



# CAPSTONE PROJECT-01 EDA ON

## Telecom Churn Analysis





# HELLO!

I am Gaurav Yogeshwar

You can find this project at -  
[Github link for this project](#)

# Customer churn?

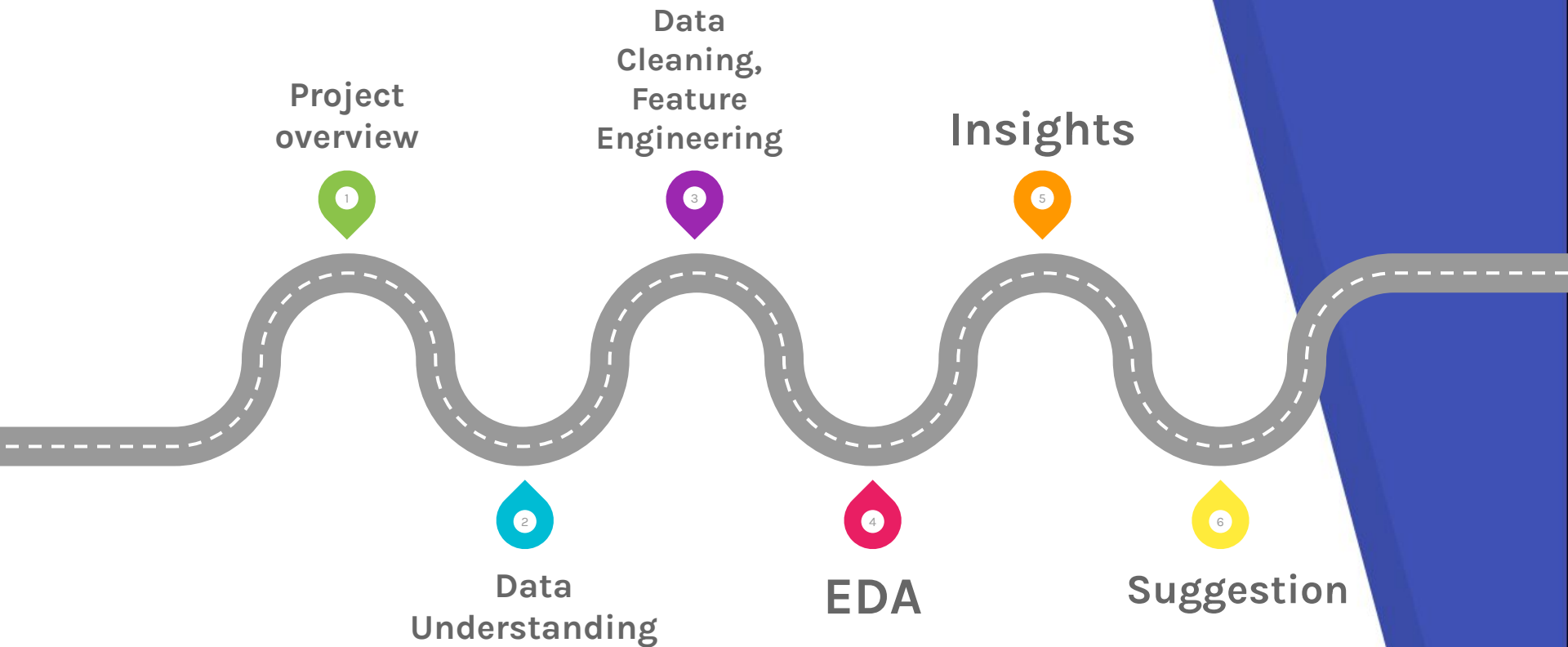
**Customer churn** is the term used when an existing customer stops using a company's services and/or stops buying their products. In other words, the customer chooses to cut his ties with the company.

**Churn rate** is defined as the proportion of customers who stopped using a particular company's products or services during a definite time frame

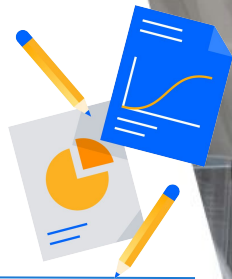
$$\text{Churn Rate \%} = \frac{\text{Number of Customers lost}}{\text{Total no. of Customers}} \times 100$$



# Roadmap



# Project Overview



Orange S.A., formerly France Télécom S.A., is a French multinational telecommunications corporation. The Orange Telecom's Churn Dataset, consists of cleaned customer activity data , along with a churn label specifying whether a customer canceled the subscription.



# Goal:

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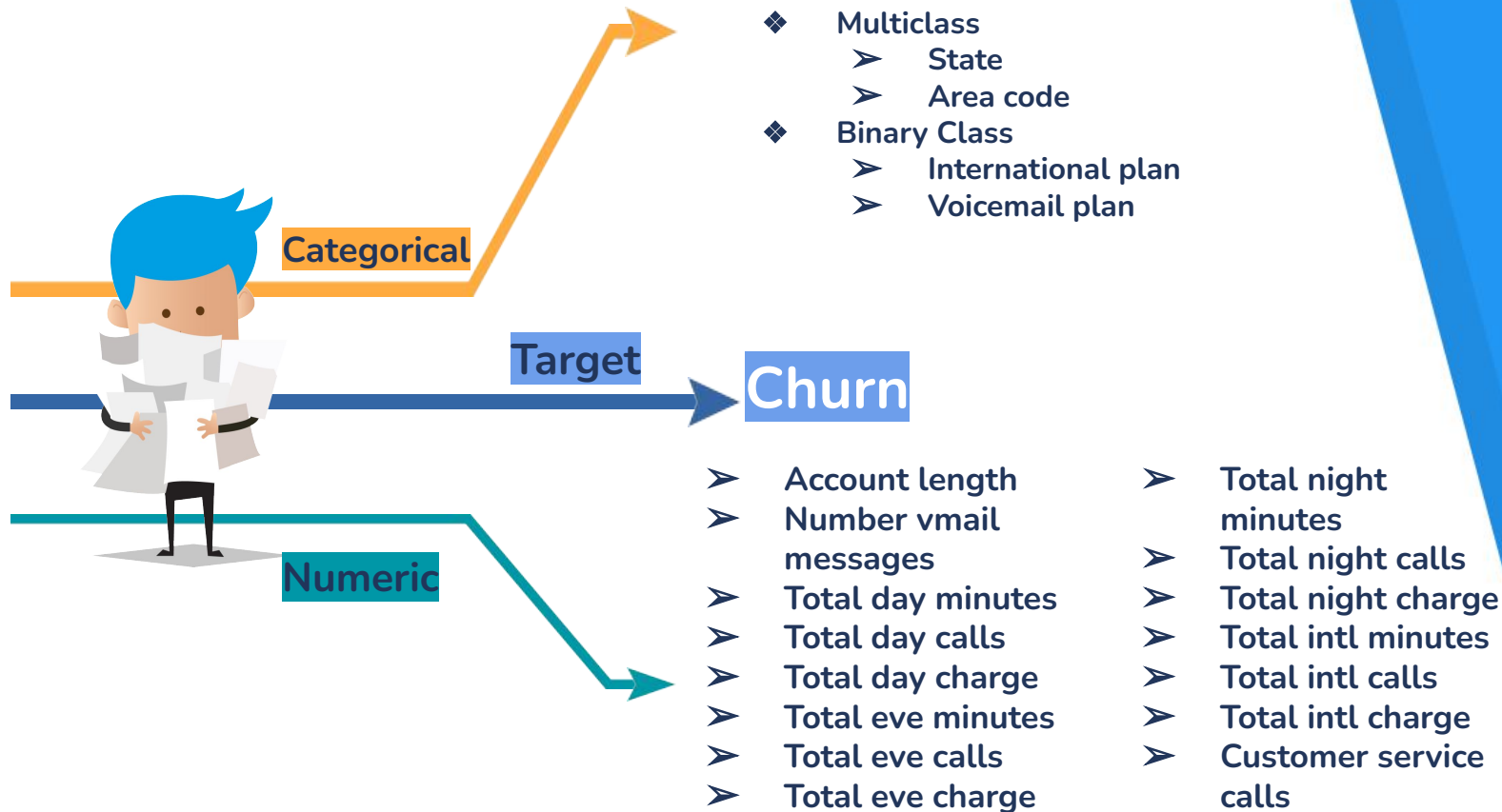


**Explore and analyze** the data to discover key factors responsible for customer churn and come up with ways/recommendations to ensure customer retention.

To meet the need to survive in the competitive environment, retaining existing customers has become a major challenge, it is cheaper to retain a loyal customer then acquire a new one.



# Data Summary



“

## Data Cleaning, Preprocessing and Feature engineering

It is process of using domain knowledge to extract features from raw data via data mining technique.

