Mahindra First Choice

Capstone Project Presentation

Team - Data Blitz

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Problem Definition

Geo Location Based Analysis

Understanding the customer behaviour based on their location and the cars that they own.

Market Segmentation

Divide the customer base into segments based on their car type, service type & total spend such that these customers will respond similarly to the different marketing campaigns.

Customer Lifetime Value Prediction

Lifetime Value Analysis of customers to maintain relationship with high profit generating customers in future & finding potential customers.

Market Recommendation

Based on the revenue generated by customers, aim is to understand which marketing technique has led to a higher revenue

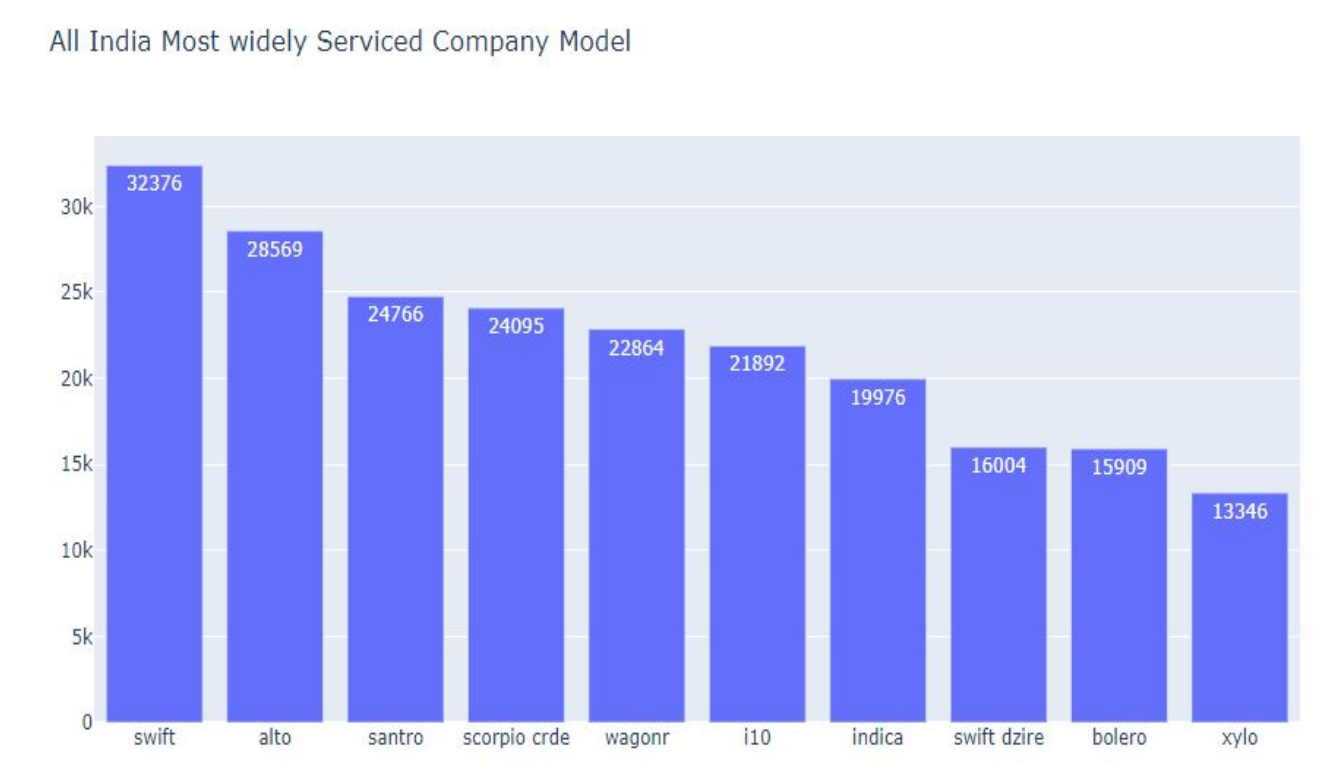
What Features Should A Roadside Assistance Have?

Data Treatment

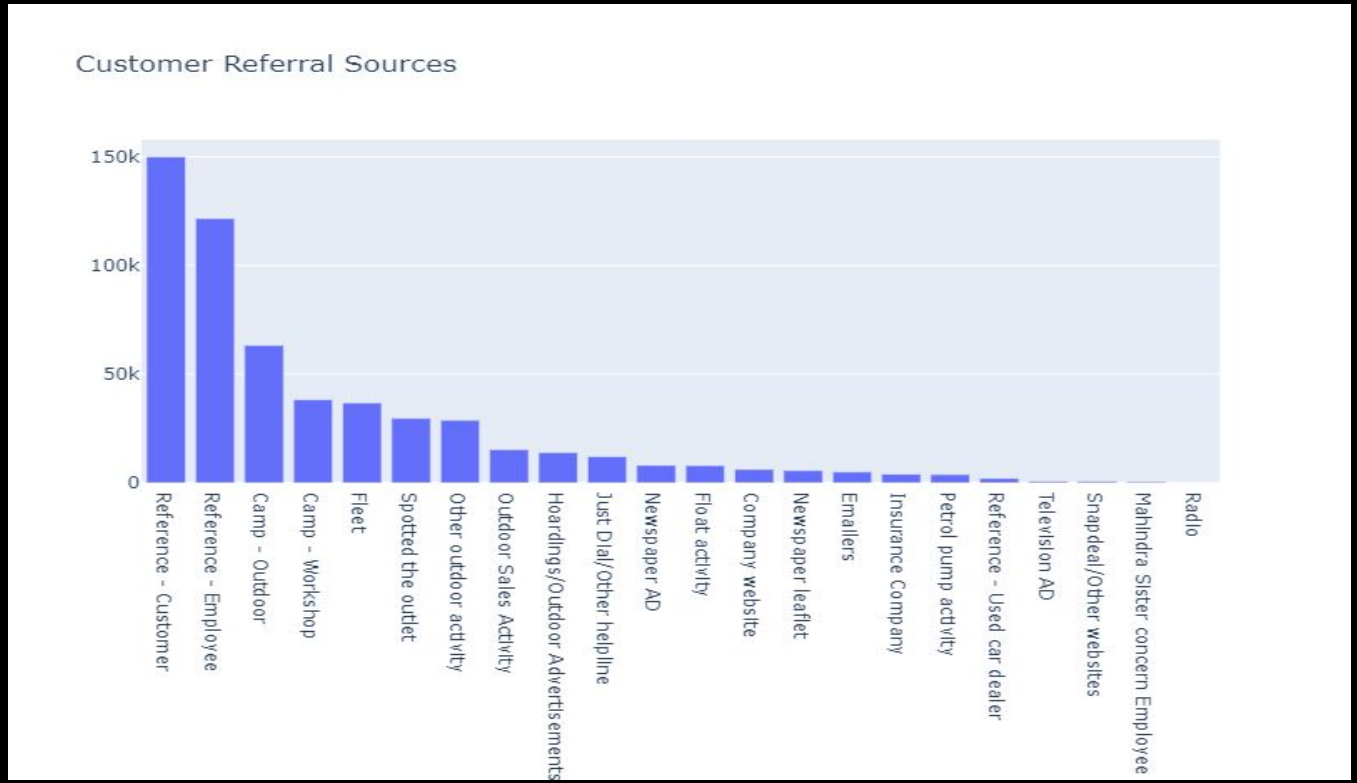
- Columns with more than 45% null values were dropped
- State, City and District replaced with data from pageocode library obtained from pincodes
- Leveraged the job card and invoice date and times to find the total servicing hours for each invoice
- Categorized the cars into 5 model types like Hatchback, sedan, SUV based on the information available on CarDekho.com

