

# Telecom Churn Analysis

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**Abstract** - All industries suffer from voluntary churn -- the loss of customers to some other company. The survival of any business is based on its ability to retain customers. This is particularly true for Telecom companies. Telecom companies today measure voluntary churn by a monthly figure, such as 1.9 percent or 2.1 percent. This is the average number of customers who quit their service per month. Annual churn rates for telecommunications companies average between 10 percent and 67 percent.

Our experiment can help understand what could be the reason for the churning of such customers by feature selection and data analysis.

**Key Words:** EDA, Churn Analysis, Reduce Churning, Telecom

## 1. PROBLEM STATEMENT

Data set is provided by Orange S.A. a French telecom MNC for 51 states of the US. The Data set contain 20 features/columns with 3333 observations each representing different customers, along with a churn label specifying whether a customer canceled the subscription.

The main objective is to explore and analyze the data to discover key factors responsible for customer churn and come up with ways/recommendations to ensure customer retention.

### 1.1 FEATURES

1. **State:** 51 unique states of US
2. **Area Code:** categorical
3. **Account Length:** Number of days account is active
4. **International Plan:** International plan activated or not.
5. **Voice mail plan:** Voice mail plan activated or not.
6. **Voice mail message:**
7. **Total day minutes:** Total day minutes used
8. **Total day calls:** Total day calls made
9. **Total day charge:** Total day charge
10. **Total eve minutes:** Total evening minutes used
11. **Total eve calls:** Total evening calls made
12. **Total eve charge:** Total evening charge

13. **Total night minutes:** Total night minutes used
14. **Total night calls:** Total night calls made
15. **Total night charge:** Total night charge
16. **Total intl minutes:** total international minutes
17. **Total intl calls:** total international calls
18. **Total intl charge:** total international charge
19. **Customer service calls:** Number of customer service calls made
20. **Churn:** Customer churn (True= churn , False= not churned ) (**Target Variable**)

### 1.2 Critical Features

Vital few features are decided from the many features.

1. **State:** 35 states contain 83% of the churners.
2. **International Plan**
3. **Voice mail plan**
4. **Customer service calls**

## 2. DATA CLEANING

A sanity check is performed on the data set to check for all the null/Nan values. The data does not contain any null values and hence analysis is performed with the same data set.

State	3333 non-null	object
Account length	3333 non-null	int64
Area code	3333 non-null	int64
International plan	3333 non-null	object
Voice mail plan	3333 non-null	object
Number vmail messages	3333 non-null	int64
Total day minutes	3333 non-null	float64
Total day calls	3333 non-null	int64
Total day charge	3333 non-null	float64
Total eve minutes	3333 non-null	float64
Total eve calls	3333 non-null	int64
Total eve charge	3333 non-null	float64
Total night minutes	3333 non-null	float64
Total night calls	3333 non-null	int64
Total night charge	3333 non-null	float64
Total intl minutes	3333 non-null	float64
Total intl calls	3333 non-null	int64
Total intl charge	3333 non-null	float64
Customer service calls	3333 non-null	int64
Churn	3333 non-null	bool