There are Three general approaches:

- ▶ Extracting Information
- ▶ Combining Information
- ▶ Transforming Information



”



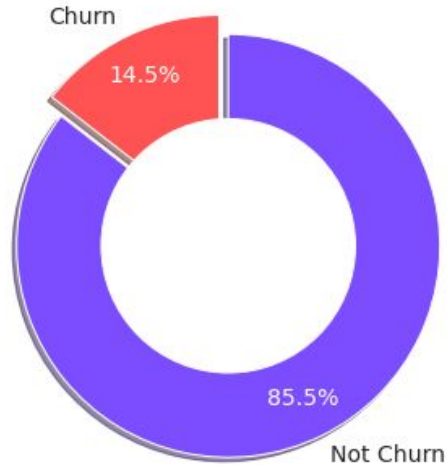


# Exploratory Data Analysis

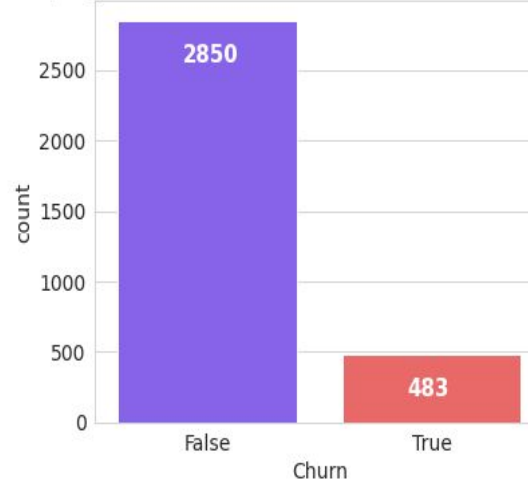


# Observation 1

Display the percentage of the class labels (Churn) with a Donut Chart.



Display the balance of the class labels (Churn)



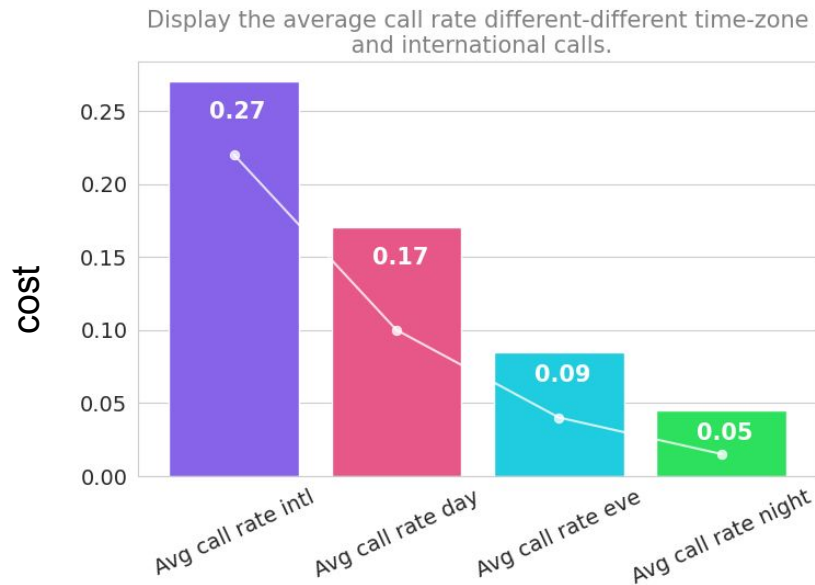
## Insights:

- ❖ The target variable is highly imbalanced, 14.5% of Orange Telecom's customers have churned, but from a customer churn perspective it's still high. Our job will be to reduce it as much as possible.
- ❖ For every single churn customer we have 5.9 retain customers.
- ❖ Total number of customers are 3333.





## Observation 2

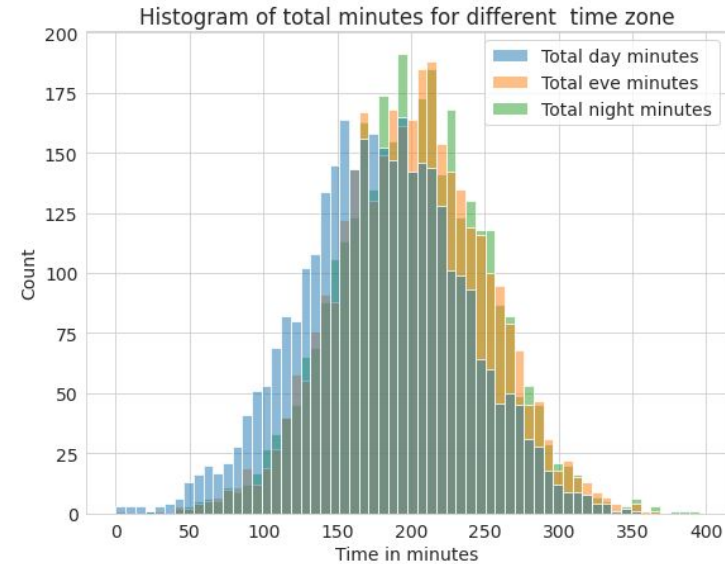
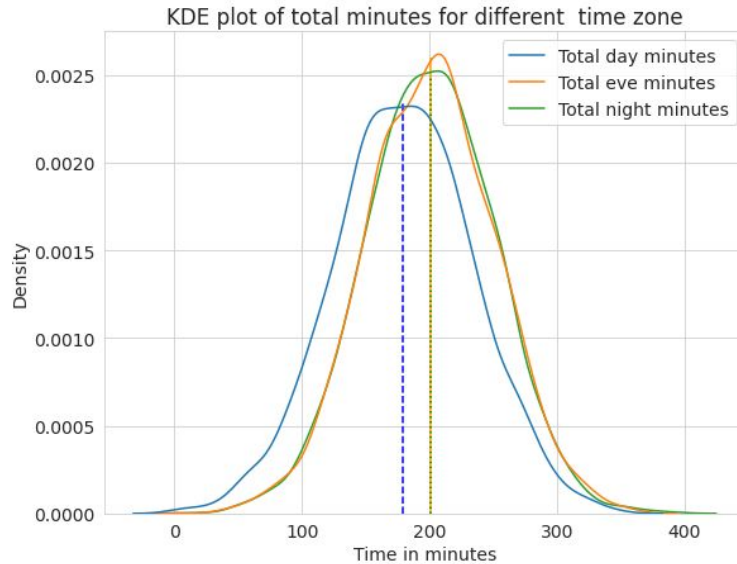


$$\text{Average call Rate} = \frac{\text{Total charge}}{\text{Total minutes}}$$

### Insights:

- ▶ Charges for International calls are highest, followed by day, then evening and night calls are cheapest.
- ▶ This is obvious that international calls are expensive compared to domestic calls.





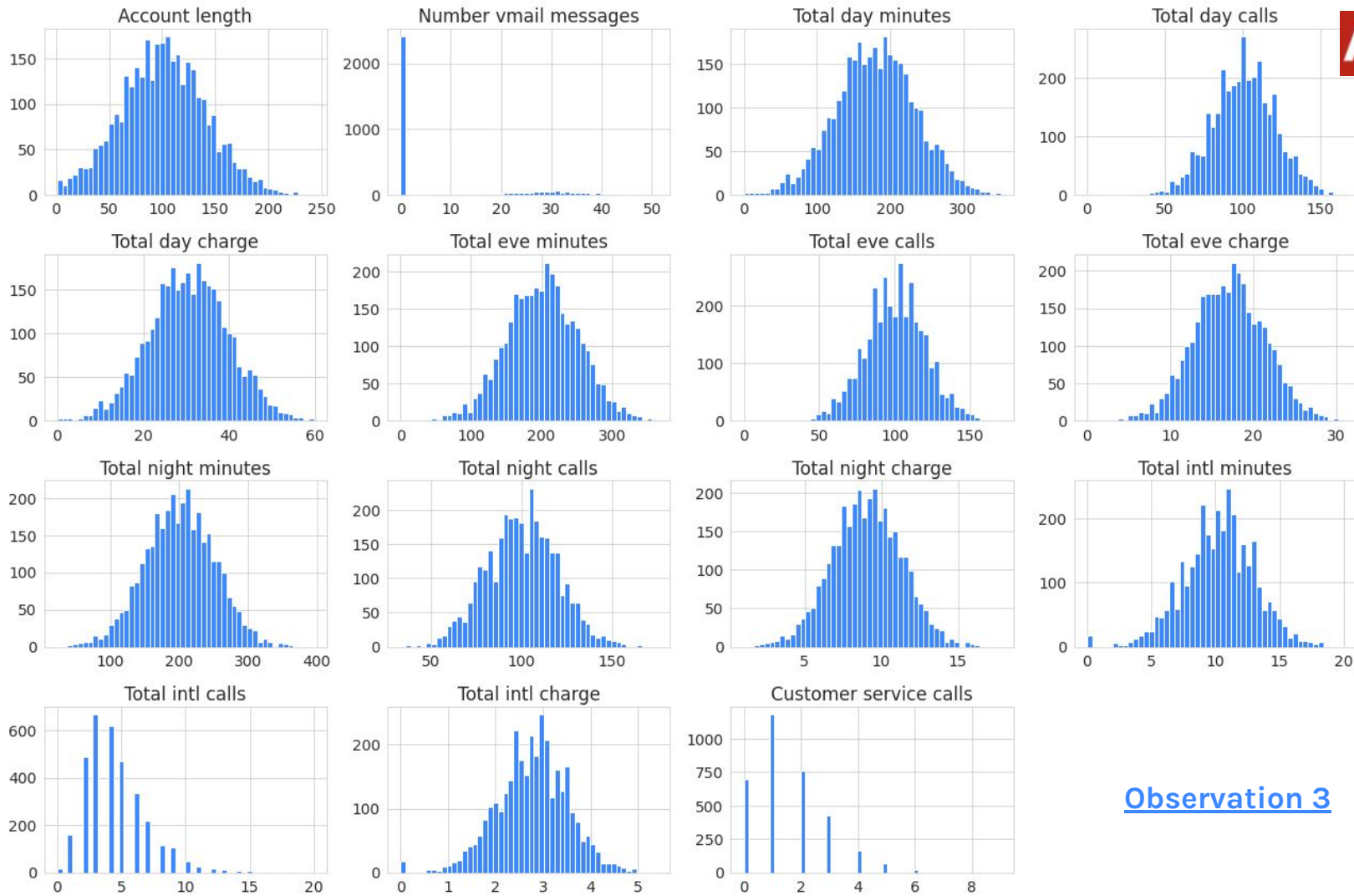
## Insights:

- ▶ On average, our customers prefer to talk more at night and evening than during the day.
- ▶ Why? (Is it because day calls are expensive....)



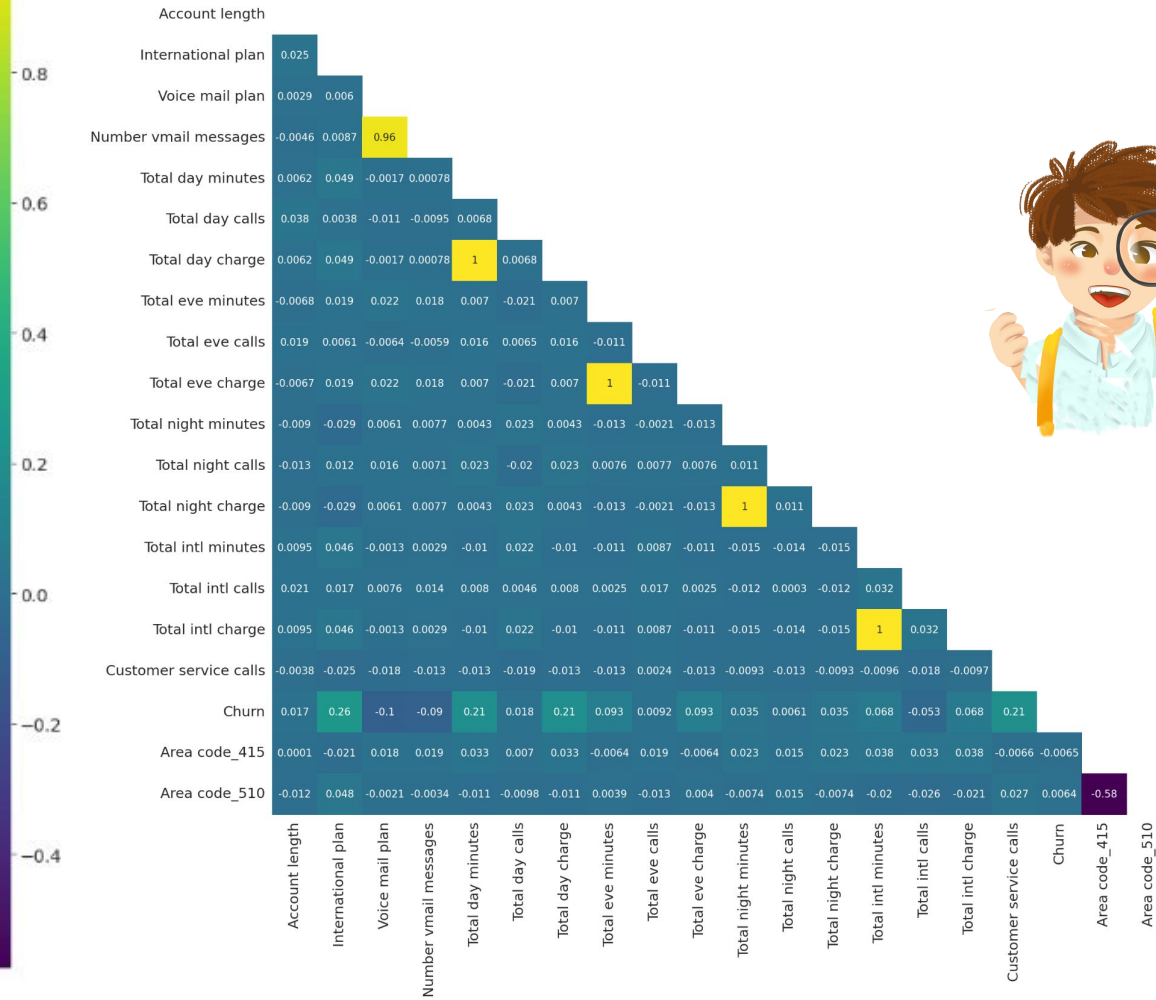
# A quick look of Histogram of each numerical