PRELIMINARY ANALYSIS

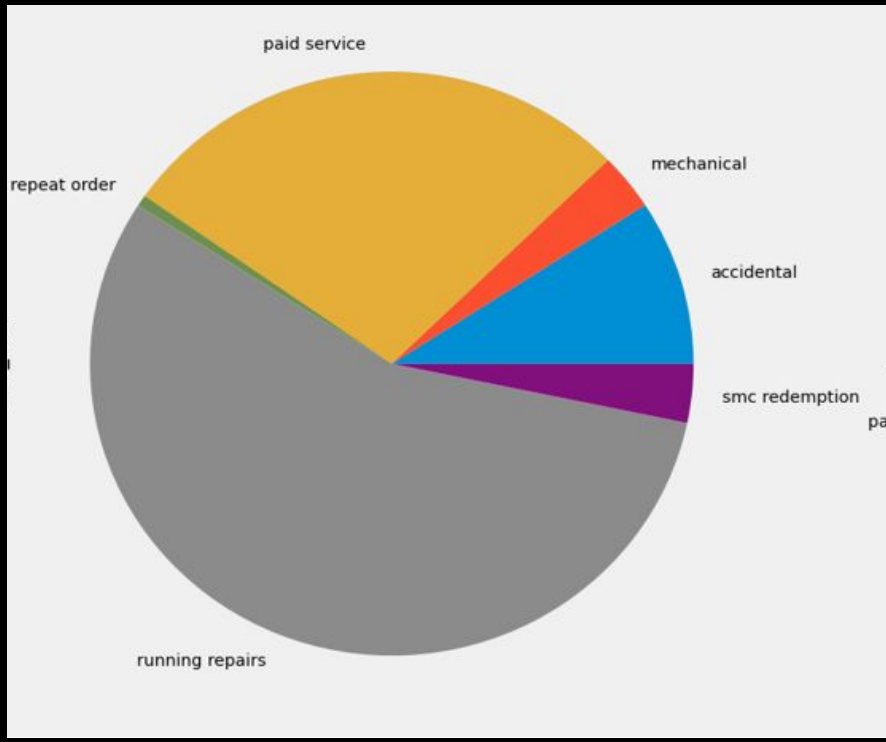
Most Serviced Model



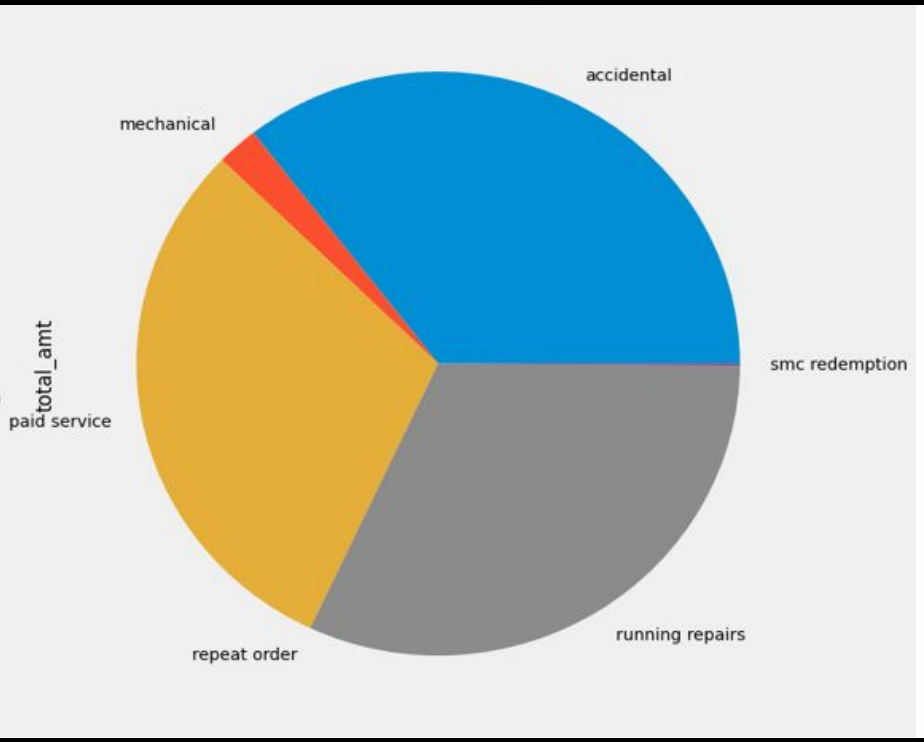
Source Of Reference For A Customer



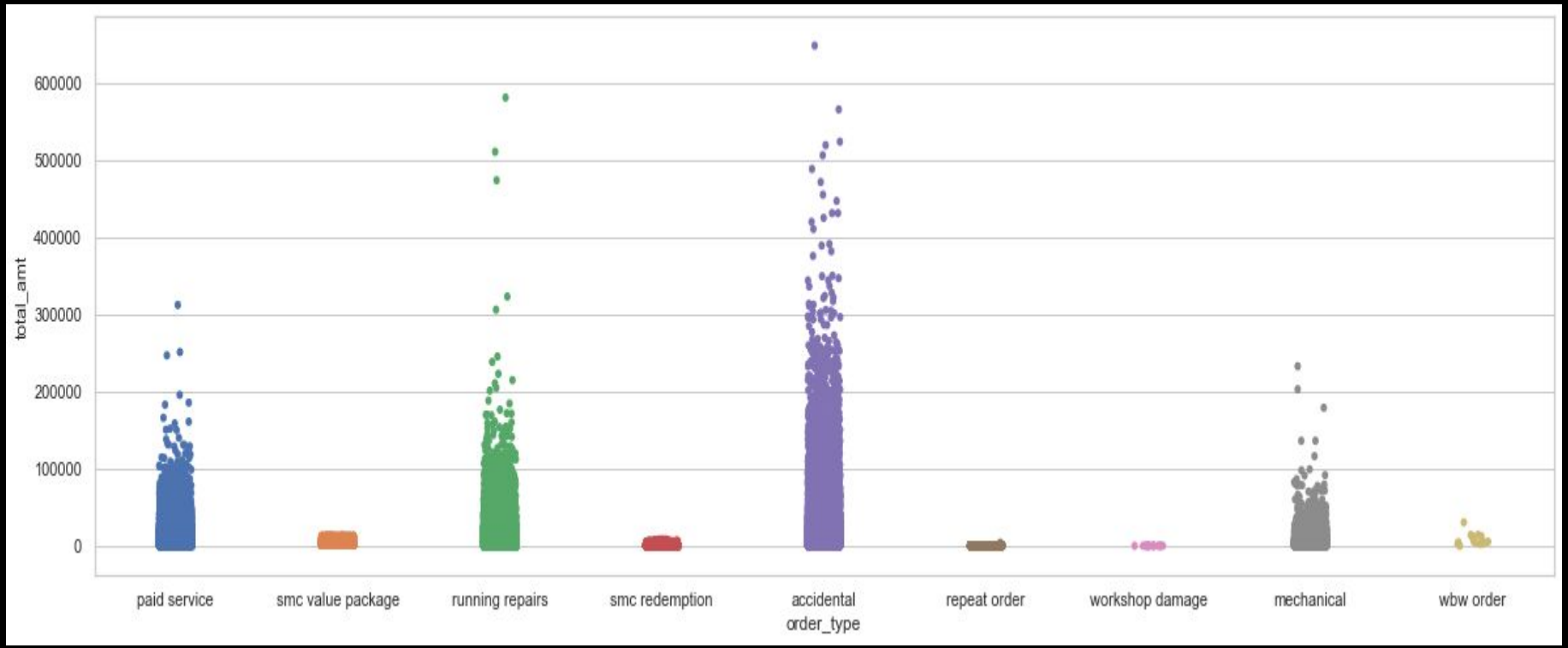
Count-wise Distribution



Cost-wise Distribution



Value delivered to business



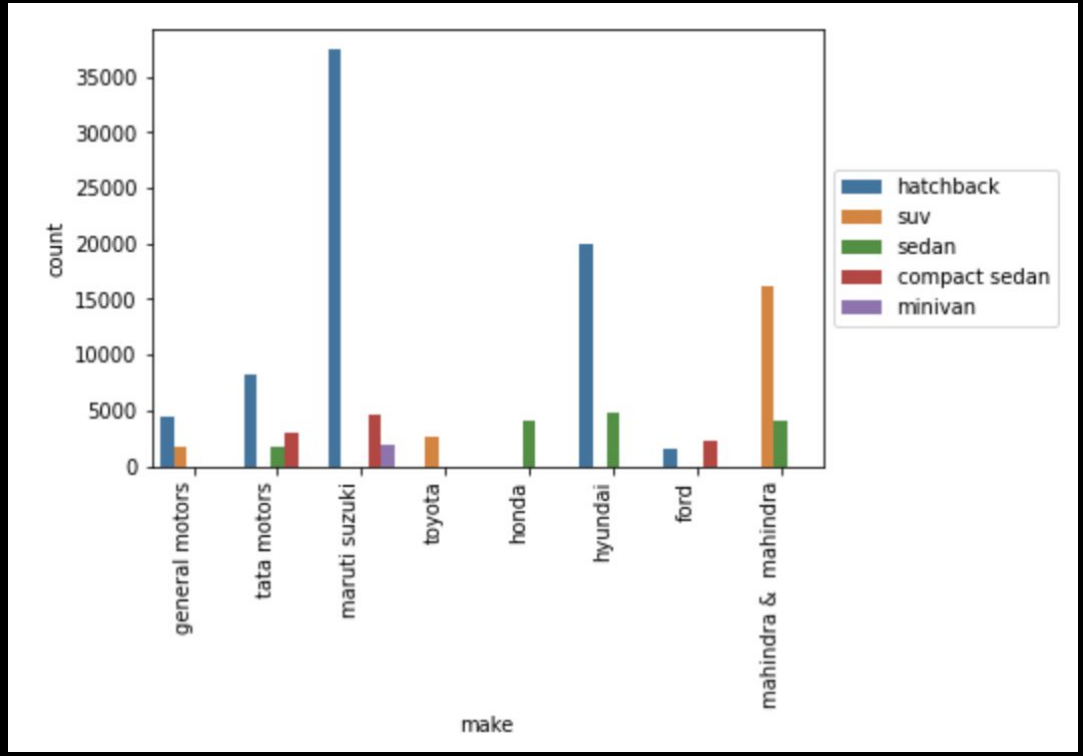
ZONAL ANALYSIS

Zonal Division of Data

- Reduced data size for faster data processing
- Scalable analysis
- Mahindra can focus on different zones with different approaches

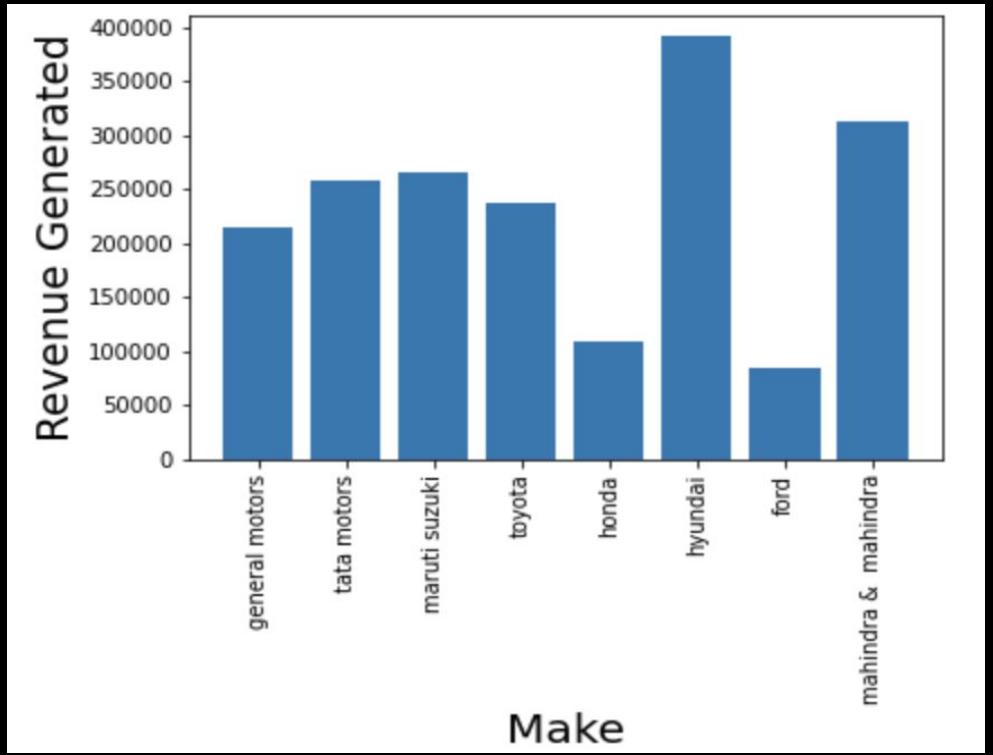
West Zone

- Most visited car type is maruti suzuki hatchback followed by hyundai
- Mahindra & Mahindra is the only make to have highest SUV types



