

# Synapticans

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# Dataset at a glance

1. Agent Location



2. Product Price and Time



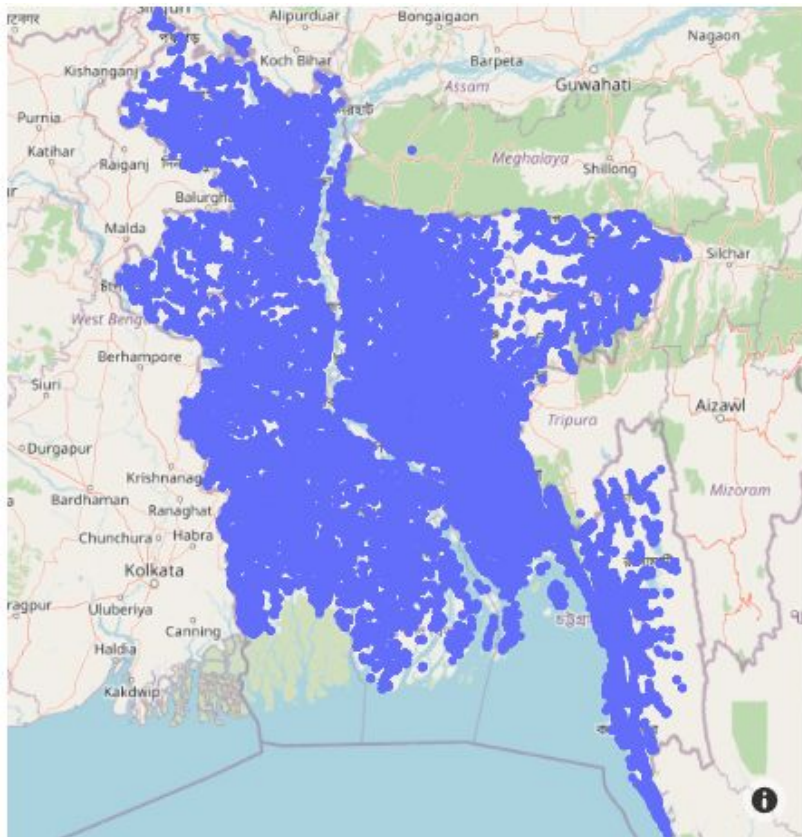
3. Sale Transactions



## Dataset at a glance

Description	Total Amount
Retail Agents	1,09,820
Product	2,127
Customer	1,87,89,480
Transactions	9,82,66,017

# Retail Distribution Network in Bangladesh

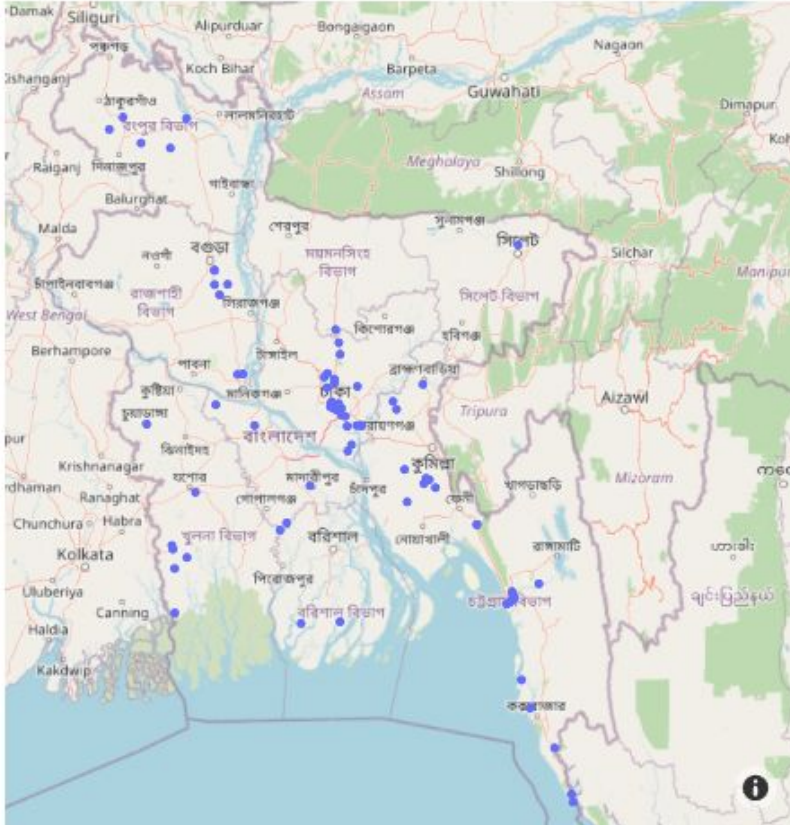


## ➤ Key Takeaway:

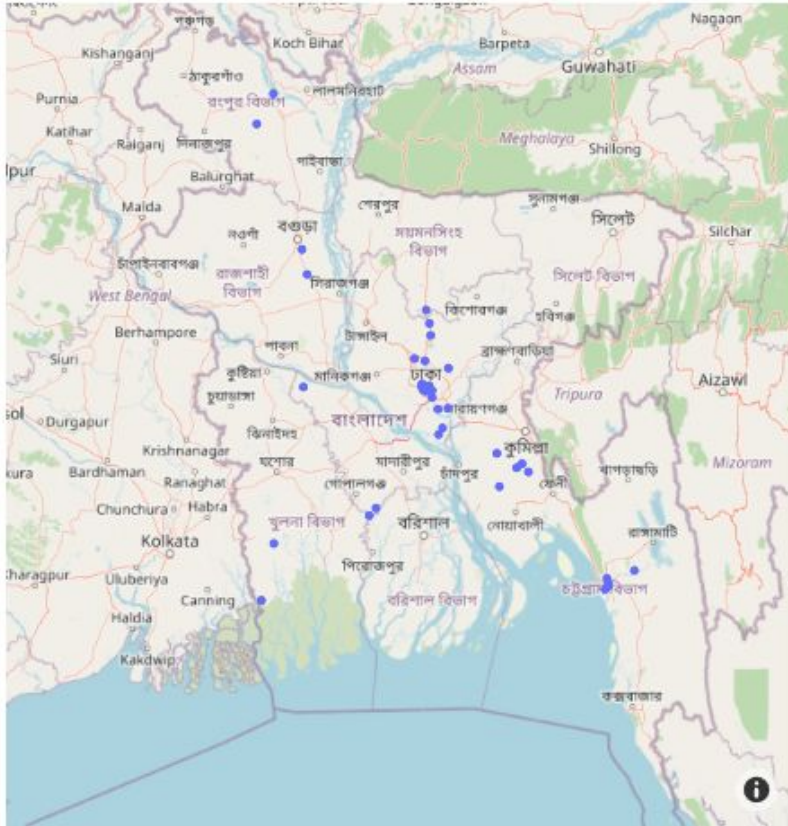
- All over the country
- Concentrated in the urban and industrial areas.
- Remote areas have a significantly low agents

# Top Retail Agents

- ★ The 100 top selling retailers have been identified from their sales record and visualized on the map.



