Problem Statement:-

Orange S.A., formerly France Telecom S.A., is a French multinational telecommunications corporation. The Orange Telecom's Churn Dataset, consists of cleaned customer activity data (features), along with a churn label specifying whether a customer canceled the subscription. Exploring and analyzing the data to discover key factors responsible for customer churn and to produce ways/recommendations to ensure customer retention.

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Business Problem Understanding:-

❖ Customer Churn in the telecom industry is one of the most significant risks for loss of revenue.

❖ The average Churn rate in the telecom industry is approximately 1.9% per month but could rise as high as 67% annually as per survey conducted.

❖ Since the cost of acquiring new customers is up to 25 times higher than the cost of retaining them, reducing the Churn rate of customer is key

❖ To reduce customer Churn, telecom companies need to predict which customers are at high risk of Churn, for this we are taking advantage of the vast streams of rich Telecom Customer Data

Objectives:-

Maxima: Company profit by retaining customers.
Minima: Customer churn by identifying the key cause of the problem.

Business Constraints:
❖ Provide offers & discounts & improve the service quality without compromising with profit.
❖ Maintain company's brand value

Data Summary:-

This is the Orange Telecom Churn dataset. In the below table it shows the top and bottom 5 rows, respectively.

	State	Account length	Area code	International plan	Voice mail plan	Number vmail messages	Total day minutes	Total day calls	Total day charge	Total eve minutes	Total eve calls	Total eve charge	Total night minutes	Total night calls	Total night charge	Total intl minutes	Total intl calls	Total intl charge	Customer service calls	Churn
0	KS	128	415	No	Yes	25	265.1	110	45.07	197.4	99	16.78	244.7	91	11.01	10.0	3	2.70	1	False
1	OH	107	415	No	Yes	26	161.6	123	27.47	195.5	103	16.62	254.4	103	11.45	13.7	3	3.70	1	False
2	NJ	137	415	No	No	0	243.4	114	41.38	121.2	110	10.30	162.6	104	7.32	12.2	5	3.29	0	False
3	OH	84	408	Yes	No	0	299.4	71	50.90	61.9	88	5.26	196.9	89	8.86	6.6	7	1.78	2	False
4	OK	75	415	Yes	No	0	166.7	113	28.34	148.3	122	12.61	186.9	121	8.41	10.1	3	2.73	3	False

	State	Account length	Area code	International plan	Voice mail plan	Number vmail messages	Total day minutes	Total day calls	Total day charge	Total eve minutes	Total eve calls	Total eve charge	Total night minutes	Total night calls	Total night charge	Total intl minutes	Total intl calls	Total intl charge	Customer service calls	Ch
3328	AZ	192	415	No	Yes	36	156.2	77	26.55	215.5	126	18.32	279.1	83	12.56	9.9	6	2.67	2	Fa
3329	WV	68	415	No	No	0	231.1	57	39.29	153.4	55	13.04	191.3	123	8.61	9.6	4	2.59	3	Fa
3330	RI	28	510	No	No	0	180.8	109	30.74	288.8	58	24.55	191.9	91	8.64	14.1	6	3.81	2	Fa
3331	CT	184	510	Yes	No	0	213.8	105	36.35	159.6	84	13.57	139.2	137	6.26	5.0	10	1.35	2	Fa
3332	TN	74	415	No	Yes	25	234.4	113	39.85	265.9	82	22.60	241.4	77	10.86	13.7	4	3.70	0	Fa

Data Summary:-

AI

Decision Variable
Churn

Categorical Data
State
International
Plan
Voicemail Pan

Numerical Data
Number vmail messages:
Total day minutes
Total day calls
Total day charge
Total eve minutes
Total eve calls
Total eve charge
Total night minutes:
Total night calls
Total night charge:
Total Intl minutes
Total Intl calls
Total Intl charge
Account Length
Customer service calls

Features Description:-

State:51 Unique state names.

Account Length: Length of the Accounts.

Area Code: Code number of area of the states.

International Plan: It has two input 'Yes' or 'No'. 'Yes' indicates the subscription of the plan and 'No' indicates the non subscription the plan.

Voice Mail Plan: It has two input 'Yes' or 'No'. 'Yes' indicates the presence of voice plan and 'No' indicates the absence of voice plan.

Number voice mail messages: The number of voice messages ranging from 0 to 50.