West Zone

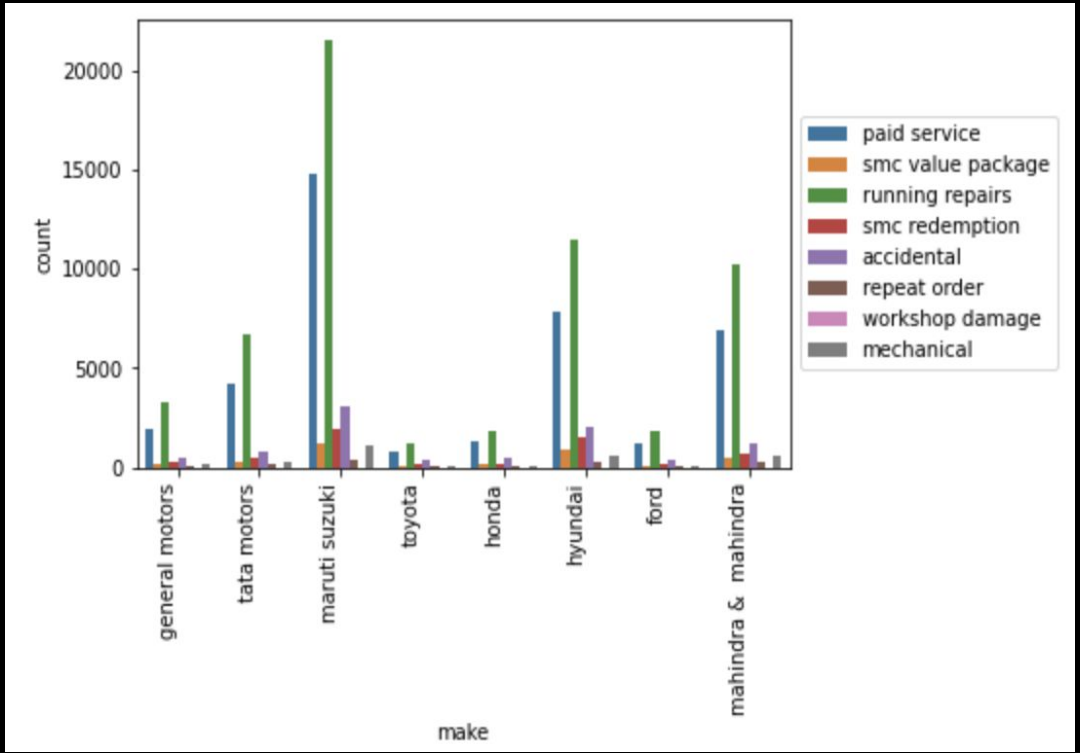
- Despite the low frequency of Hyundai and Mahindra cars, they prove to be the cash cows for the west zone.
- Maruti Suzuki is closely followed by Tata, Toyota and General motors.



West Zone

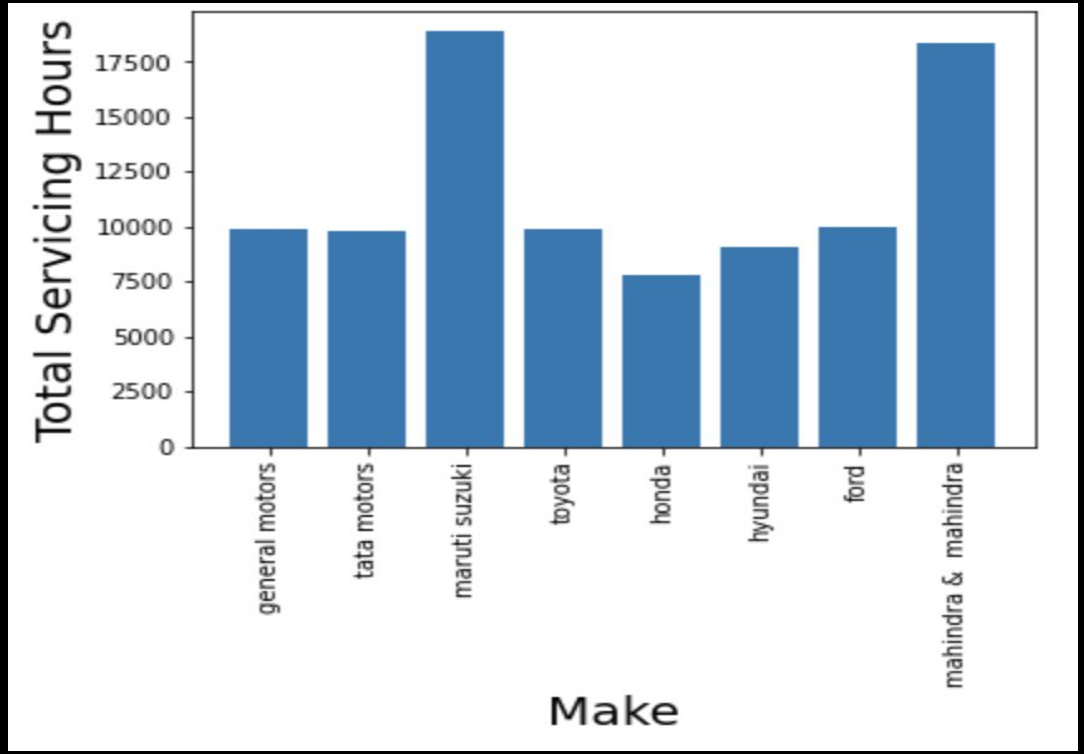
- Running Repairs and Paid Services are the most common orders received by the west zone across car models.

- Maruti Suzuki and Hyundai have a significantly higher reported number of accidental services.



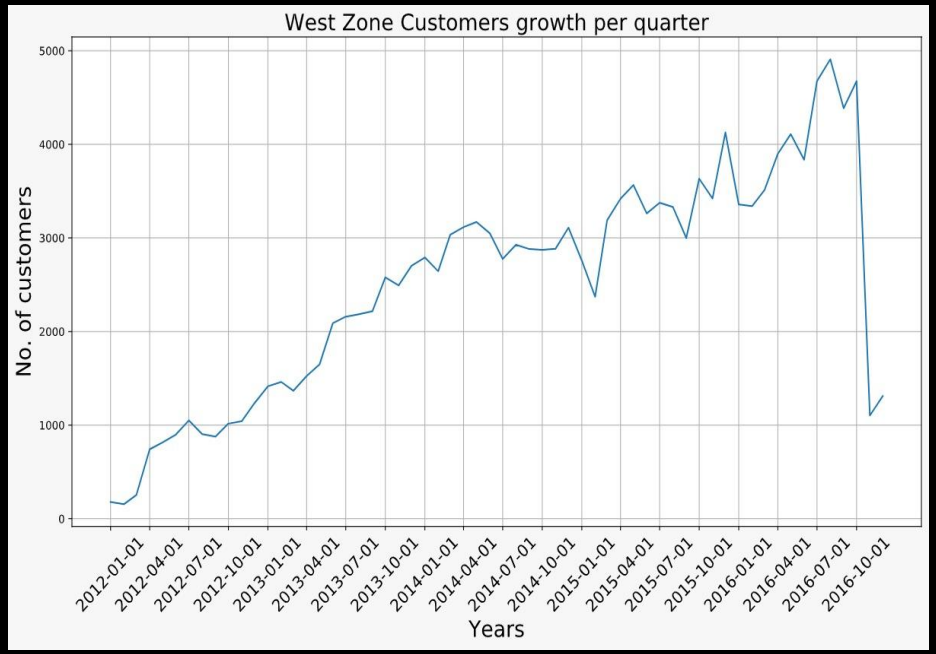
West Zone

- Servicing hours for Maruti Suzuki and Mahindra & Mahindra are the highest.
- Servicing hours for General Motors are significantly lesser and yet generate more revenue for the garages.



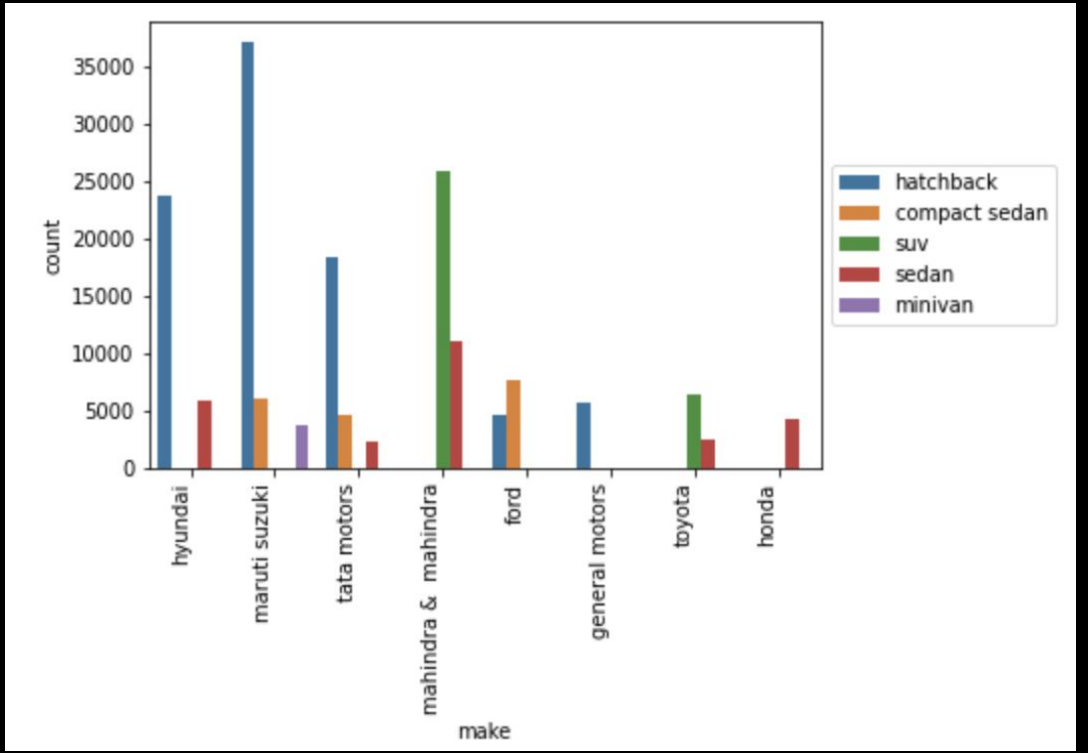
West Zone


West Zone Revenue growth per quarter
Revenue (Rs.)
20000000
15000000
10000000
5000000
0
2012-01-01
2012-04-01
2012-07-01
2012-10-01
2013-01-01
2013-04-01
2013-07-01
2013-10-01
2014-01-01
2014-04-01
2014-07-01
2014-10-01
2015-01-01
2015-04-01
2015-07-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01
Quarters


West Zone Customers growth per quarter
No. of customers
5000
4000
3000
2000
1000
0
2012-01-01
2012-04-01
2012-07-01
2012-10-01
2013-01-01
2013-04-01
2013-07-01
2013-10-01
2014-01-01
2014-04-01
2014-07-01
2014-10-01
2015-01-01
2015-04-01
2015-07-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01
Years