# Top Isolated Retail Agents



- ❑ Agents who doesn't have any other agents in nearby 500m
- ❑ Mostly based on Metropolitan cities
- ❑ Among the top 100 seller 40% them are isolated seller

# Recommendation for Top Isolated Retail Agents

Demand for Service in Metropolitan area

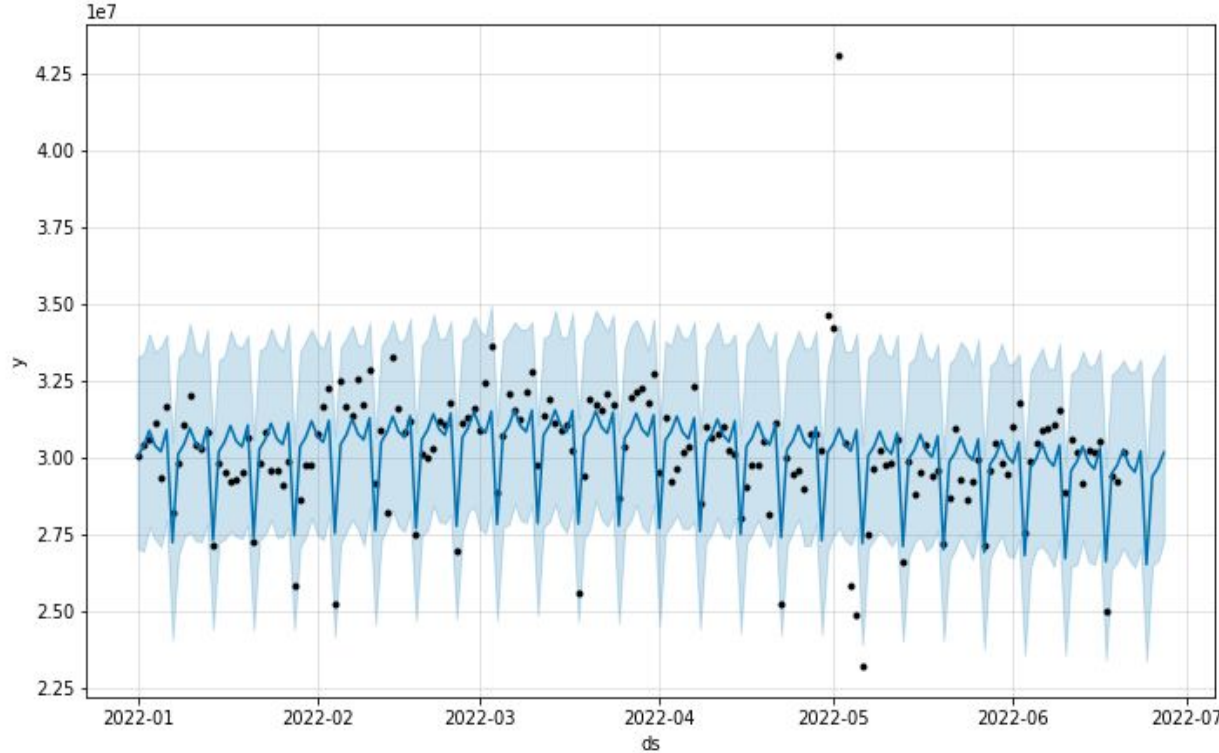


Potential sales are being under achieved.



Recommending for setting up more retailers and advertisement

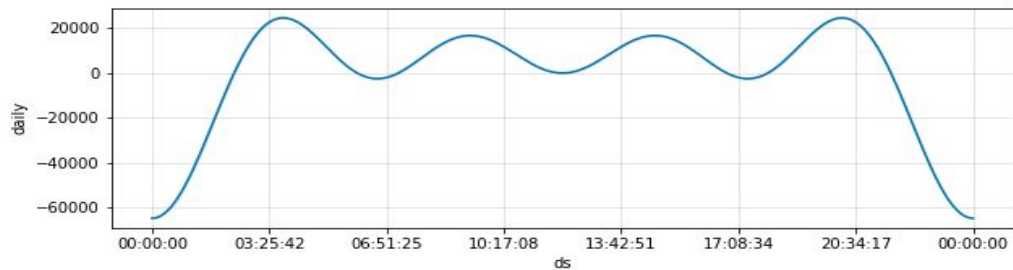
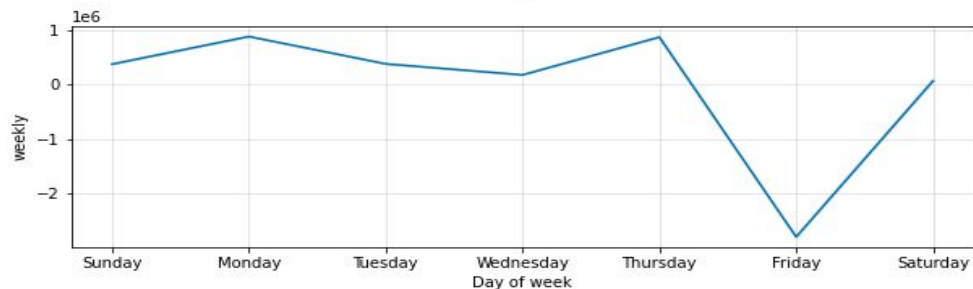
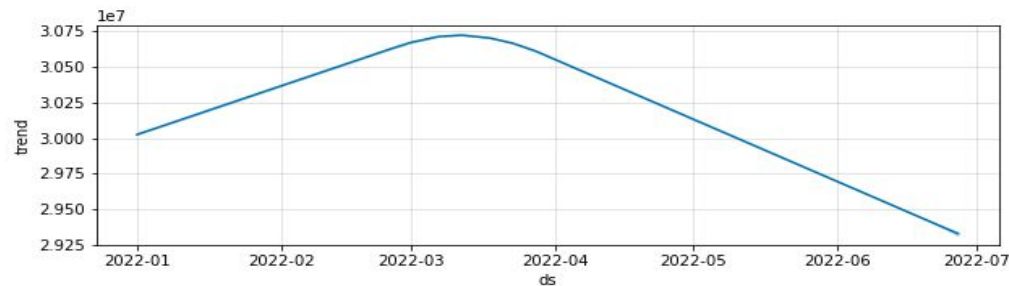
# Forecast: Next Week's Daily Total Sales



- ❑ Transactions are for 175 days
- ❑ SoTA forecasting model Prophet
- ❑ Prediction for next 7 days



