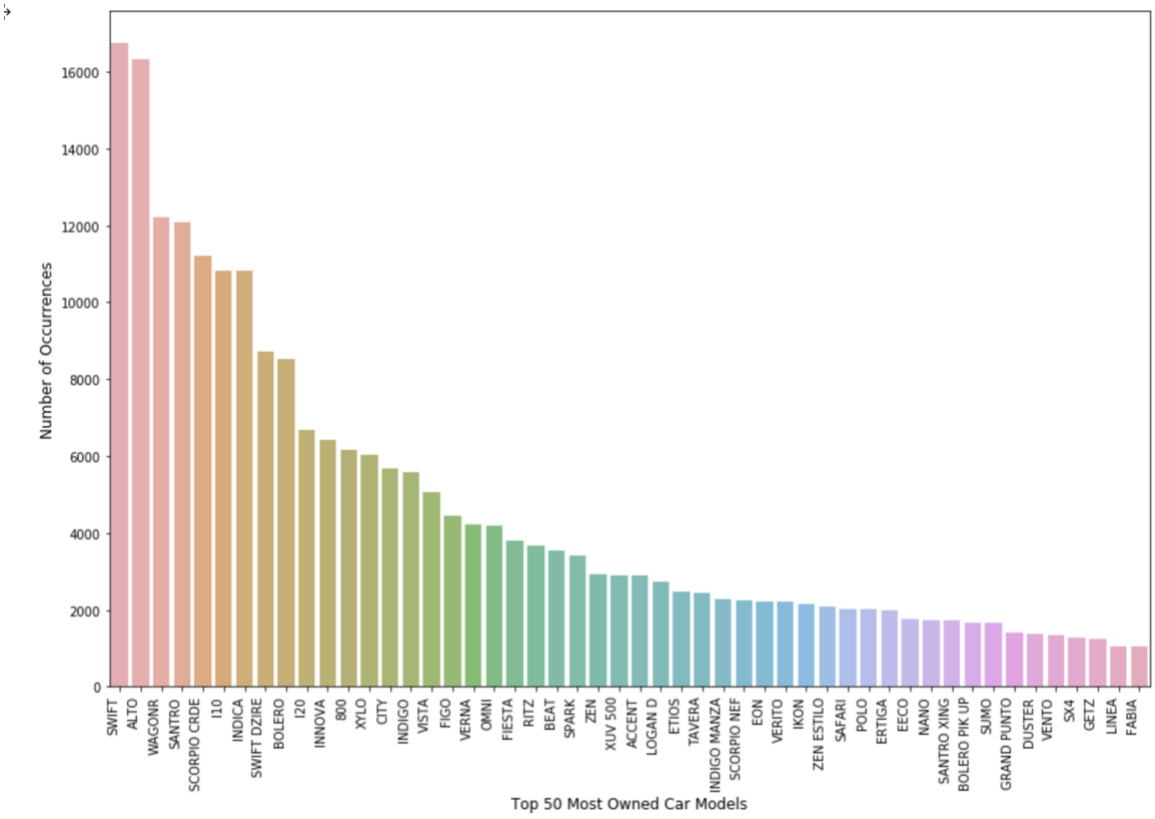
Mahindra First Choice Services, Case Study

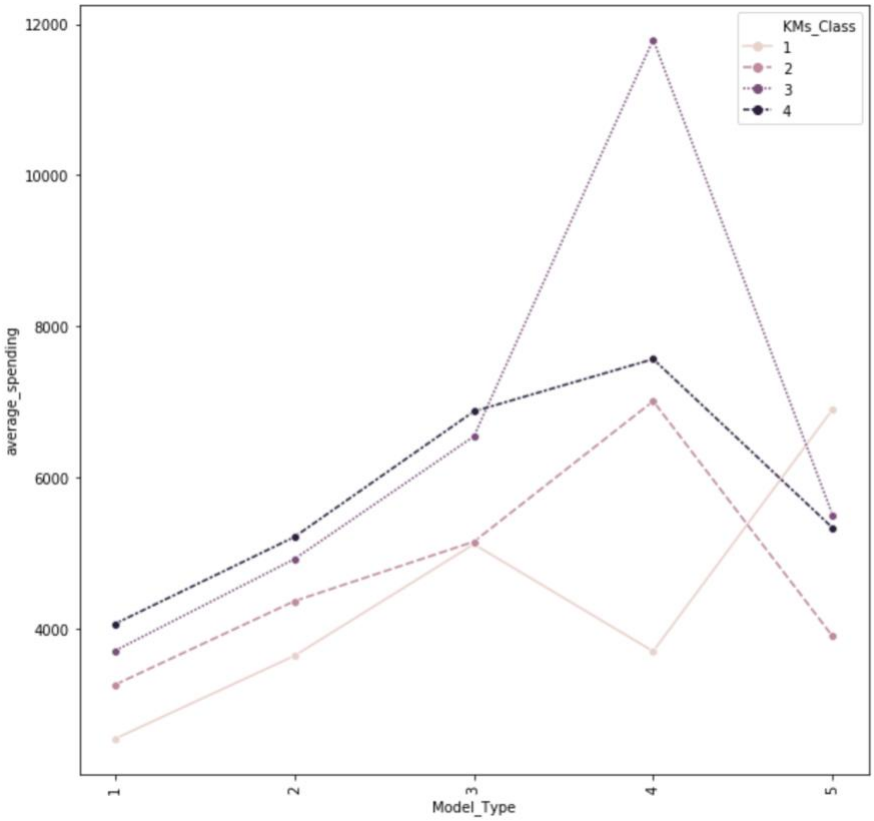
We have a dataset of customers who have visited Mahindra First Choice workshops for services.
We need to finds patterns of customer behaviour and identify Customer Lifetime Value.