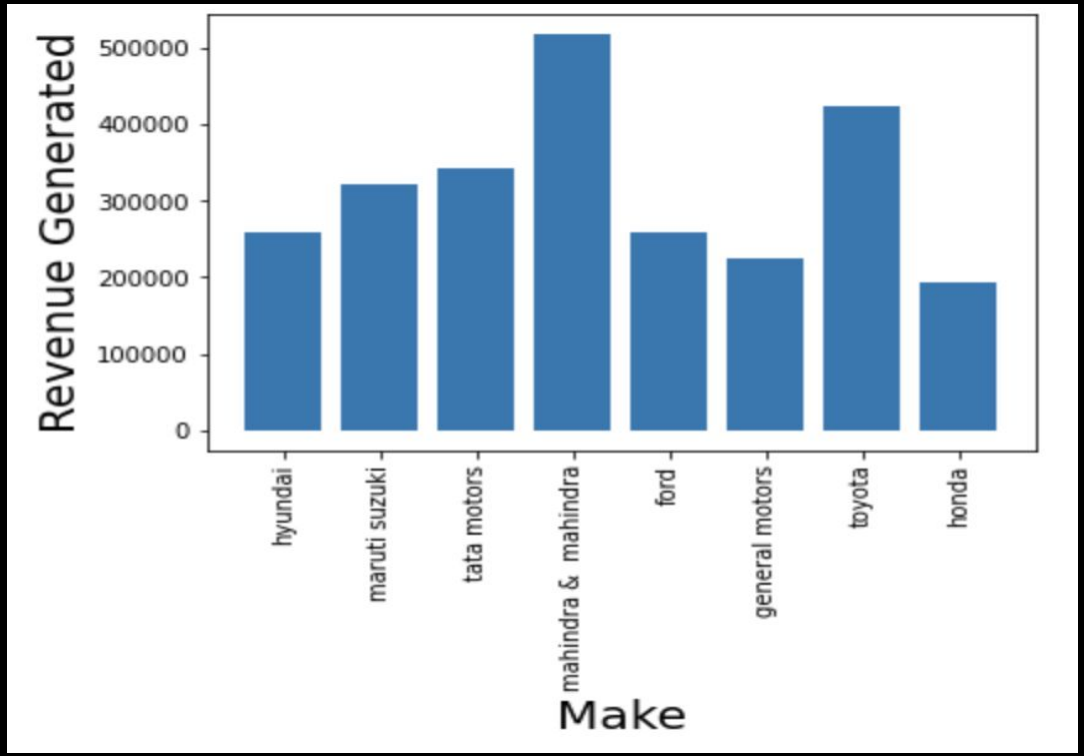
South Zone

- Hatchbacks are the most popular cars across models.
- Sedans and compact sedans are more popular in the South than that in the West



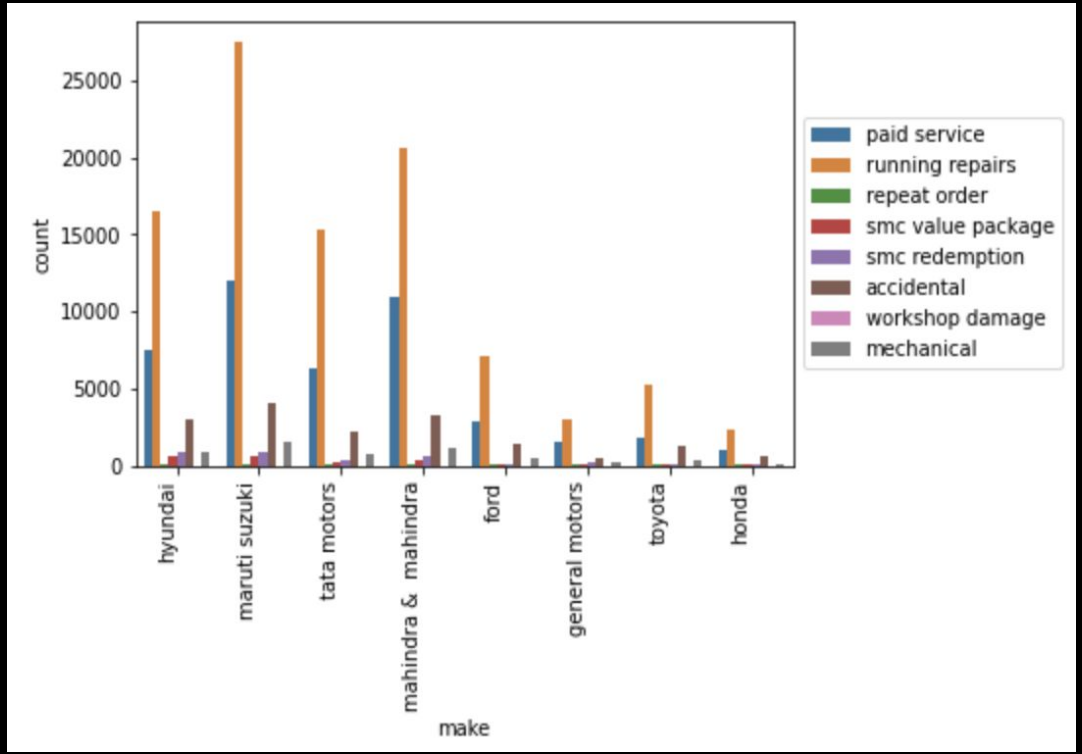
South Zone

- Despite having the highest frequency, Maruti Suzuki brings lower revenue.
- The SUVs and sedans of Toyota are the highest revenue generators in the south zone.



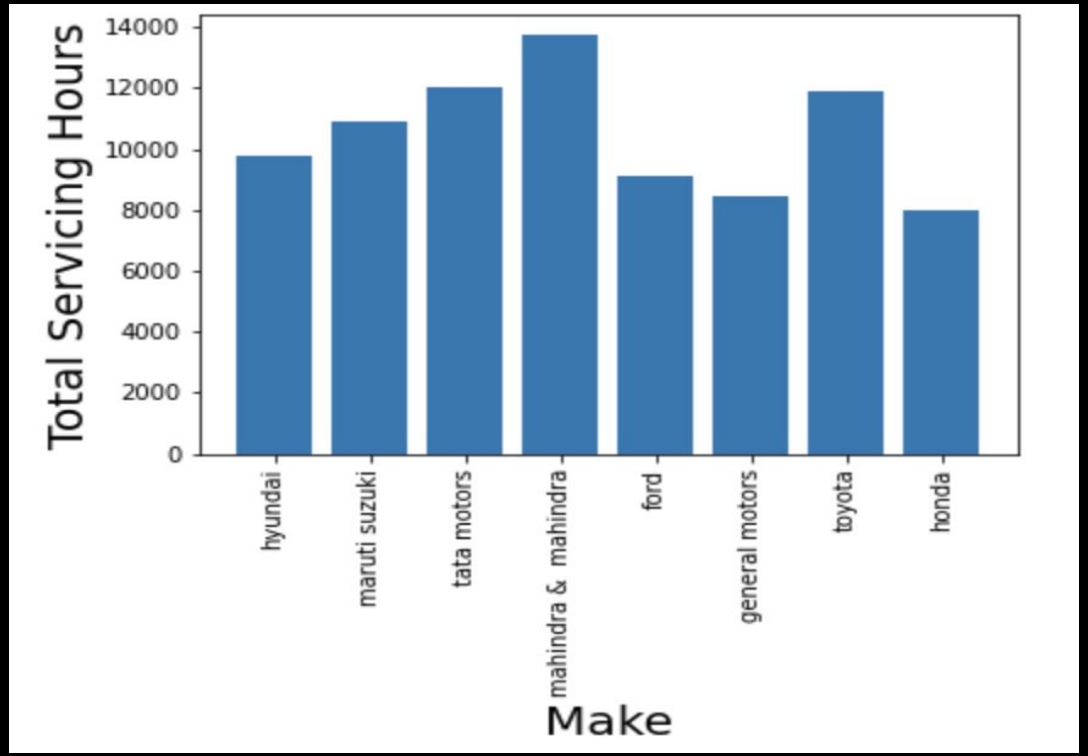
South Zone

- Running repairs and paid services are frequent issues reported across models.
- Repeat orders are almost negligible in the south zone
- Accidental cases reported in the South Zone are more than that in the West Zone.

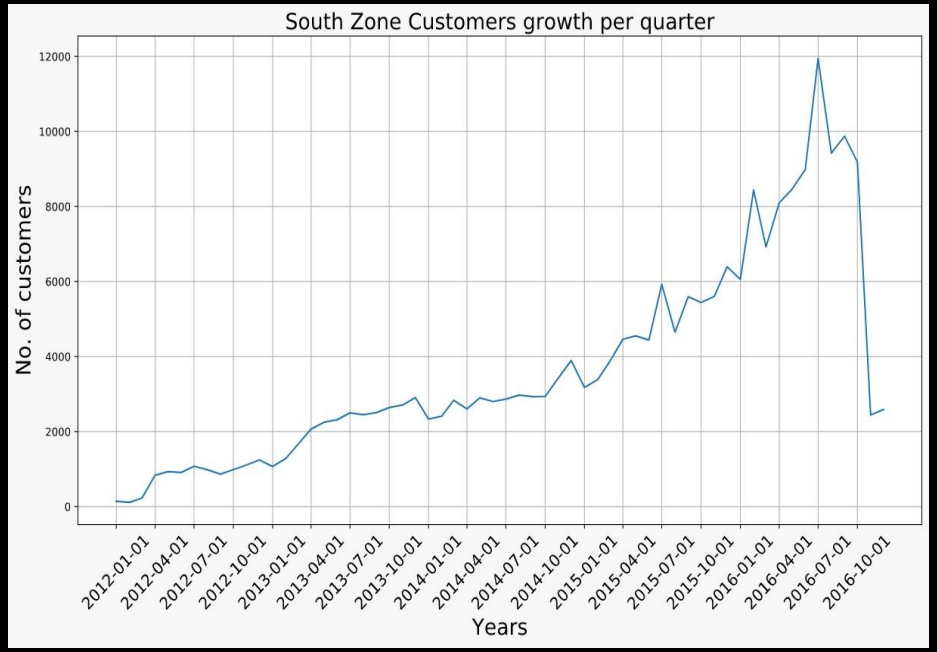


South Zone

- Servicing Hours are significantly higher in the South Zone.
- Garages in the South take lesser time to repair Maruti Suzuki as compared to the West Zone



South Zone


South Zone Customers growth per quarter
No. of customers
Years
0
2000
4000
6000
8000
10000
12000
2012-01-01
2012-04-01
2012-07-01
2012-10-01
2013-01-01
2013-04-01
2013-07-01
2013-10-01
2014-01-01
2014-04-01
2014-07-01
2014-10-01
2015-01-01
2015-04-01
2015-07-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01