Total day minutes: Total minutes spent in morning.
Total day calls: Total number of calls made in morning.
Total day charge: Total charge that customer consumed in morning.
Total eve minutes: Total number of minutes spend in evening.
Total eve calls: Total number of calls made in evening.
Total eve charge: Total charge that customer consumed in evening.
Total night minutes: Total number of minutes spend in night.
Total night calls: Total number of calls made in night.
Total night charge: Total charge that customer consumed in night.
Customer service calls: Number of service calls made by the customer.
Churn: customer churn, if 'True' means churned customer, if 'False' means retained customer

ANALYSING THE CHURN:-

Below Plot shows the number of customers Churned and Not Churned, where False represents the customers retained and True represents the customer Churned
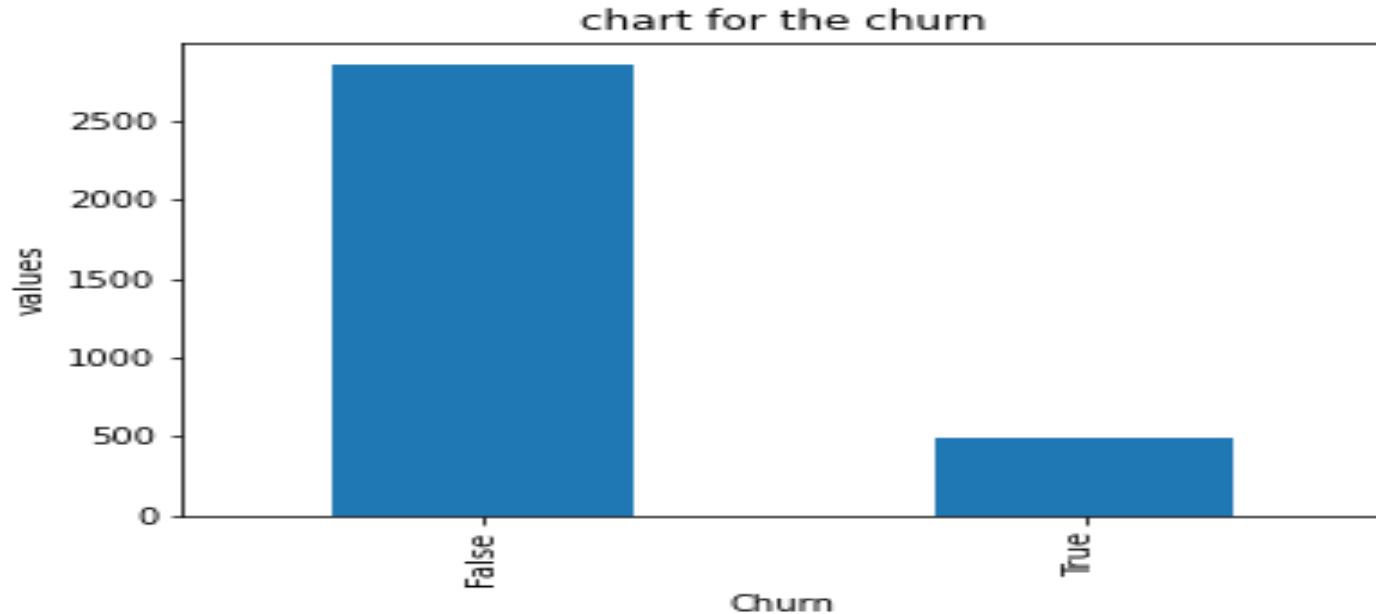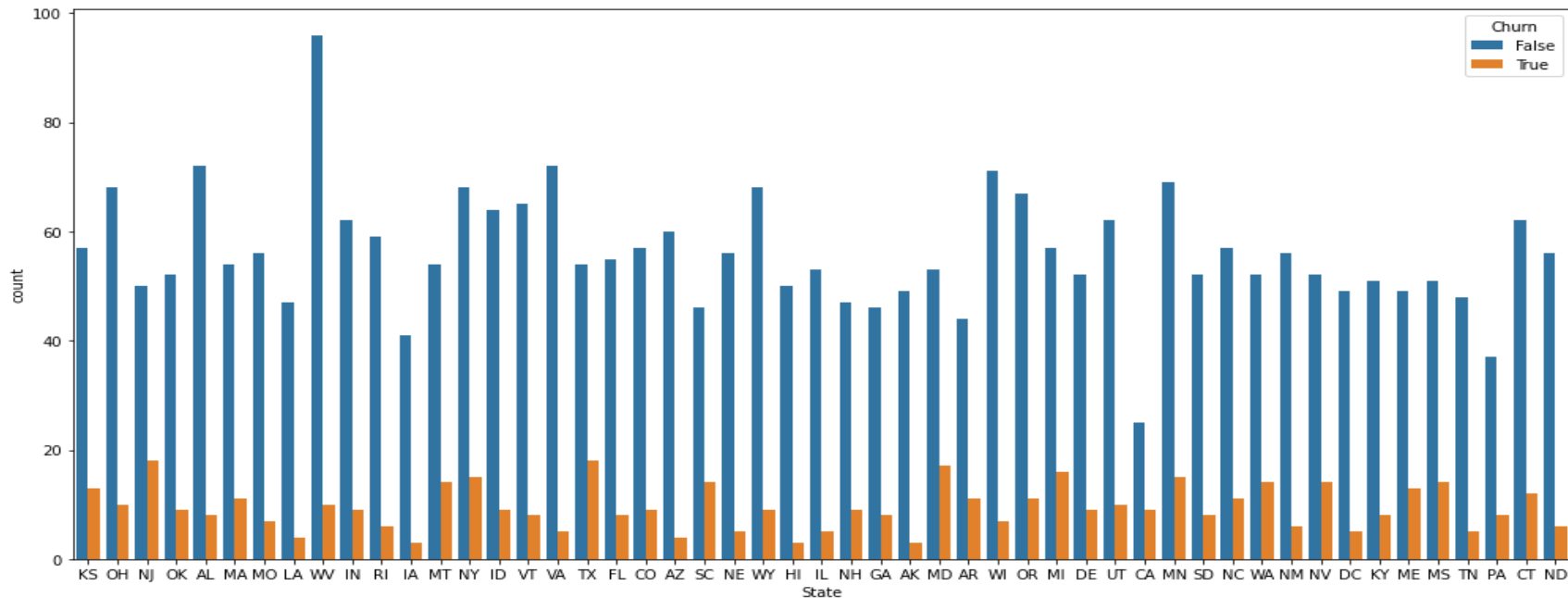
Analysing the Null Values:-