## attributes



Observation 3

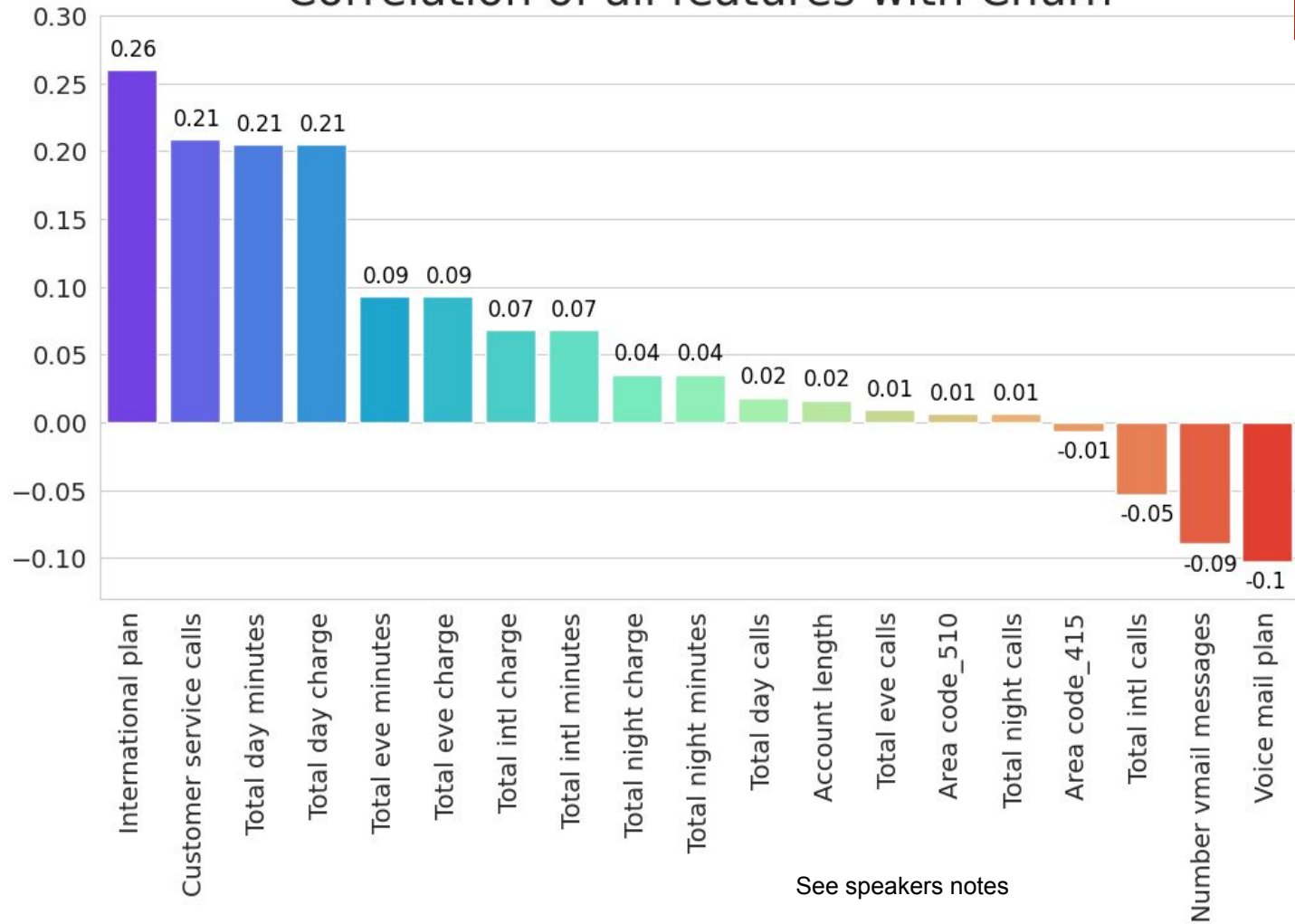
Display Heat Map of correlation matrix



Observation 4



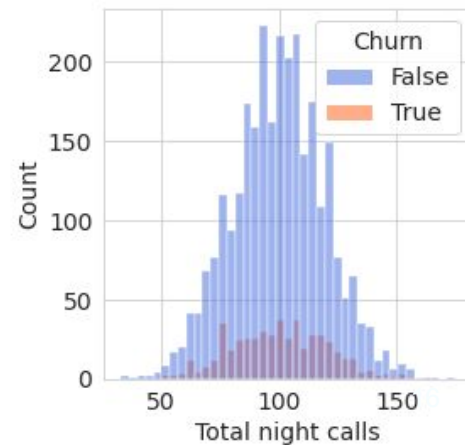
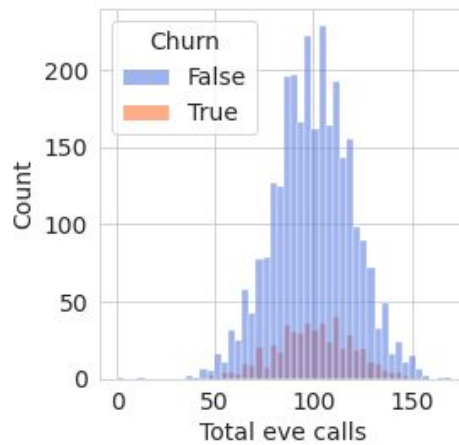
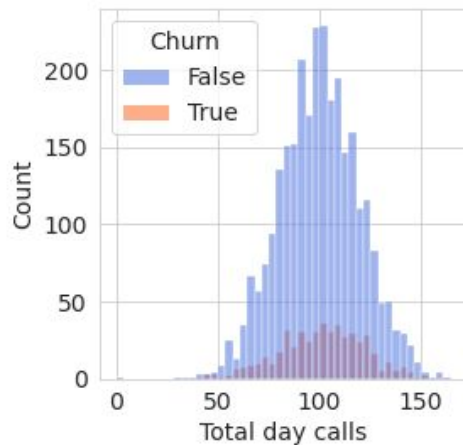
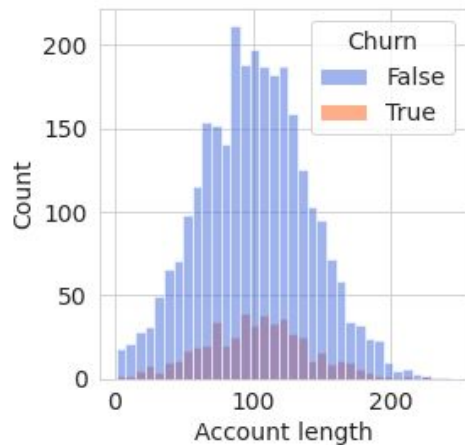
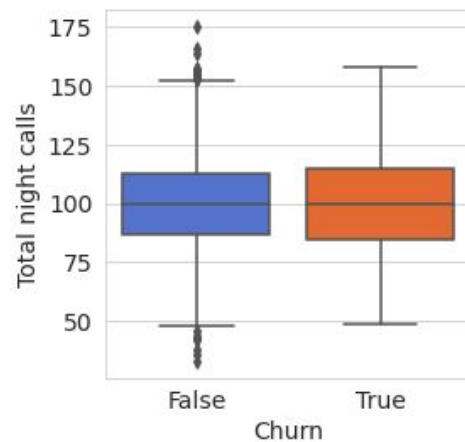
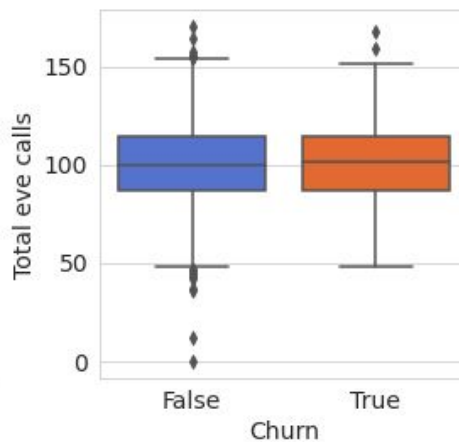
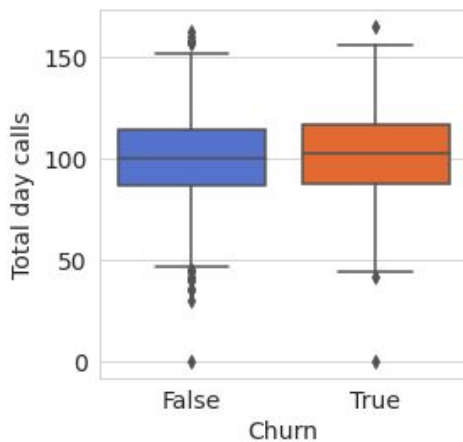
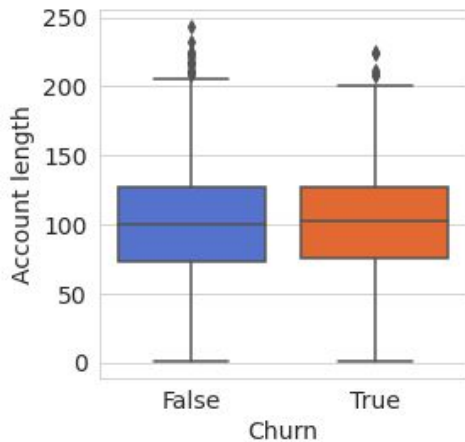
## Correlation of all features with Churn



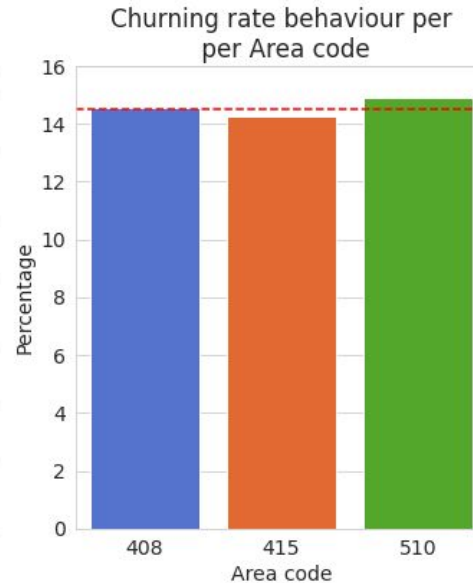
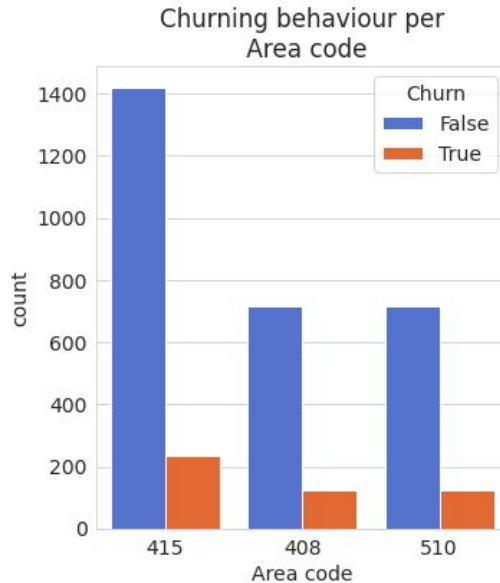
See speakers notes