South Zone Revenue growth per quarter
Revenue (Rs.)
Quarters
0
10000000
20000000
30000000
40000000
2012-01-01
2012-04-01
2012-07-01
2012-10-01
2013-01-01
2013-04-01
2013-07-01
2013-10-01
2014-01-01
2014-04-01
2014-07-01
2014-10-01
2015-01-01
2015-04-01
2015-07-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01

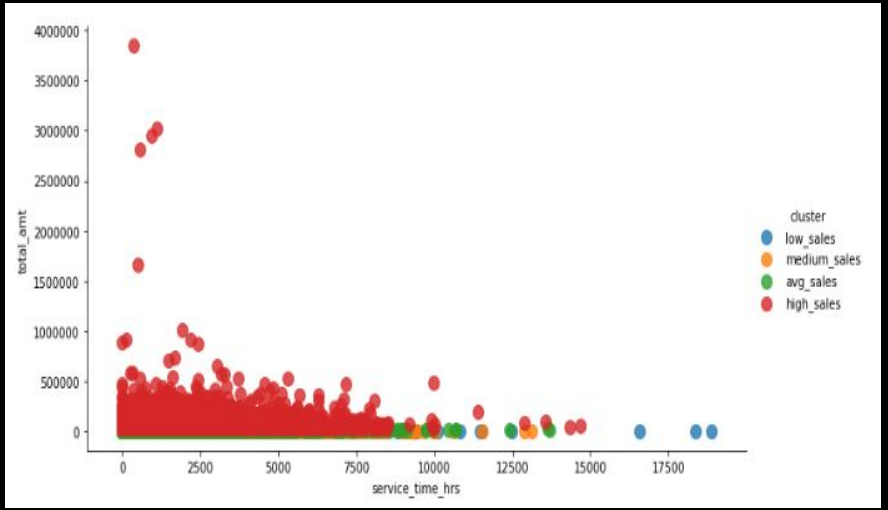
CUSTOMER SEGMENTATION

Customer Segmentation

- Customer segmentation helps identify customers based on their revenue and the average servicing time
- Objective is to ideally minimize the service time without losing on revenue
- This was achieved by grouping customers based on make, model, city, order type, average service time and average revenue

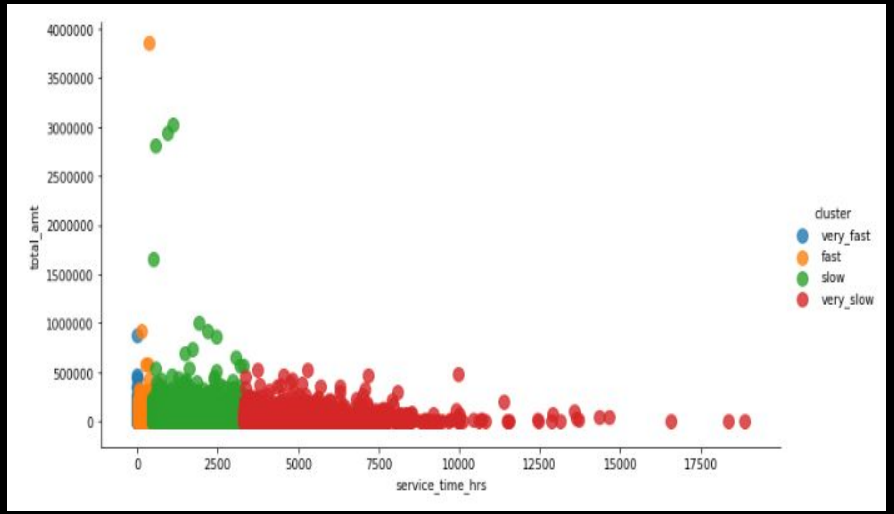
Clustering Based On Revenue Generated

Cluster	Total Amount	Servicing time (Hrs)	Customer No
High sales	54069	1333	16158
Avg sales	12422	936	64632
Medium sales	4218	575	80789
Low sales	905	219	161579



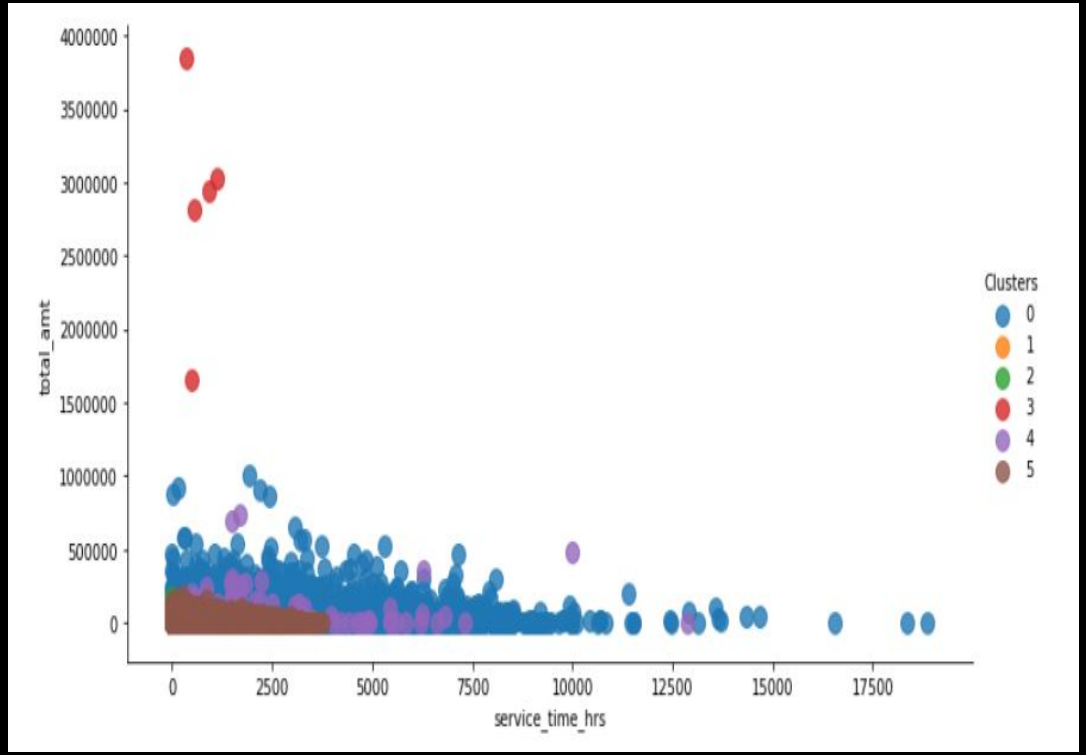
Clustering Based On Service Time

Cluster	Total amt	Servicing Time (Hrs)	Customer No
Very slow	12585	4857	16158
Slow	12742	1409	64632
Fast	8982	121	80771
Very fast	2544	5	161558



K-Means

- Through Elbow plot we found 6 is the ideal number of clusters needed
- Cluster 0 contains highest number of elements followed by Cluster 4 and 5



LIFETIME VALUE PREDICTION

LifeTime Value Of A Customer

- Customer LifeTime Value is the prediction of the possible revenue generation from future customer based on business history
- Repeating customer invoices were grouped and mean of total amount was considered

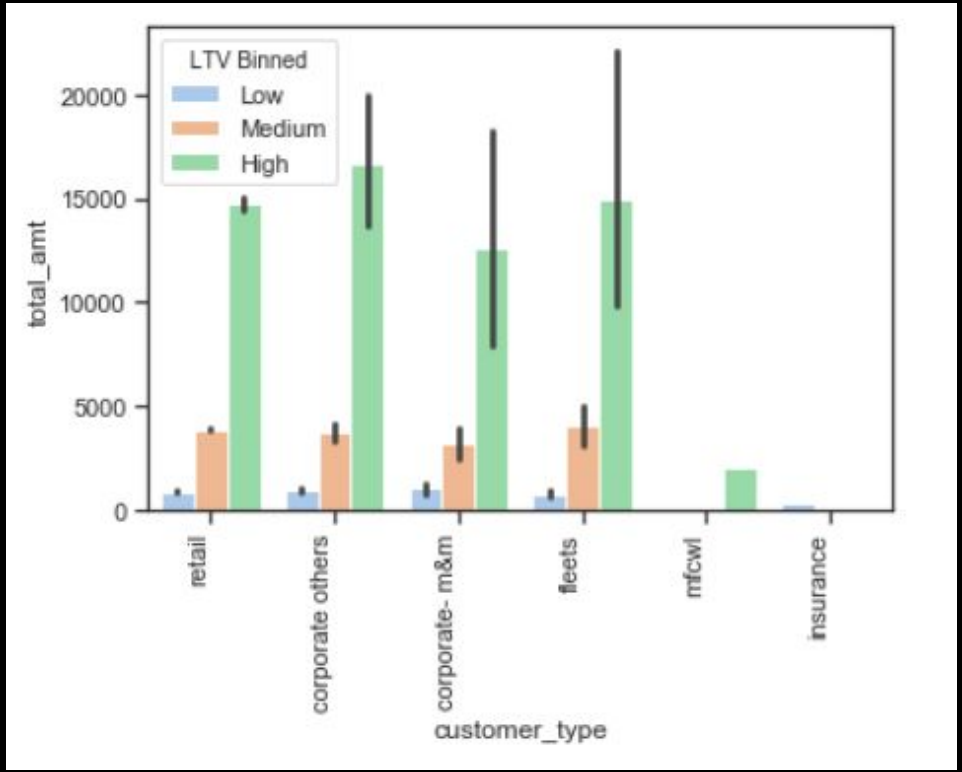
LifeTime Value Prediction

Model	Train Score	Test Score
Linear Regression	0.75	0.75
Decision Tree	0.97	0.93
Random Forest	0.98	0.92
XGB Regressor	0.98	0.93

MARKET RECOMMENDATION

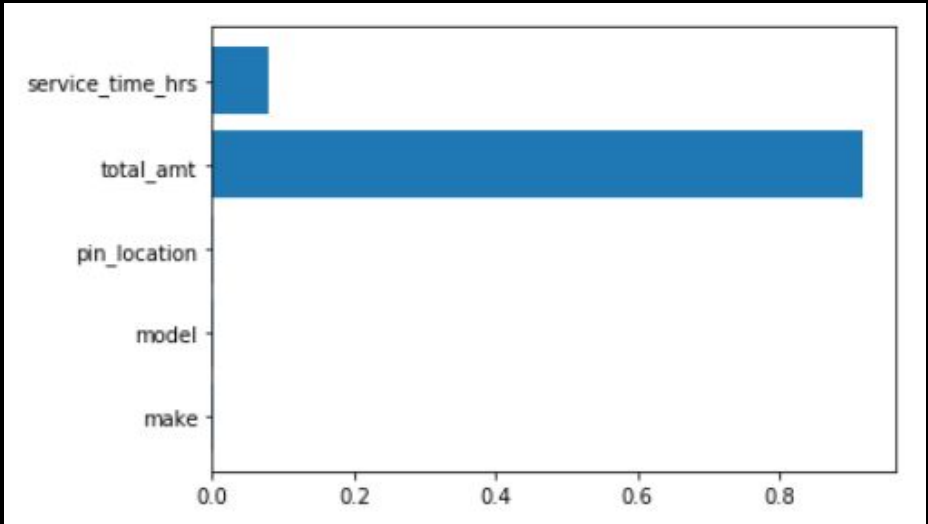
Understanding The Revenue Generated Basis Market Recommendation (2015)

- High LTV customers are mainly Retail or Corporate.
- Insurance has no significant ROI to the Lifetime Value of a customer.
- Second hand cars also do not generate revenue.
- Rental service cars are also generate High LTV but there is a great variation in the amount generated.