After analysing the dataset, it was found that the dataset does not contain any null values in it and the below head map did not show any spike in it, which shows that there is no null values.
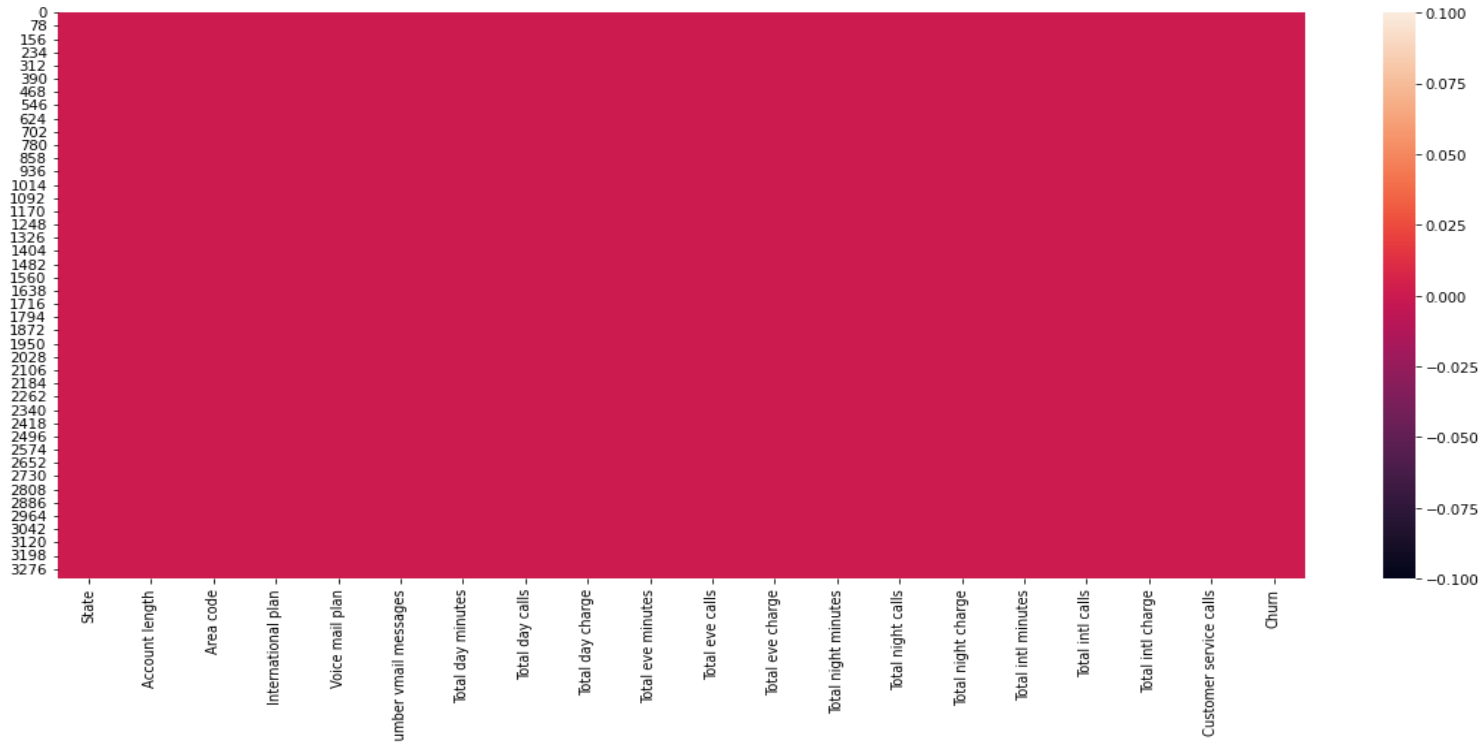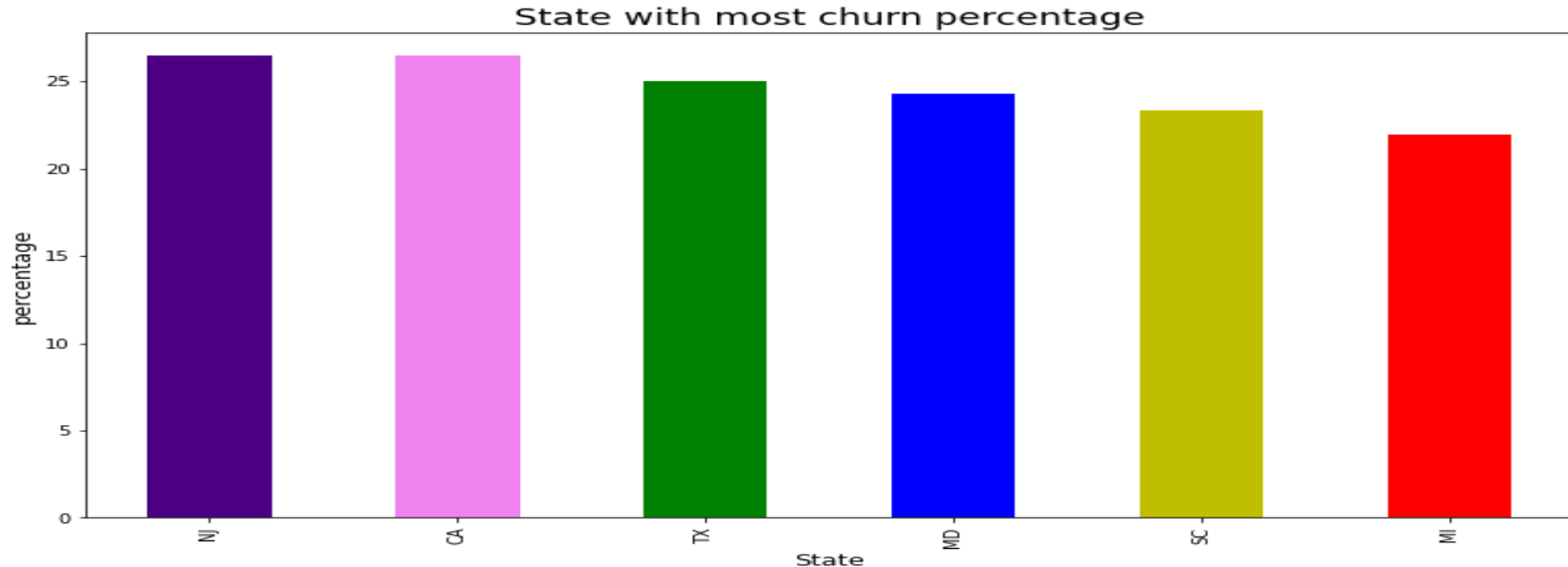
Analysing State column:

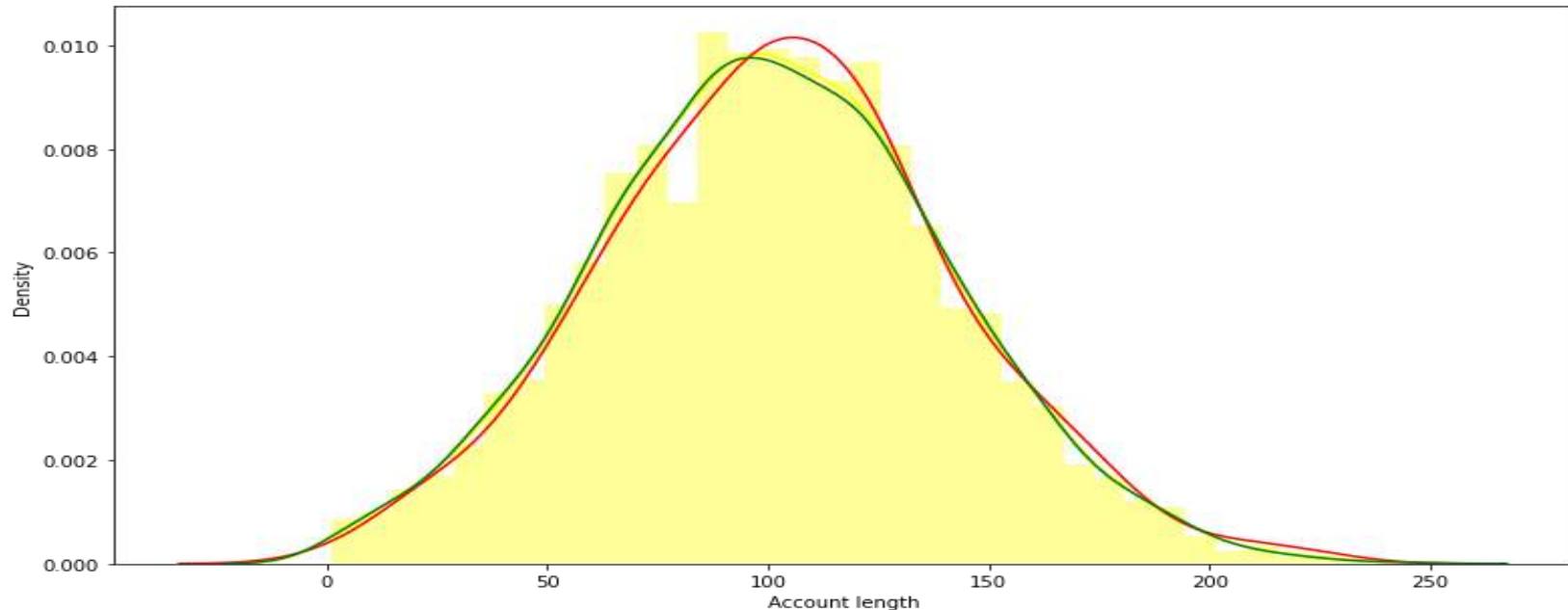**The below plot shows the Churn and Retained customer in each state.**