# Forecast: Next Week's Daily Total Sales



# Forecast: Next Day's Sales of Each Retail

	agent	max sale	min sale	mean sale
0	632791e6ac867e8257e6fccb2f5ef5eb8e6eed8ee2bd03...	141.0	141.0	141.000000
1	c48ff60fa46230c0ebbcfa1e7064224bda84952554f6ff...	4155.0	200.0	774.483895
2	264c4537ccffb2b544ed7f4bac7d8cf04f08ccb23ea634...	6933.0	210.0	1026.247766
3	7a876f47bde543409b9e546ab128bcb10fe304dbd9cecb...	3443.0	335.0	958.917637
4	5a226d44dec4bae00991d8e8d9ae370a77640e7e62734f...	1509.0	284.0	645.604992
...	...	...	...	...
109815	3e000a511d22a7fbd12e88a341c7b244712c04423a04cf...	2561.0	224.0	686.584650
109816	4437ab436e1ae13242b618f9257e8bec8c978ebc87b993...	9021.0	160.0	1049.116198
109817	4600a270cbf8c95a342d85cd91d5ac579e40d6c87e49d3...	7711.0	169.0	864.405942
109818	36b40e283296c0abdd3c276e602b23cdf31ec6ecc33325...	1987.0	709.0	1348.000000
109819	31a3e73ec306f05b4e7a3433e94bb1991f1fd8d4eb733b...	608.0	263.0	394.300000

109820 rows × 4 columns

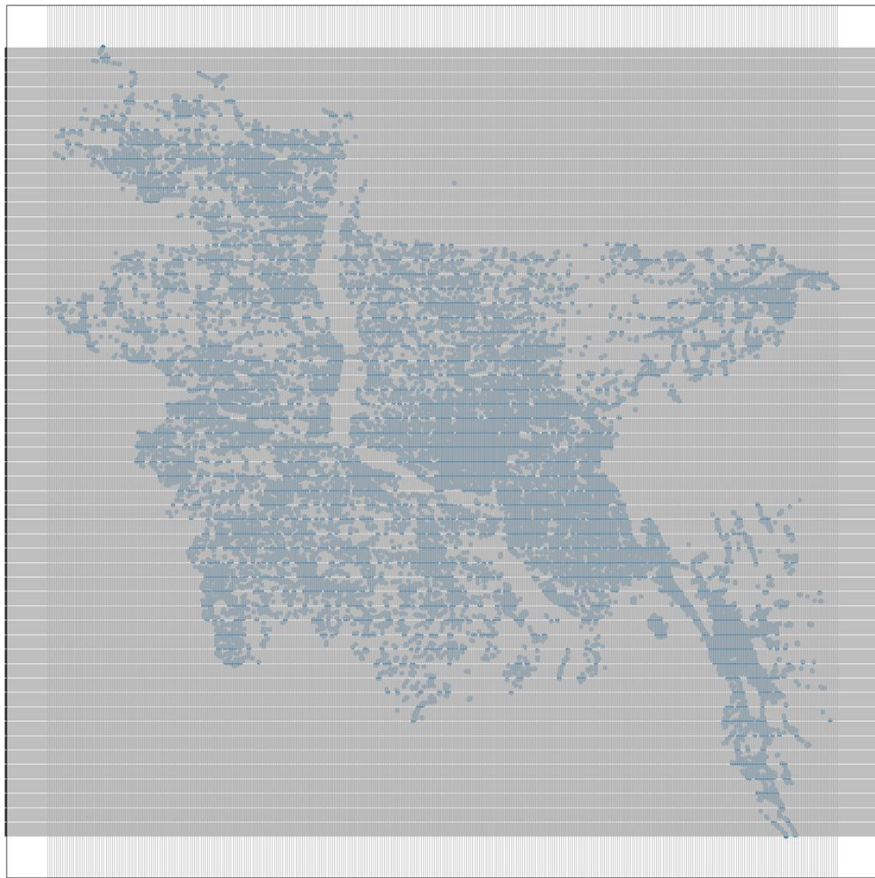
## Forecast: Justification of the forecast

- On going inflation affected the market
- The provided dataset have only transaction for 6 months only





# Geo-blocks (Geo hash of approx. 1.2 x 0.6 km) with Retails



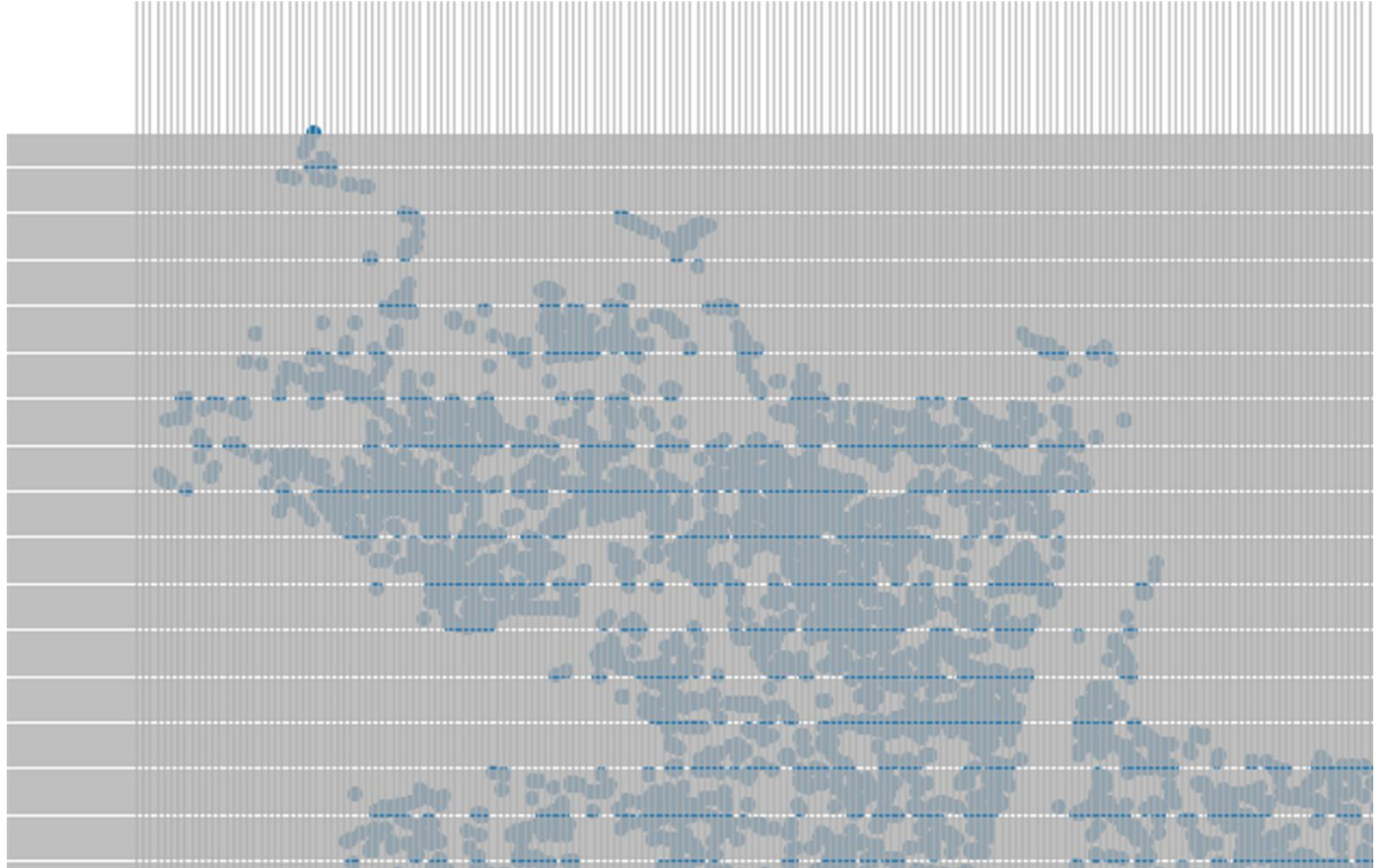
A Geohash is a unique identifier of a specific region on the Earth. The basic idea is that the Earth is divided into regions of user-defined size and each region is assigned a unique id, which is called its Geohash.