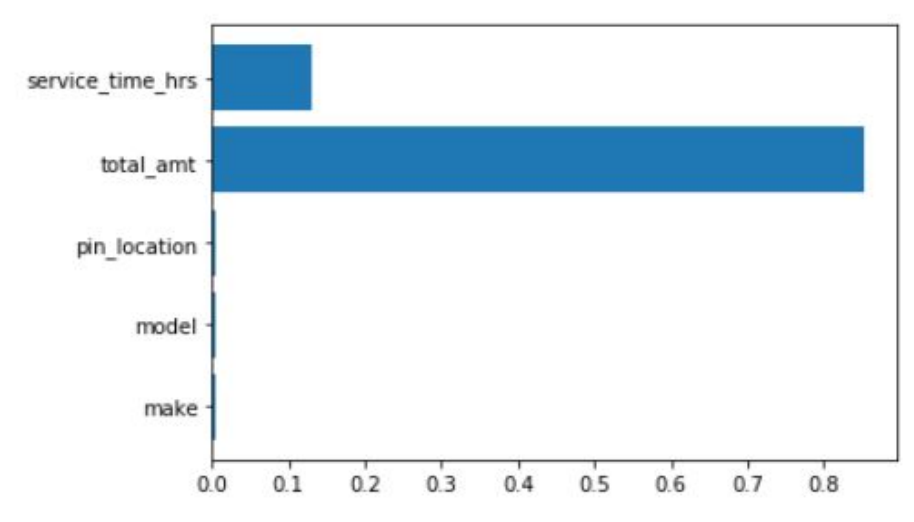


Feature Importance

Decision Tree



Random Forest



Classification Models

Model	Train Score	Test Score
Decision Tree	0.86	0.87
Random Forest	0.85	0.86
XGB Regressor	0.86	0.86

Outcomes

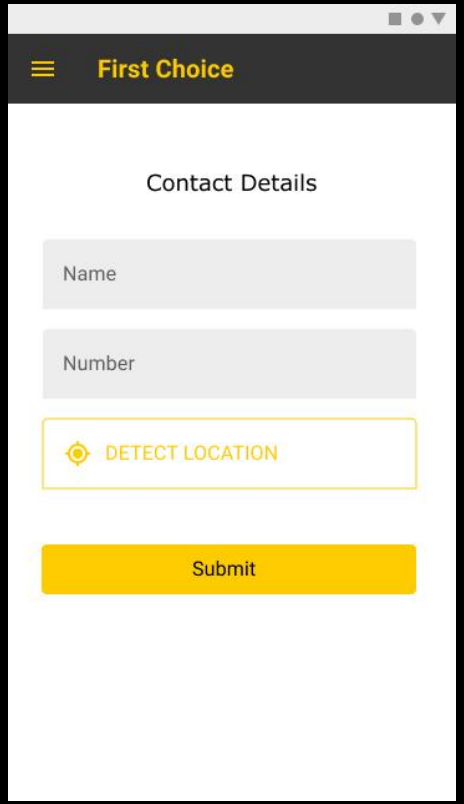
- Maruti Suzuki customers are the highest visitors across all zones but the revenue generated from them is much lesser.
- Accidental cases form the lion’s share of the revenue but given the nature of the service the time required to complete the job is also relatively high.
- Given the popularity of brands like Maruti Suzuki, Hyundai and Mahindra, their vehicle also tend to visit the garage more often so it makes sense to stock up their parts.
- Retail ropes in highest no. of customers hence special offers should be planned for them.
- Mahindra should target Tata and General Motors customers since they contribute the highest revenues.
- Ratings and reviews of cars serviced should also be added to the data to understand the quality of the service and fix the problems in a particular garage.

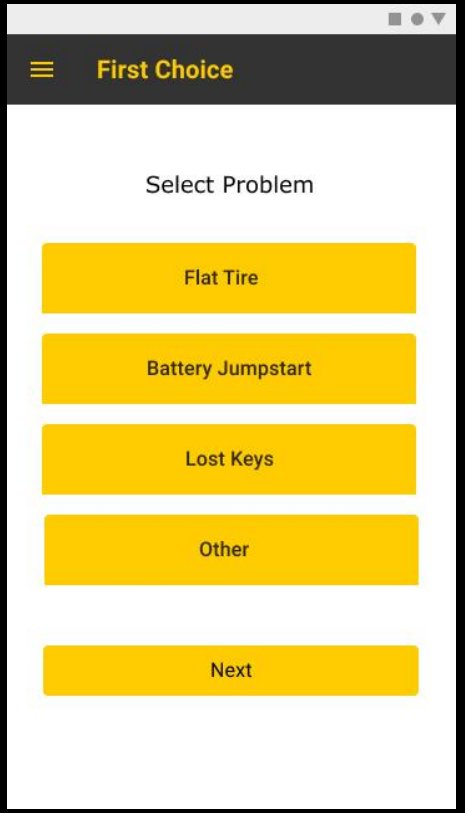
Things That Could Be Done

- We could have built Interactive Web App in which we could have added dynamic filters.
- Adding efficiency of the garage as a parameter would help Mahindra First Choice understand which garage is facing issues.
- LTV of customer could also be zone and state specific to deep dive and get a more accurate results.
- Parts and inventory data could also be leveraged to make predictions for the same.

Roadside Assistance App Mock-up

- In an event of car breakdown customers are one tap away from getting a service from the nearest First Choice registered garage
- Customer can also request the vehicle to be towed in case of immobility
- Given the revenue and frequency of accidental repairs app will mahindra become the “first choice” of many customers
- App will help convert fence sitters to loyal customers

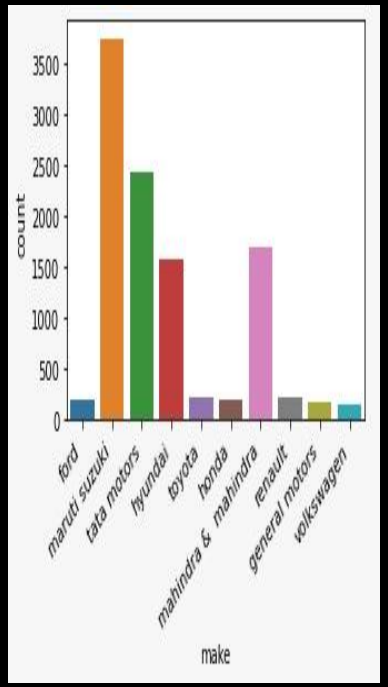


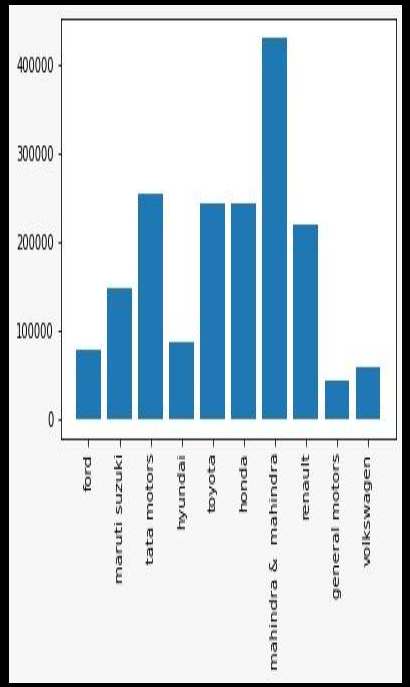


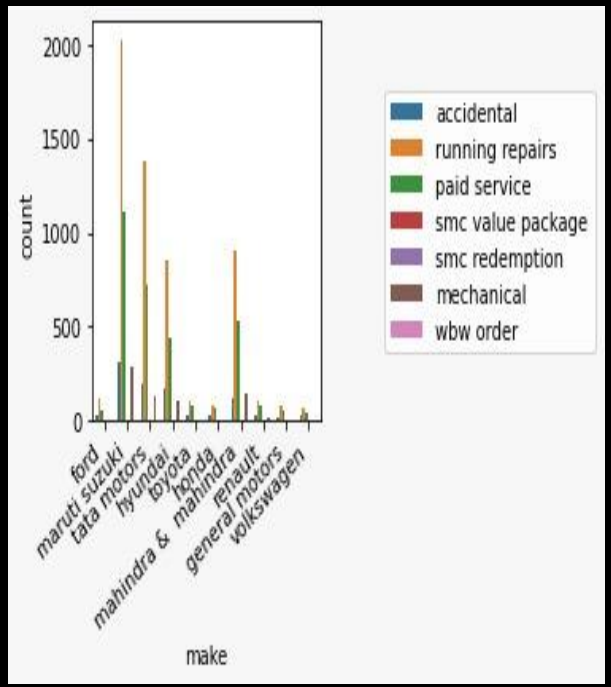
Interactive Map For Car Models Across India