Problem Statement 1 - Ownership and Spending patterns Overview



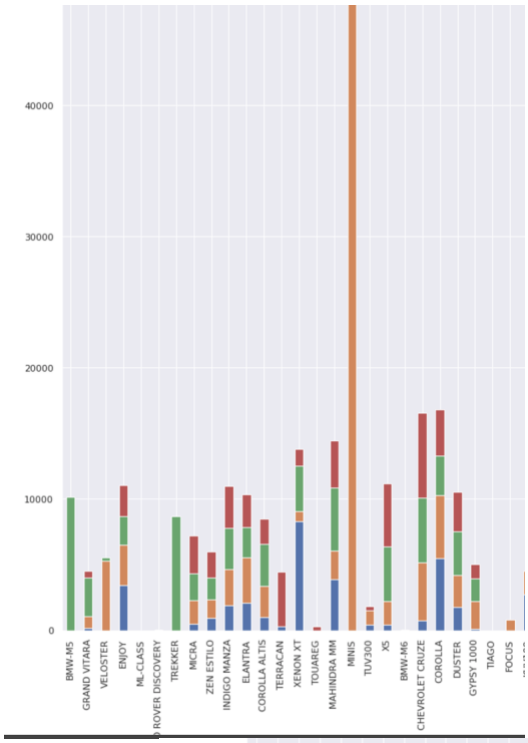
- This chart depicts the top 50 most owned car models throughout the country.
- Pattern suggested that economy priced hatchbacks are the most selling models and value conscious customers.
- We have analyzed lowest owned models. Some of them include: A-star, pushpak, Eco-sport, tata nano, TT, Z4 and Estilo.

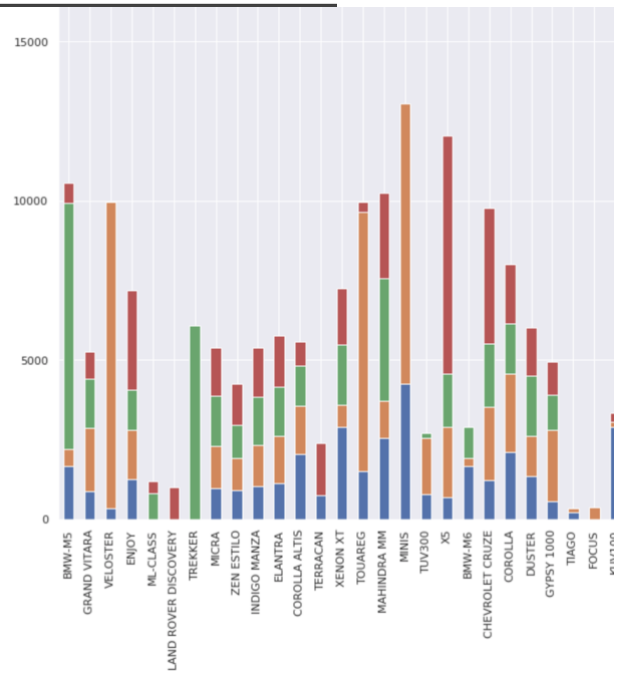
Model type and Car age visualization



- We have divided the dataset into model types which is the type of the car [1: Hatchback, 2: Sedan, 3: XUV, 4: Luxury, 5: Utility Vehicles]. Also we have classified cars as per their age on the basis average mileage [1: 1year, 2: 2-3 year, 3: 4-5 year, 4: >5 year]
- The graph suggests the average spending on a particular car type as per its age.
- As seen in the graph, after completing 3 years average spending on a luxury car shoots up tremendously as compared to other car types.

Average Labour and Parts Spending





These graphs depicts the average labour spending and average parts spending on some of the models.