We visualized the geo blocks and the retailer information together on top of the map of Bangladesh.



## Zoomed View of Geo-blocks





# Creation of Geo Blocks

## Filtering:

- Firstly NaN values are omitted
- Secondly outlier area are omitted.

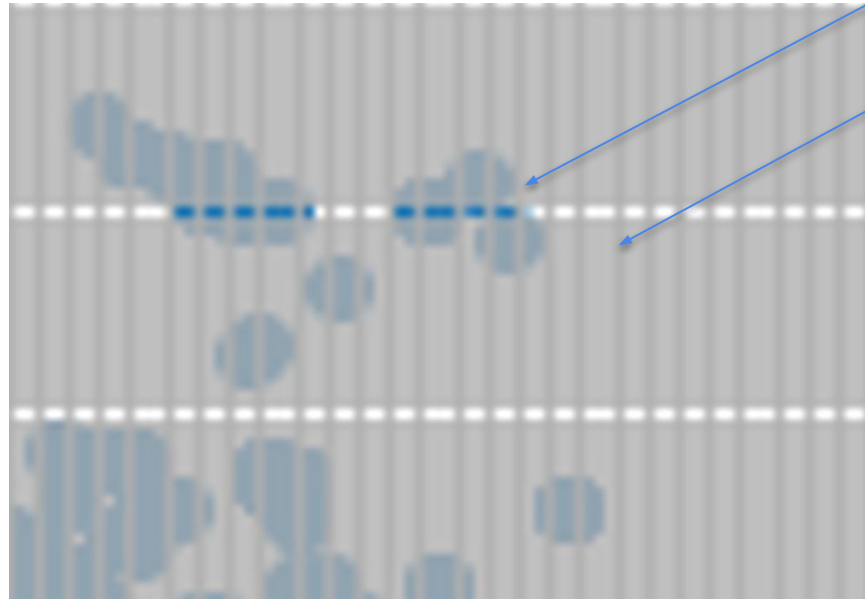
1.2 km





# Searching of Geo Blocks with Retail

- Grid Search
- Including into desired geo blocks with retail
- Number of geo blocks with retail = **23,907**
- Total geo blocks = 4,10,308



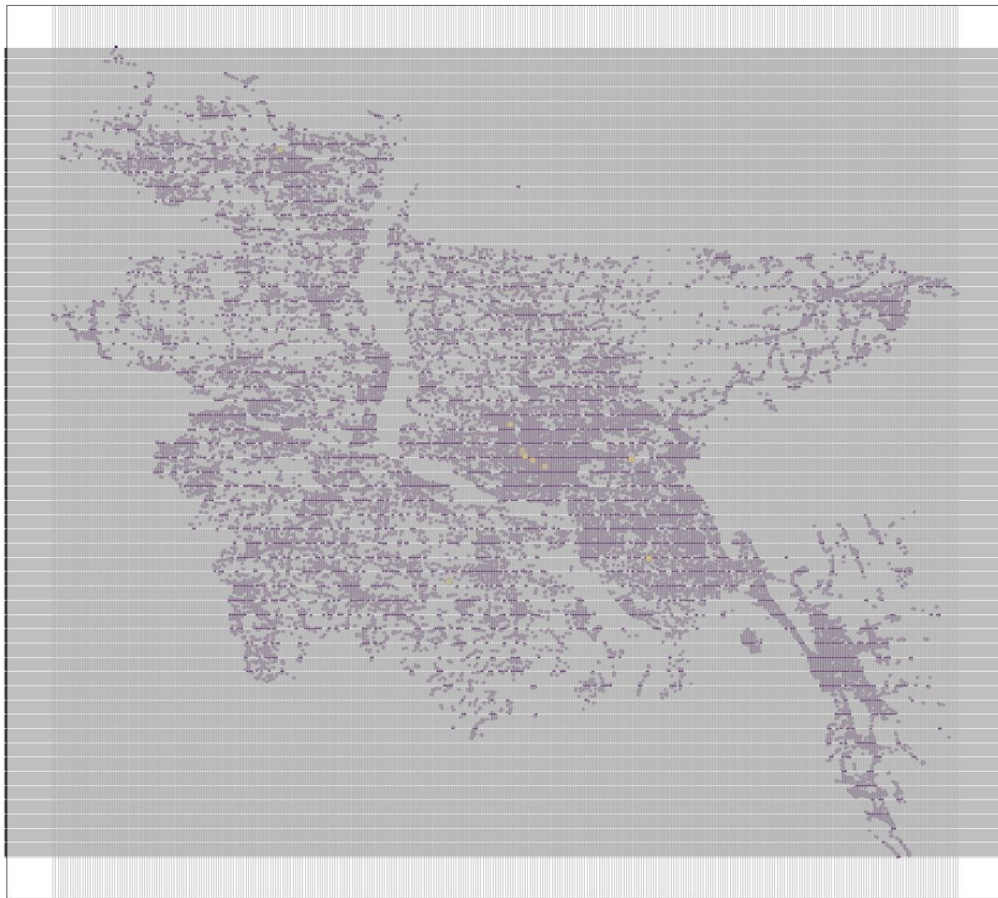
Geo Block with retail

Geo Block without retail





# Future Retailer Deployment



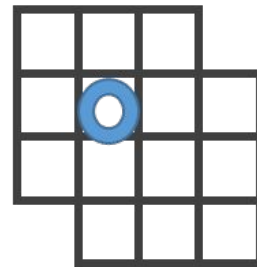




# Algorithm for Finding 10 Targeted Geo Blocks



3x3 neighborhood of  
Empty geohash



3x3 neighborhood



# Top 10 Targeted Geo Blocks

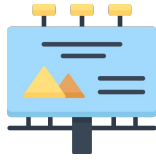






# Top 10 Targeted Geo Blocks





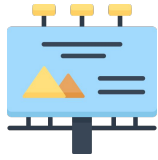
# Big Billboard Placement

- Best location for advertisement.
- We find the most important position by finding the highest number of agents in an area.
- We found top selling product from sorting so we would recommend two products for billboard: Product 17,16

