be seen that the number of bookings are quite high.

## Analysis of traffic for different hours of the day on Sunday



Bookings from **Marathahalli** are quite high. From 6-8 AM.



Again the bookings from **International Airport** has increased.

## **SUMMARY OF LONG DISTANCE BOOKING-**

We can clearly see that as we approach the weekend the number of bookings increases.

The bookings increases because as we approach weekend the number of tourists arriving the city increase.

During the weekend the number of bookings increases a lot because even the residents of the Bangalore go out on a vacation.

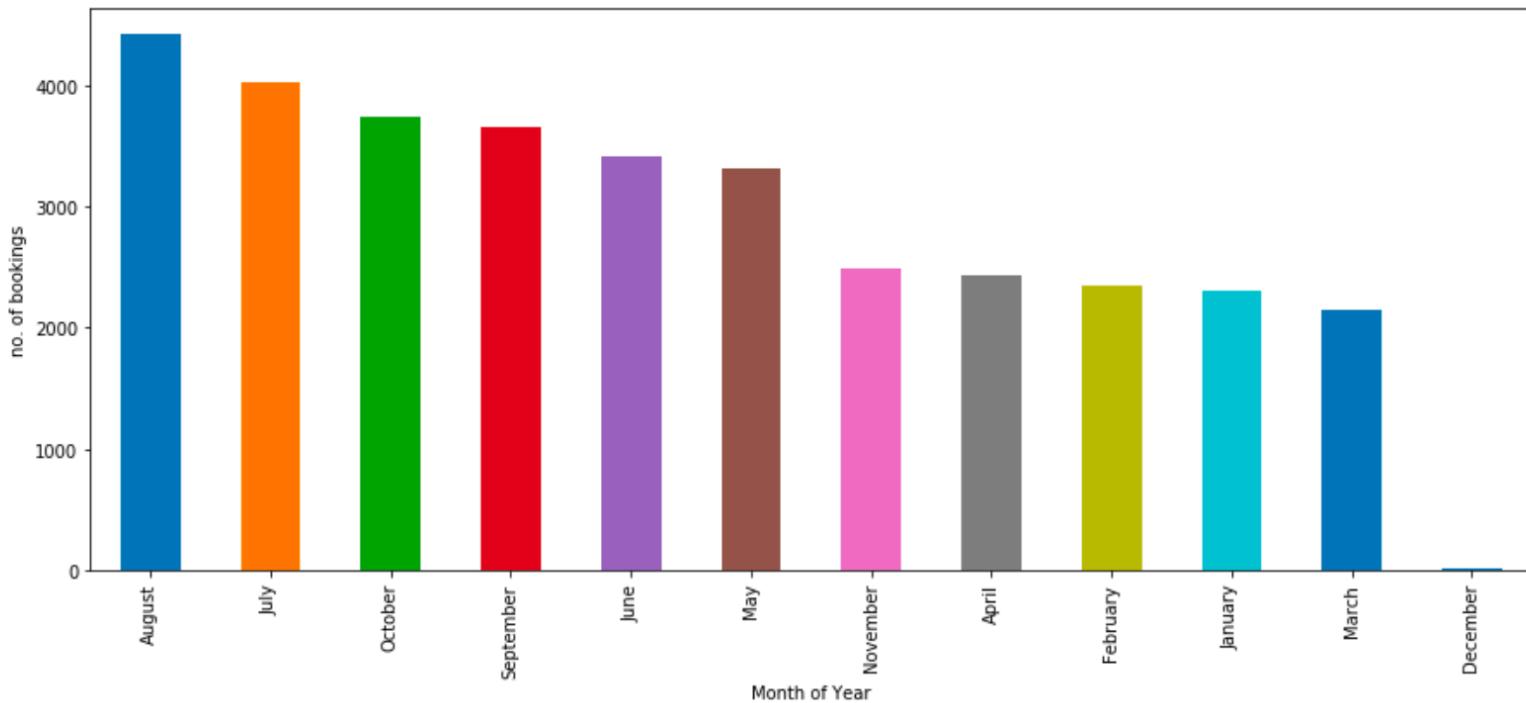
## **PLAN TO INCREASE THE BOOKINGS-**

In order to increase the long distance bookings we must place the drivers strategically in the places where demand is high. We must tell the drivers in advance in which area of the city at what time they will get maximum benefit. Which can be found out by the graphs shown above.

## **POINT TO POINT TRAVEL**

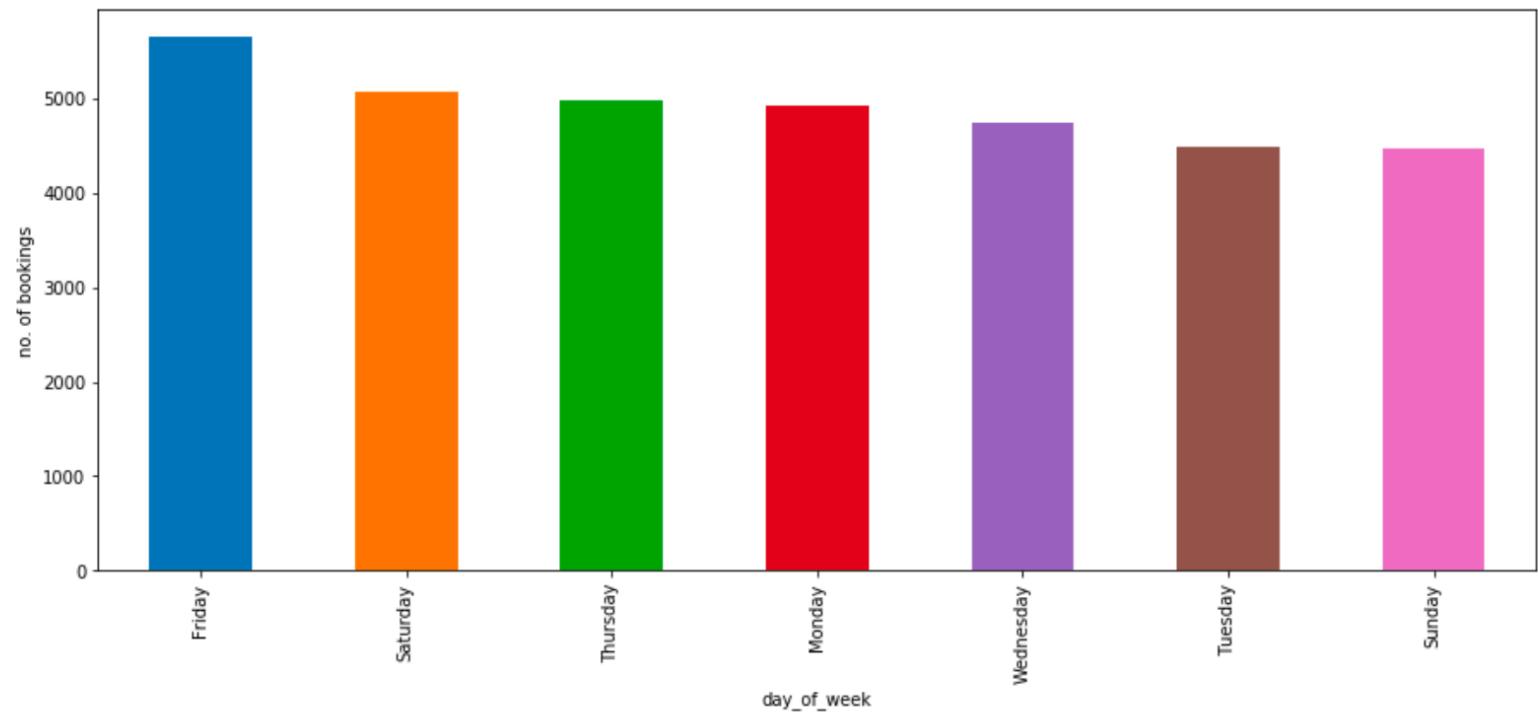
Point to point travel is mostly used by the residents of the Bangalore who have to go to office point to point travel is also used by the people arriving to the airport and have to go to the nearby hotel.

### **Month of the Year Analysis-**



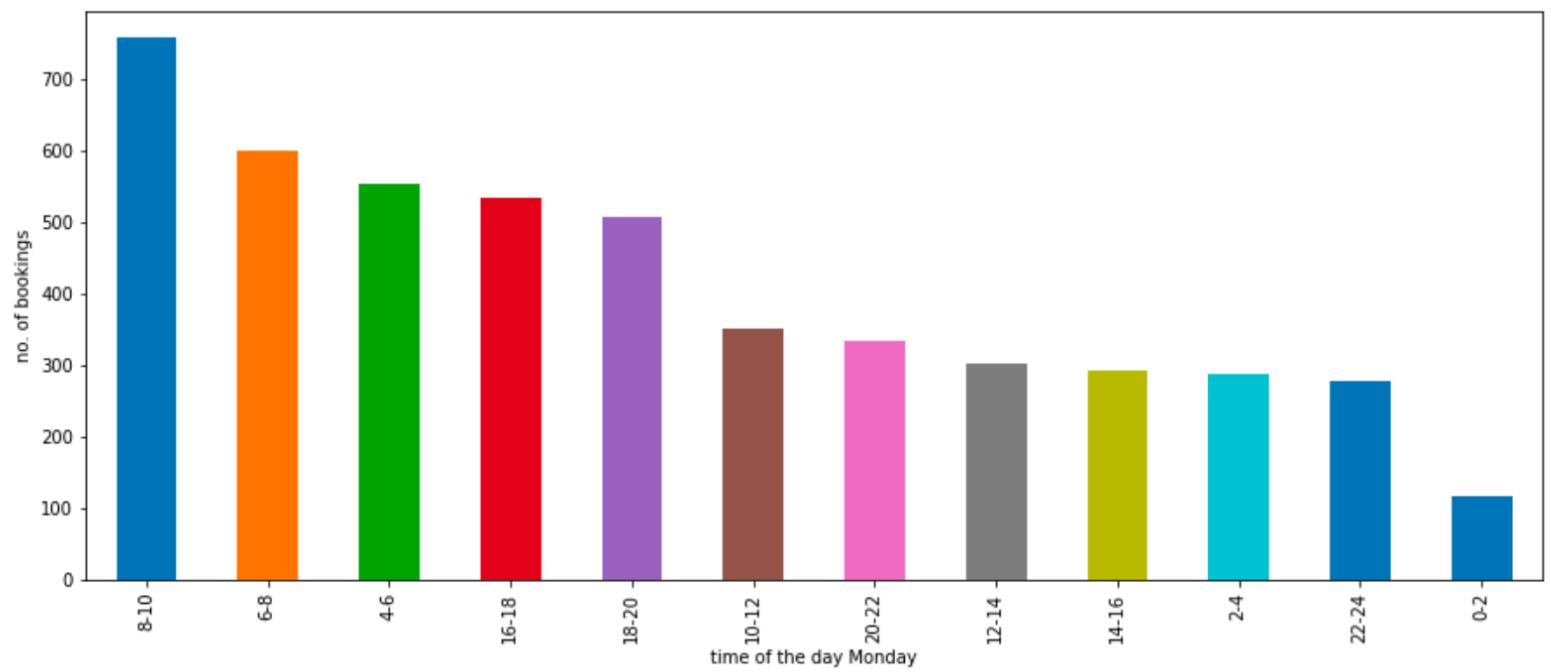
From the above graph it can be seen that the number of bookings in the month of December decline very much according to me this is due to the lack of data or because most of the people in Bangalore go on a vacation.

## Day of the week Analysis-



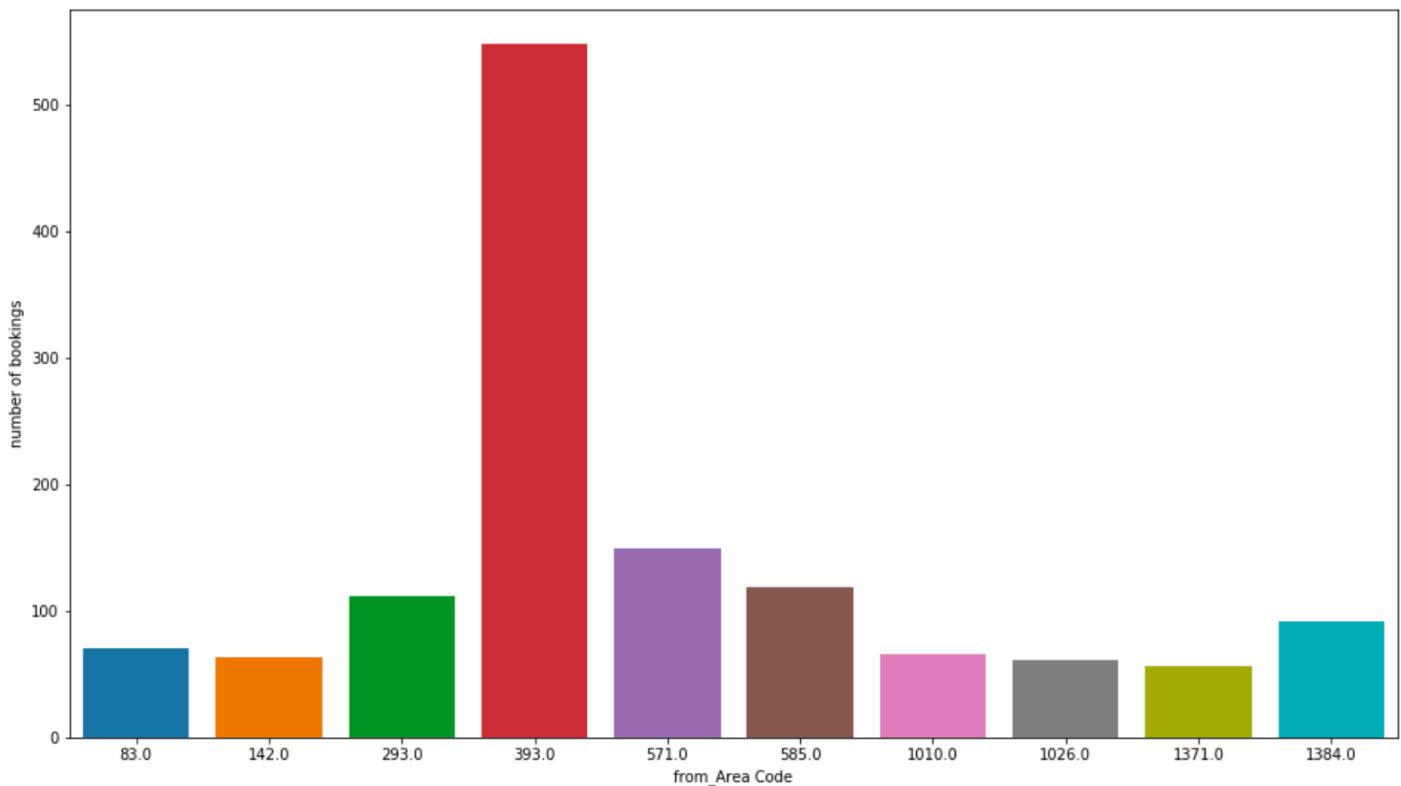
The number of bookings remains almost constant throughout the week.