Problem Statement 2 - Geography Business Overview

	Order Type	District
0	Accidental	Tamil Nadu
1	Mechanical	Tamil Nadu
2	Paid Service	Maharashtra
3	Repeat Order	Maharashtra
4	Running Repairs	Tamil Nadu
5	SMC Redemption	Maharashtra
6	SMC Value Package	Maharashtra
7	WBW Order	Punjab
8	Workshop Damage	Maharashtra

Figure 1Ranking of Districts by Order Type orders

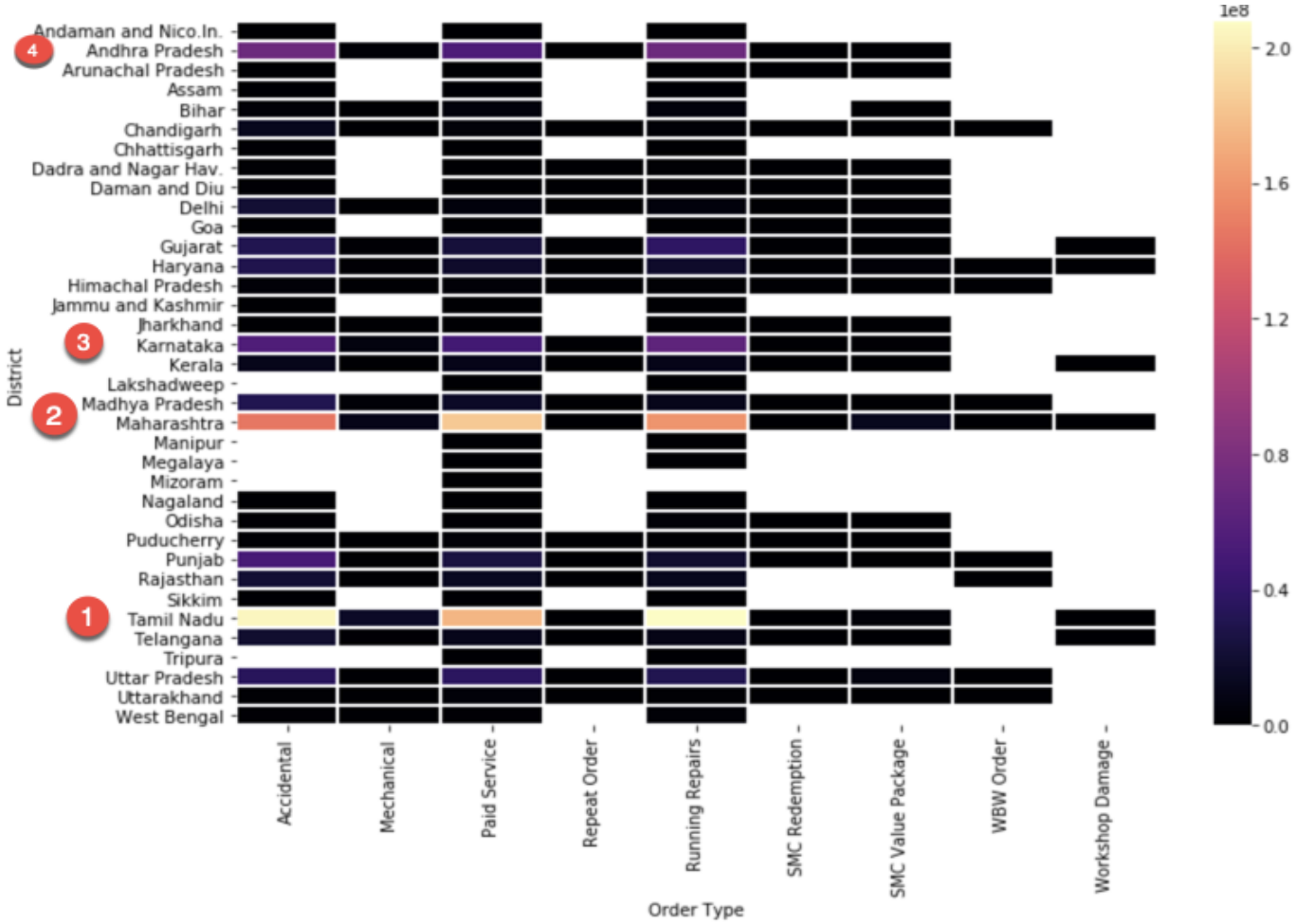
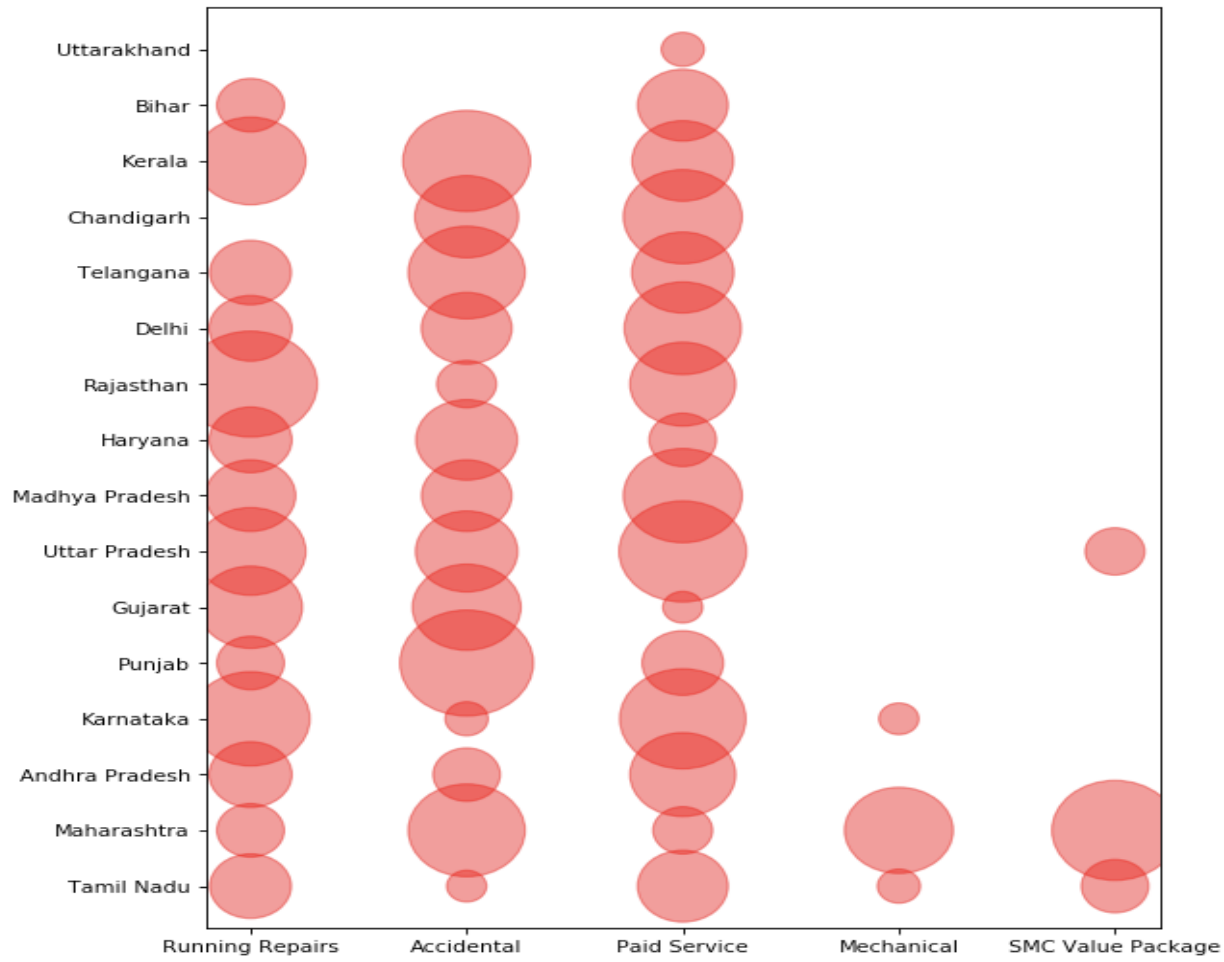


