# CUSTOMER CHURN PREDICTION


# Group 8 members

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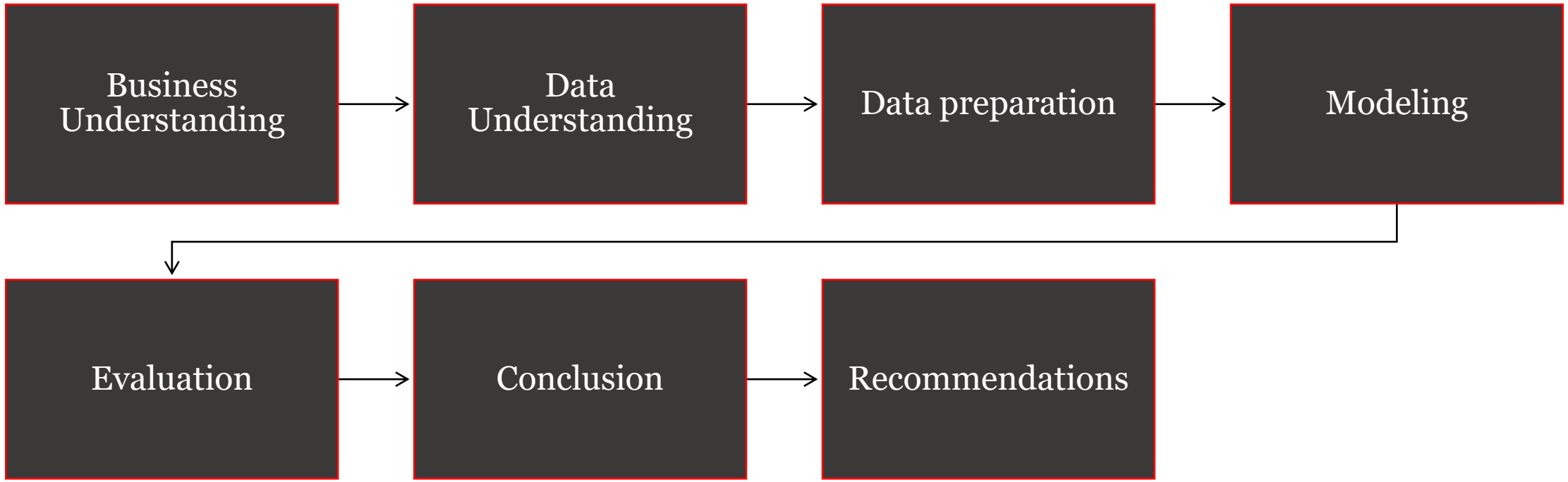
# Outline


Business Understanding
Data Understanding
Data preparation
Modeling
Evaluation
Conclusion
Recommendations

# Overview


- Customer churn is a critical focal point in the telecommunications industry
- It costs **5 times more** to acquire a new customer than to keep an existing one
- For telecoms, **gaining a firm understanding of churn rates** and **prioritizing customer retention** sets the stage for sustained profitability and long-term success

# Business Problem

- Syriatel Telecommunications is experiencing a substantial increase in customer churn rates in USA and wants to understand the underlying factors contributing to this trend

# Objectives

To understand which factors or variables contribute the most to customer churn

To identify different customer segments based on churn behaviour

To develop a model that can accurately predict customer churn

To obtain valuable insights that help generate the best recommendations to protect Syriatel's revenue