## Monday Analysis-



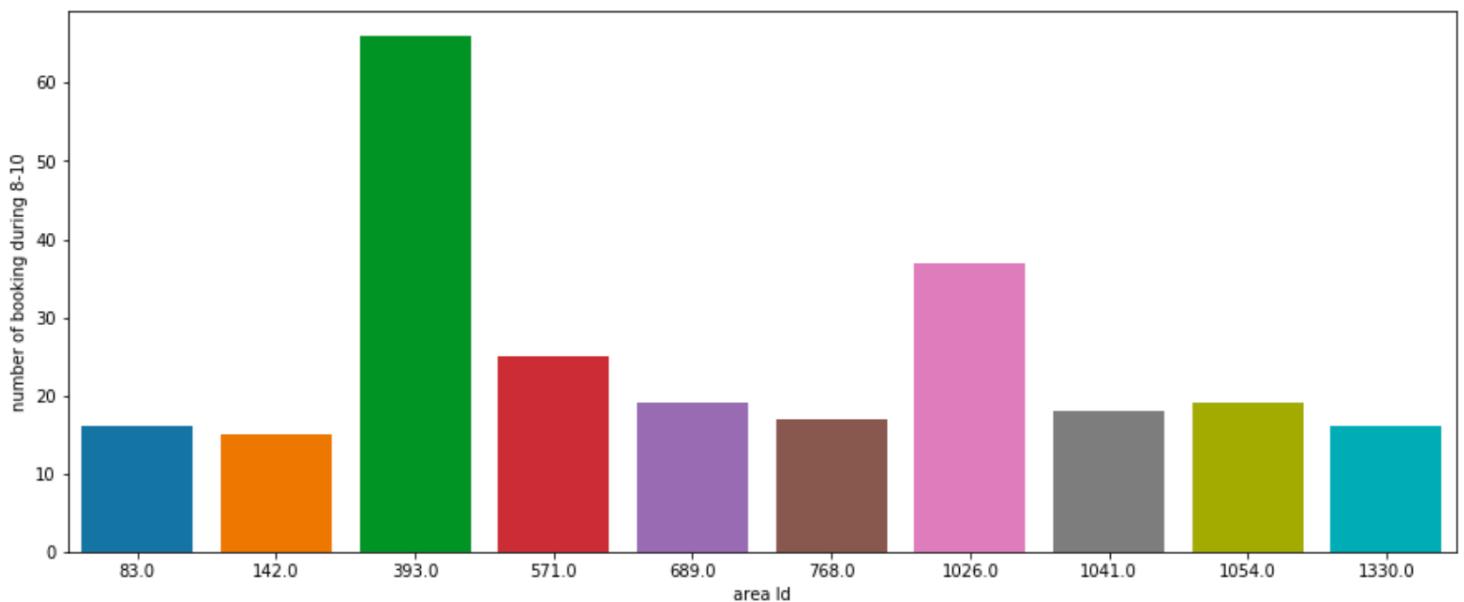
Number of bookings on 8-10 are the highest. In order to analyse the bookings in the morning and evening we will analyse the bookings on 8-10 and 16-18 because usually office hours lie in that period only.

## Area Wise Analysis-



Despite the number of residents taking cabs most number of bookings happens from the international airport.

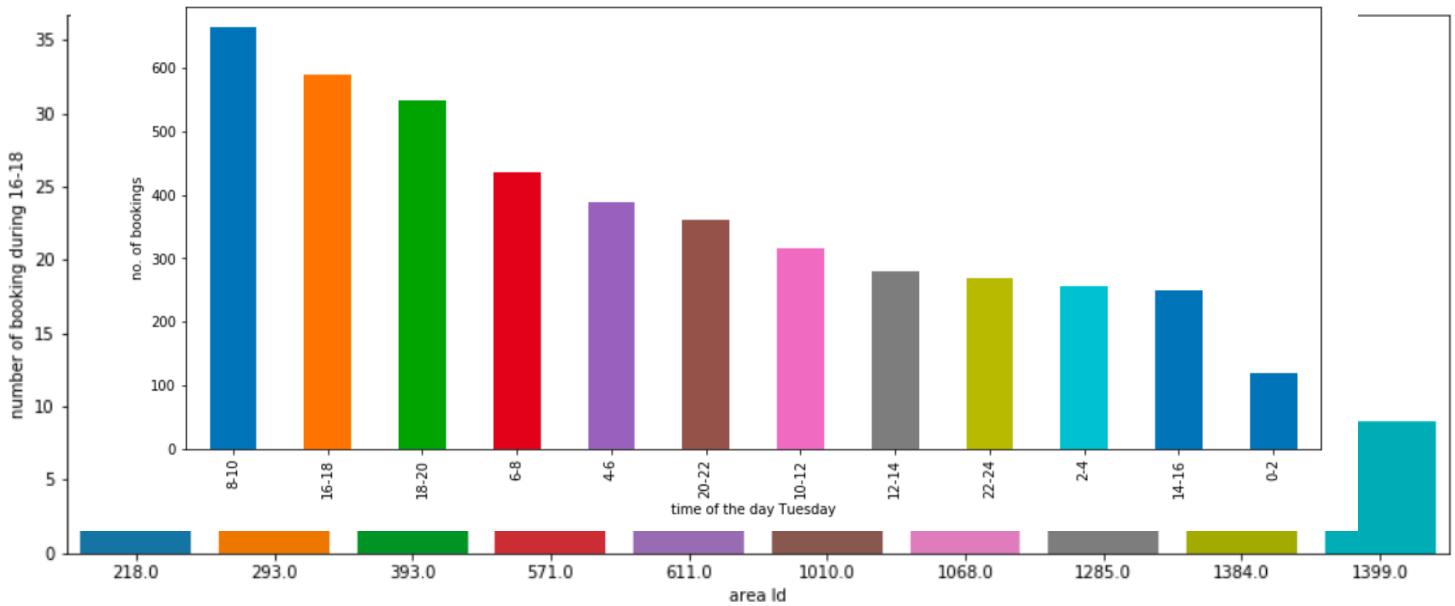
## Analysis of traffic for different hours of the day on Monday



For the time period of 8-10 AM most of the booking is done from the **airport area and Yelahanka(1026)** Yelahanka is one of the oldest locality of the Bangalore. Since 8-10 is the office going hours most of the bookings are either from airport or from the residential area.

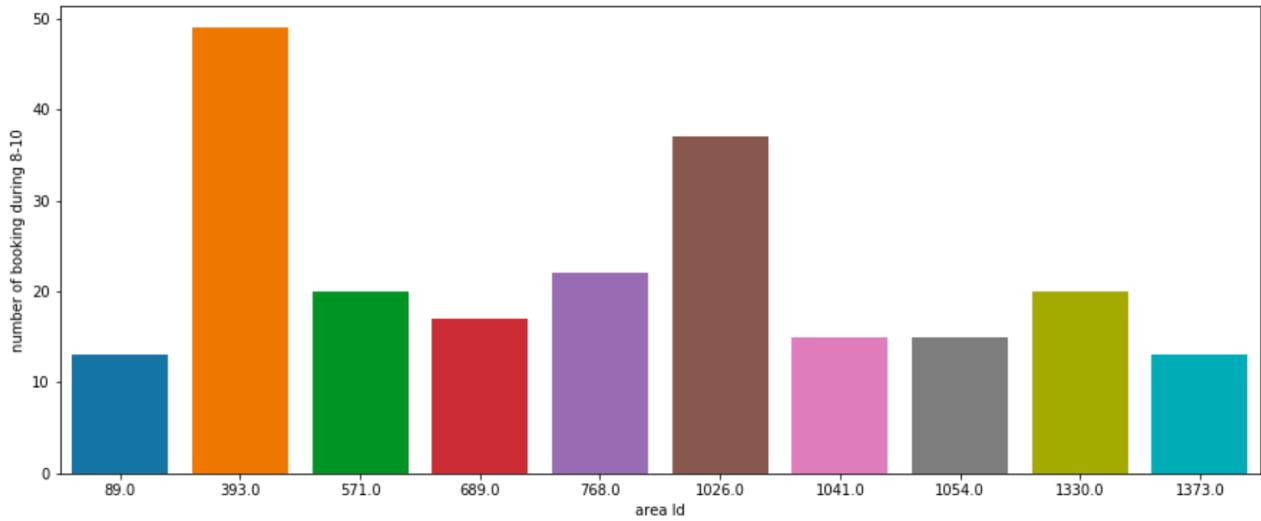
For the time of 4-6P.M. most of the bookings are from **electronic city(293)** since these are office over hours and most of the people are going to Home.

## Tuesday Analysis-

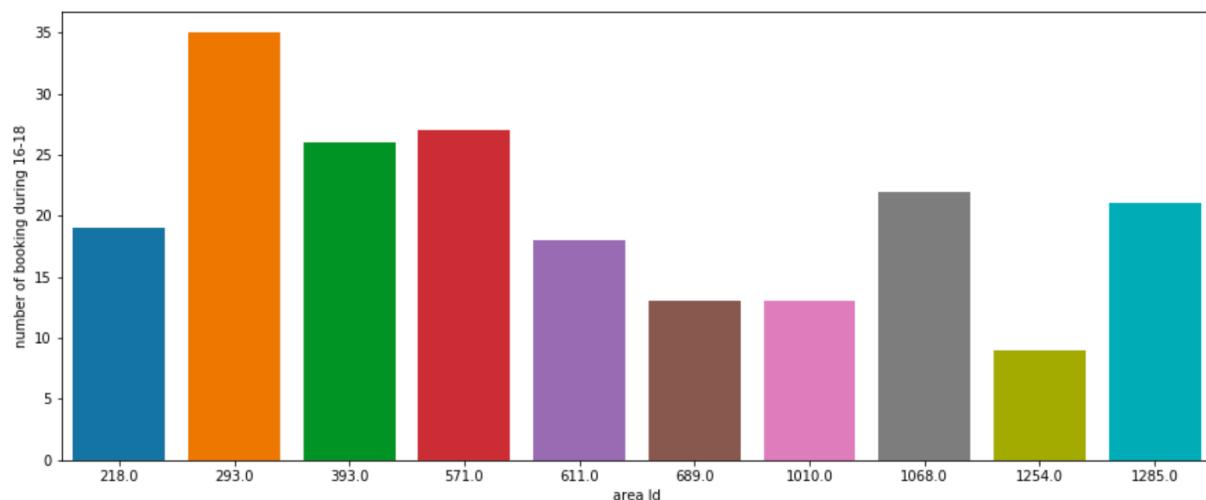


Here we can see that most of the bookings are done for the time interval 8-10 AM which is the time when most of the people go to office and for 4-6 PM which is the time when most of the people leave office.

### Analysis of traffic for different hours of the day on Tuesday-

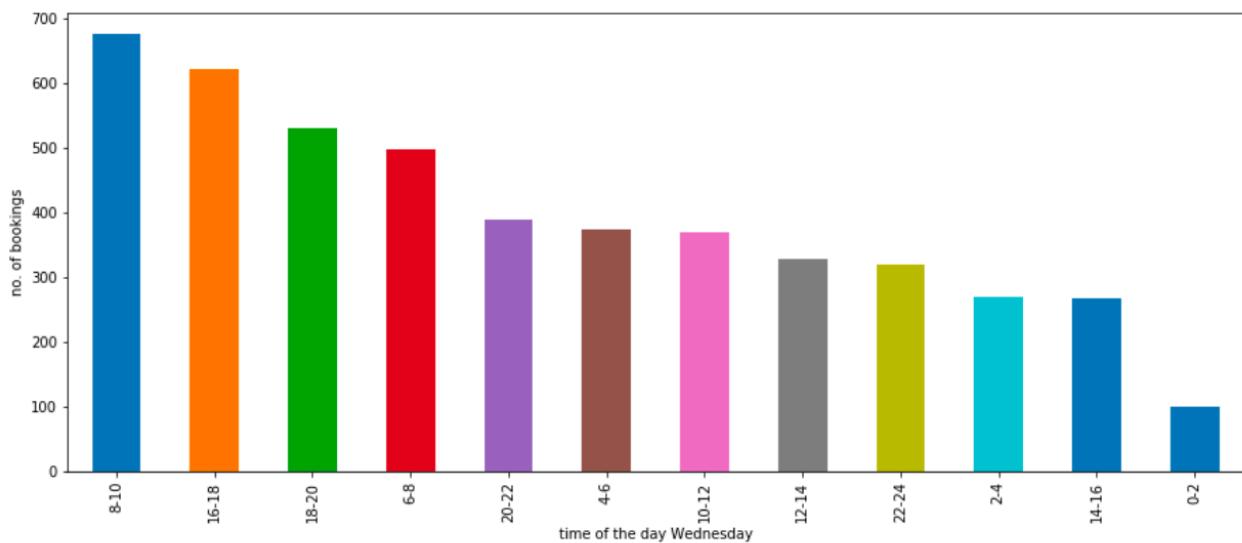


For the time period of 8-10 AM most of the booking is done from the **airport area(393) and Yelahanka(1026)** Yelahanka is one of the oldest locality of the Bangalore. Since 8-10 is the office going hours most of the bookings are either from airport or from the residential area.



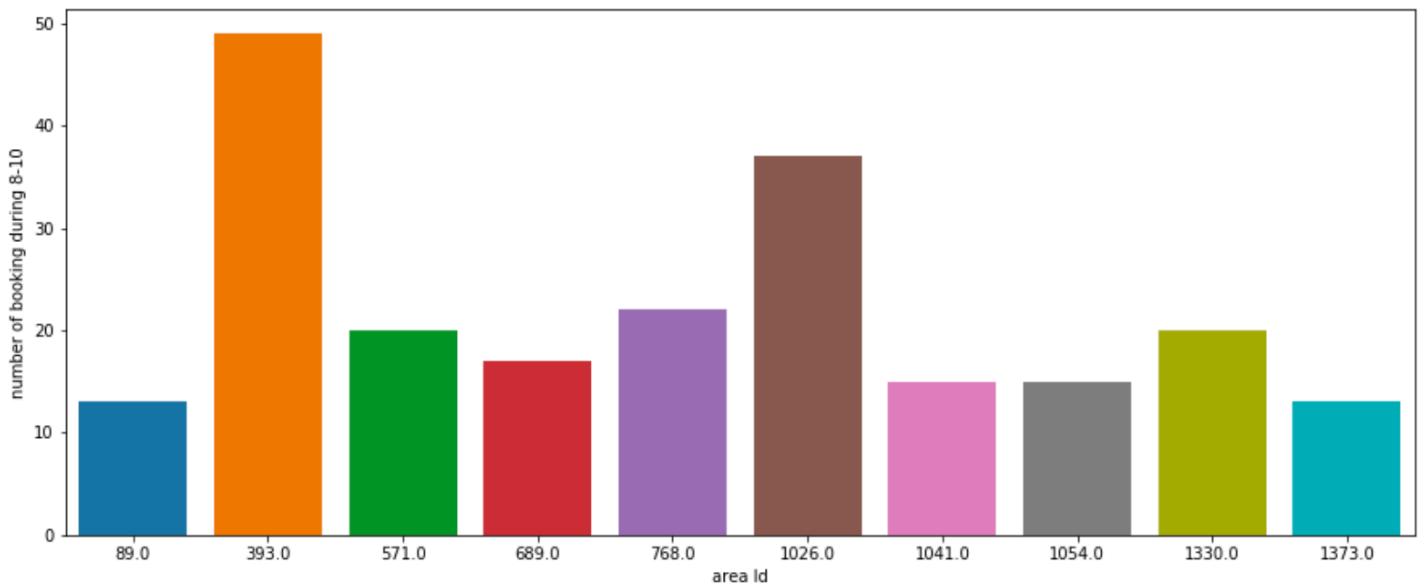
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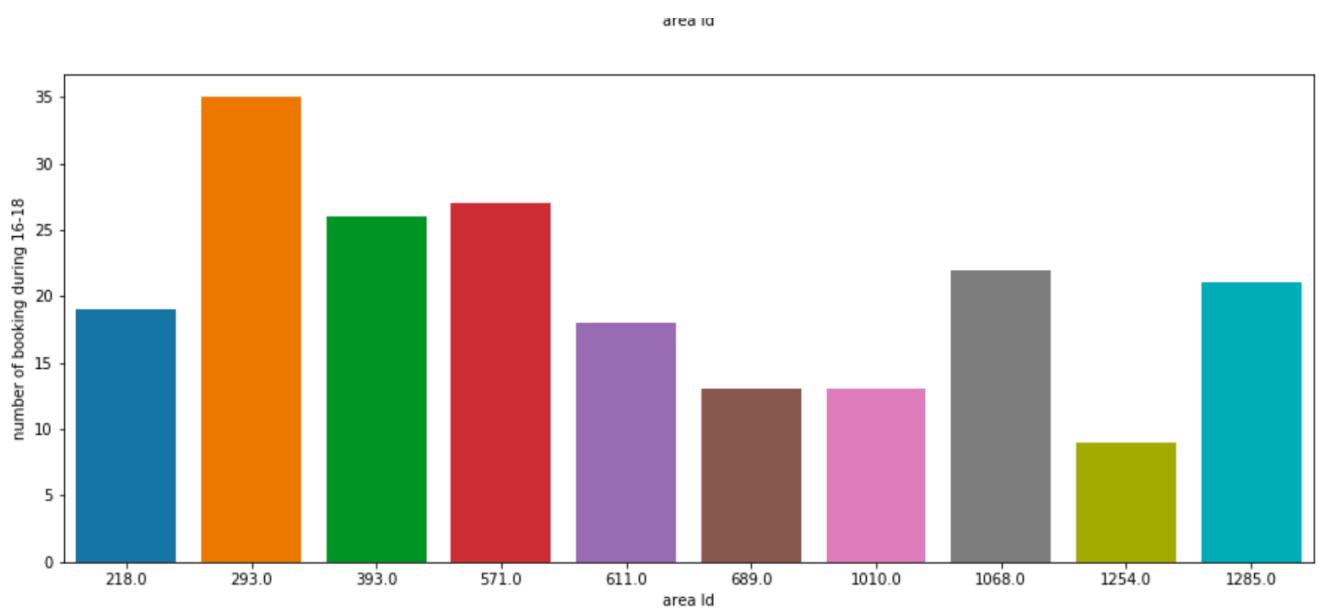