Top State Churn Percentage:-

Top state Churn percentage. CA,NJ,TX,MD,SC,MI are the states who has high churn rate more than 21.74
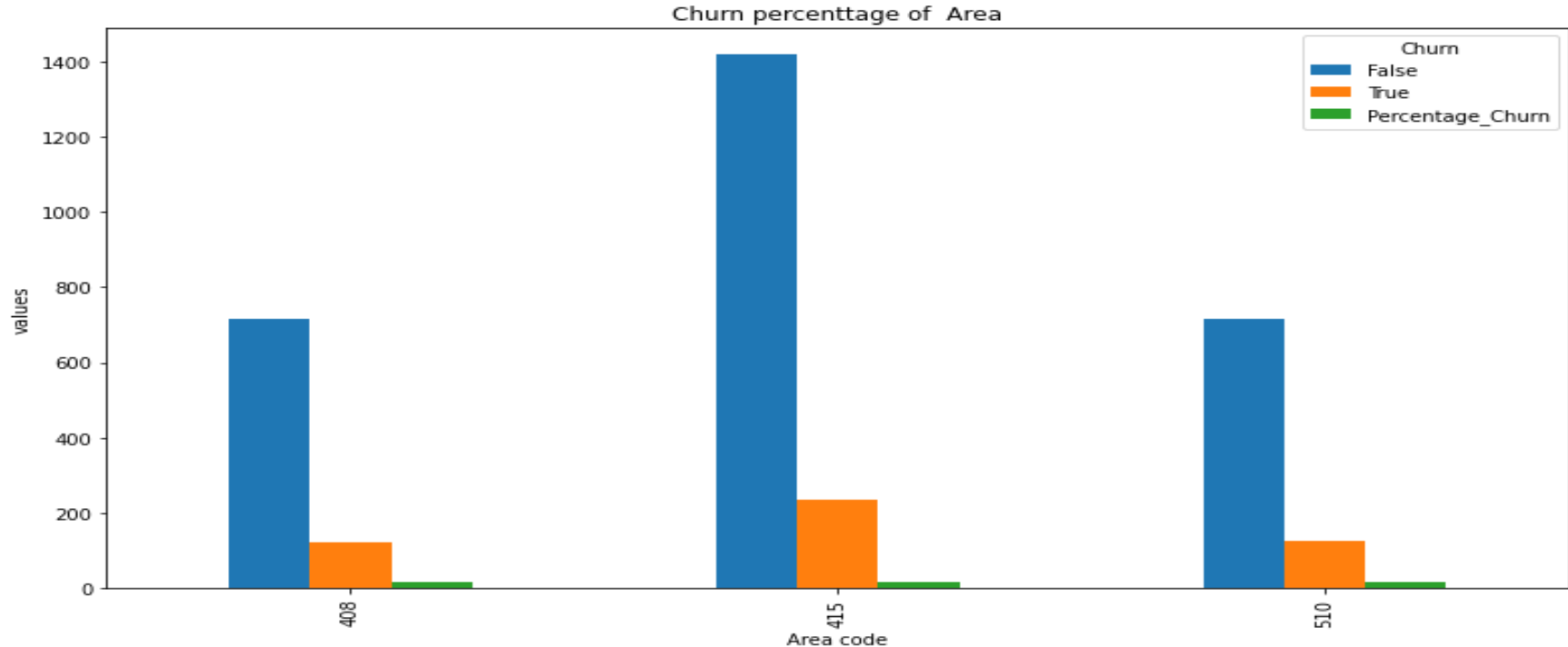
Account Length Vs Churn:-