Fig -1: Features

## 3. ANALYSIS OF DATA

### 3.1. Churners rate in the data set

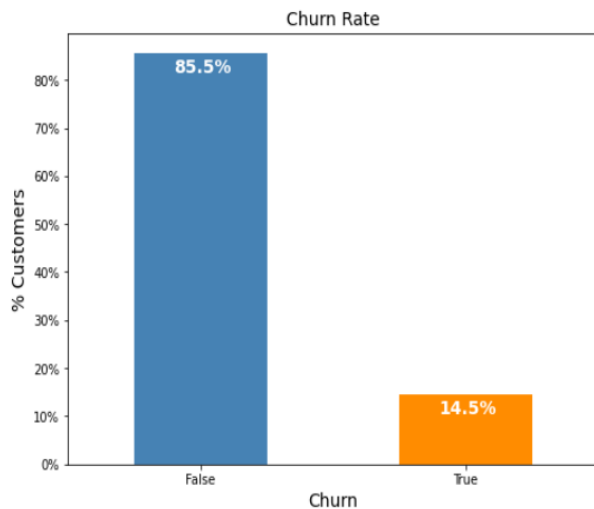
Total Customer: 3333

Churn(=True) customer: 483

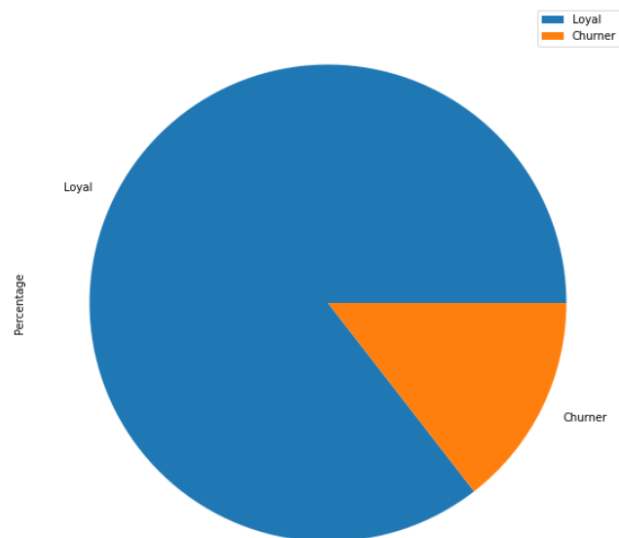
Loyal(churn = False) customer = 2850

Percentage of Churn Customer:

Total Churn percentage =



**Fig -2:** Percentage of loyal and Churners



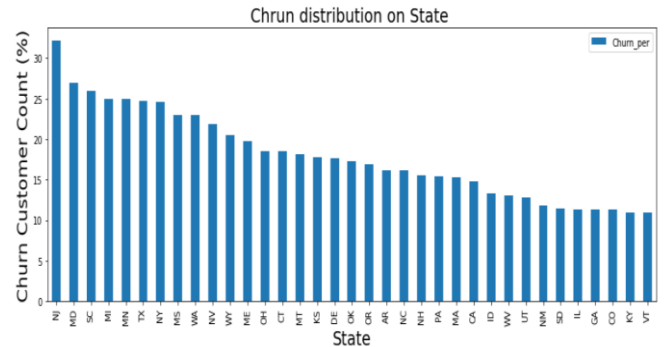
**Fig -3:** Pie Chart representation

85.5% percent of the total customers from the data set are loyal and 14.5% of them are in the churners list.

14.5% is high for a top MNC and should be reduced.

### 3.2. State Wise Churners analysis

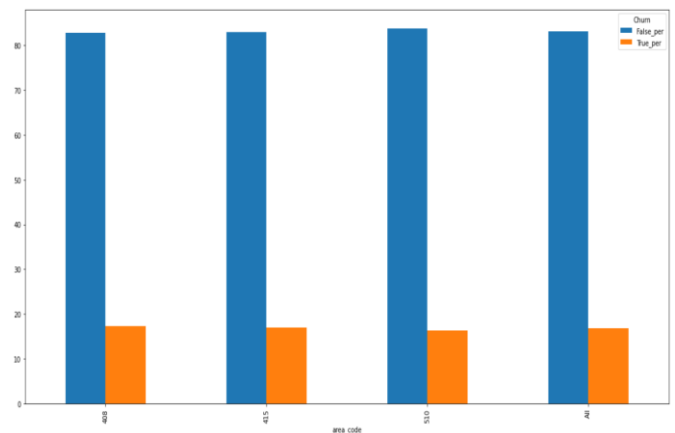
State-wise comparisons of 51 states suggest that churner's rate is higher for some states and relatively lower for other states. 35 top states that are contributing to 83% of the churners list are selected to narrow down the analysis and further analyses are performed on the filtered dataset.