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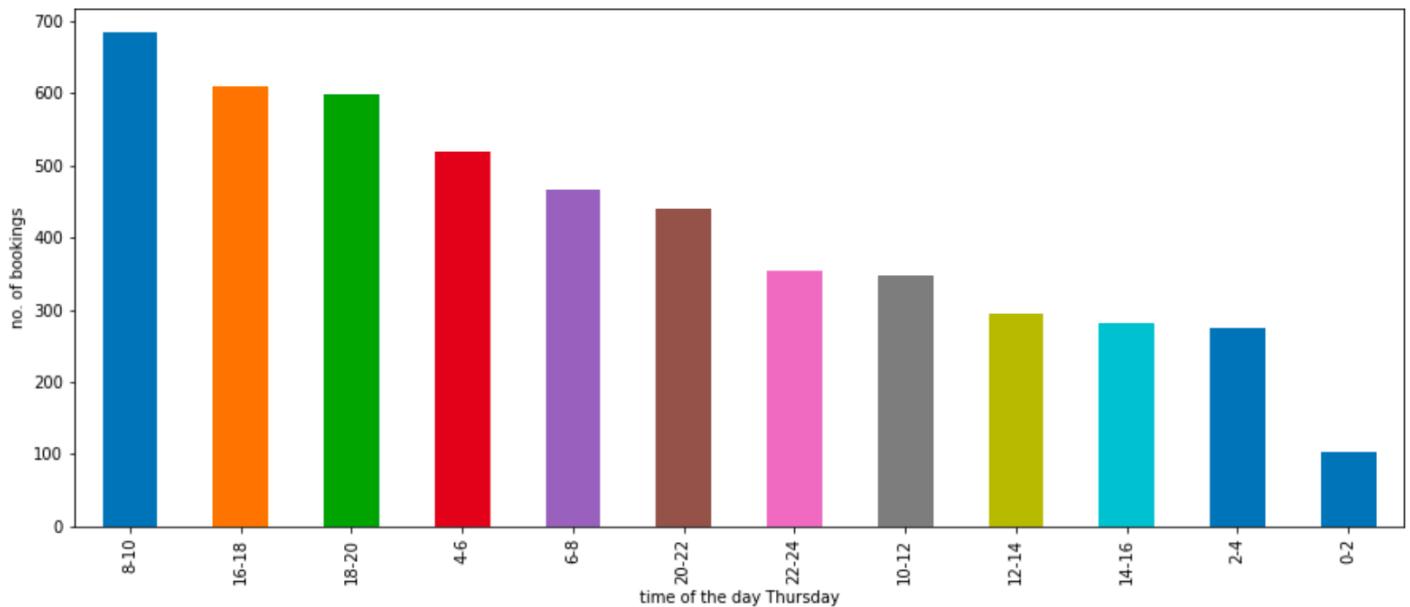


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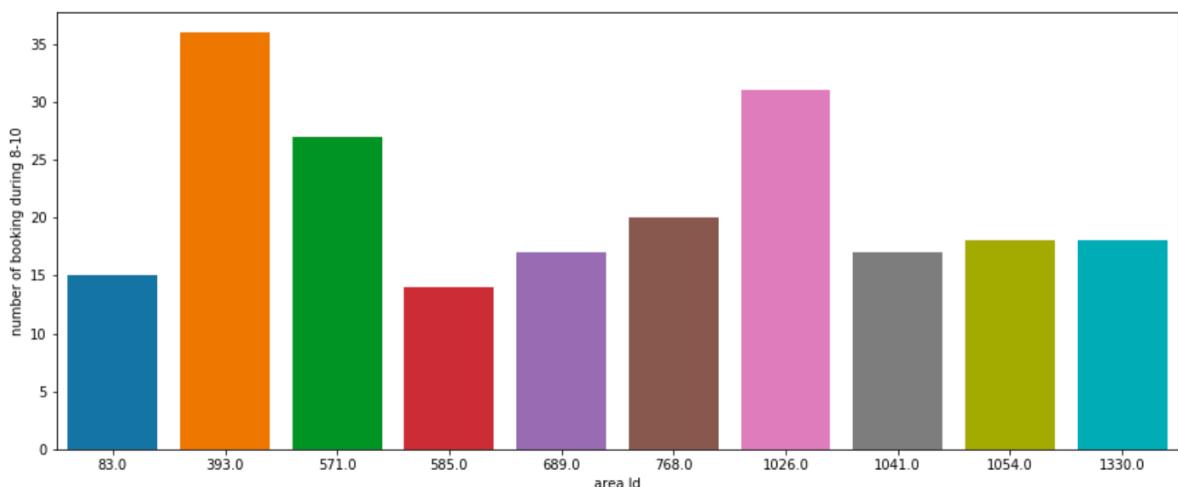
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## Thursday Analysis-

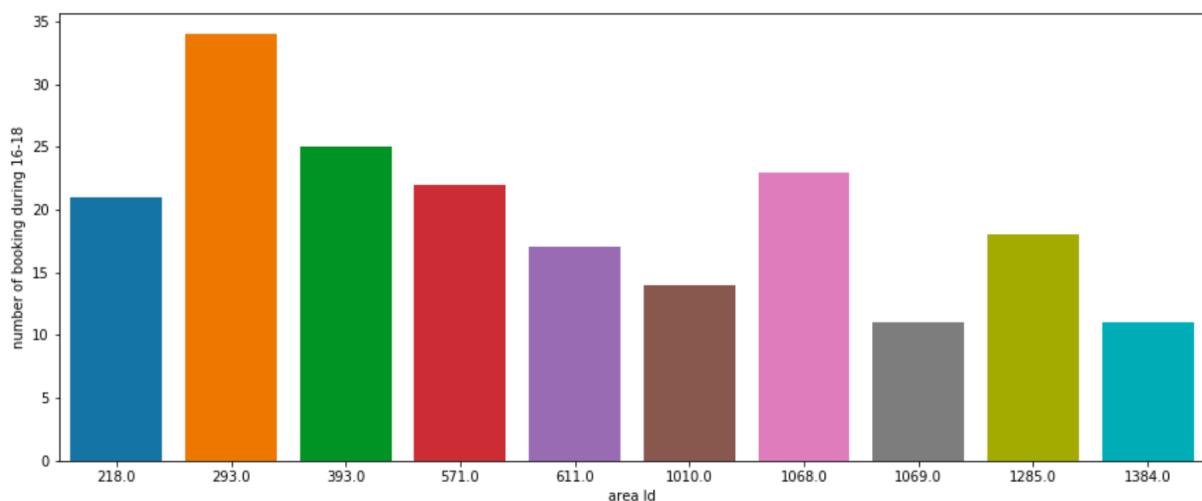


Following the same week day pattern we can see that most of the bookings are done for the time interval 8-10 AM which is the time when most of the people go to office and for 4-6 PM which is the time when most of the people leave office.

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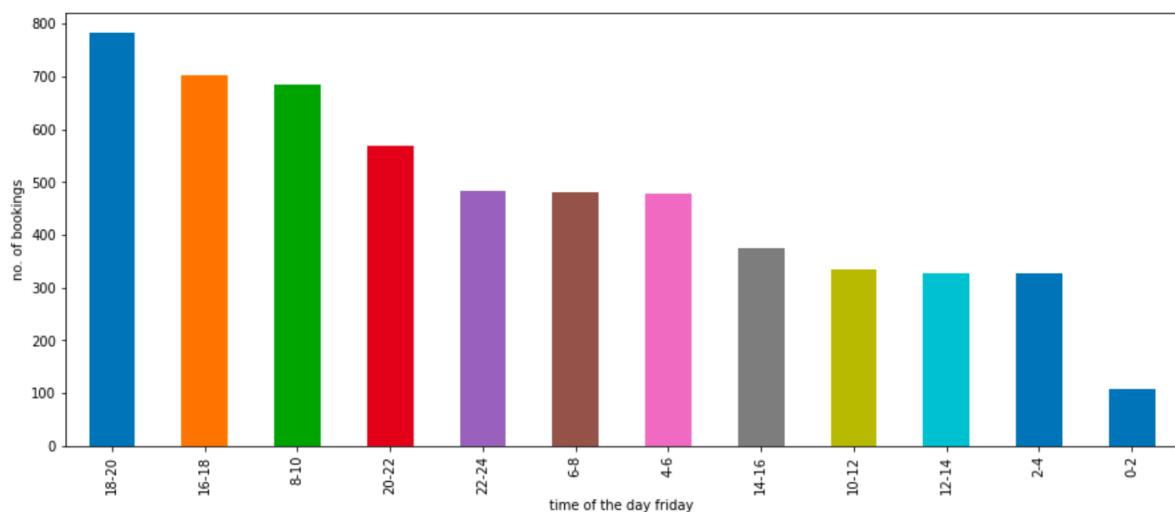


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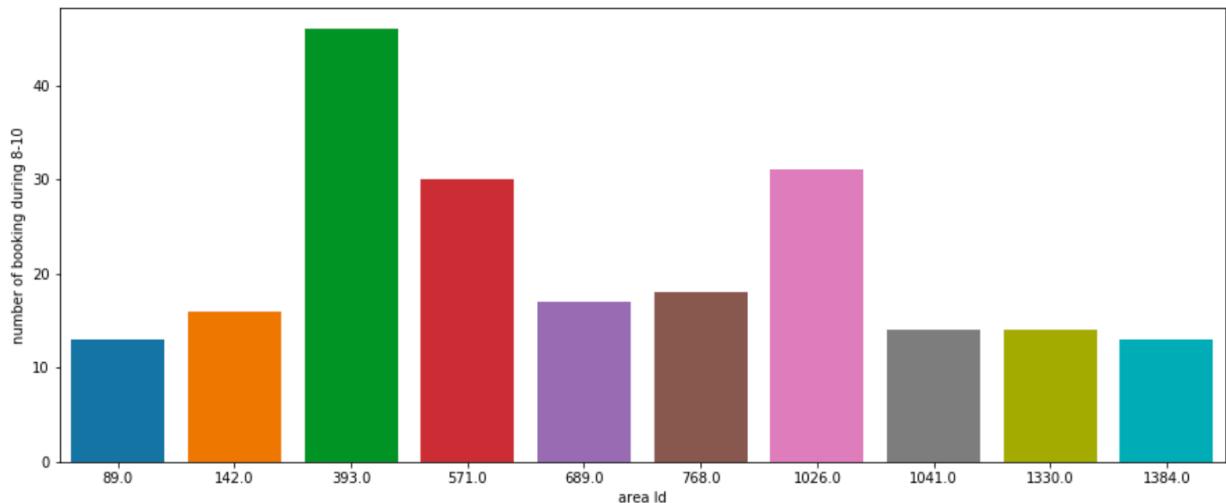
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## Friday Analysis-

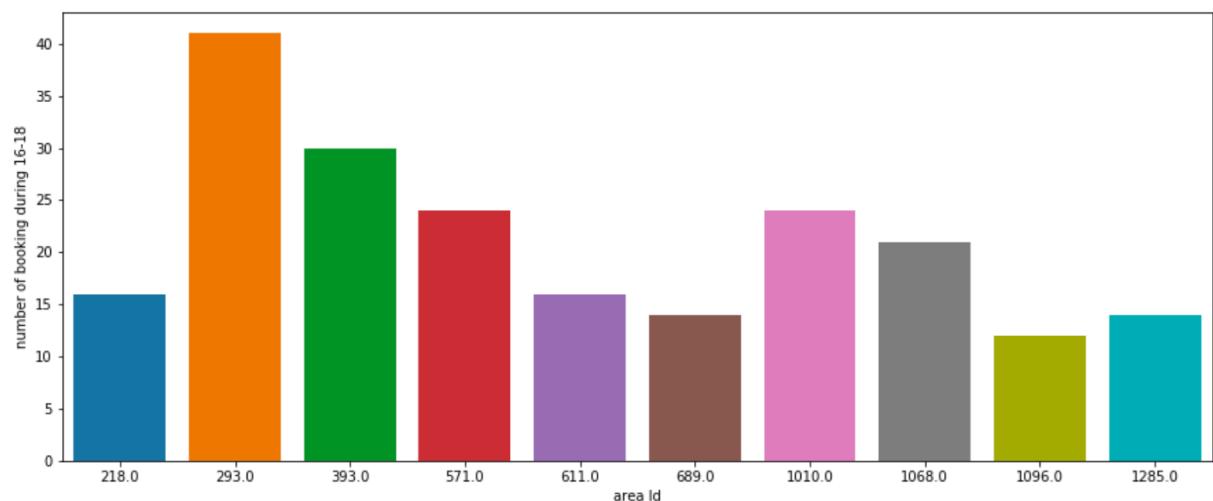


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### Analysis of traffic for different hours of the day on Friday-

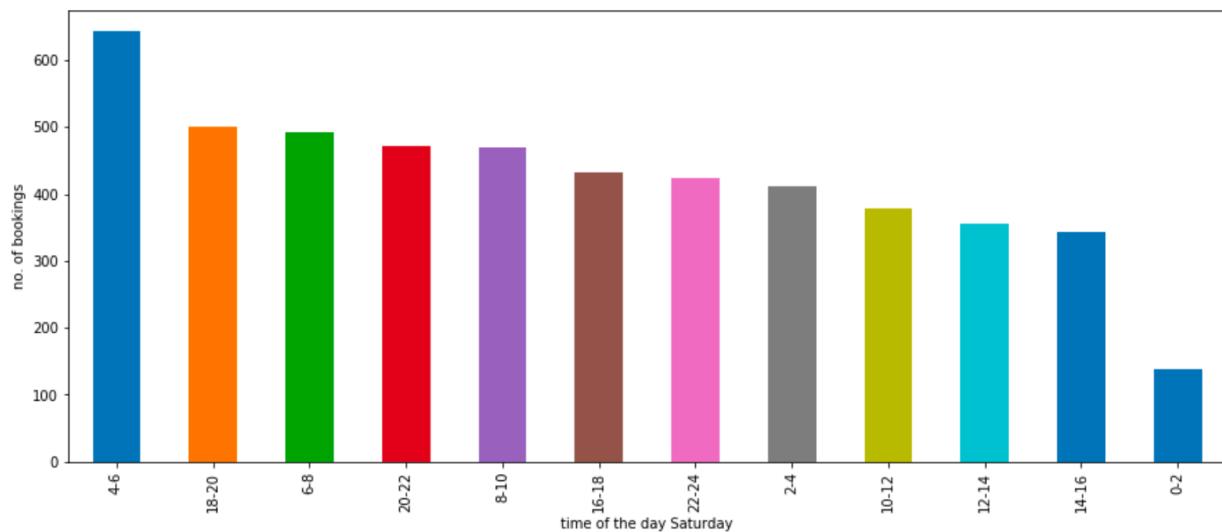


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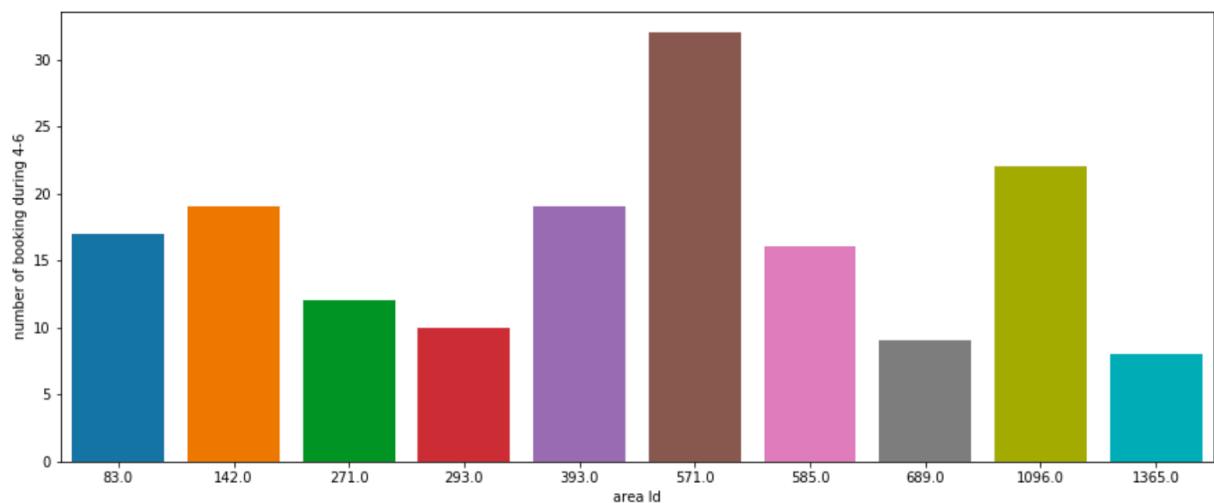
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## Saturday Analysis-