The below plot shows the effect of Account length on churn
There is no sign of customers Churned because of the length of the usage of their account.
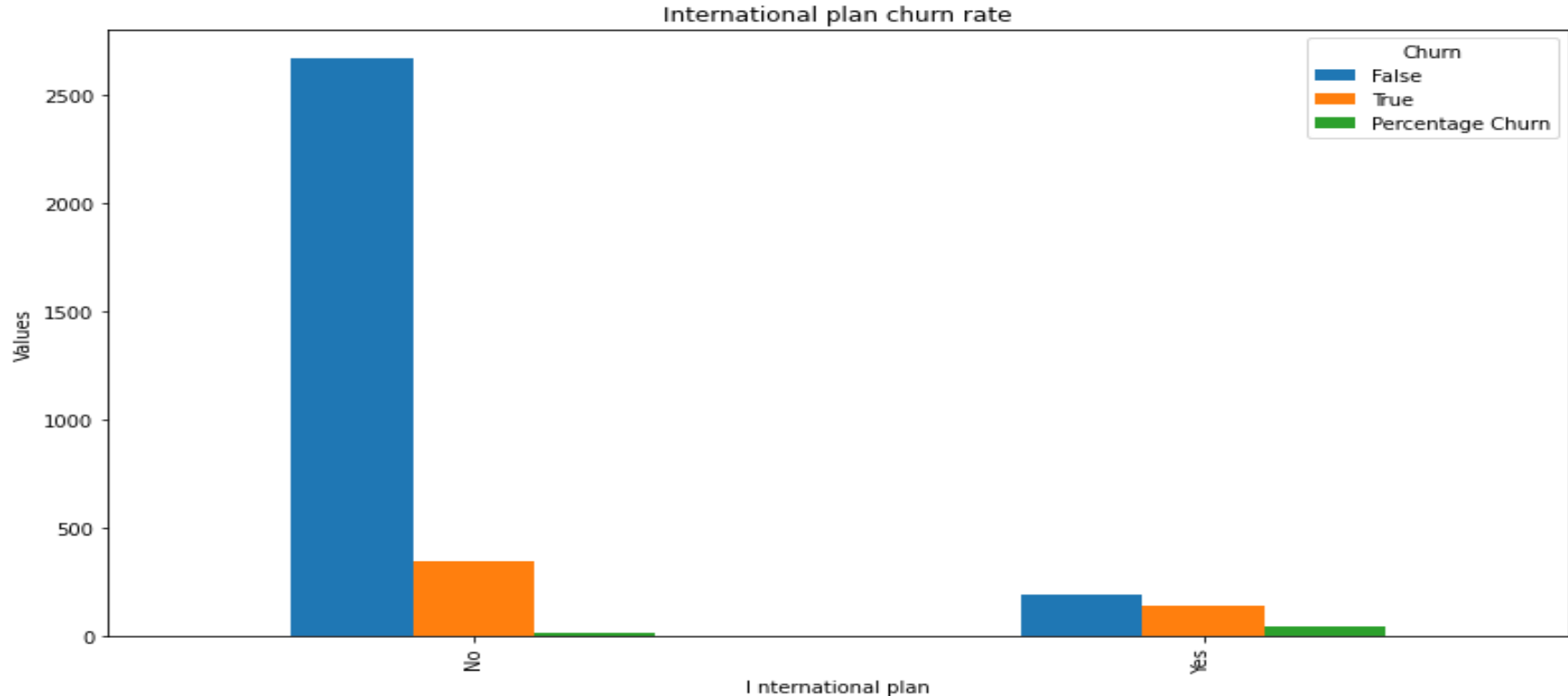
Analysis of Area Code:-

**The below plot shows all the values with Churn.
The area code has only 3 unique values and considered as a nominal data type and has nearly equal number of Churn.**

Analysis of International Plan Vs Churn:-

The below plot shows the Churned and non-Churned customer respective to their international plan.

Analysis of International Plan Vs Churn:-

The below table shows the percentage of churned customer respective to the international plan.
The Churned percentage with international plan is 42.41% which shows that the Churn rate is highly affected by the plan in terms of call price or network issue.

| Churn	False	True	Percentage Churn
International plan			
No	2664	346	11.495017
Yes	186	137	42.414861