The best position:

**23.600303699999483, 89.82775300000007**

Number of Agent : **163**



# Billboard Placement

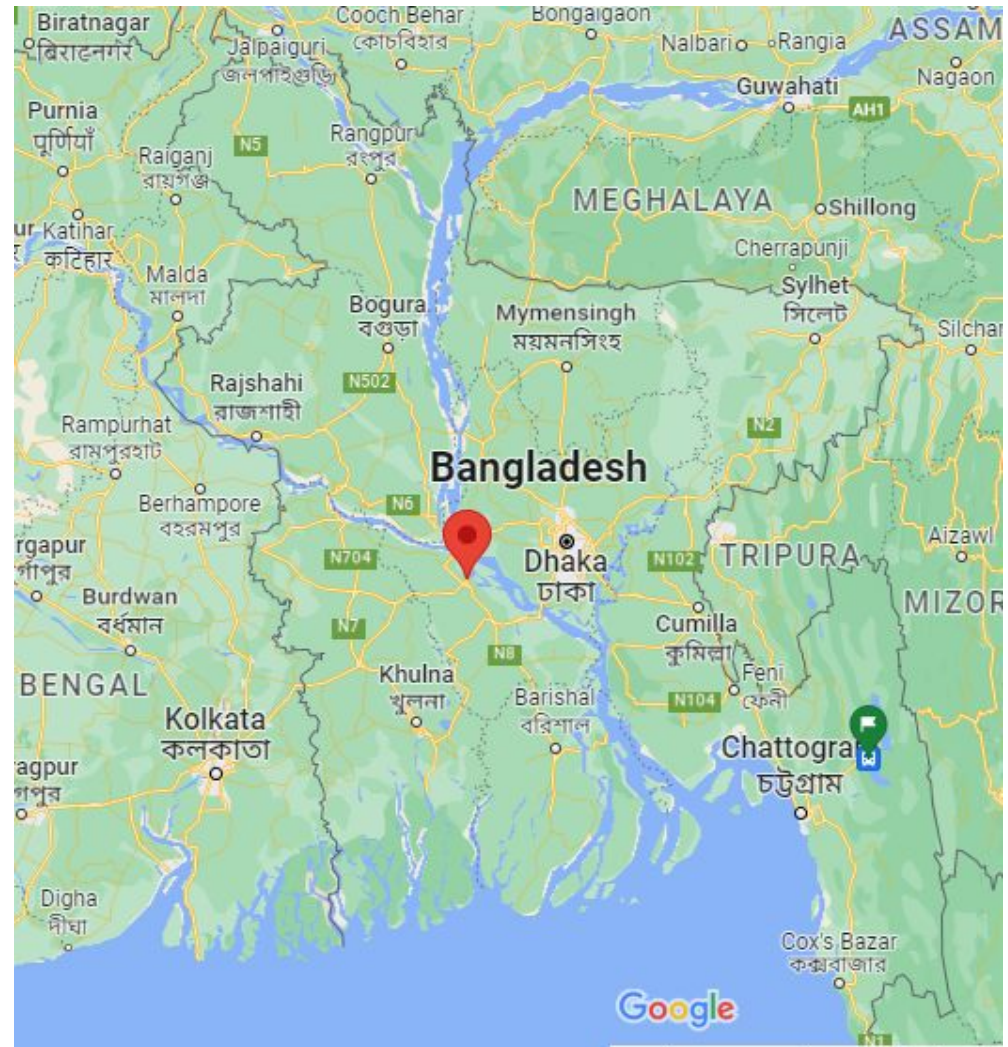
**The best position:**

23.600303699999483, 89.82775300000007

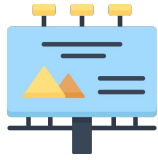
**Location:**

**(Dhaka - Faridpur Hwy, Faridpur)**

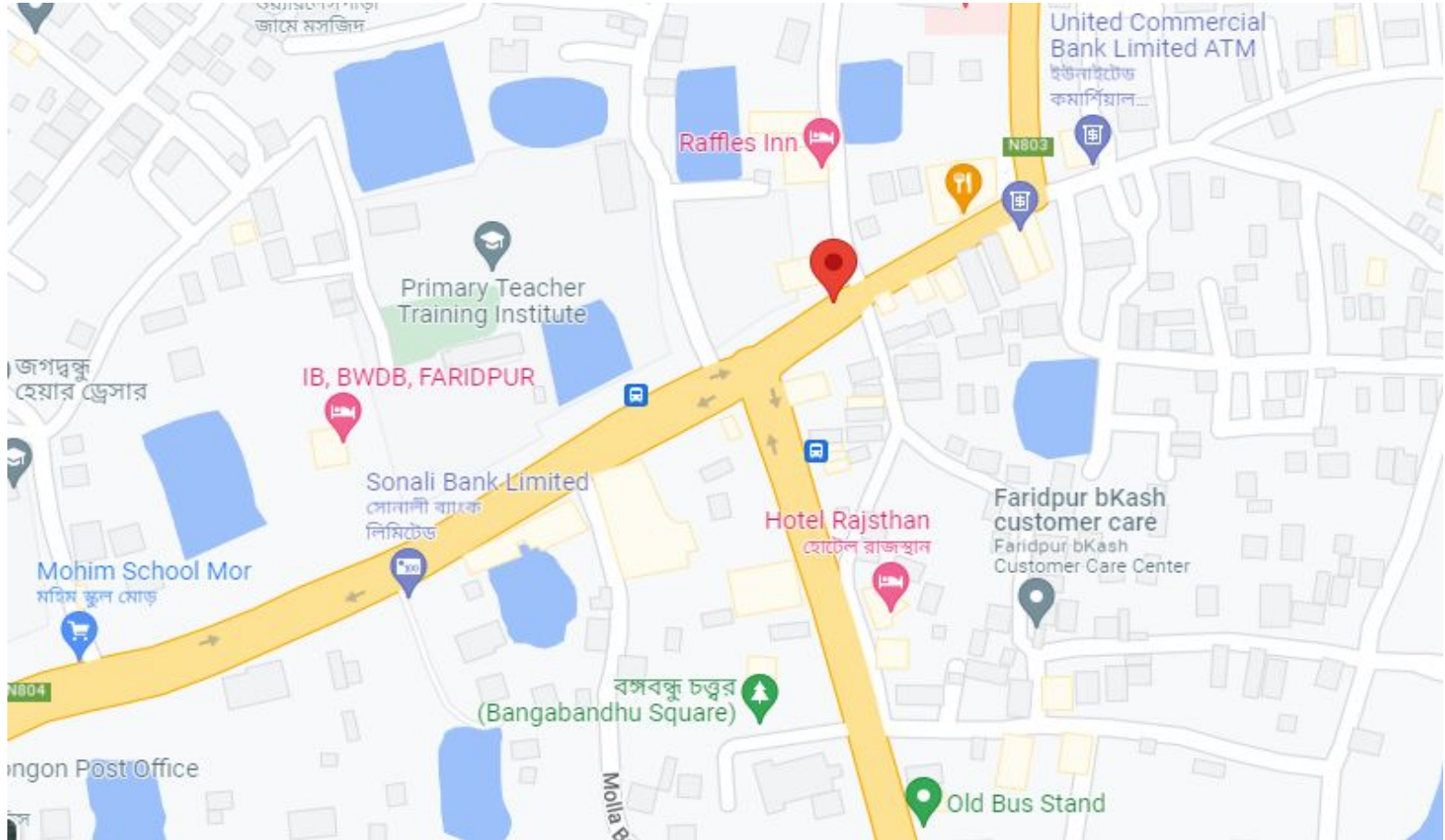
**Number of Agent : 163**



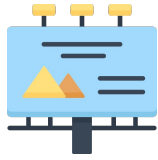




# Billboard Placement (The best position)



[See on map](#)



# Billboard Placement (The best position)



# Area categorization

**Target:** Classify Agent Location

- A. Residential