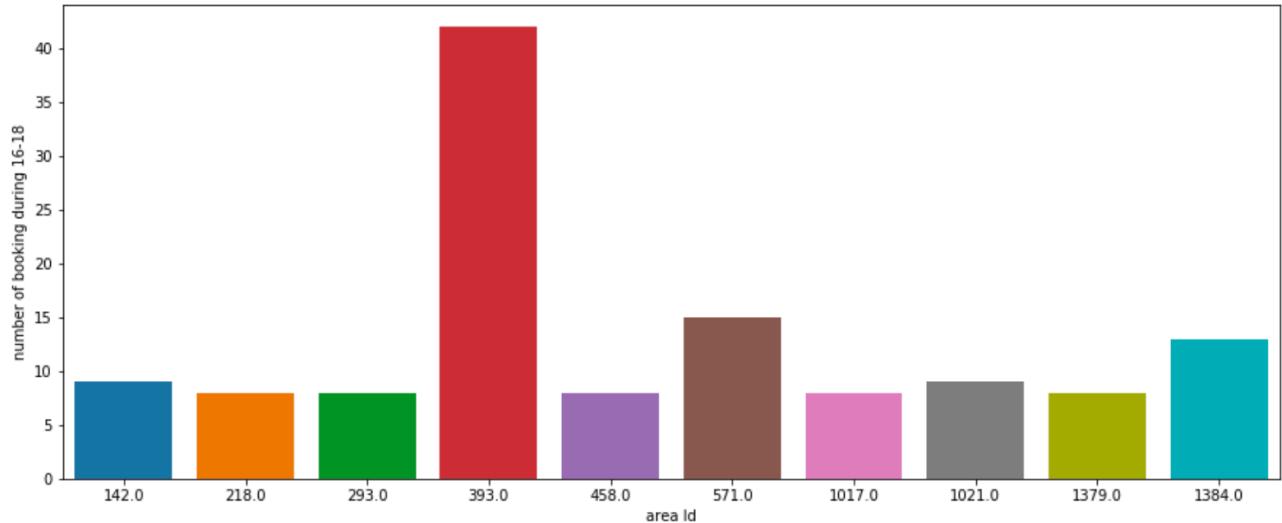


From the above graph we see the change in the trend in the timings for the peak bookings because of the weekend this time the peak of bookings occur from the time period 4-6AM and 6-8PM.

## Analysis of traffic for different hours of the day on Saturday-

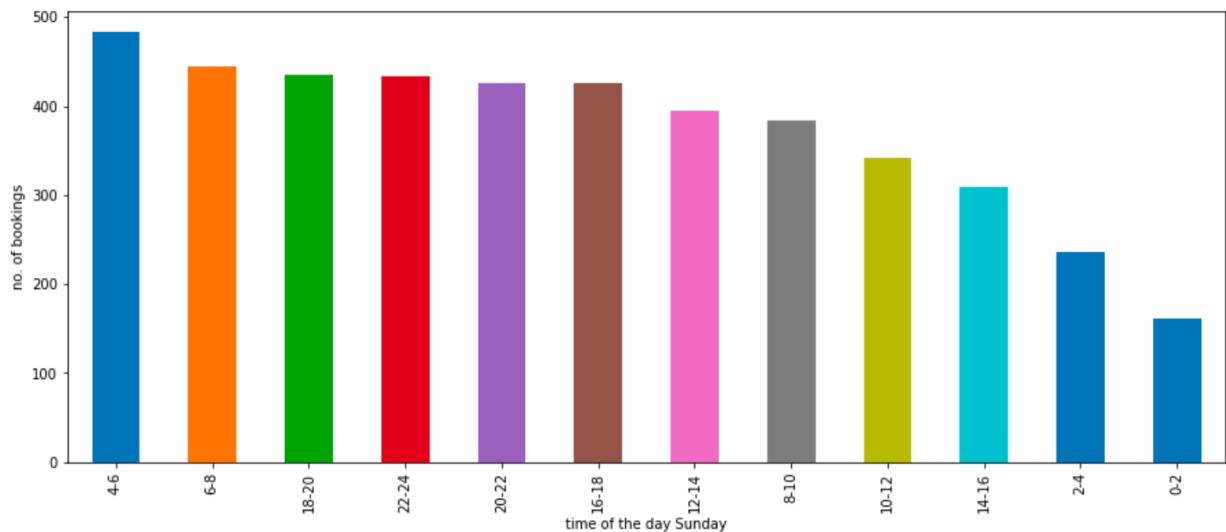


From the above graph we can see that the most of the bookings occur from **marathahalli(571)** since it is the major bus stop and during weekend tourists come.



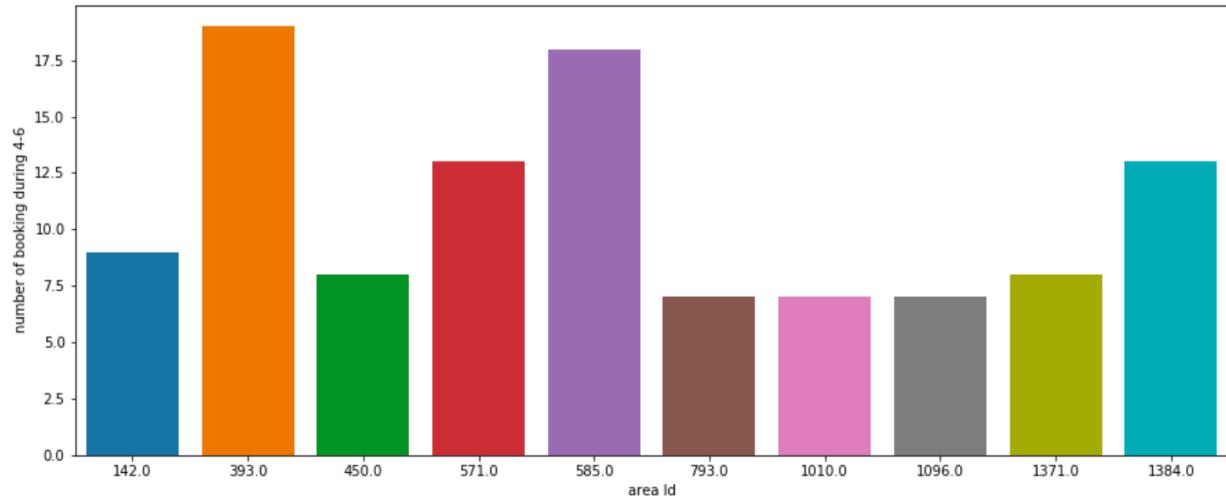
In the above graph we can see that most of the bookings are from the **International Airport**. This is because most of the international flights are scheduled at the evening.

## Sunday Analysis-

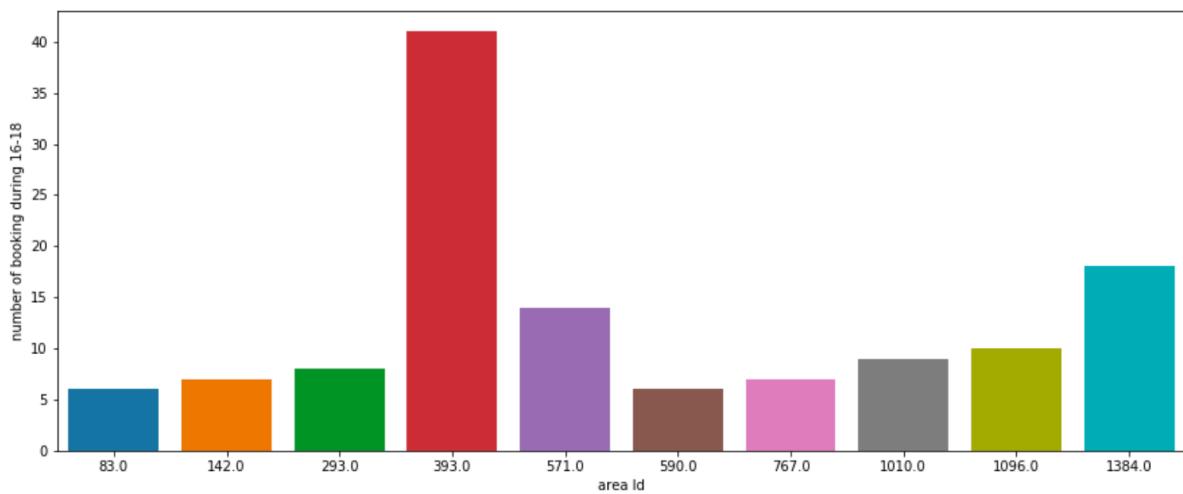


Observing the same weekend trend from the above graph we see the change in the trend in the timings for the peak bookings this time the peak of bookings occur from the time period 4-6AM and 6-8PM.

### Analysis of traffic for different hours of the day on Sunday-



We see that the major booking happens from the **international airport(393)** and the **major bus station majestic(585)**. This is due to the increased number of tourists during weekend.

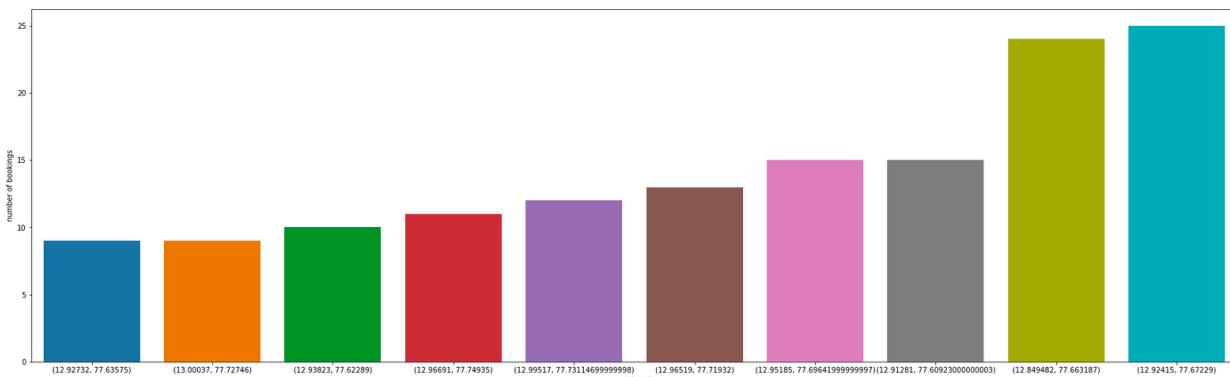


In the above graph we can see that most of the bookings are from the **International Airport**. This is because most of the international flights are scheduled at the evening.

## Airport Booking Analysis -

Throughout the analysis we can see that the majority of bookings happens from the International Airport no matter the day, this is because Bangalore is the place to major IT Companies.

### Where do people go from the Airport?



Most of the people coming from the air port are either going to bellandur probably because they live there and other people are going to electronic city because that is where all the IT companies are established.

## Summary of point to point analysis-

We see a common trend throughout the week days the major bookings are from the 8-10 A.M. and 6-8 P.M. because those are the office timings.

During the weekend the trend shifts to major bookings from 4-6AM and 6-8 AM

We also observe that the bookings from the airport remains high.

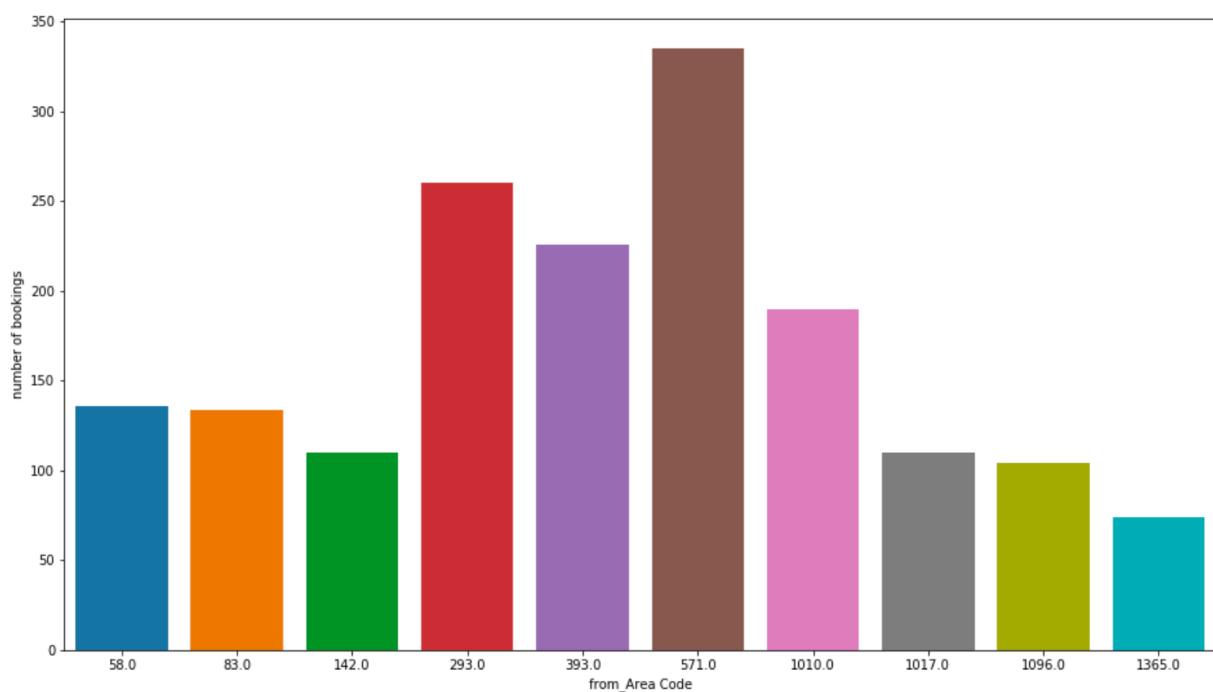
## **How to surcharge?**

We can increase the amount during the office hours such that people book the cab late or early thus evenly distributing the booking.

Since most of the people go from airport to electronic city and bellandur what we can do is we can increase the price of the cab going to electronic city or bellandur from airport and decrease the price of cab available at the electronic city and bellandur thus giving equal opportunity to drivers coming from airport.