Analysing Voice Mail Plan:-

After analysing the customers data who has subscribed for the voice mail plan, we found out that 8.7% of the customers have churned.
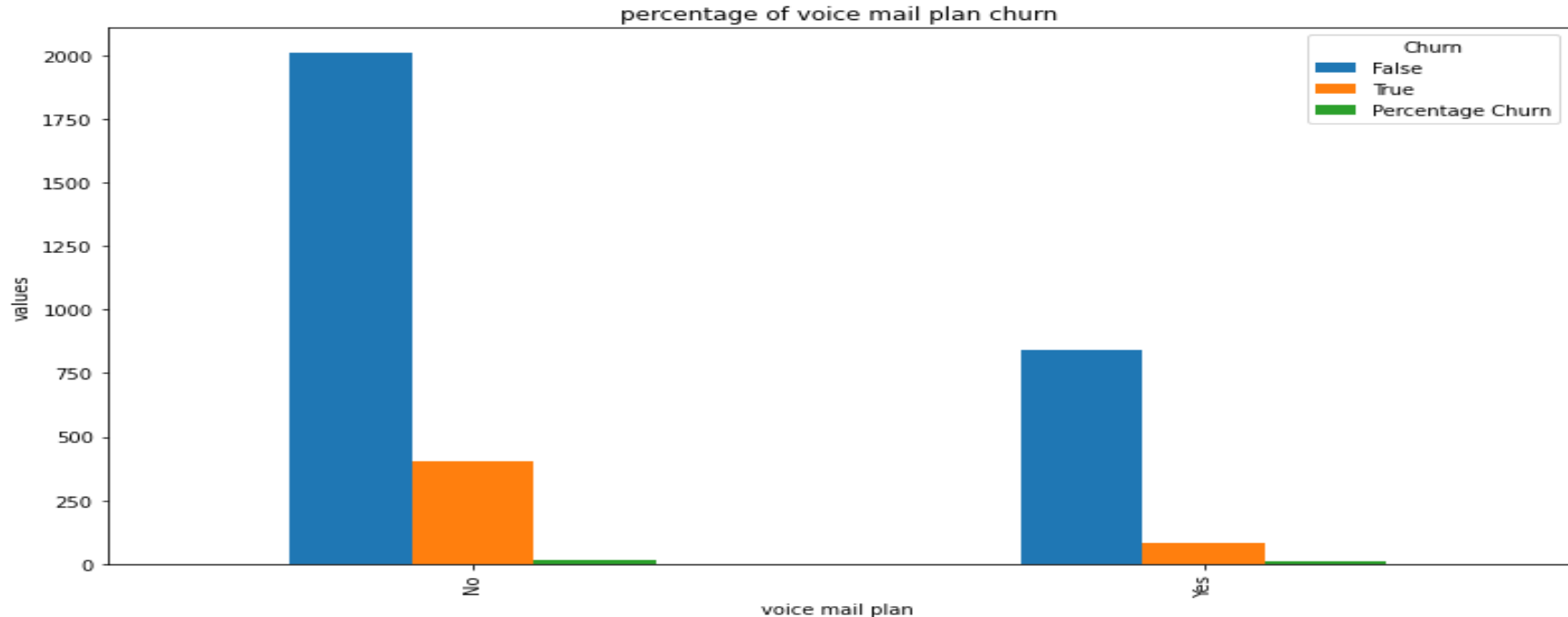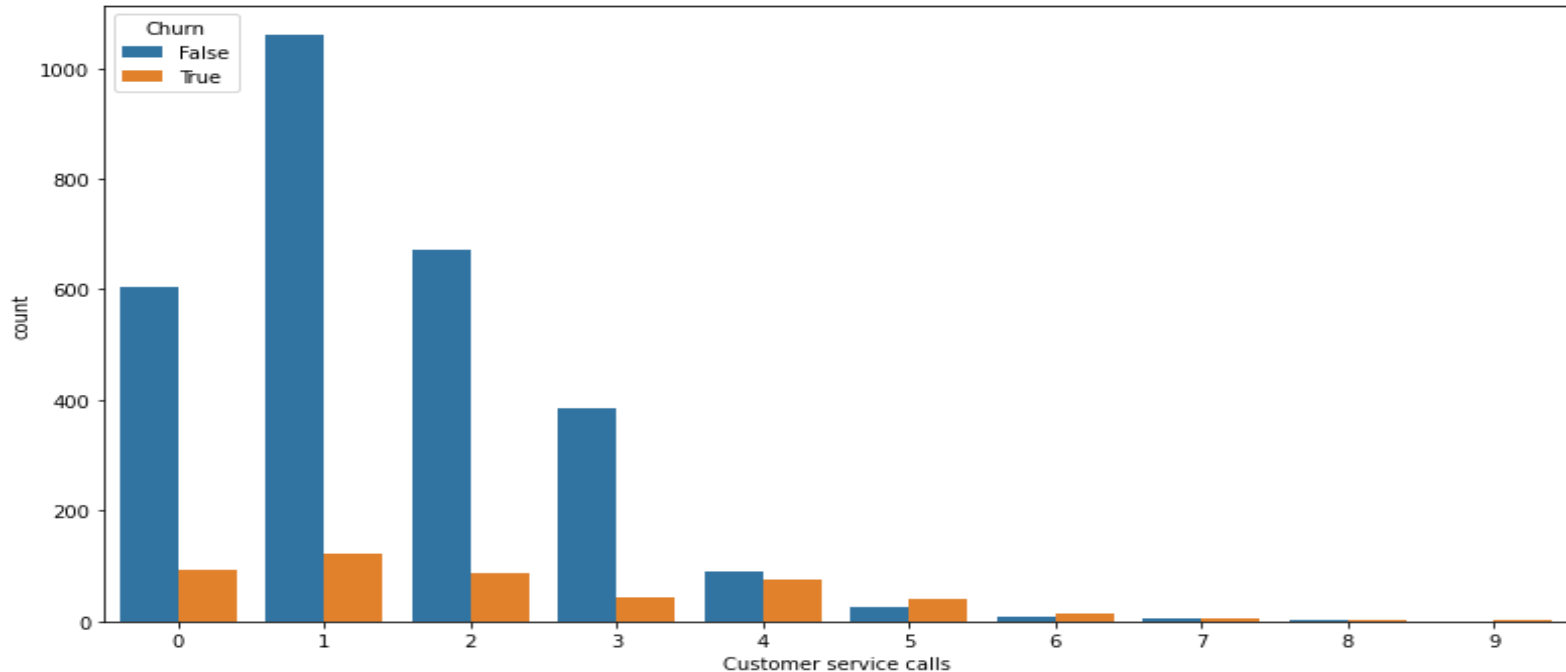
Number of Voice Mail Vs Churn:-