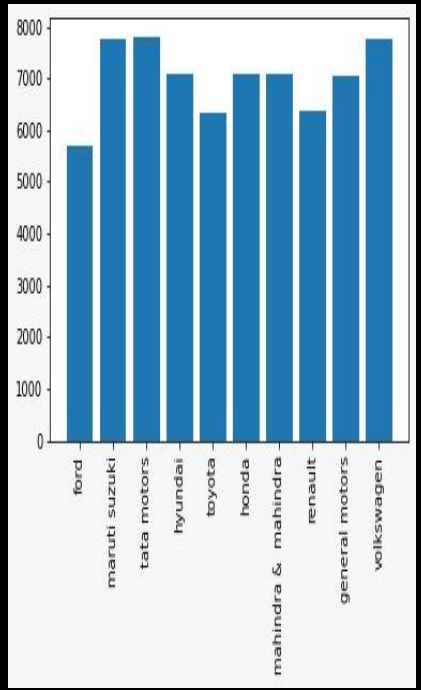
THANK YOU

CENTRAL ZONE

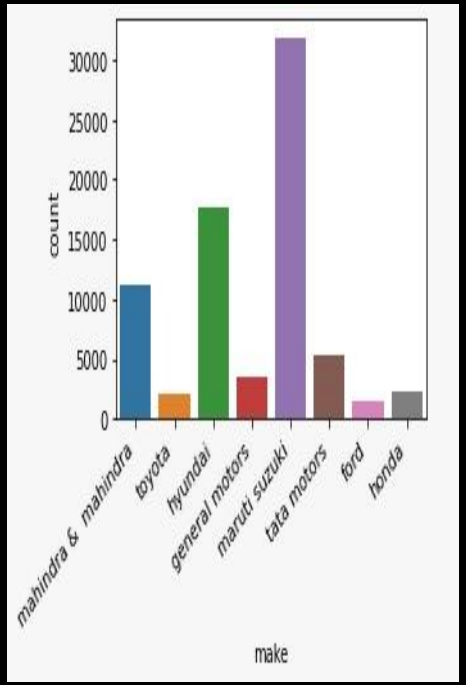


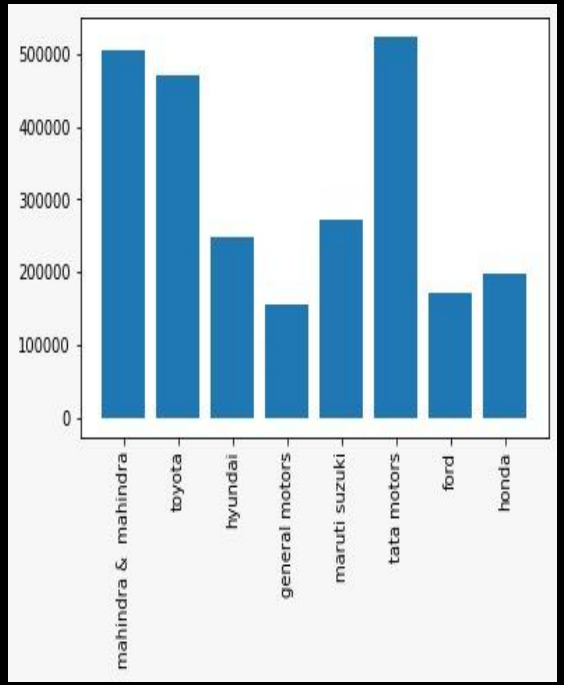


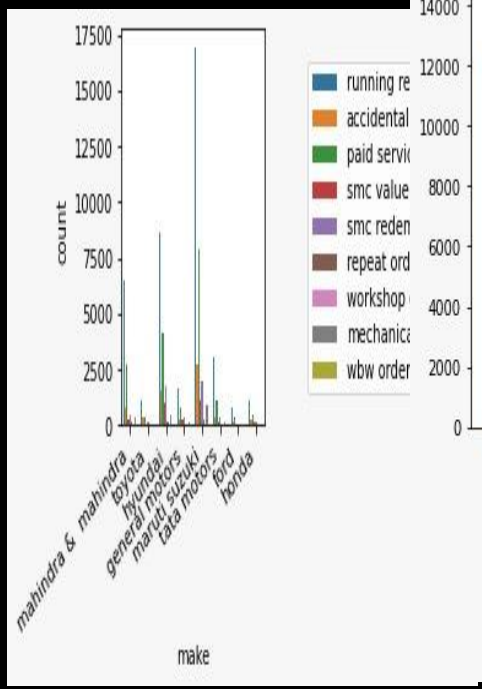


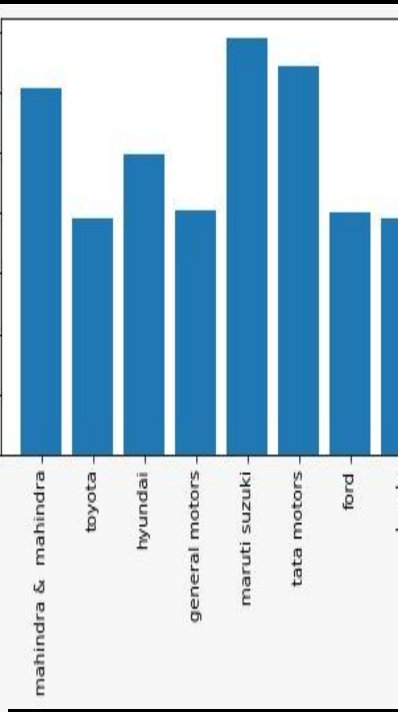


NORTHERN ZONE

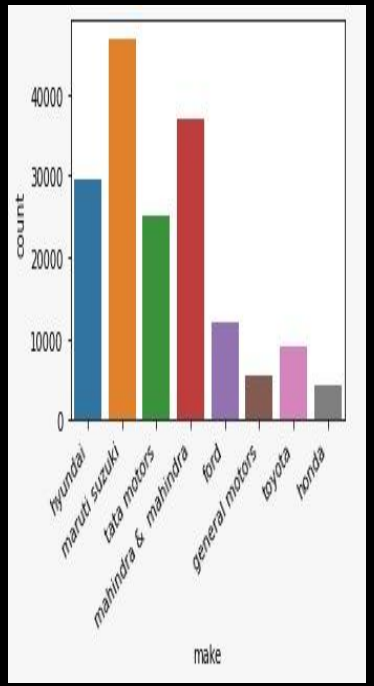


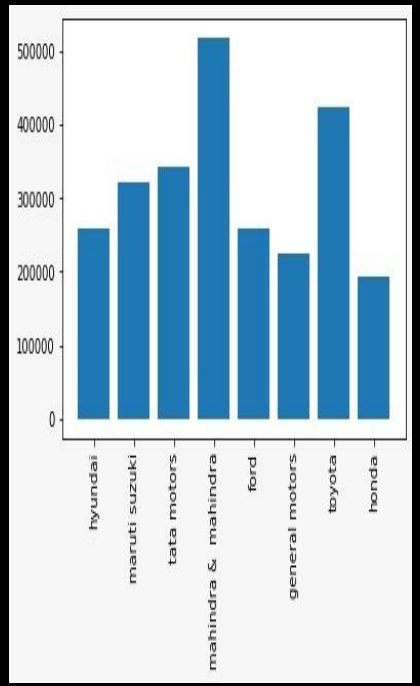


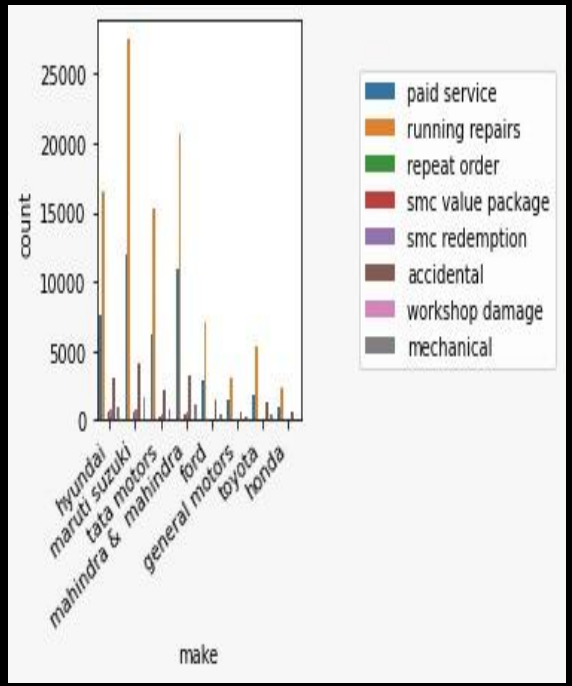


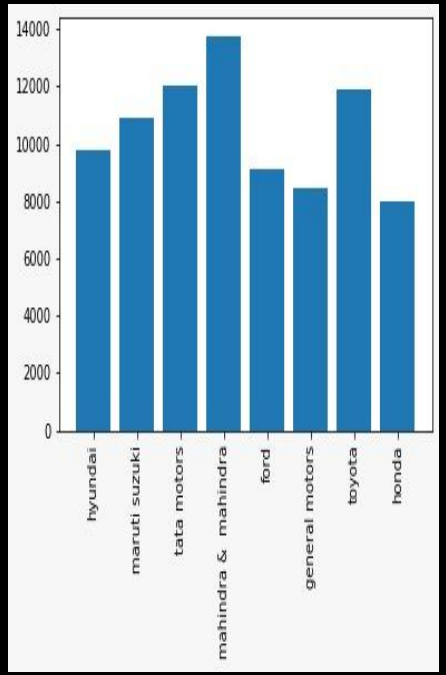


SOUTHERN ZONE

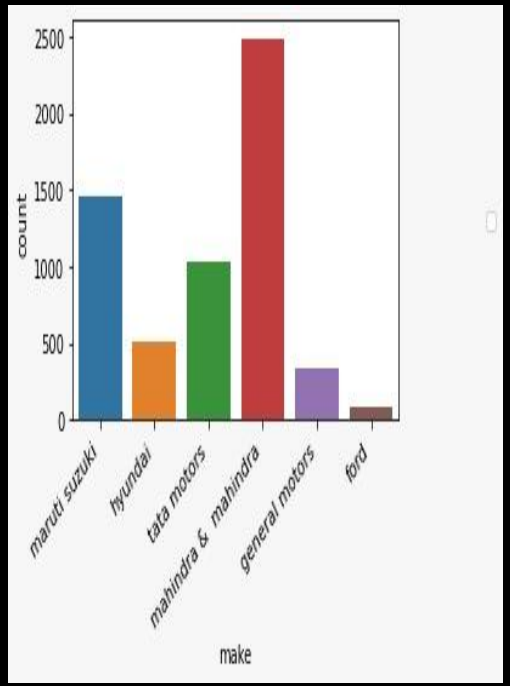


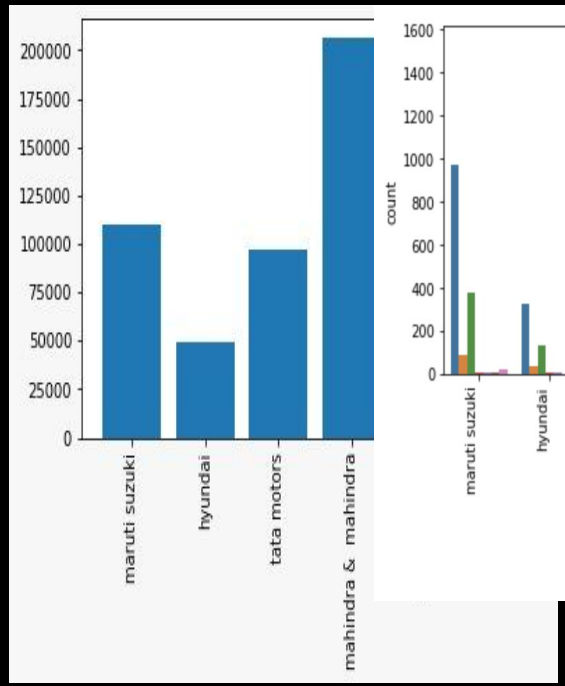


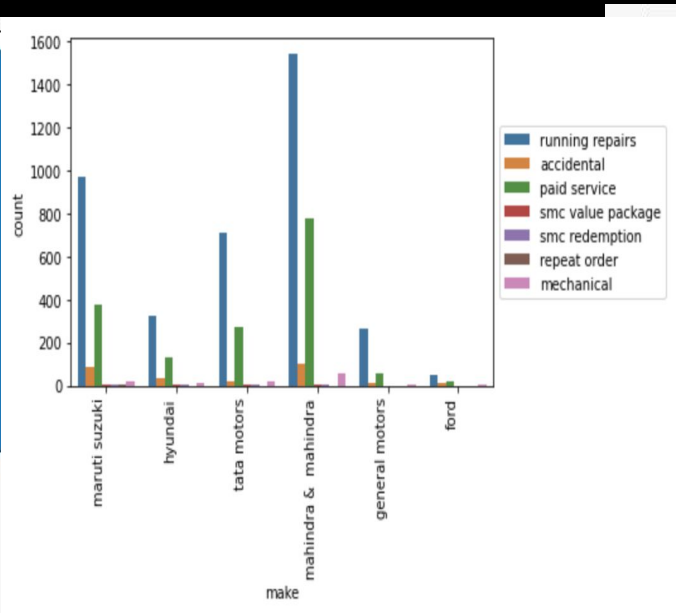


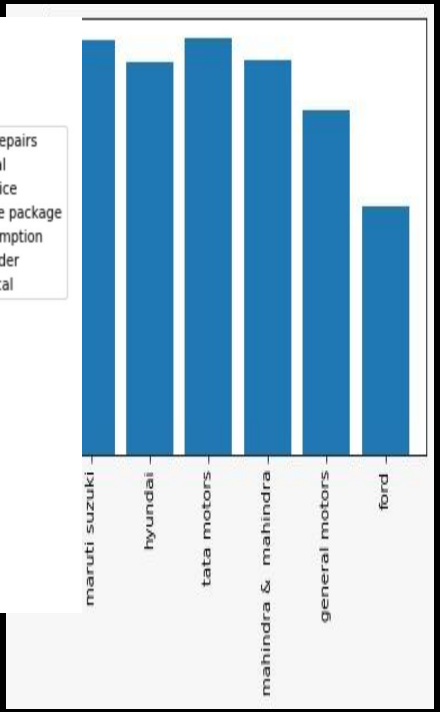


EASTERN ZONE

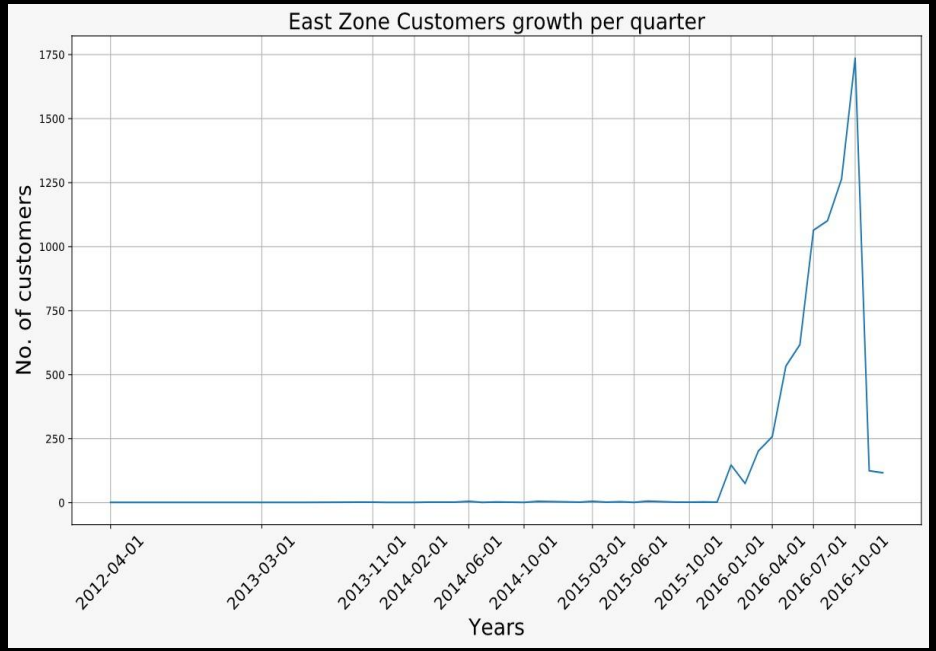


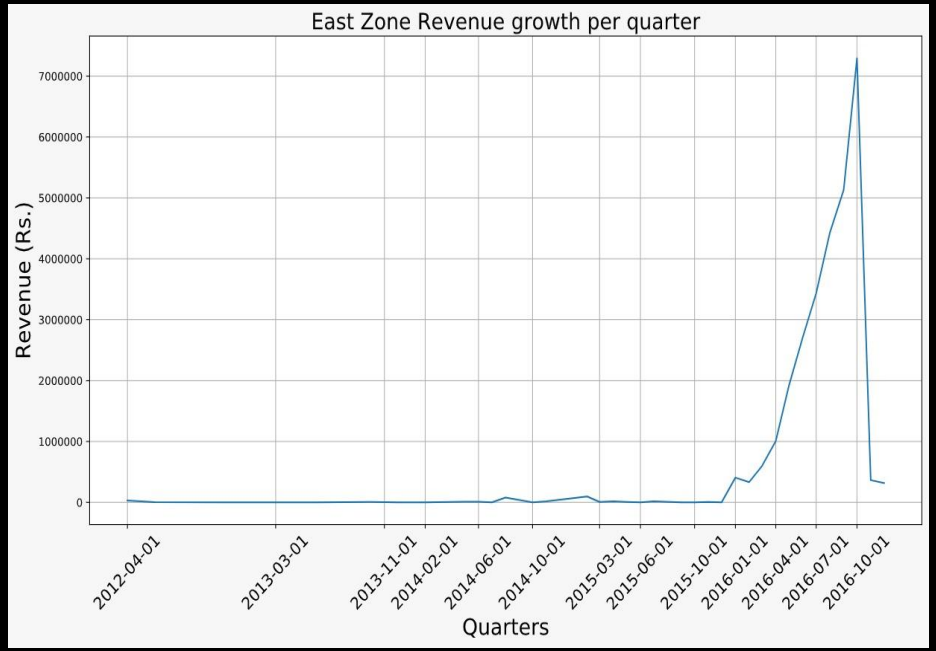




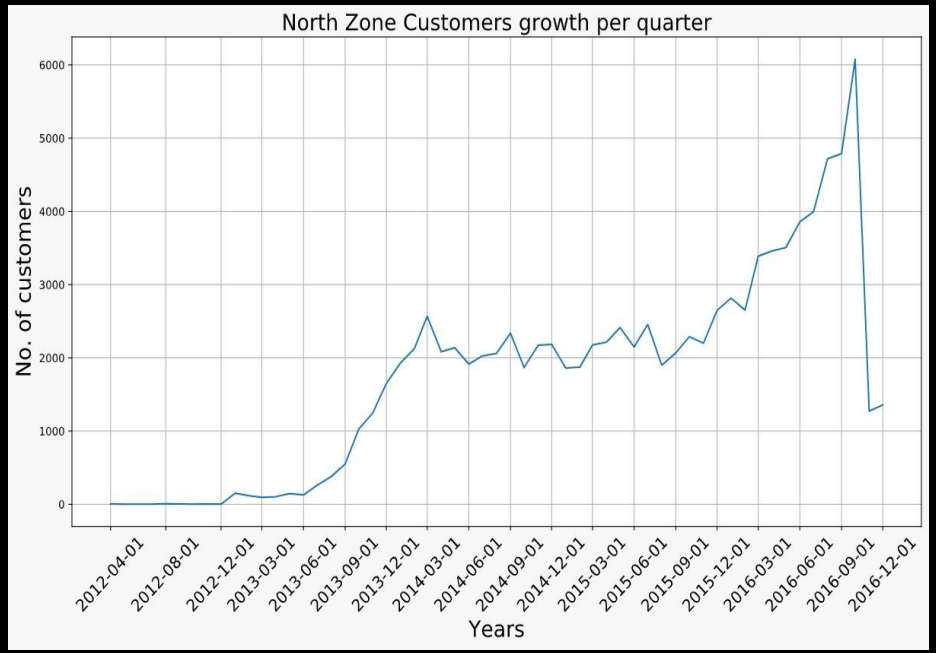


East Zone


East Zone Customers growth per quarter
No. of customers
1750
1500
1250
1000
750
500
250
0
2012-04-01
2013-03-01
2013-11-01
2014-02-01
2014-06-01
2014-10-01
2015-03-01
2015-06-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01
Years


East Zone Revenue growth per quarter
Revenue (Rs.)
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
2012-04-01
2013-03-01
2013-11-01
2014-02-01
2014-06-01
2014-10-01
2015-03-01
2015-06-01
2015-10-01
2016-01-01
2016-04-01
2016-07-01
2016-10-01
Quarters

North Zone


North Zone Customers growth per quarter
No. of customers
Years
0
1000
2000
3000
4000
5000
6000
2012-04-01
2012-08-01
2012-12-01
2013-03-01
2013-06-01
2013-09-01
2013-12-01
2014-03-01
2014-06-01
2014-09-01
2014-12-01
2015-03-01
2015-06-01
2015-09-01
2015-12-01
2016-03-01
2016-06-01
2016-09-01
2016-12-01


North Zone Revenue growth per quarter
Revenue (Rs.)
Quarters
0
5000000
10000000
15000000
20000000
2012-04-01
2012-08-01
2012-12-01
2013-03-01
2013-06-01
2013-09-01
2013-12-01
2014-03-01
2014-06-01
2014-09-01
2014-12-01
2015-03-01
2015-06-01
2015-09-01
2015-12-01
2016-03-01
2016-06-01
2016-09-01
2016-12-01

Central Zone