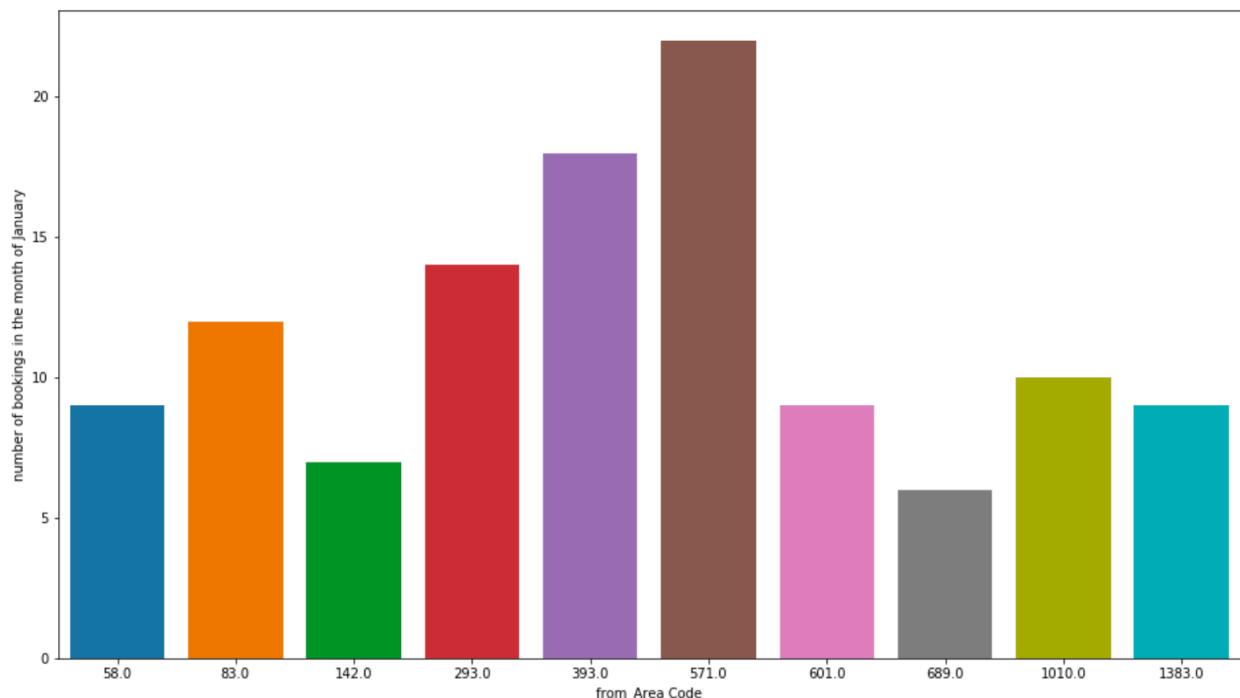
## **Hourly Rental Analysis.**

First I am going to analyse the areas of hourly rentals. In hourly rentals I also made a feature which tells us for how much time was the car booked.

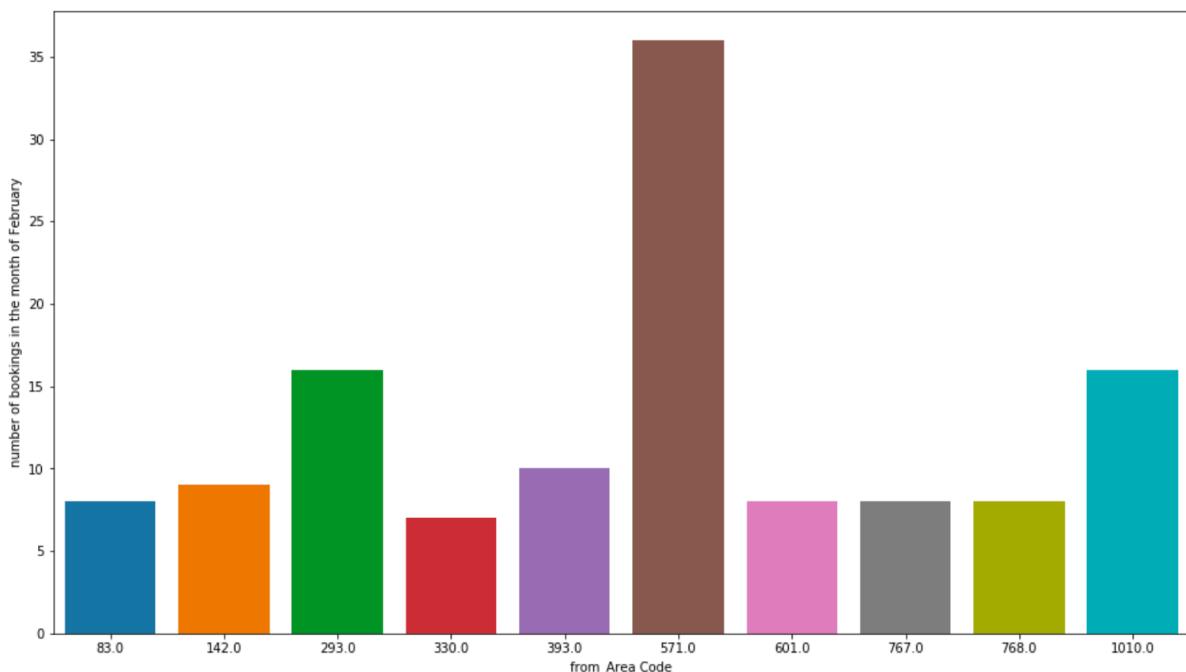


From the graph given we can see that the hourly rentals are taken mostly from the **electronic city**, **airport** and **marathahalli**.

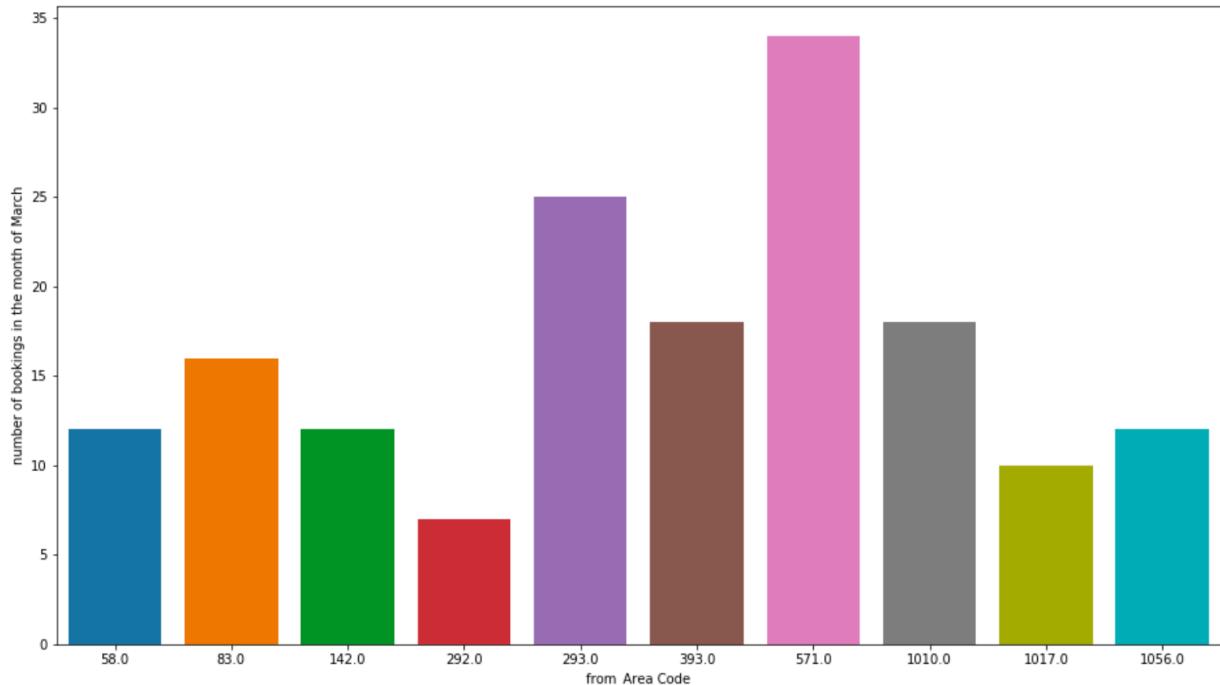
## Month and area wise distribution of Hourly rentals.



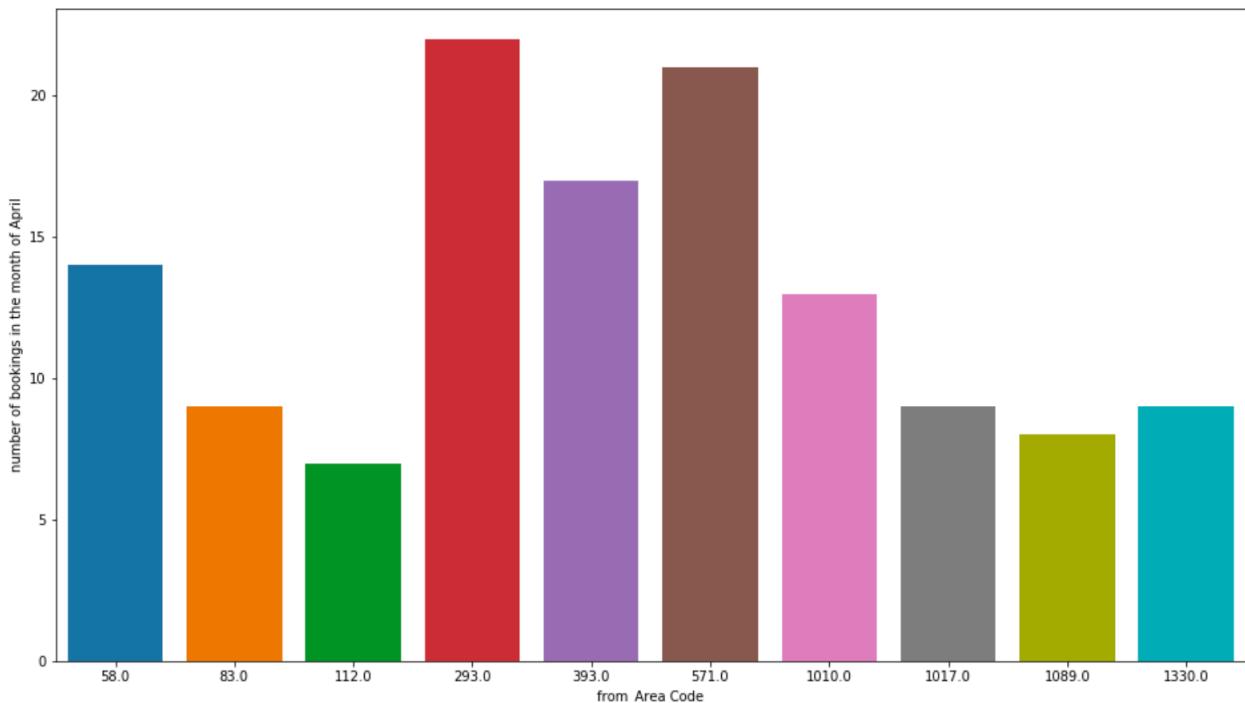
From the above graph we can see that most amount of bookings come from **marathahalli(571)** **airport(393)** and **electronic city(293)** In the month of January.



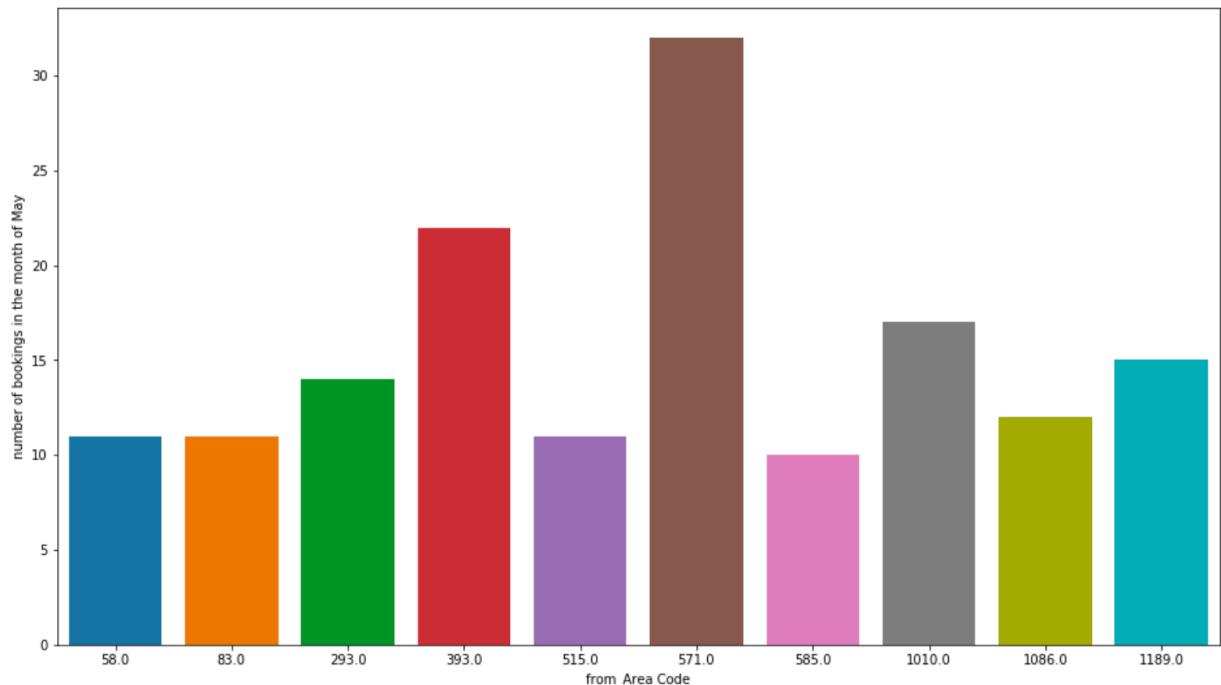
For the month of February we can see that most number of bookings come from the **marathahalli(571)**, **electronic city(293)** and **Whitefield(1010)** white field is also one of the major area where most of the IT companies are located.



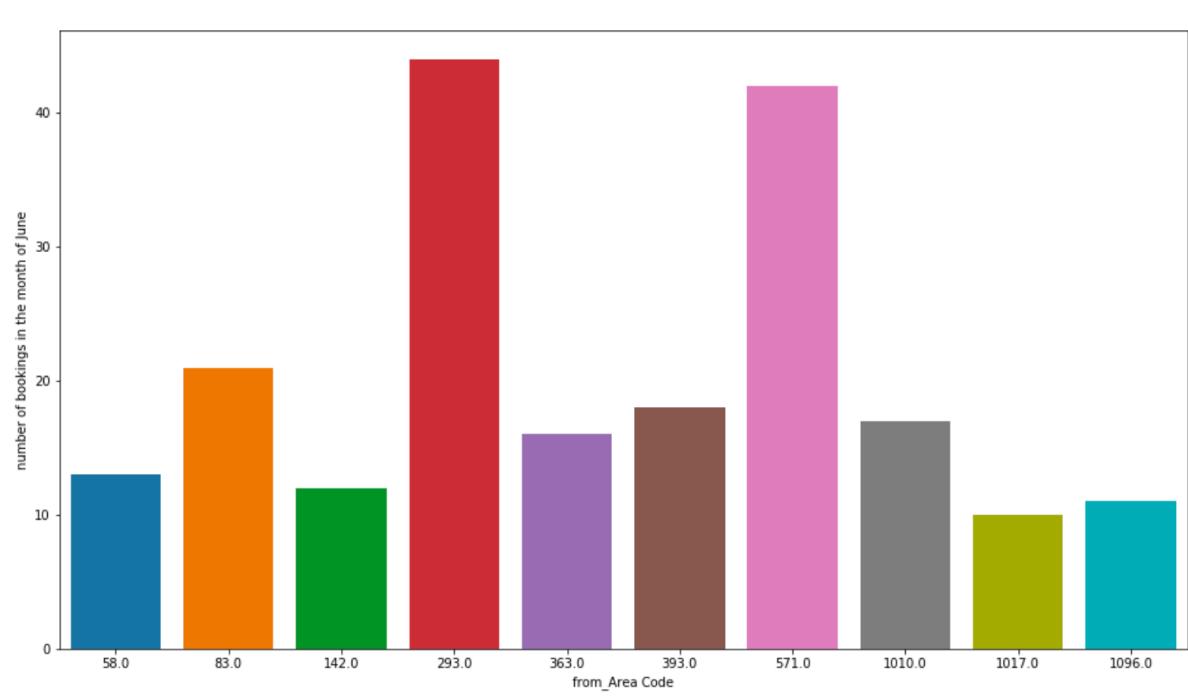
From the above graph we can see that most amount of bookings come from **marathahalli(571)** **airport(393)** and **electronic city(293)** In the month of March.