## Observation 5: Behavior of features that have no correlation with the target variable.



# Area Code

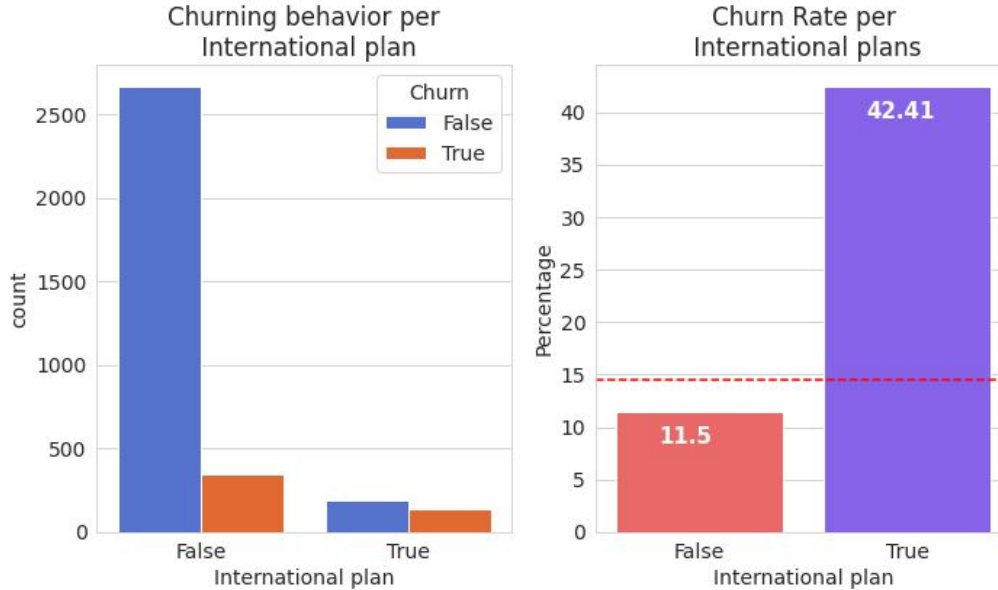


## Insights:

- ▶ As we can see that Account length, Area code, total calls at different time does not affect the churn behavior of the customers.
- ▶ Area code 415 has twice as many customers as others.



## Churn analysis with International plans and International minutes

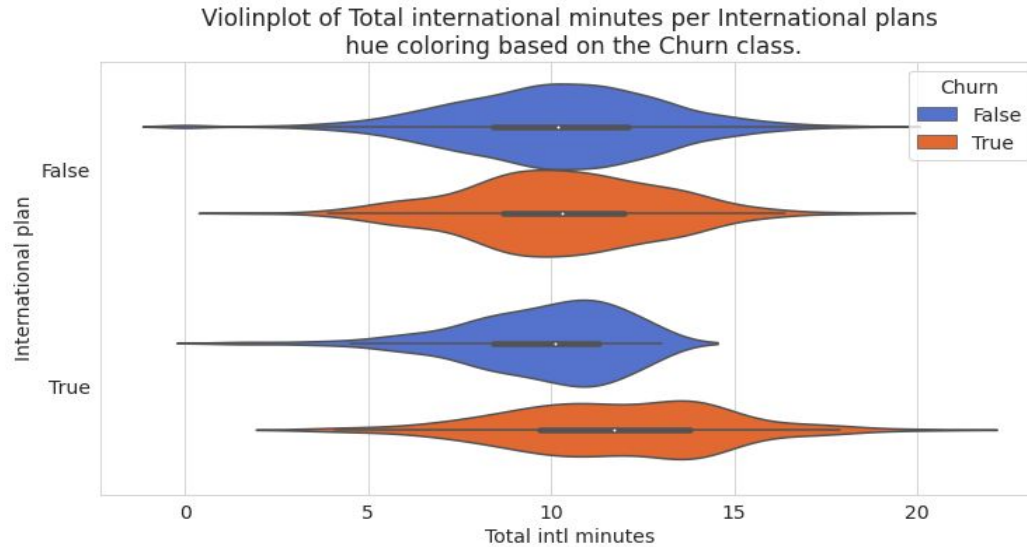


### Observation 6



- 9.69% of users have international plans.
- Customers having International plans have overall high churn rate.

## With International plan and Total intl minutes



### Customer with international plan

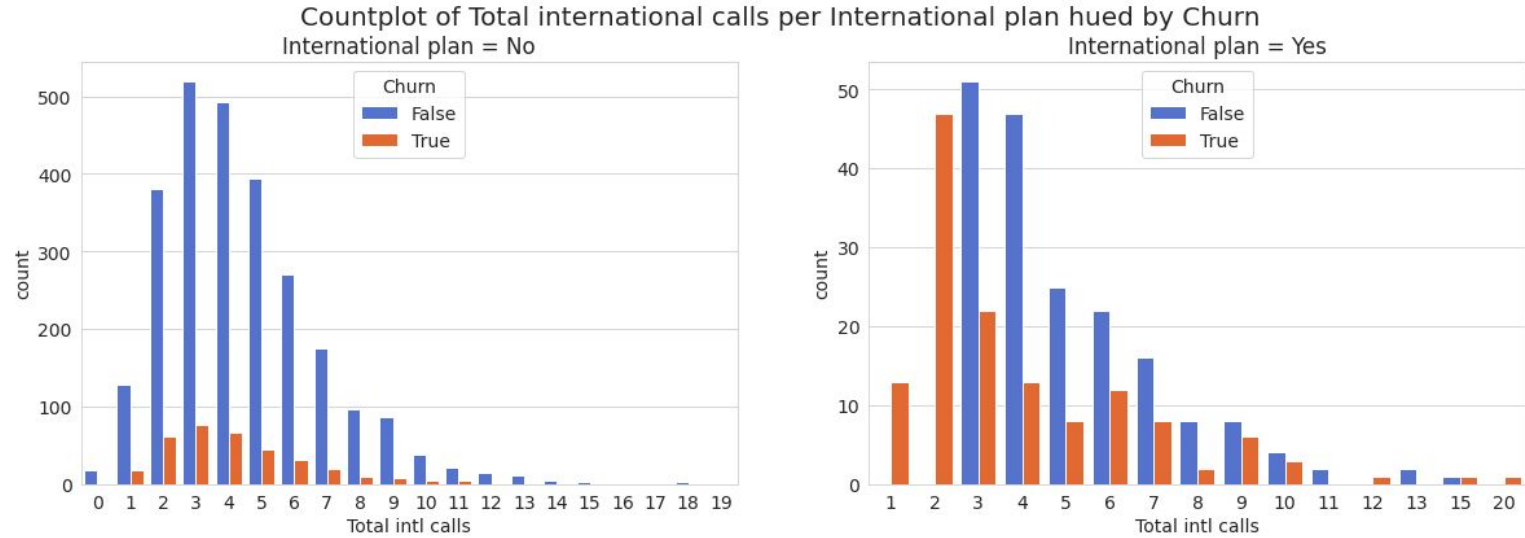
- ▶ High churn rate for high value of total international minutes.

### Customers with no International plan

- ▶ Churn rate is independent of the total international minutes.



## With With International plan and Total intl calls



### Users without international

- ▶ Churn and retain behavior plans follow same pattern

### Users with International Plans

- ▶ Regardless of any number total international calls Churn rate is very high, not a single **user retained till 2 calls**.

Overall it has overall negative correlation with international plan as we can see in few slide back

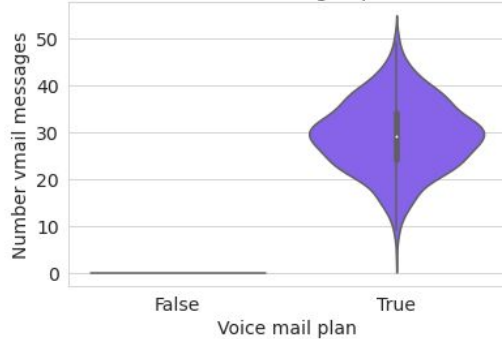




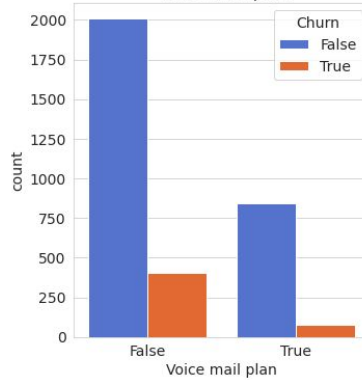
## Observation 7

## With Voicemail plans

Number of voice mail messages per Voice mail plan



Churning behavior per Voice mail plan



Churn Rate per Voice mail plan



★ 27.66% of users have Voicemail plans.