**Fig -4:** States contributing to 83% churners

### 3.3. Area Code Wise Churners analysis

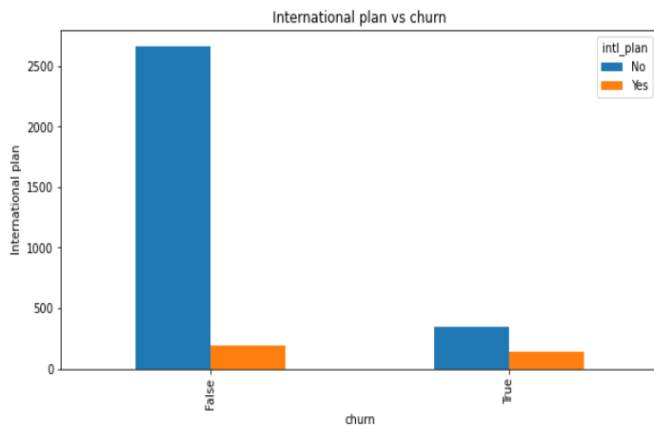
Analyses suggest that in area code wise there is no variation in churner's rate.



**Fig -5:** Area Code wise distribution of churner and loyal

### 3.4. International plan wise Churn analysis

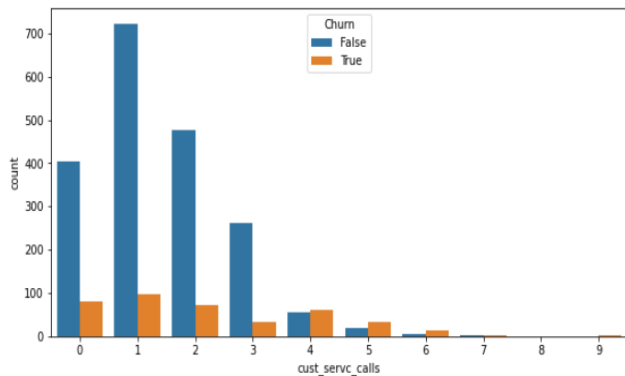
The churn rate is compared with the customers who have opted or not opted for the international plan and it suggests that customers who opted for the international plan are on the higher side to leave the company.



**Fig -6:** International plan vs. Churn distribution

### 3.5. Customer service calls wise Churn analysis

Customer service is an important tool to retain the customer. The churn rate is compared with the number of customer service calls made by each customer.

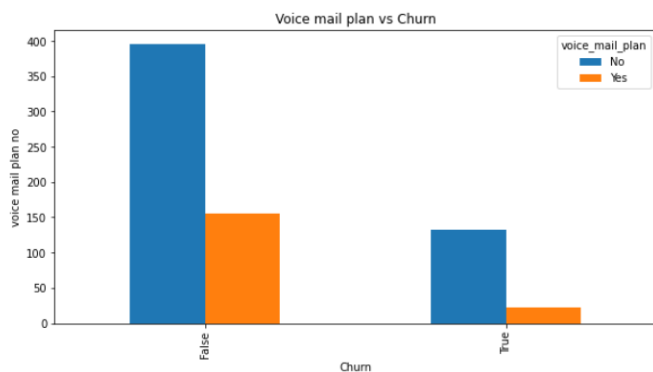


**Fig -7:** Customer service call vs. Churn distribution

Analysis suggests that the percentage of customers moving out sharply increases from four customer service calls and above.

### 3.6. Voice mail plan wise Churn analysis

Churn rate is compared with the customers who have opted or not opted for voice mail plan and it suggests that customers opted for voice mail plan are on less frequent to churn.



**Fig-8:** Voice mail plan vs. Churn distribution

## 4. OBSERVATIONS

- 85.5% percent of the total customers from the data set are loyal and 14.5% of them are in the churners list.
- 35 top states that are contributing to 83% of the churners list
- The churn rate by area code does not differ from the overall.
- Customers with the International Plan tend to churn more frequently.
- Customers with the Voice Mail Plan tend to churn less frequently.
- Customers with four or more *customer service calls* churn.

## 3. CONCLUSIONS and RECOMMENDATION

Based on the above observations, the following proposals are made that could reduce customer churn:

1. Any strategy to alleviate churn must focus more on states having above-average churn.
2. Survey all the customers whose call minutes and charges are above average to check for churn intent. Identify root causes for churning and take proper decisions to mitigate those concerns.
3. Survey International plan customers to understand the problems and identify root causes for churn. Then take steps to curtail those causes.
4. Escalate all calls beyond the 2nd customer call to ensure that any issues that the customer faces are fixed before the next call. Proactively check on customers to confirm that their issue is fixed.

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