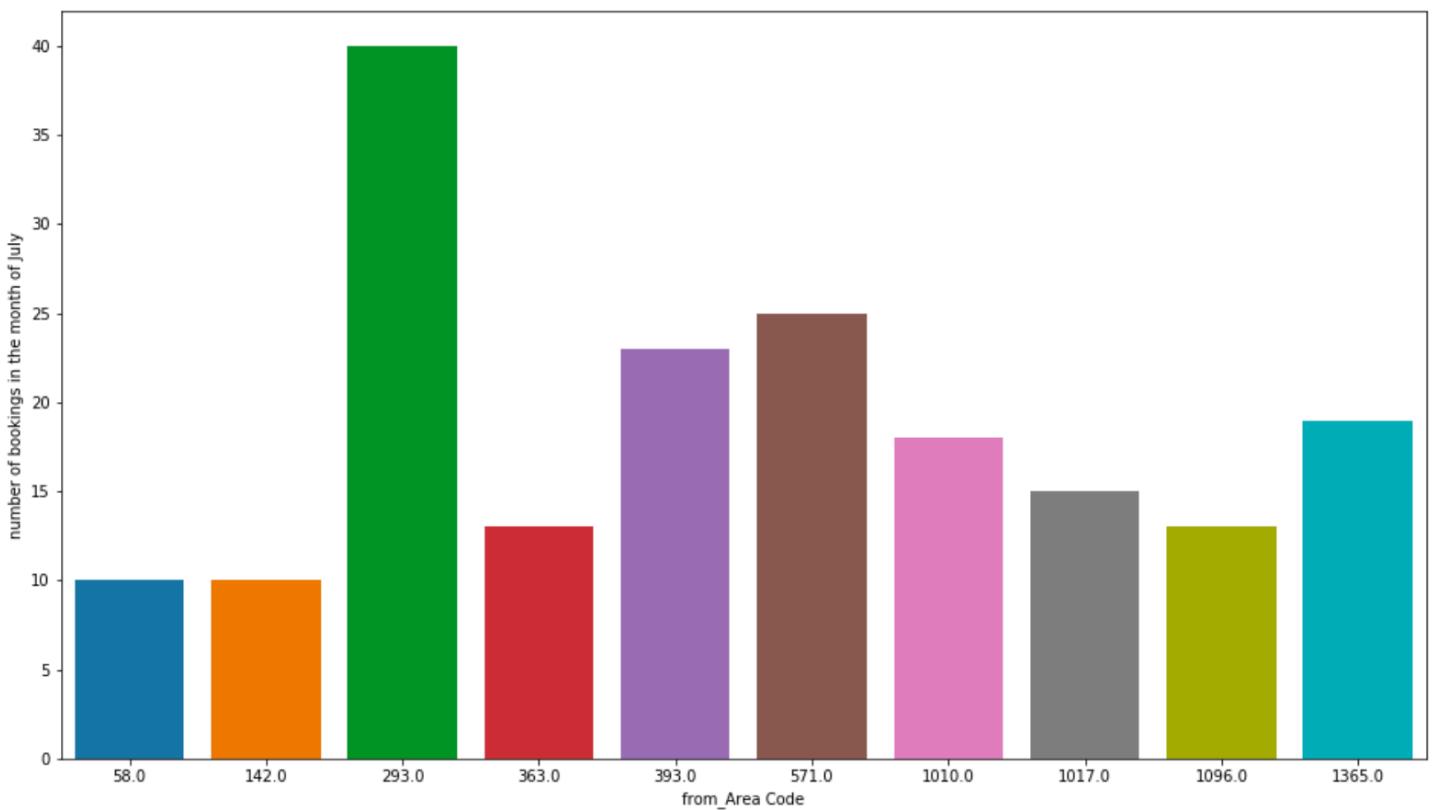
Following the same trend In April we can see that most of the bookings come from **marathahalli(571)** airport(**393**) and **electronic city(293)**. In the month of April.



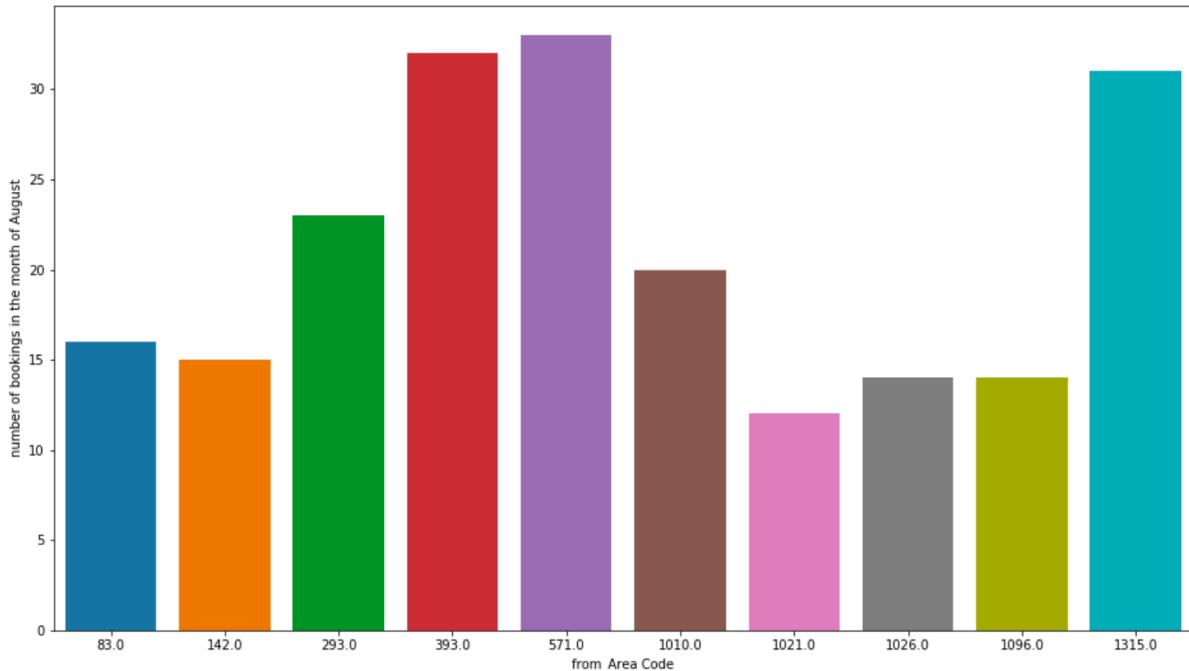
For the month of May we can see that most number of bookings come from the **marathahalli(571)**, **Airport(393)** and **Whitefield(1010)** white field is also one of the major area where most of the IT companies are located.



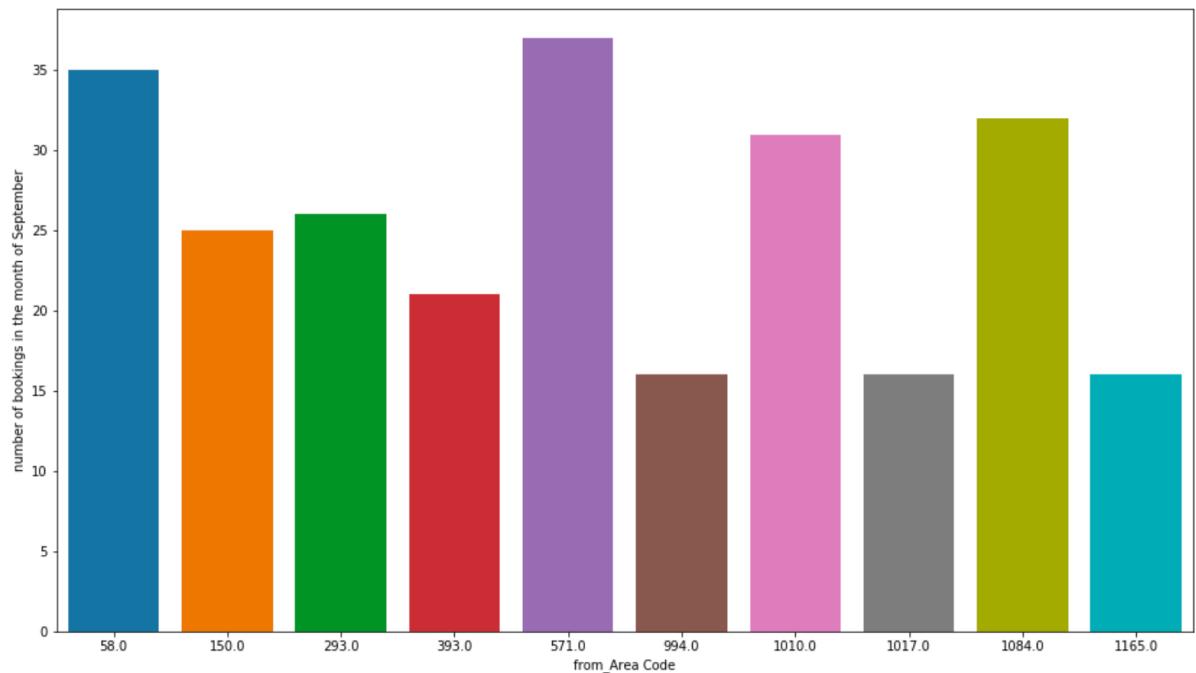
We can see that for the month of June the major bookings come from **Electronic City(293)** and **marathahalli(571)**



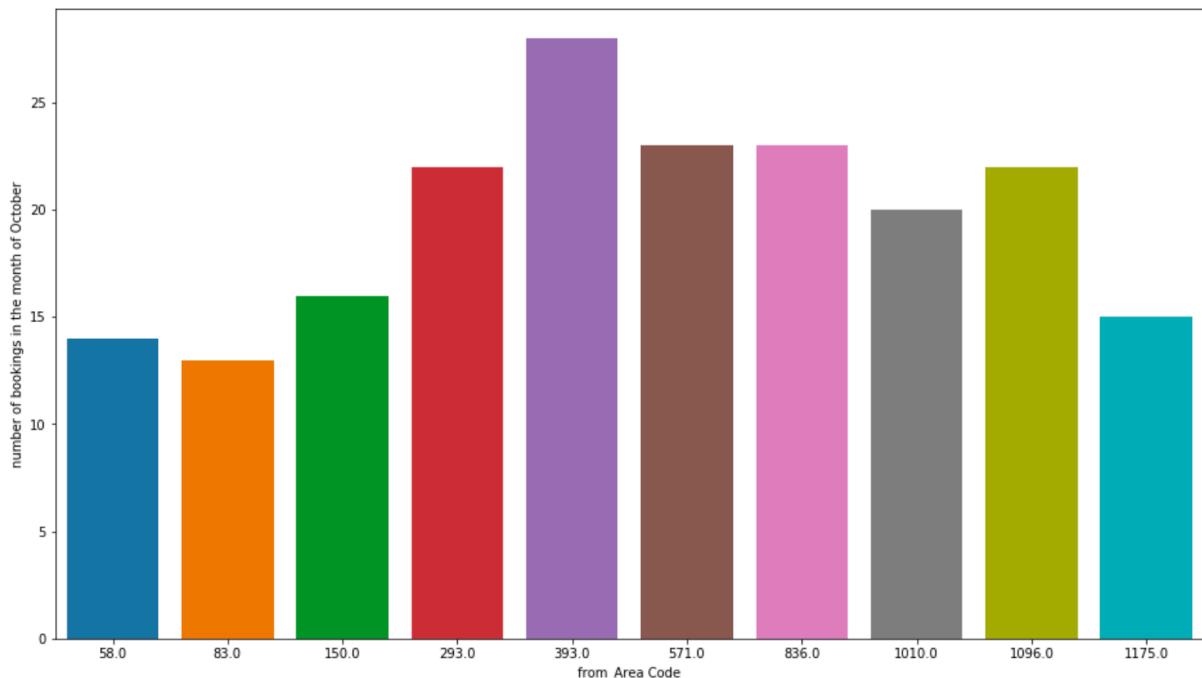
We see that for the month of July major bookings come from **Electronic City(293) and marathahalli(571)**.



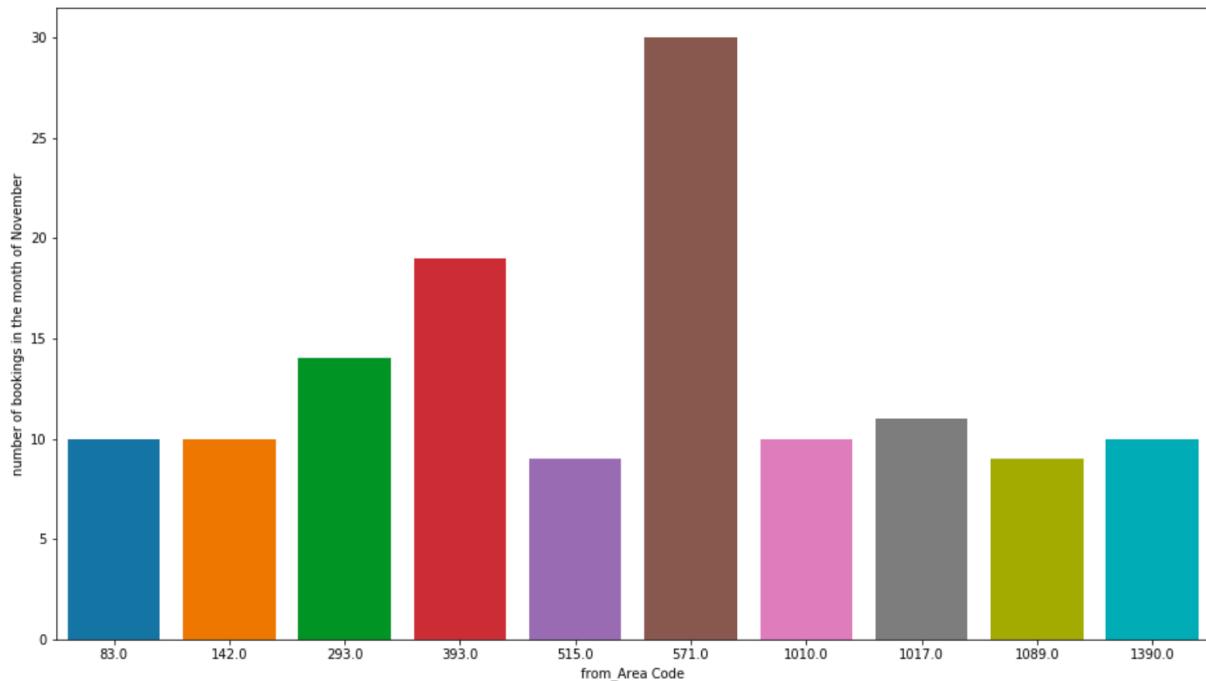
We see that for the month of July major bookings come from **Electronic City(293), marathahalli(571) and Koramangala(1315)**. Kormangala is the emerging area of offices for new IT companies.



Major bookings for the month of September comes from  
**marathahalli(571), Whitefield(1010), Vasanth Nagar  
(58).** Vasanth Nagar is an area of luxury hotels.

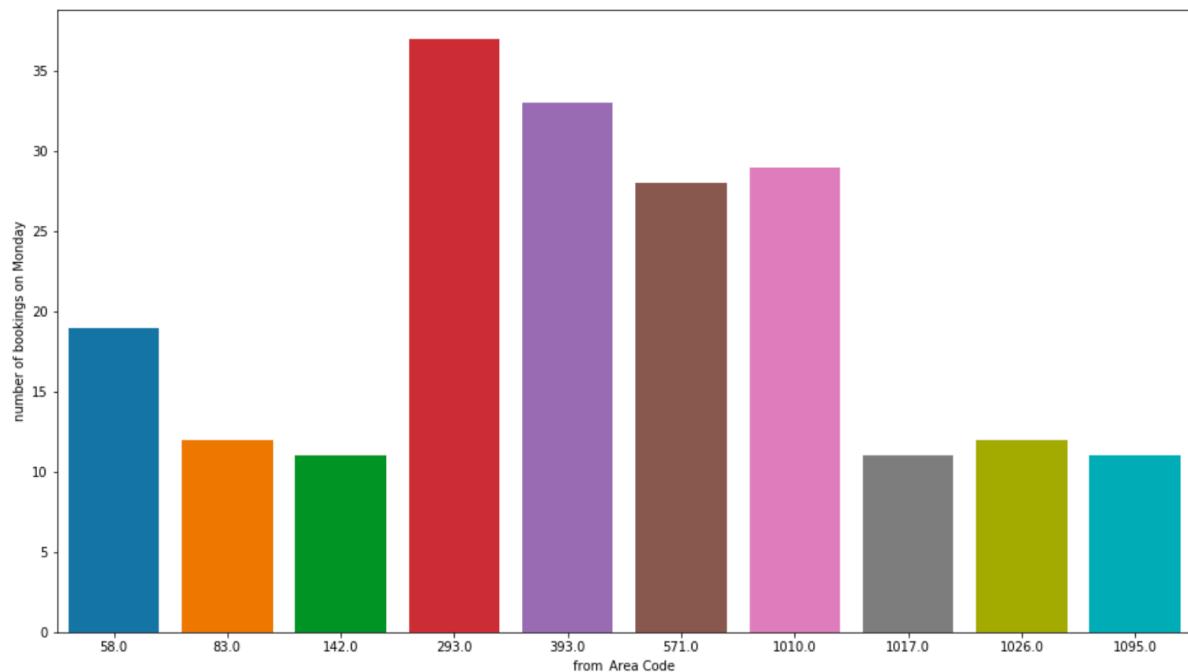


For the month of October we can see that the bookings are evenly distributed with most number of bookings from **marathahalli(571), Airport(393)**.