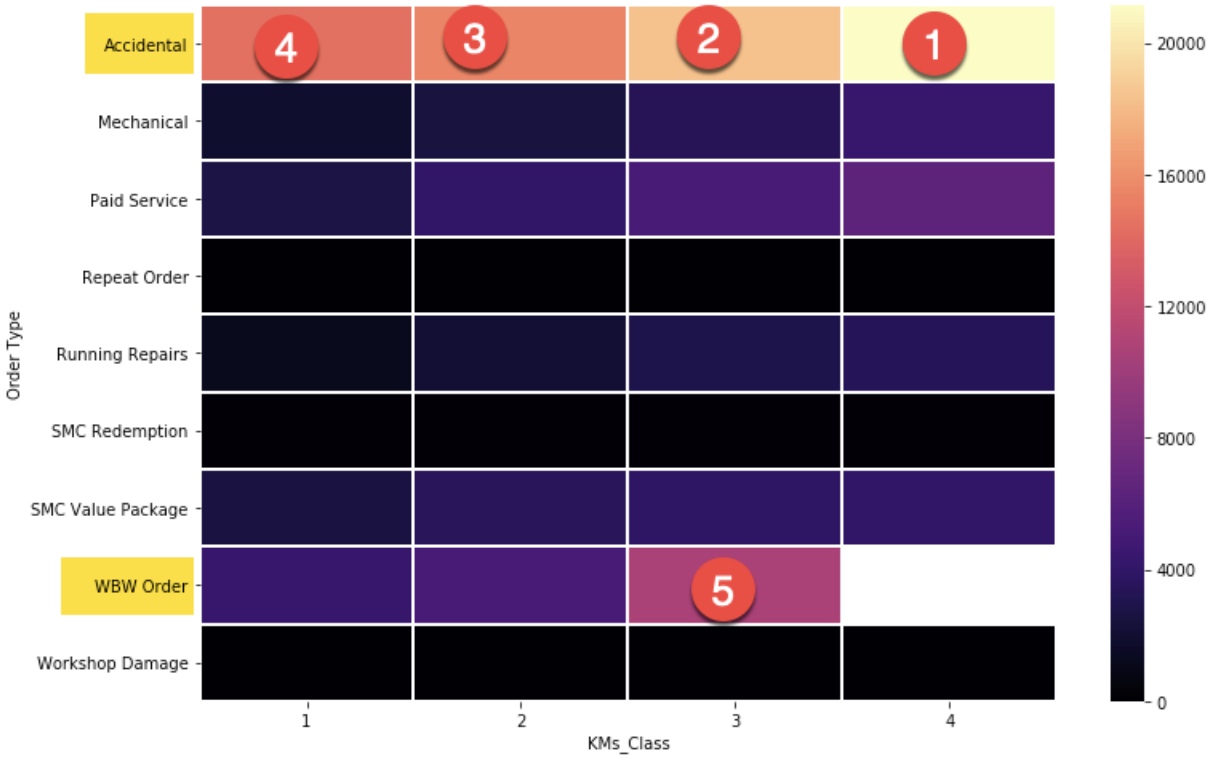
Figure 2: Heatmap Visualisation

A Closer look to top Districts driving revenue to the overall business by top Order Types

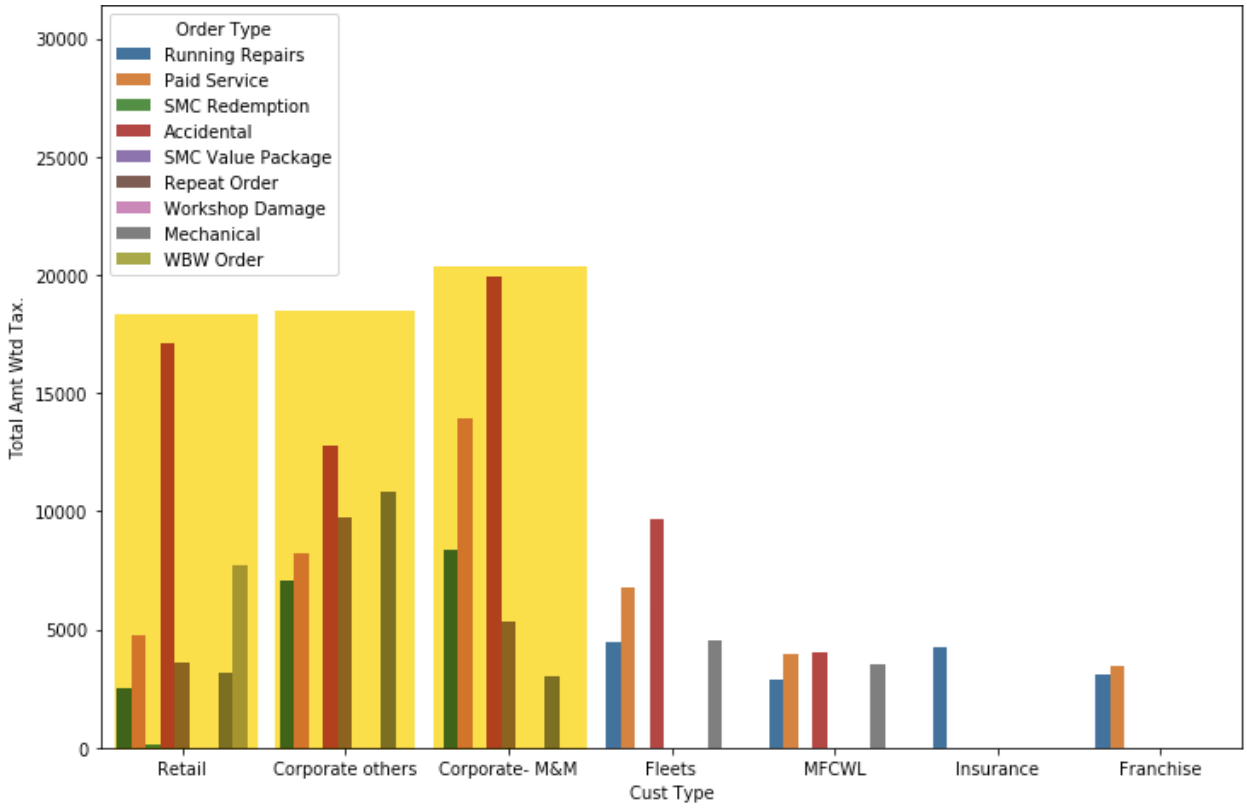


Car Class breakdown by Mileage driven

	Km Driven	% Car count
Class 1	< 20k	12%
Class 2	20k < 60k	38%
Class 3	60k < 100k	28%
Class 4	> 100k	22%



Order Type and Customer Type Overview



-”Accidental” order type seems to be a strong vertical across all unit businesses.
-“Paid Services” is a strong niche from Corporate.
-”Mechanical” type is a solid revenue source for Retail customers.