- B. Tourist spots
- C. Transit hubs
- D. Corporate area

## **Available Features in Dataset:**

1. Transaction time for each Agent (Month and Day Hour )
2. Agent Location (latitude and longitude)



# Area categorization: Intuition and Algorithm

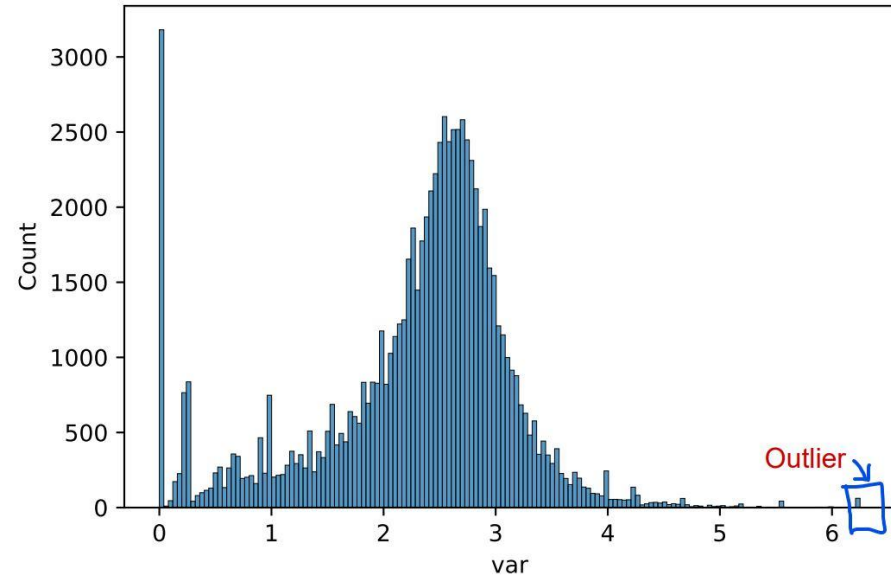
## Intuition

1. Variability of monthly transaction > Tourist spots
2. Transaction Hour profile > Residential, Transit hubs and Corporate area

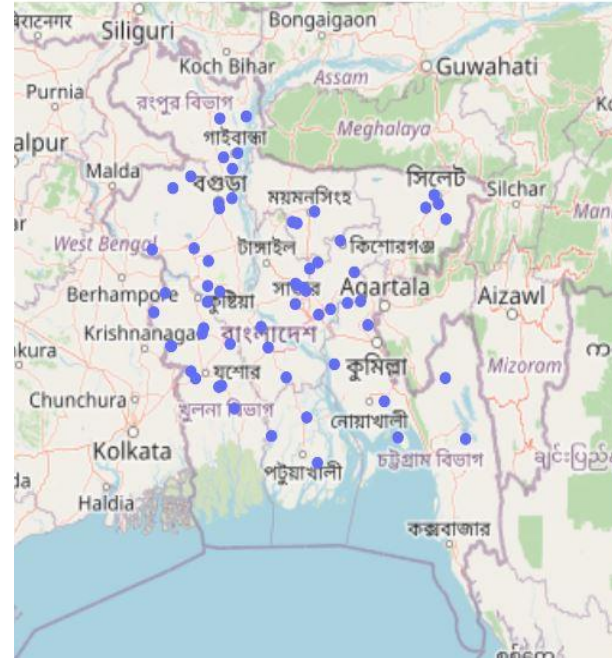
## Algorithm

1. Max variance of monthly transaction > Tourist spots
2. Pattern in transaction hour profile > Classify rest of the place