User without voicemail plan

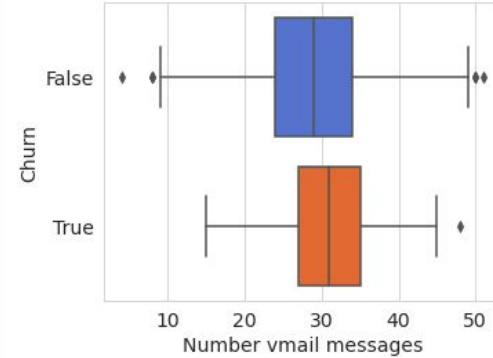
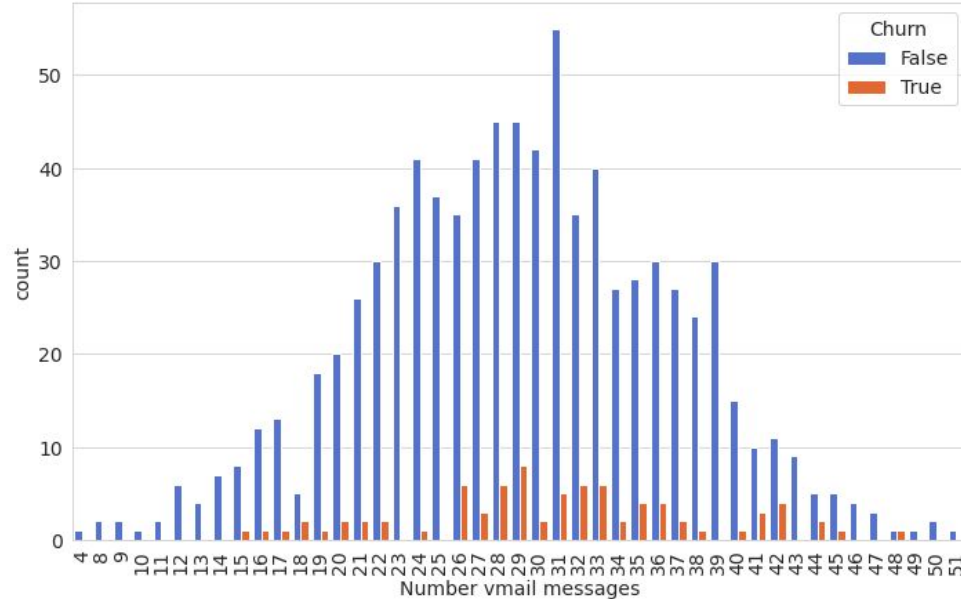
- Those who don't have a voicemail plan don't send voicemails.

User with voicemail plan

- Churn rate of users is low if they have vmail plans.

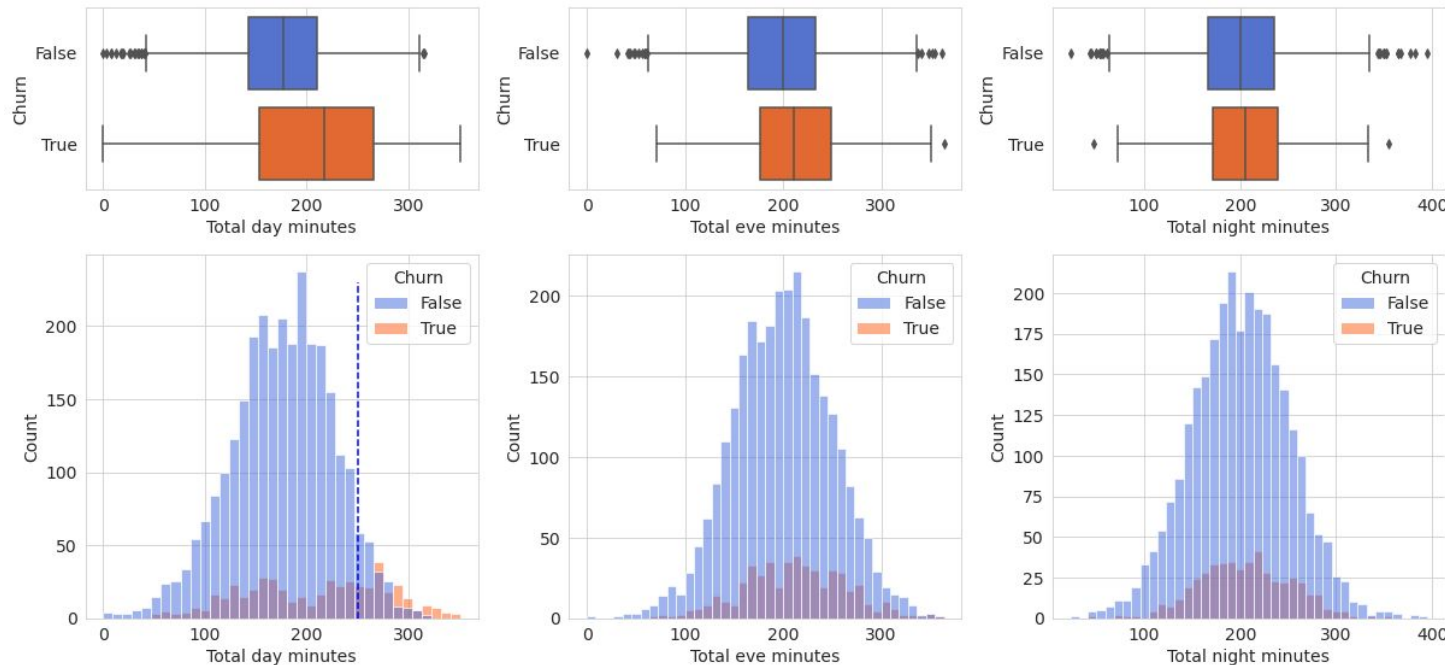
# With Number of voice messages

Churn behavior per number of voice mail plan for customers who have taken vmail plans



As number of voicemail messages increases then chances of getting churned is also increasing.

# Total day, evening and night minutes



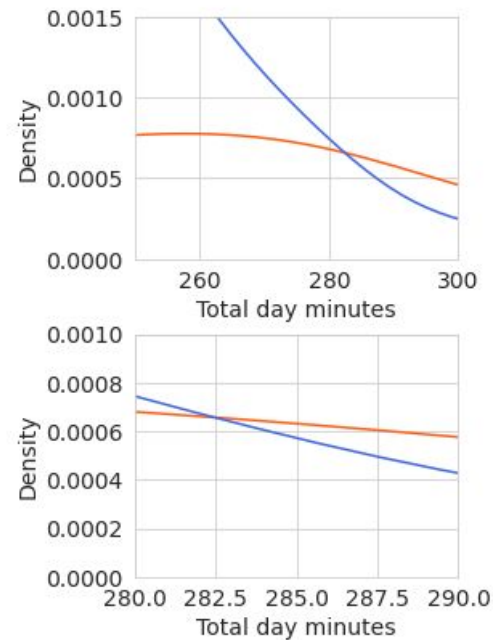
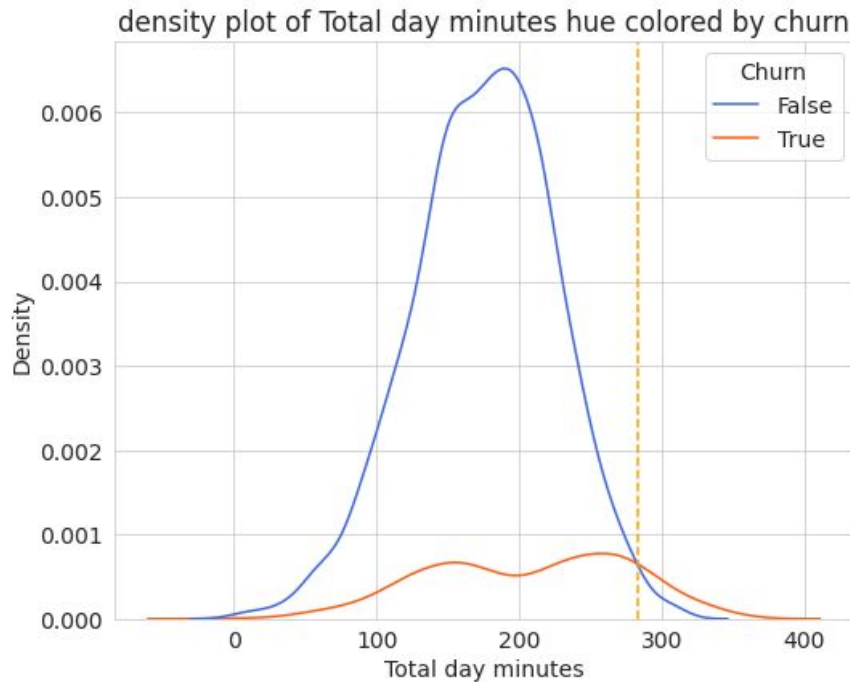
## For Day Users

- The churn rate of the user who talks more on the phone has been seen higher.

## For Evening and Night Users

- The churn behavior is the same for all users, although the in box plot median is slightly higher for churned user in evening times, but the difference is that high compare to day users.