Revenue Forecast - Times Series Analysis with Prophet

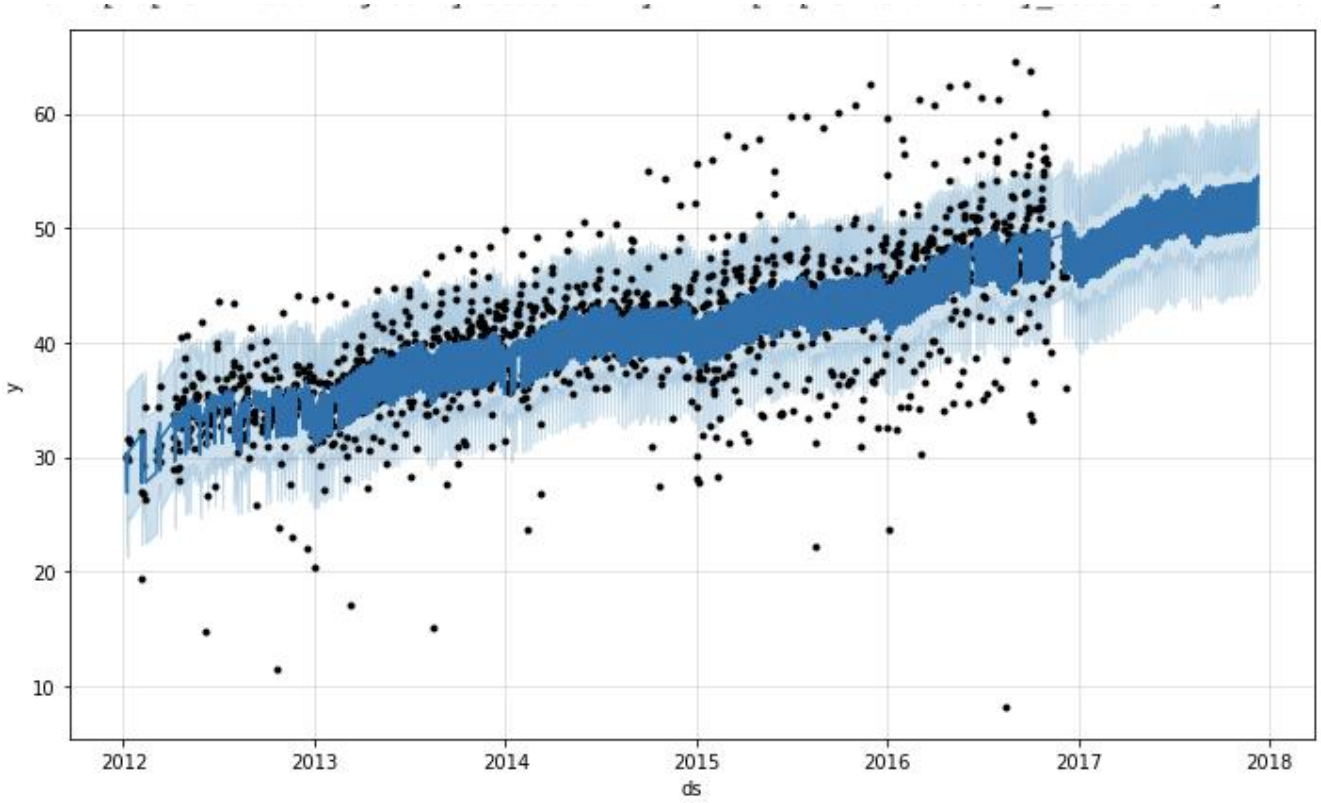


Figure 3 Daily Forecast : Revenue

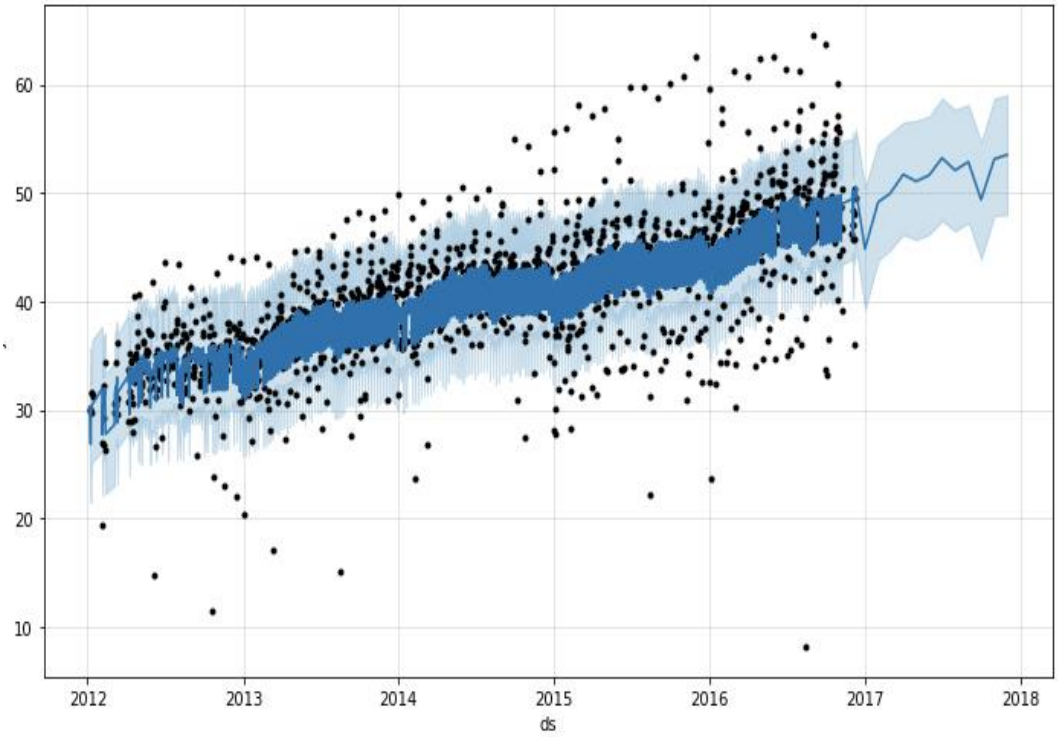
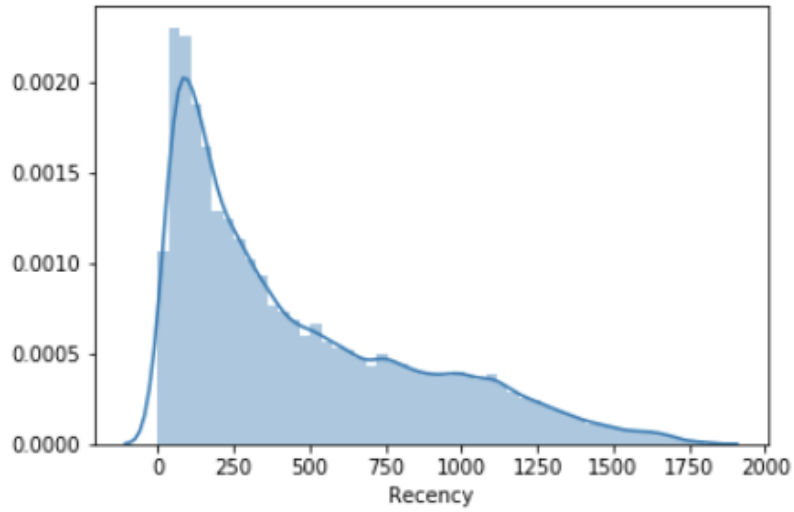


Figure 4: Monthly Forecast : Revenue

Customer Lifetime Value

RFM Calculation: Recency, Frequency and Revenue.

CustomerID	Recency	Frequency	Revenue
84707	619	1	840.17
10606	130	1	7768.47
E26809	375	1	1953.91
86562	503	2	6904.58
76013	350	1	9336.12



RFM: Segmentation approach using K-Means clustering

	CustomerID	RecencyCluster	FrequencyCluster	RevenueCluster	Recency	Frequenc
0	84707	2	0	0	619	
1	10606	2	0	0	130	
2	E26809	2	0	0	375	
3	86562	2	0	0	503	
4	76013	2	0	0	350	

- This RFM scoring model identifies our high value customers from the others.
- Using K-means clustering, we divided our data into **5 clusters** for recency, frequency and monetary using Recency value, Frequency of visit to workshop and Revenue that particular customer has generated.
- Higher the value of any cluster, more valuable is the customer

OverallScore			
1	110.815939	1.096277	2.781173e+03
2	374.961805	2.447558	1.237012e+04
3	186.080996	2.200679	1.179124e+04
4	791.179620	1.597676	5.020955e+03
6	163.000000	542.666667	3.689578e+05
7	163.000000	333.000000	4.813756e+06
8	163.000000	1110.000000	3.801249e+06

Predictiving our Customer LTV - Using K-Means Clusters and XGBoost: Accuracy: 88%