# Tourist Spot Location

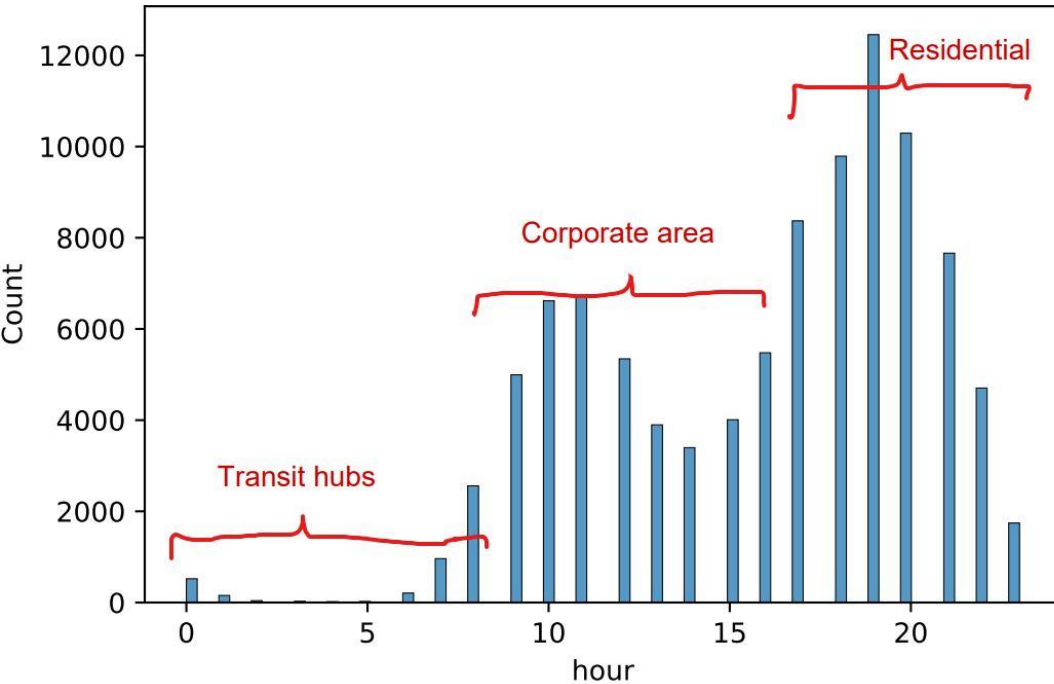


Locate outlier of monthly variance



class  
• Tourist spots

# Residential, Transit hubs and Corporate area



Transaction vs Day Hour

1. Divide the transaction histogram into 3 regions.

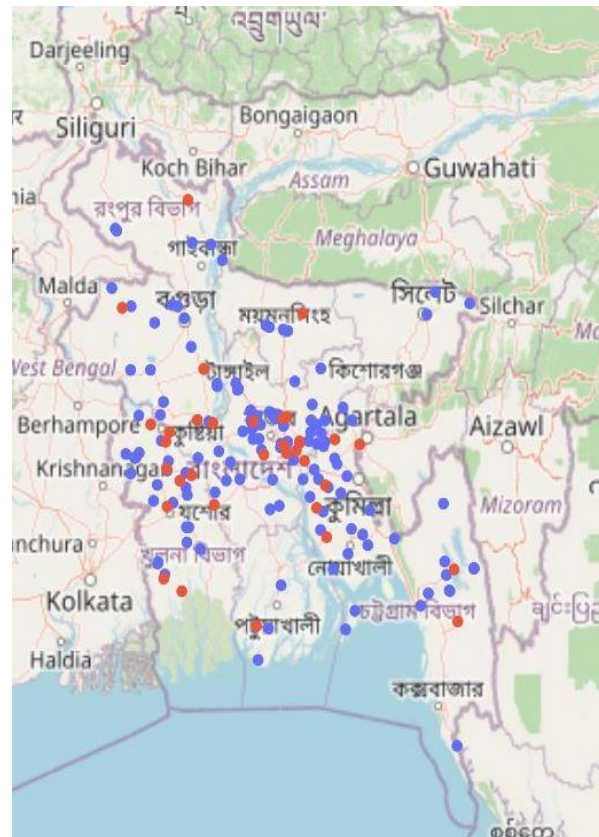
0-9 > Transit hubs

9-18 > Corporate area

18-23 > Residential

2. Agent > Select the zone where transaction occurs most

# Visualization of Categorized Areas



class

- Corporate
- Transit hubs



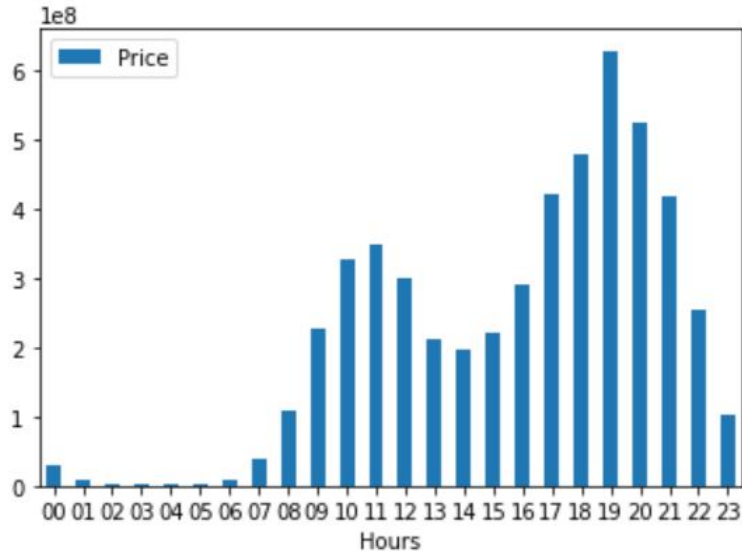
**Residential:**  
99%

**Corporate:**  
0.75%

**Transit Hub:**  
0.25%

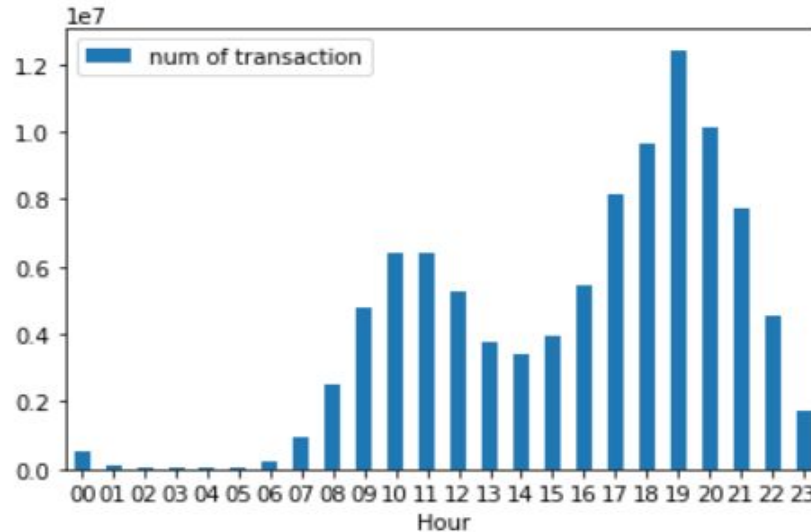
# Peak Hour in terms of Sale

- ❑ We extracted the hourly sale for all the 20 transaction files and summed the sales for each hour.



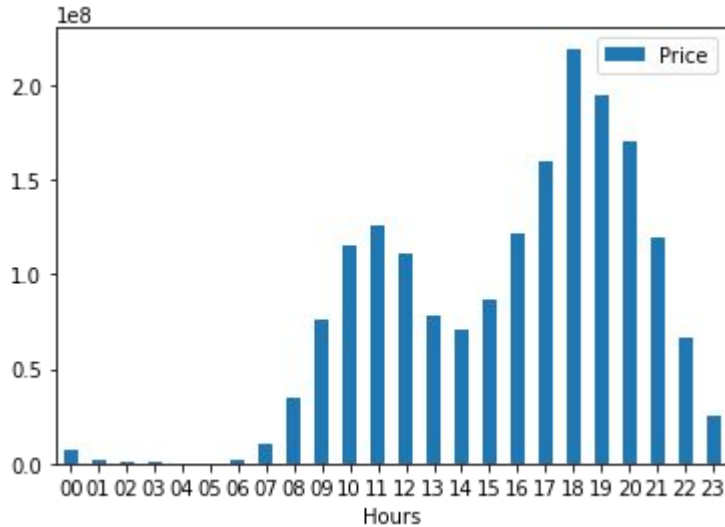
# Peak Hour in terms of number of Transaction

- ❑ The peak hour for transaction was also calculated in the same manner as the peak sales hour. The peak transaction time was found to be 19:00 Hr as well.