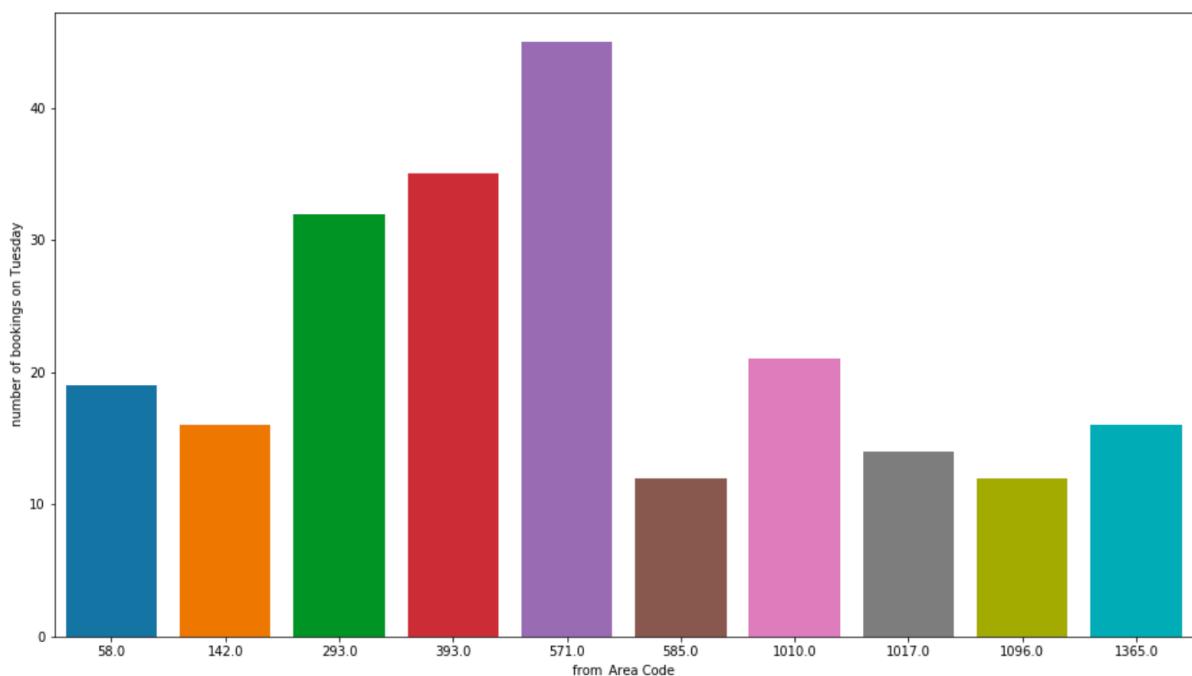


For the month of November we can see that bookings are concentrated in the area of **marathahalli(571), Airport(393)**.

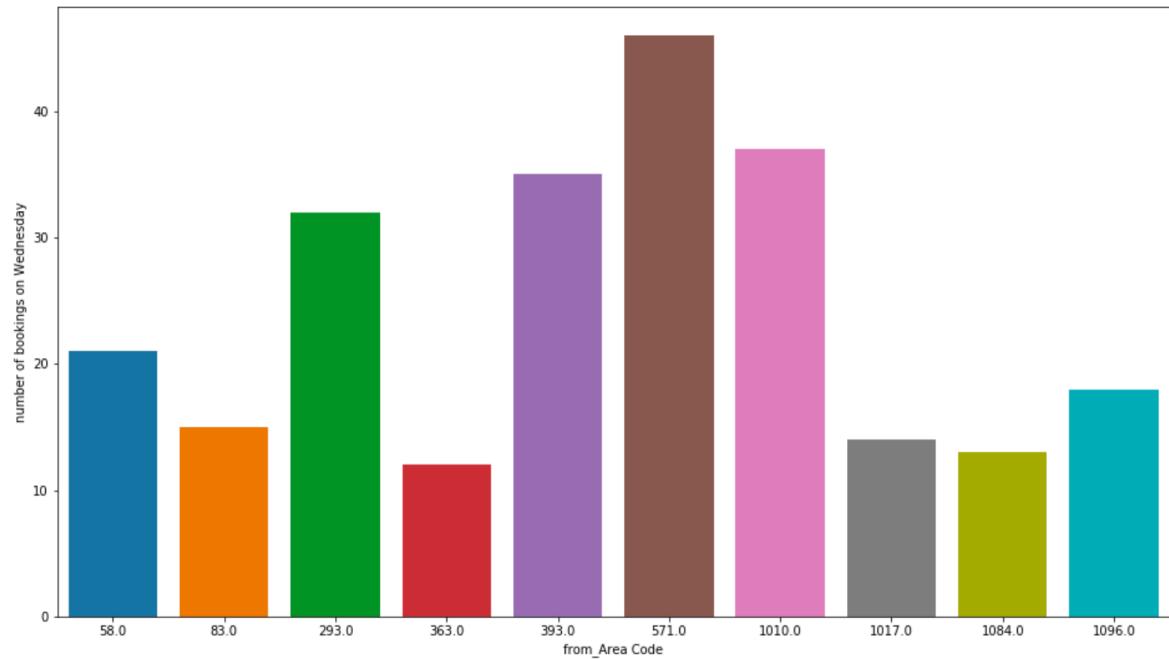
## Day wise analysis of the hourly rentals.



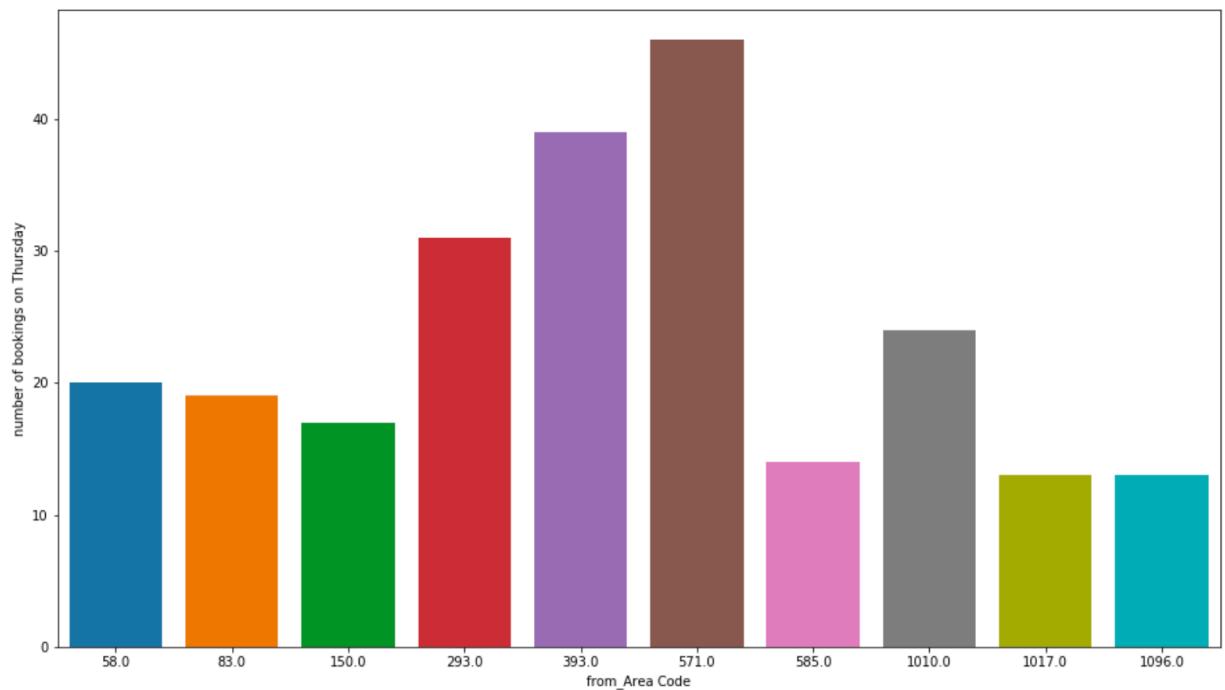
For Monday most of the bookings come from **marathahalli(571), Airport(393), Whitefield(1010) and Electronic City(293)**.



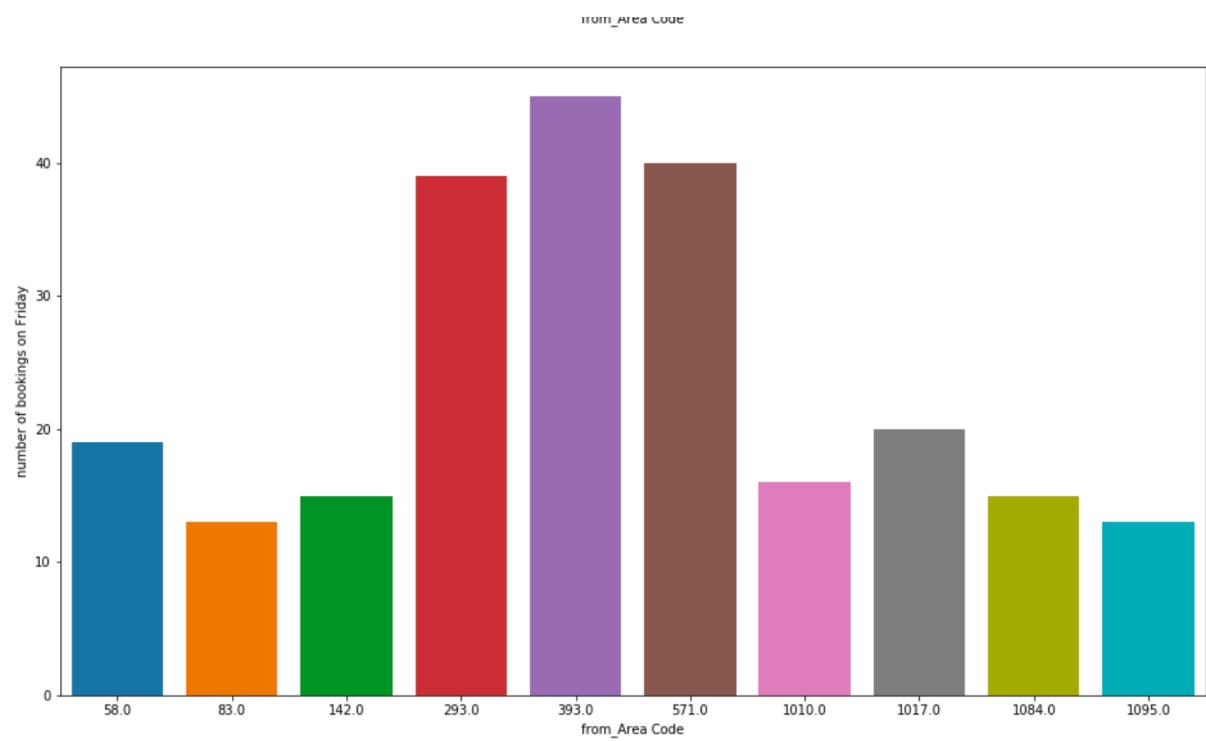
For Tuesday we can see that most of the bookings come from **marathahalli(571), Airport(393), Electronic City(293)**.



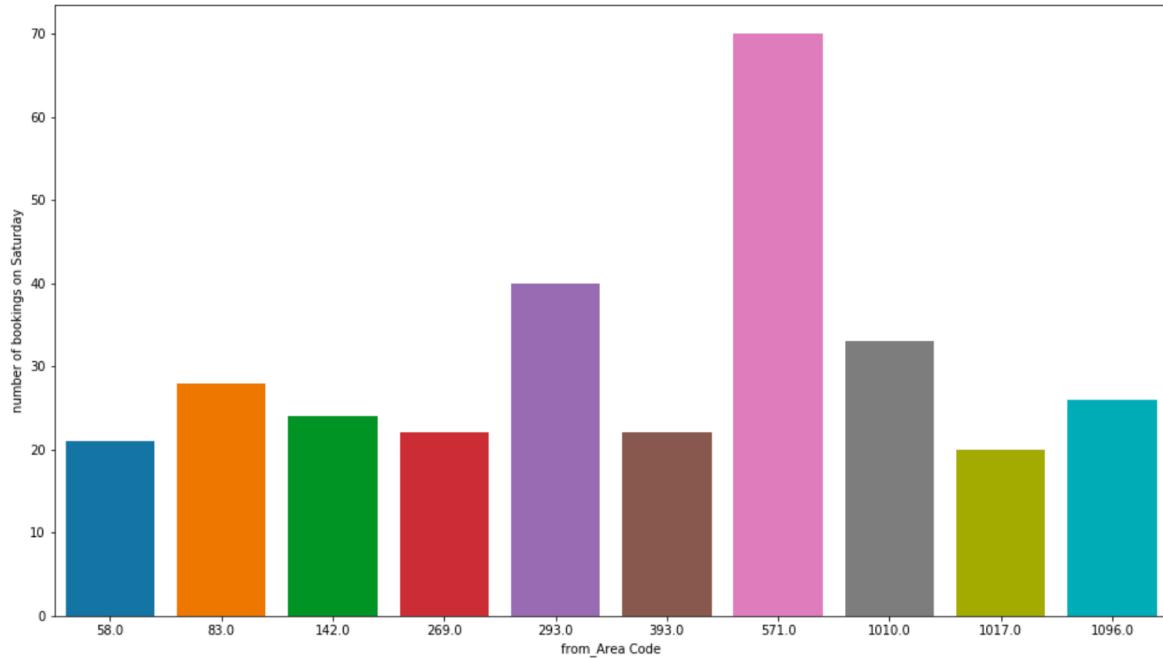
For Wednesday we can see that most of the bookings come from **marathahalli(571), Airport(393), Electronic City(293)**.



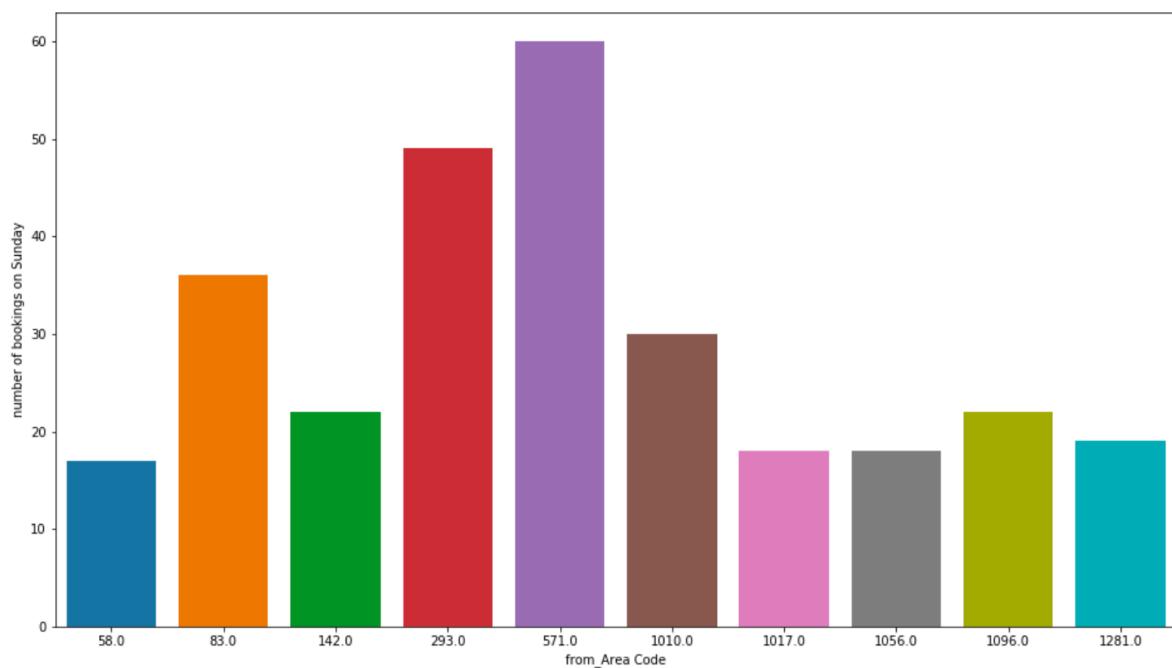
Following the same weekday trend we can see that for Thursday most of the bookings come from **marathahalli(571), Airport(393), Electronic City(293)**.