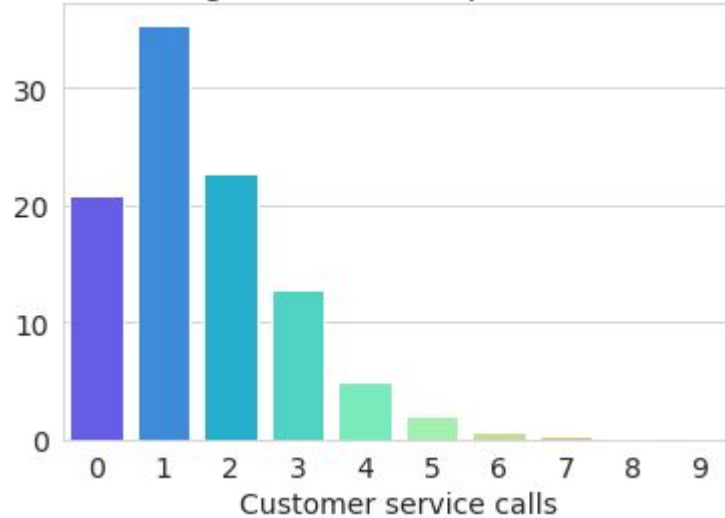
**Lets see at what value of total day minutes the likelihood of churning is exceeding for churning customer.**



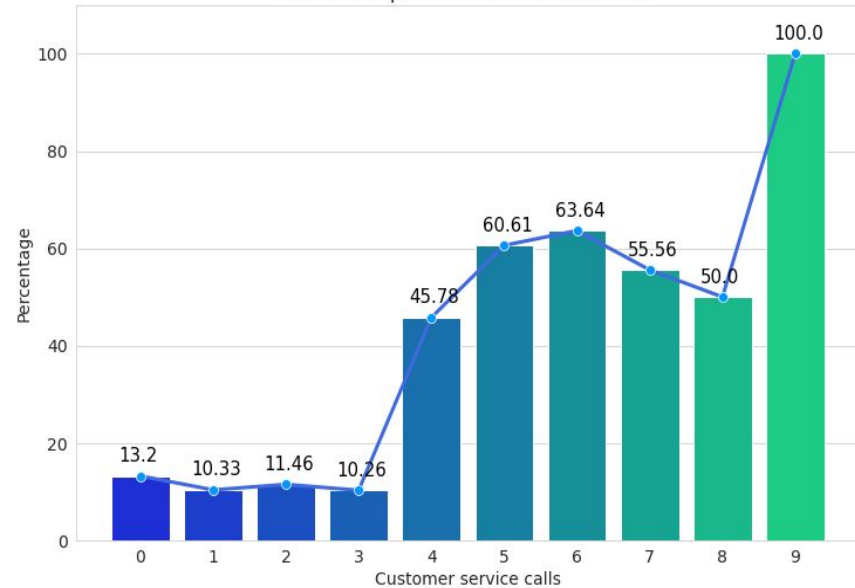
- If customer talk more than 283 minutes in day time then it likelihood of getting churn higher.

# With Customer service calls

Percentage of customer per service calls

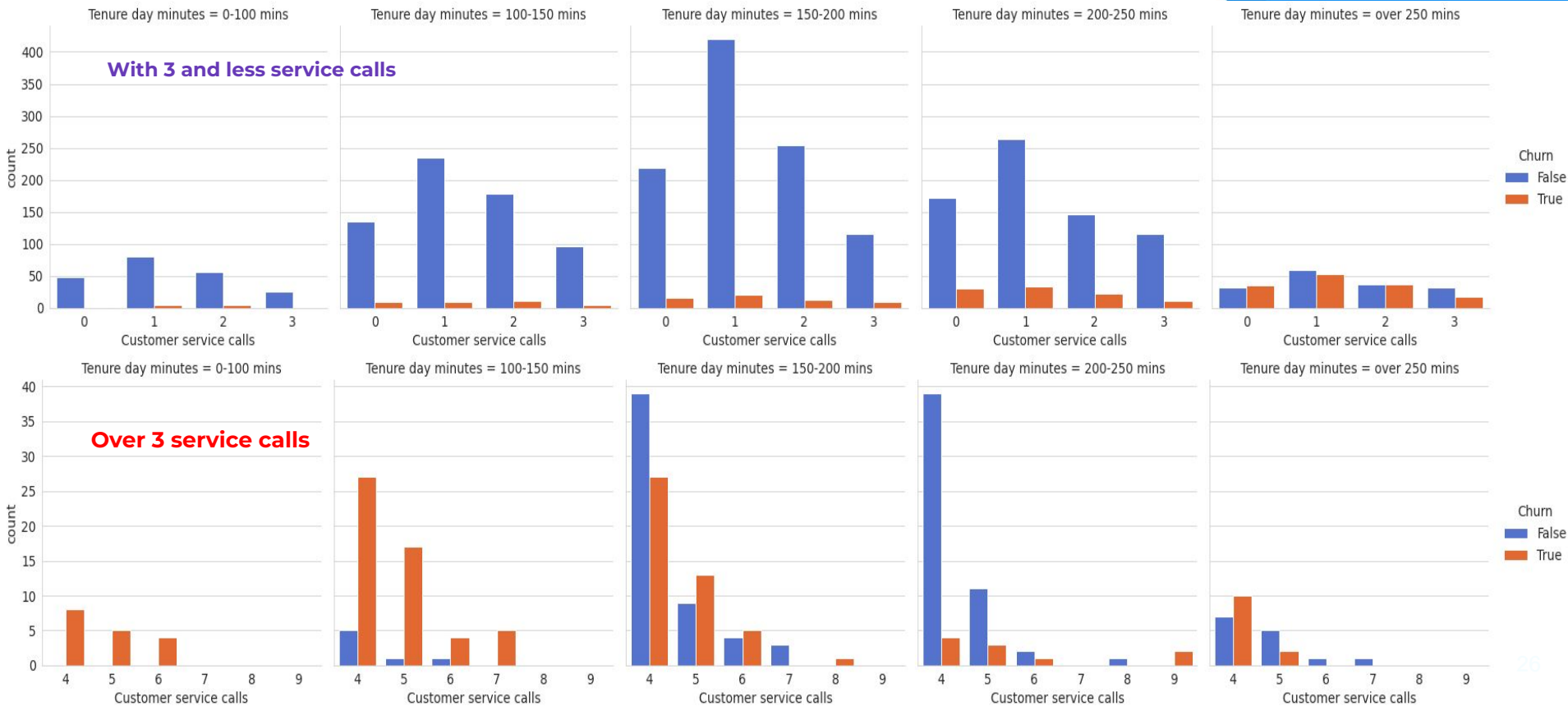


Churn rate per Customer service calls



- ▶ Churn rate increases significantly for 4 or more calls to the customer service.
- ▶ The number of customer service calls greater than 3 is significantly low.

# Customer Service calls, per Tenure day minutes

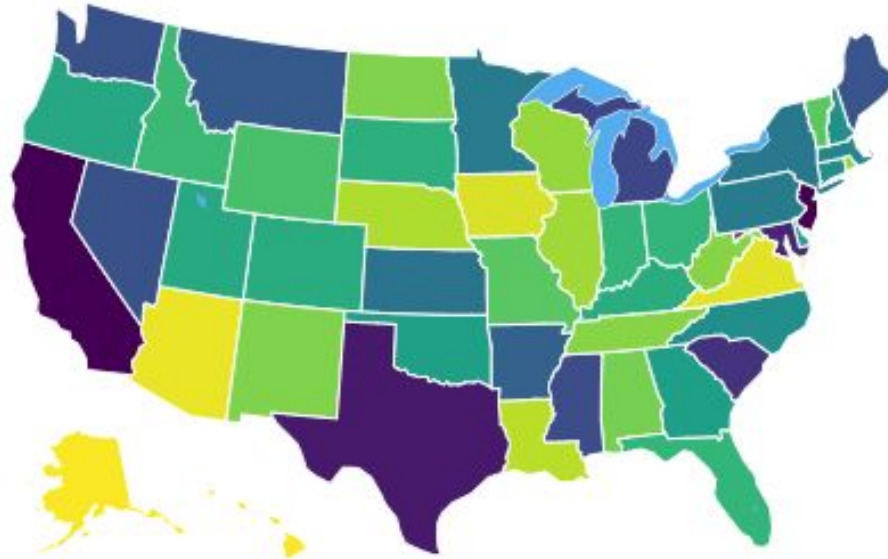
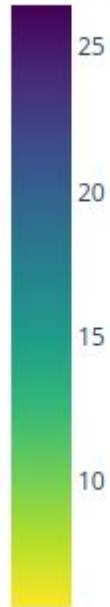