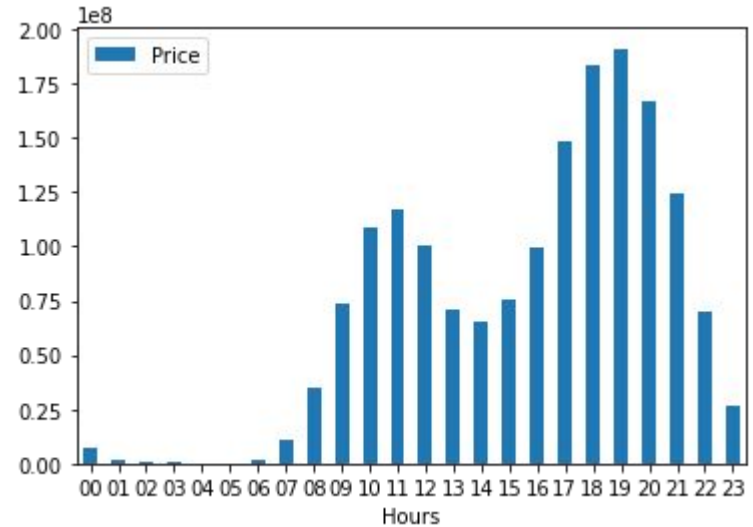


# Impact of Seasonality on Peak Hour

- ❖ We plotted the total hourly sale for each month in order to observe the variation in the peak hour.

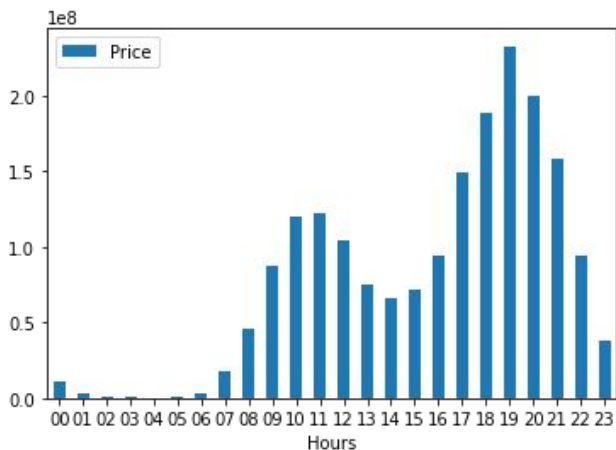


January

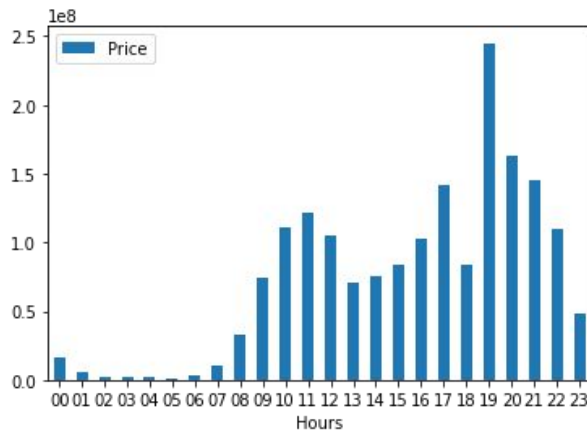


February

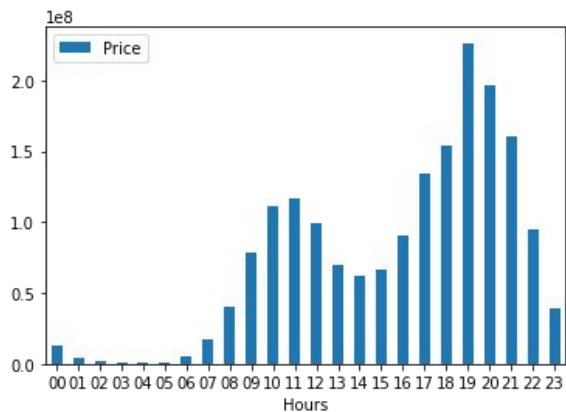
# Impact of Seasonality on Peak Hour



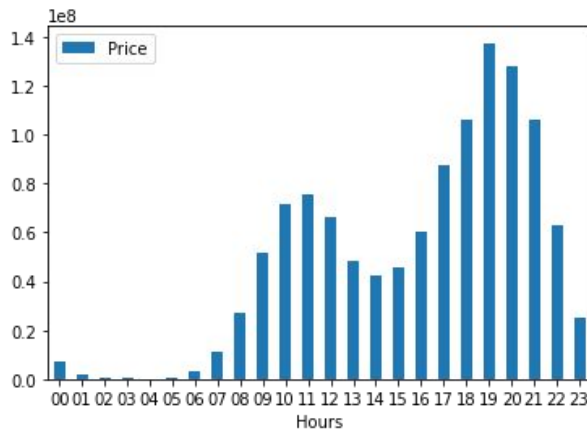
March



April



May



June



# Impact of Seasonality on Peak Hour

- ❑ Almost all the months show a very similar kind of sale distribution over hours in a day.
- ❑ The month of January has peak sales rate at 18:00 Hr and the rest of the months have a peak sale rate at 19:00 Hr. It can be interpreted that this happens due to the fact that days are shorter in the month of January.
- ❑ From the graphs we can see that highest sale rate happens from 17th-20th hour when most of the working hours are over.

# Customers who are spending most

Customer	Total Transaction
Customer_8715772	760
Customer_473960	754
Customer_8601882	683
Customer_12133000	601
Customer_18763032	568

# Retails Serving Highest Number of Travelers

- From the transaction data, we find out the top 5 retailer who has the most transactions.
- Then for those agent we find out the unique customer they have served.
- Finally we sort that dictionary for value to find the best server retailer.

The top 5 best retailers:

1. 3597e9c320bf42227f018874ea95d3927ac8a90c20335761f45df9b8759bdfd050066
2. c92e6f7611a5f1d0d8398ddb8b89e0a16ade36e4372549d5c2b23175b174b2c047479
3. 0cedf61ee96c949b630f2cfde70c07bb23eac4d510b0b4f5eebe08180b9fdb5431769
4. 751bb91b04df6944df2fddbeaf2e1b1bd47514d22e332a7e73a3afc86e386aa028099
5. 469a725a9cdee6fda6662fb7e11f38aae824a59ead84c49847b10eeac33b39da23594

# Business Idea Generation

- Profit Sharing
- Customer Feedback
- Organizing Symposium



**Thank You**