The below Box plots shows the relationship between Churn and the number of voice mail.
When there are more than 20 voice mail messages, then there is a Churn.
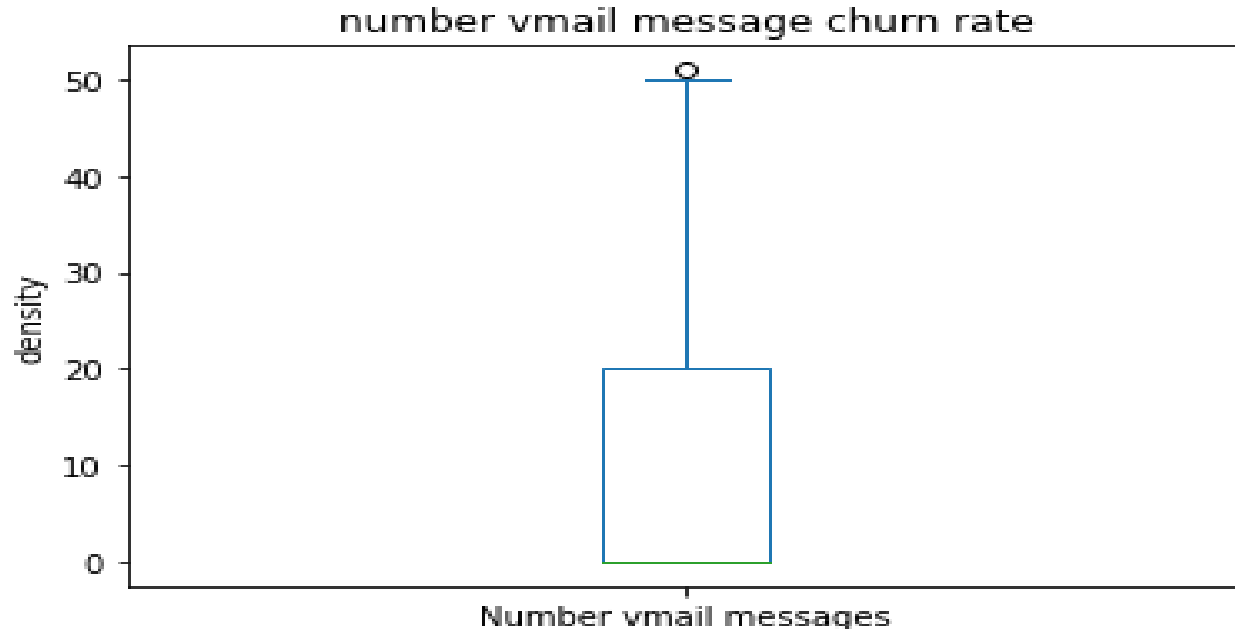
Customer services Call VS Churn:-

The below plot shows churn for the number of customer service calls.

Customer services Call VS Churn:-

The below table shows mapping of the number of customer calls to the churn percentage.
It's clear that after 4 calls at least 45% of the customers Churn.
Customer with more than 4 service calls have high probability of Churning.

Churn	False	True	Percentage Churn
Customer service calls			
0	605	92	13.199426
1	1059	122	10.330229
2	672	87	11.462451
3	385	44	10.256410
4	90	76	45.783133
5	26	40	60.606061
6	8	14	63.636364
7	4	5	55.555556
8	1	1	50.000000
9	0	2	100.000000

Challenges:-

- ❖ **Difficult to analyse columns like account length and area code.**
- ❖ **Need to plot a lot of graphs for the columns for understanding the data.**
- ❖ **For calls data, there is no direct relation to churn but related columns has played some role.**

Conclusion:-

After performing exploratory data analysis on the data set and analyzing the Churn, the following conclusions can be provided:

- ❖ There are some states where the churn rate is high as compared to other maybe due to network coverage.
- ❖ Area code and Account length do not play any kind of role regarding the churn rate
- ❖ In the International plan those customer who have this plan churned more and the International calling charges are also high so the customer who has the plan unsatisfied with network issue and high call charge.
- ❖ In the voice mail section when there are more than 20 voice mail messages then there is a churn, so it basically means that the quality of voice mail is not good.
- ❖ Total day call minutes, total day calls, total day charge, total eve charge ,total eve calls, total eve minutes, total night charge, total night calls, total night minutes did not play any kind of role regarding the churn rate.
- ❖ In International calls data shows that the churn rate of those customer is high, who takes the international plan. Thus, it means that in international call, charges might be high also there is a call drop or network issue.
- ❖ In the customer service calls data shows us that whenever an unsatisfied customer called the service center the churn rate is high, which means the service Centre didn't resolve the customer service.

Recommendation's:-

❖ **Improving the network coverage in the Churned states.**
❖ **In International plan providing some discount plan to the customer may resolve the problem.**
❖ **Improving the voice mail quality or taking feedback from the customer may help.**
❖ **Improving the service of customer call center and taking frequent feedbacks from the customers, regarding their issues and trying to resolve it as soon as possible.**

THANK YOU