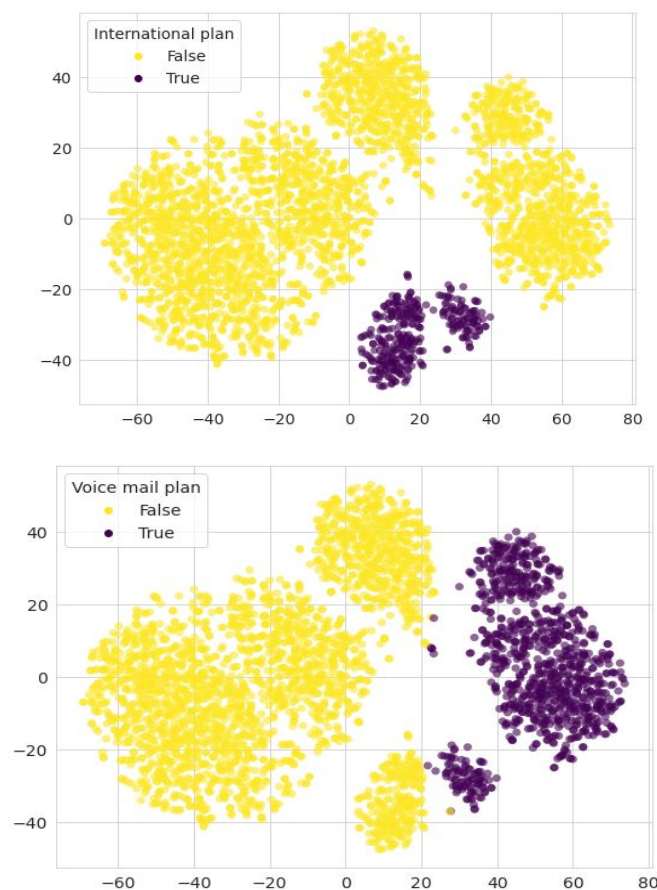
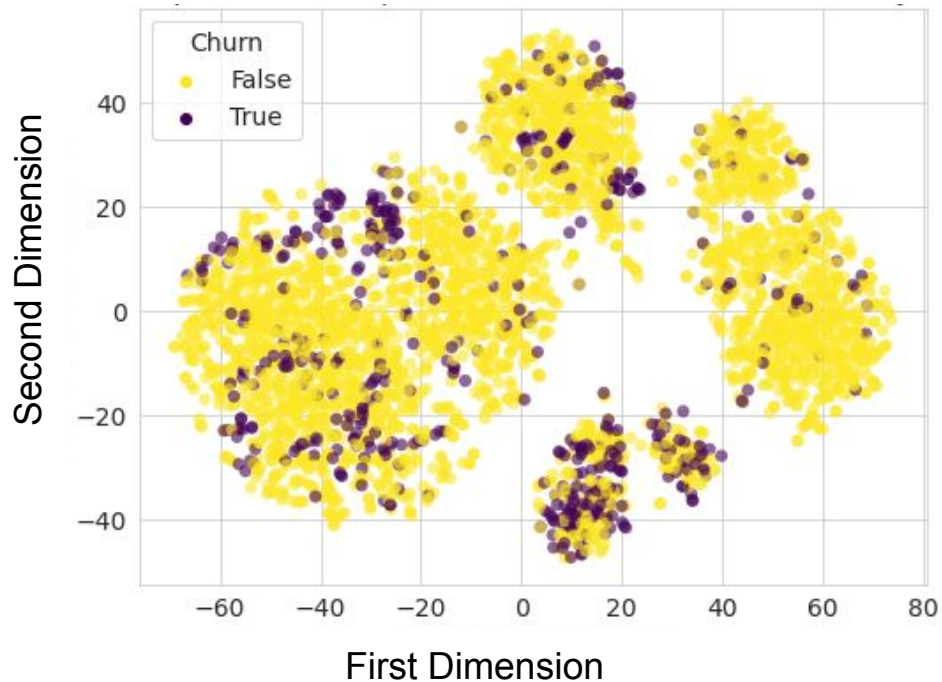
## Churn rate for different states by choropleth map

Churn Rate

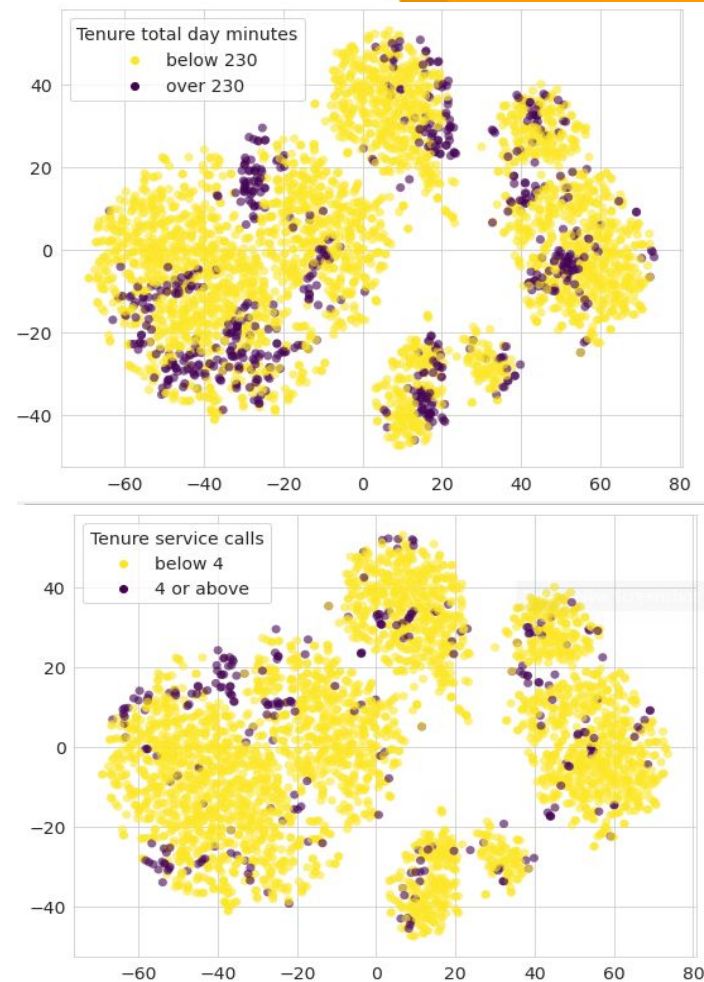
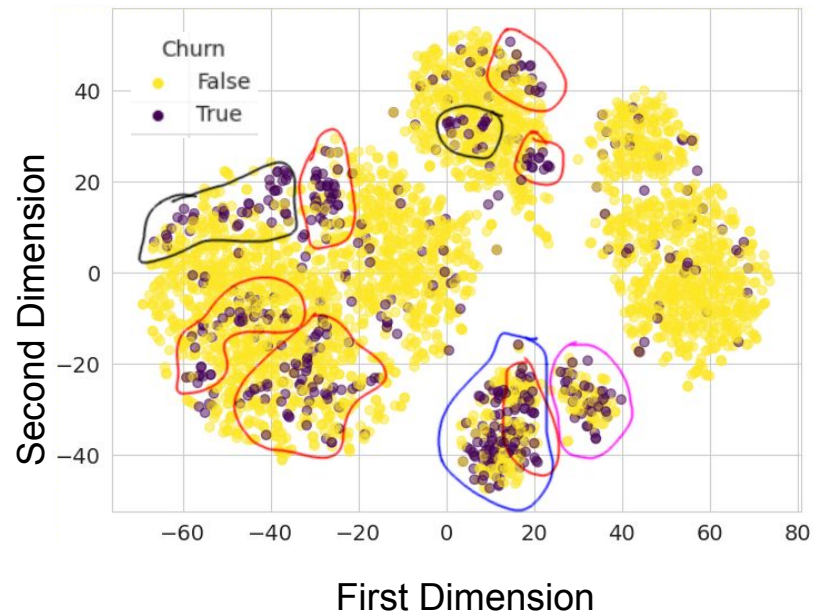


Observation 10

# Scatter plot for 2 components in Reduced dimension (using t- SNE)



## Churn cause in the reduced dimension by grouping on features



# Recommendations

## International plan

We need a very attractive **international plan**, which can provide satisfaction to the customers making international calls.

I

## Tariff plan

Need to introduce better tariff plans for day as well as evening calling which is specially designed for users talking too much day. Day tariff will be the first priority.

T

Need a new **voicemail** plan along with the old one which is specially designed keeping in mind the more voicemail senders.

## Voicemail Plan

V

Need to improve feedback system that doesn't ignore customer problems

## Feedback System

F



# ***Thank You!!!***

Any questions?

*Thank you  
For your  
Attention*