# Data understanding

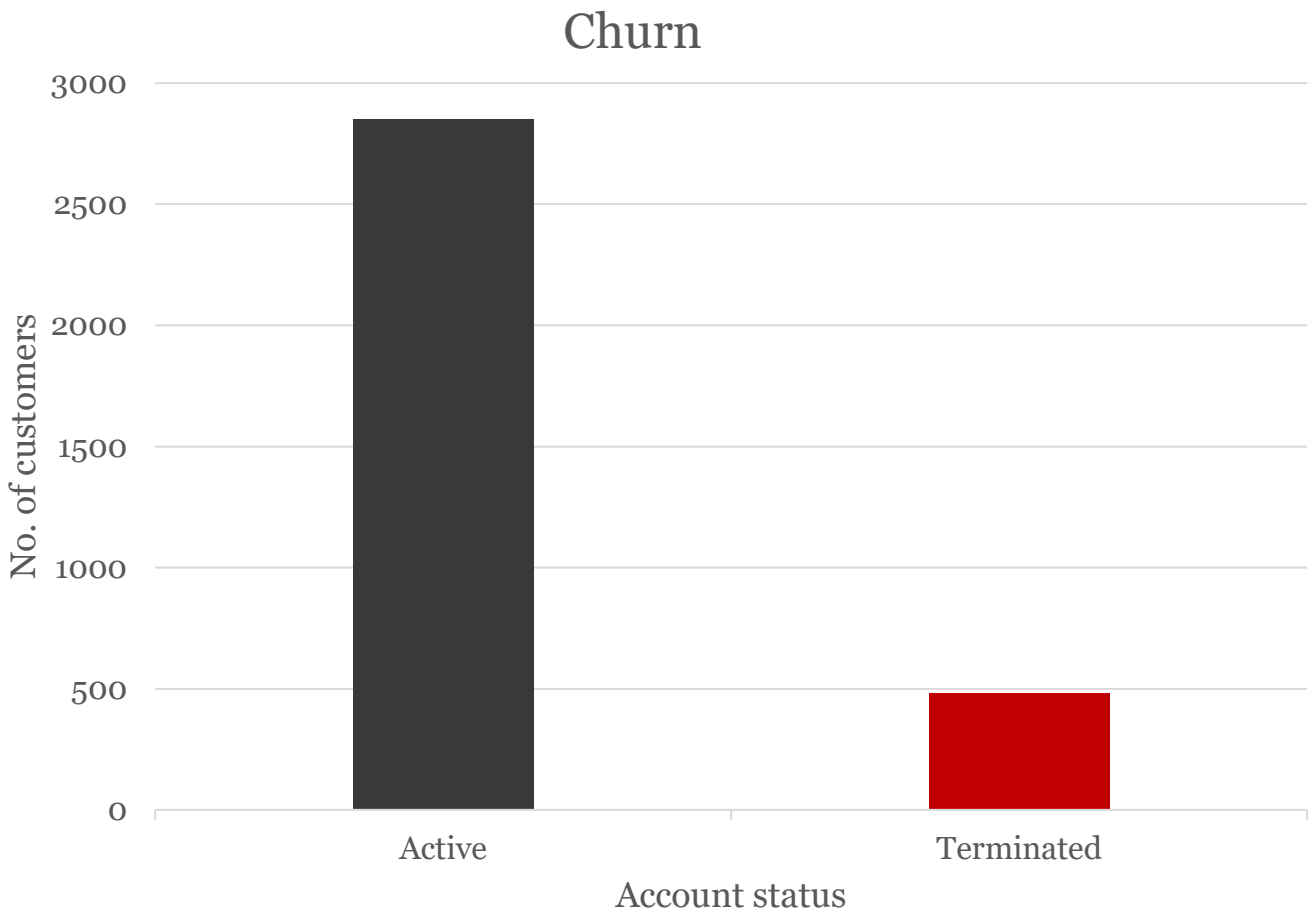
- The analysis investigates a telco dataset containing **3333** records and **21** variables
- The features encompass a mix of numerical and categorical variables
- The target variable is "**churn**"

# Data preparation

The dataset underwent cleaning, including checking for **duplicated rows** and **missing values**, and **dropping unnecessary columns**

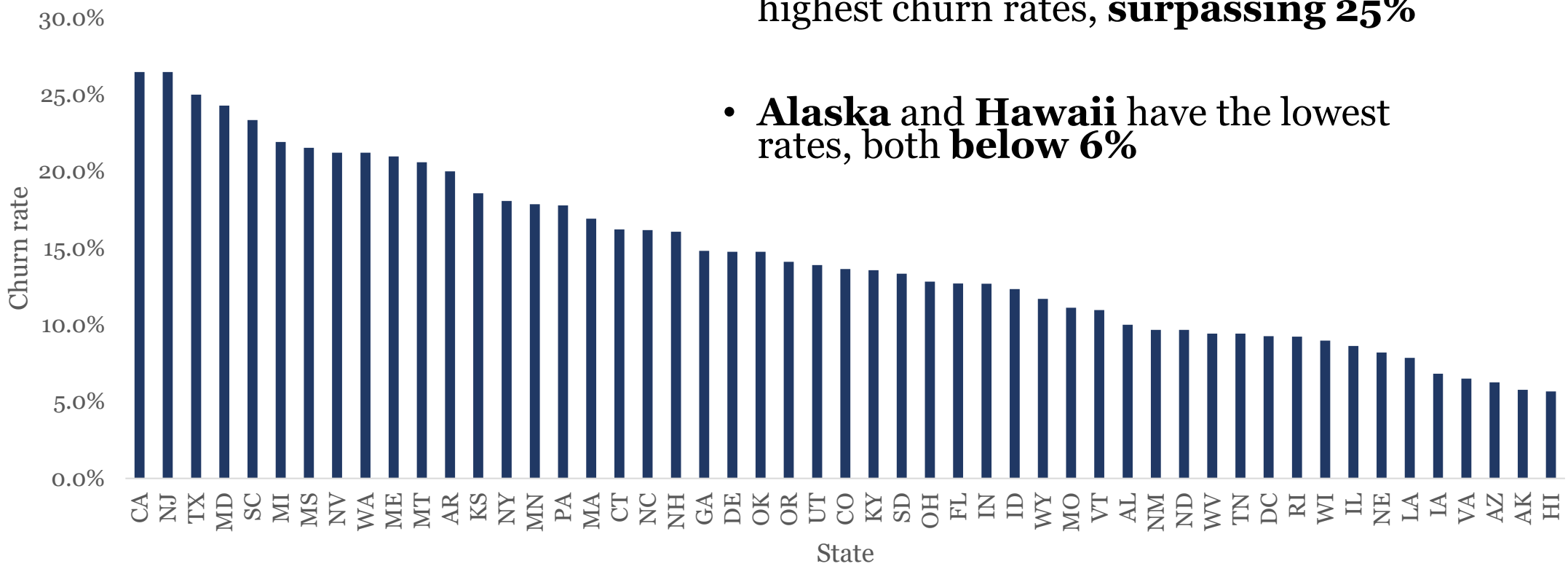
Data analysis included **univariate analysis** of the target variable "**churn**" , **bivariate and multivariate analysis** of churn in relation to other features in the dataset