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Accuracy of XGB classifier on training set: 0.87
Accuracy of XGB classifier on test set: 0.87
              precision    recall  f1-score   support

           1       0.88      0.16      0.27        87
           2       0.94      0.80      0.87      3797
           3       0.76      0.98      0.85      3824
           4       0.94      0.86      0.90      4965

    accuracy                           0.87     12673
   macro avg       0.88      0.70      0.72     12673
weighted avg       0.89      0.87      0.87     12673
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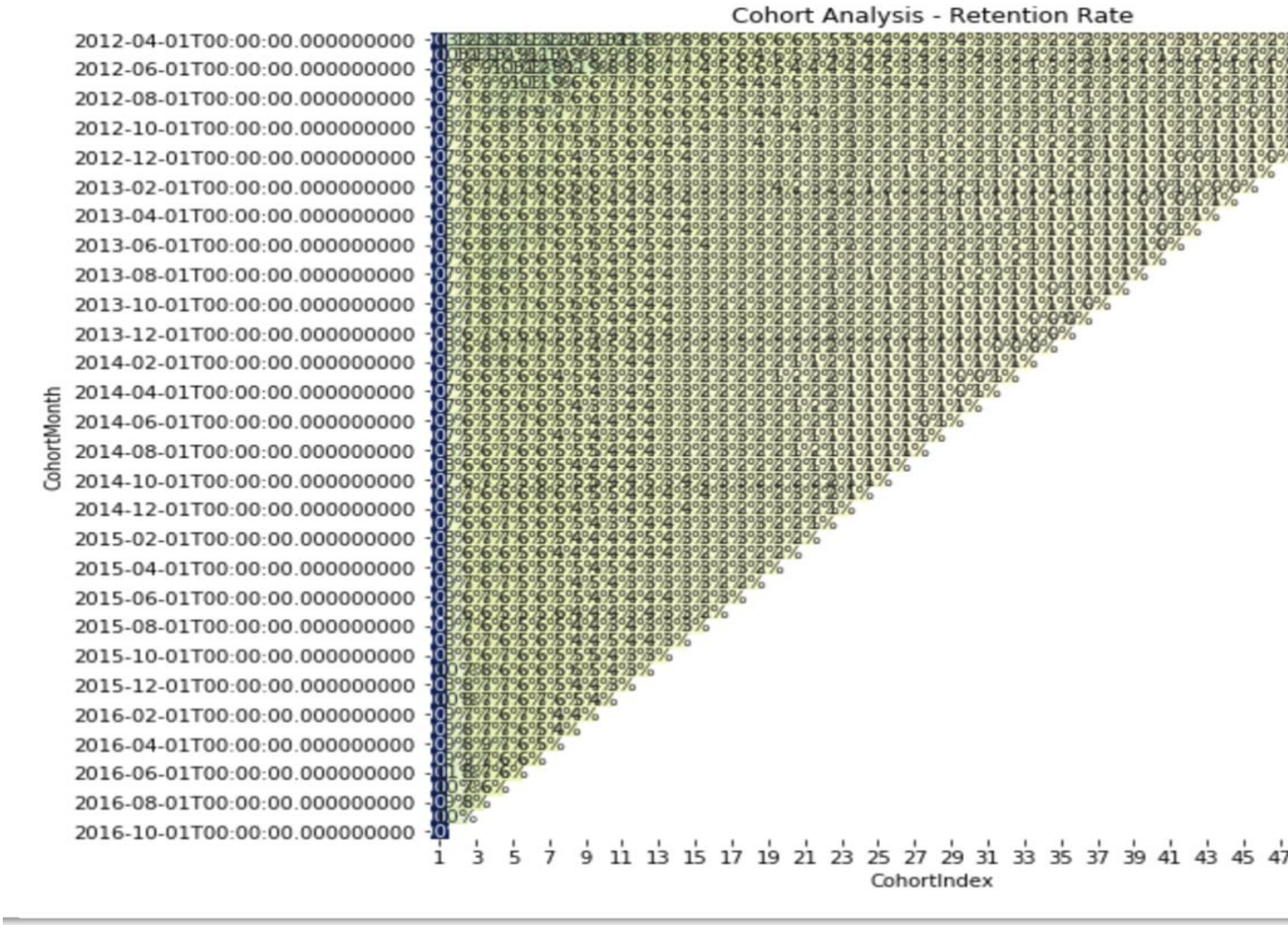
Cohort Analysis



We have used Cohort Analysis to study customer behavior in terms of retention and revenue generation.

- Retention: We made the Cohort with respect to customer visit such that if customer has visited the workshop in a particular month, what is his chance to visit in the subsequent months. Using this, we have mapped the retention percentage of the customers.
- As per this heatmap, we can say that retention was better initially but it has reduced with time