Following the same weekday trend we can see that for friday most of the bookings come from **marathahalli(571), Airport(393), Electronic City(293)**.



From the above graph we see that during weekend too there is no change in the trend and most of the bookings come from **marathahalli(571) and Airport(393)**.

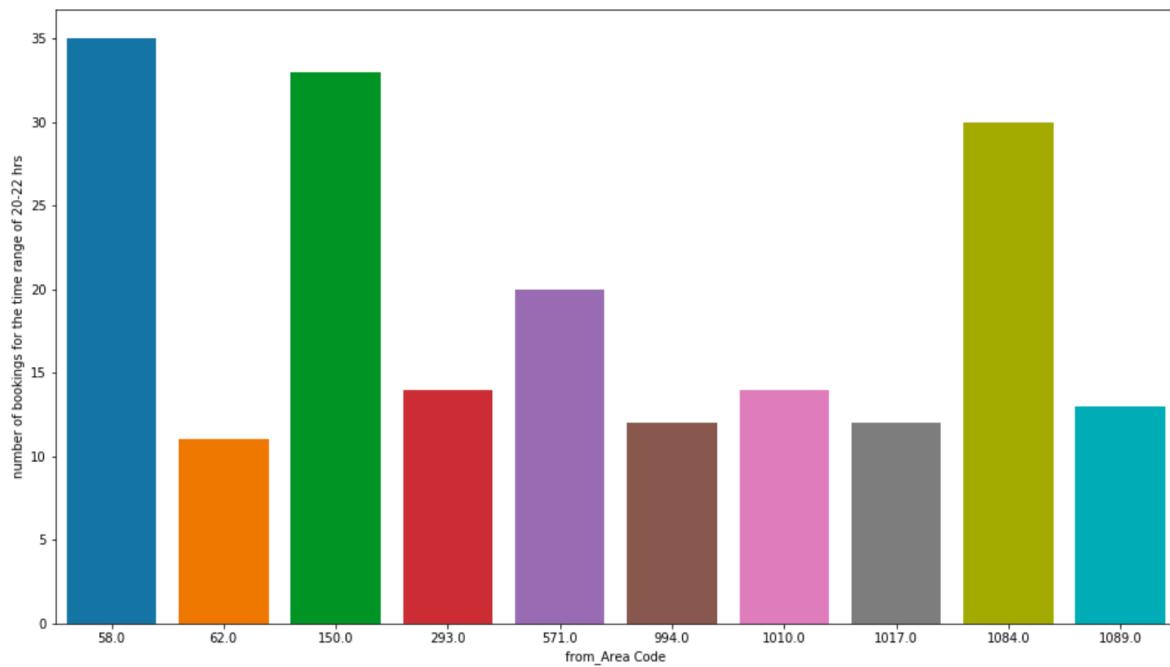


From the above graph we see that during weekend too there is no change in the trend and most of the bookings come from **marathahalli(571) and Airport(393)**.

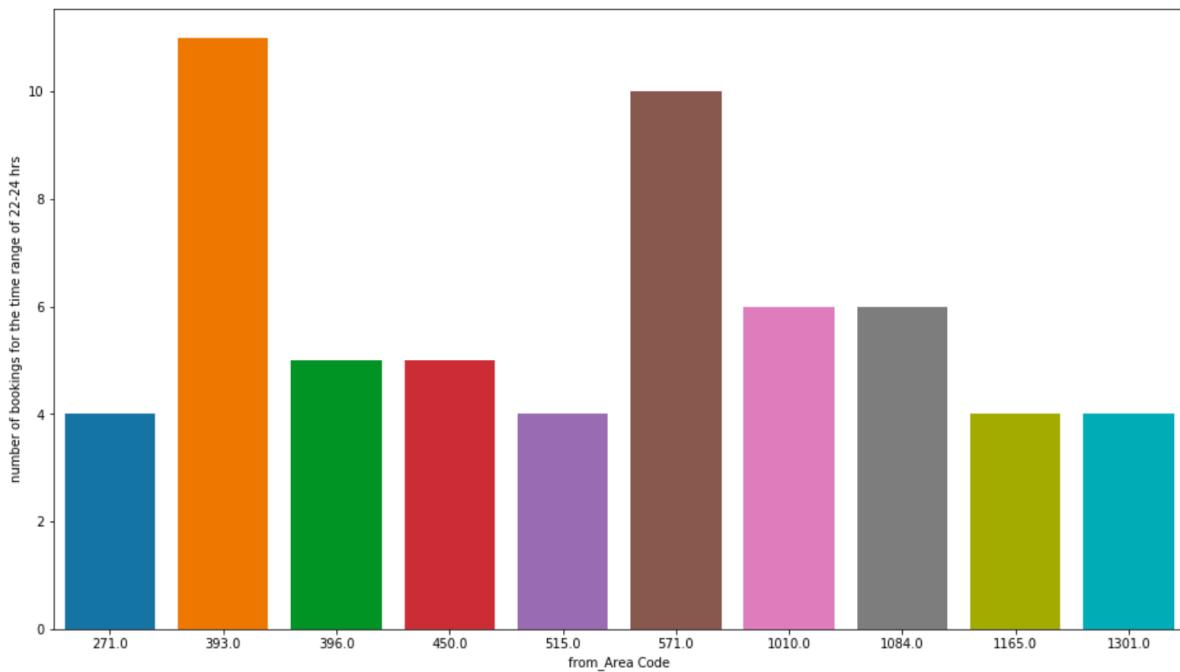
## Amount of Time for which the booking is done-

### LARGE AMOUNT OF TIME FOR WHICH BOOKING IS DONE-

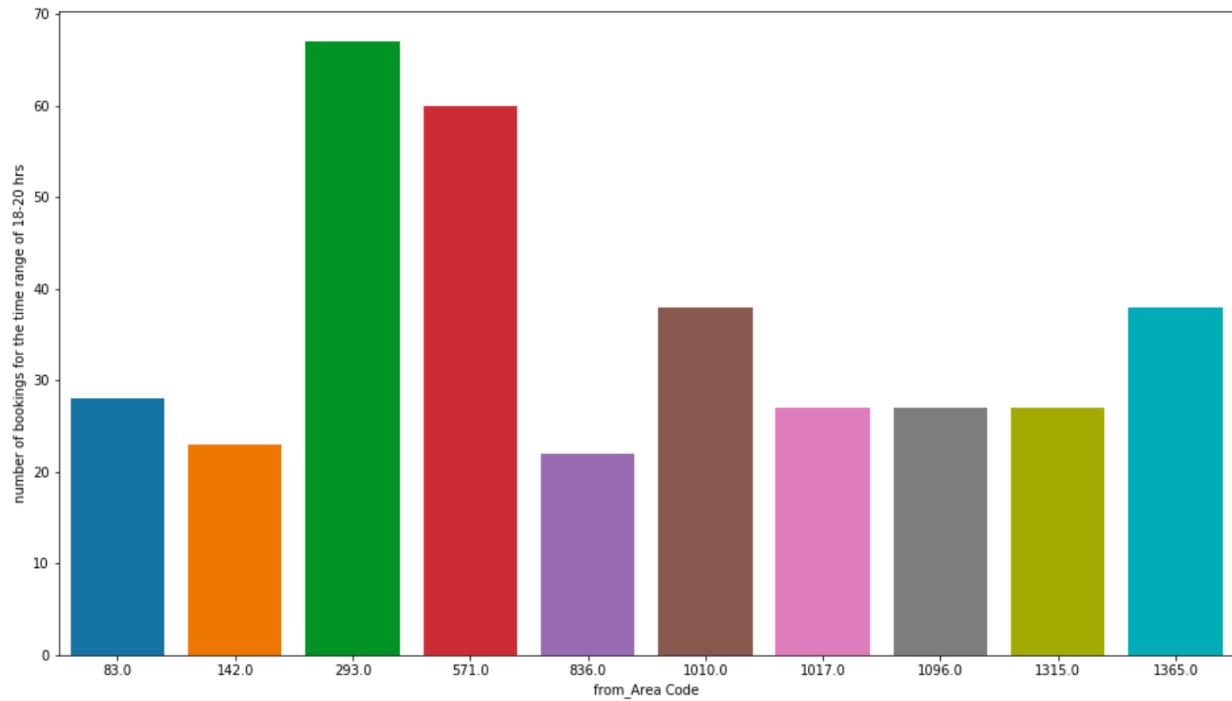
(Here we show only the plots which are important rest all the plots are shown in the code.)



We see that bookings of the cars for 20-22 hours happen from **Vasanth Nagar(58)** which is obvious because Vasanth Nagar is the area of luxurious hotels. Bookings also happened from **J.P. nagar(1084)**.

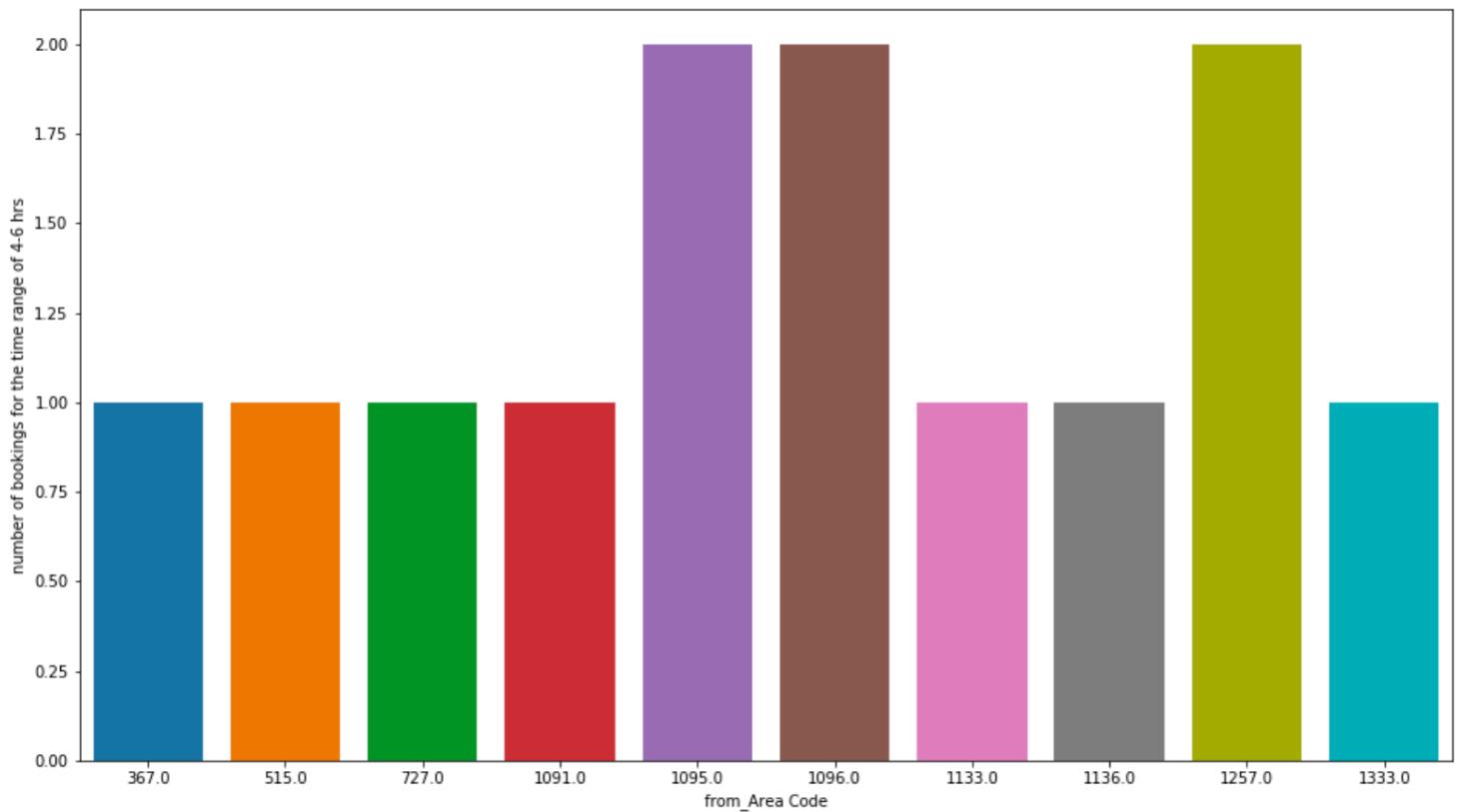


We see that the bookings of 22 to 24 hours happens mostly from the **Airport(393)** and **marathahalli(571)**.



We see that most of the bookings for 18 to 20 hrs happen from **Electronic City(293), Whitefield(1010), and marathahalli(571)**

## Booking for smaller period of time -



We see that for the time period of 4-6 hours bookings are done from **Bellandur(1095)**, **Brookefield(1096)** Brookefield is a posh area in Bangalore, **Koramangala(1257)**

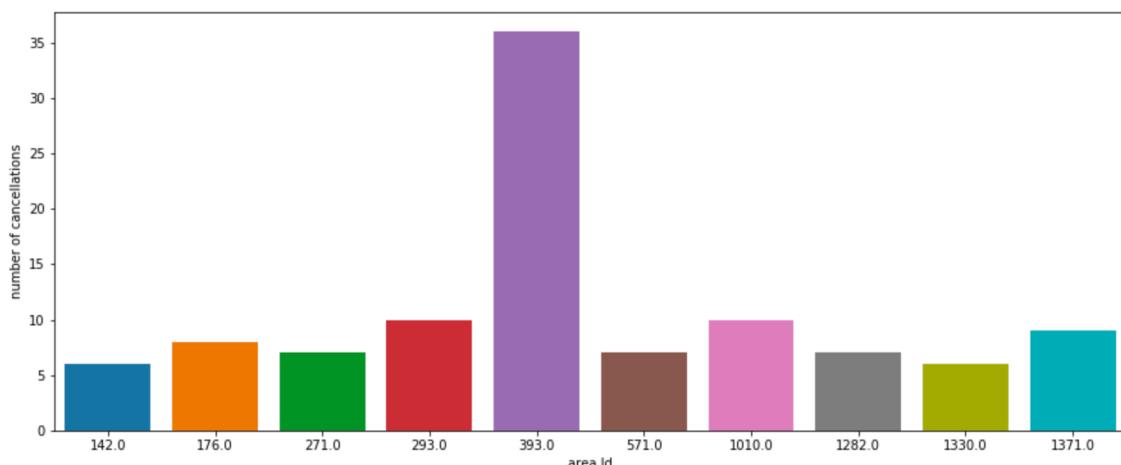
## **Summary of Hourly analysis -**

We see that most of the bookings for the large amount of time come from the airport area, Electronic City and marathahalli

Short bookings mostly come from Bellandur, Brookefield, Koramangala.

## **How to increase the profits-**

1)As we can see that most of the long hours bookings are done from **airport area, electronic city and marathahalli** what we can do is establish a permanent parking in these areas for self driving vehicles



We can also see that most of the cancellations are done from the airport area this is because the waiting time is high in the airport area and so no driver really takes the booking towards airport hence less number of cabs are available there to begin with. By having a self driving parking cars we can solve this problem too.

Now since the booking time period is high we must have large number of cars as compared to those areas where booking time is low.

2) Now the bookings for the short amount of time is done from the areas **Bellandur, Brookefield and Koramangala** so we must establish a single parking facility to cater the needs of all three areas and the

number of cars should be less since the amount of time of booking is less.