# Churn vs. Retention



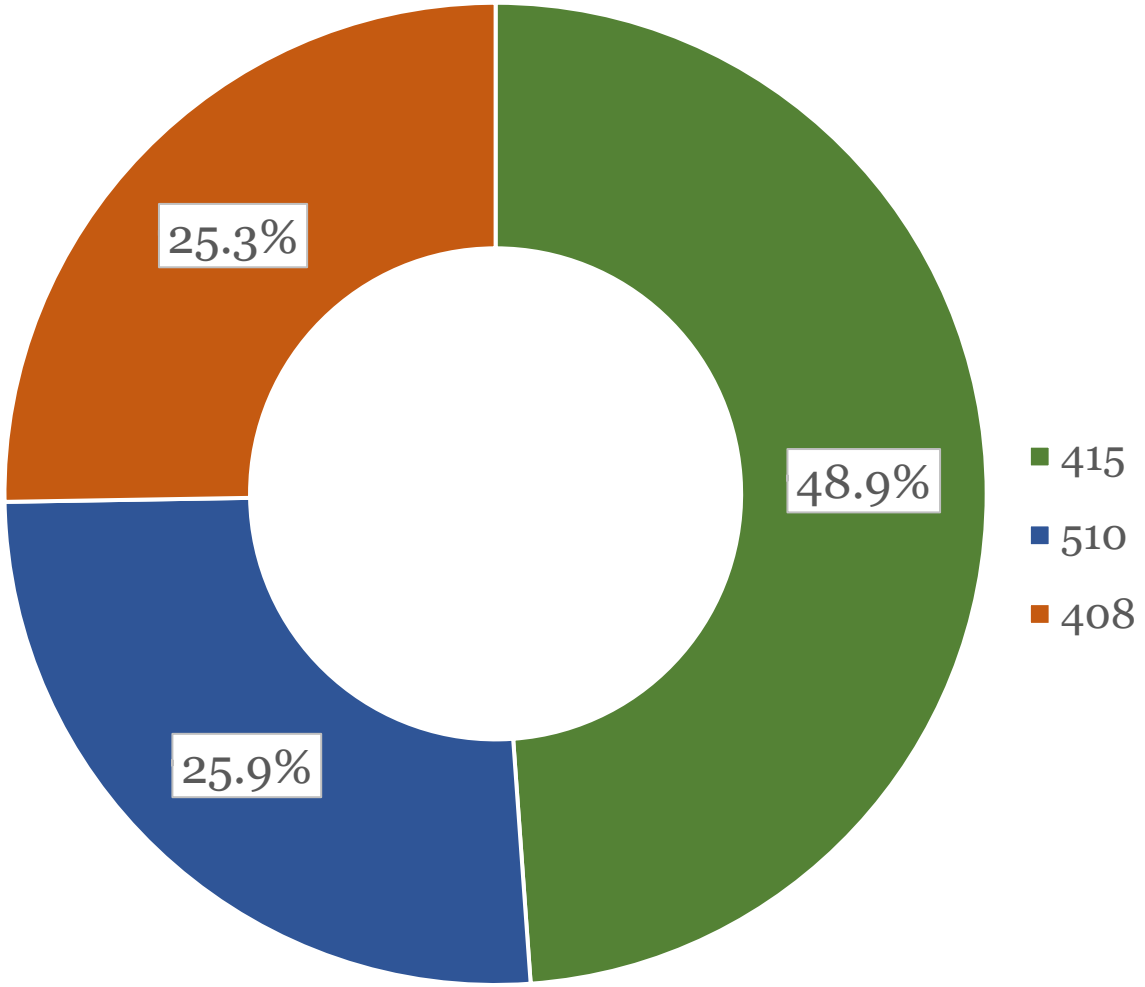

- Total number of customers: **3,333**
- Terminated accounts: **483**
- Churn rate: **14.5%**

# Churn by State



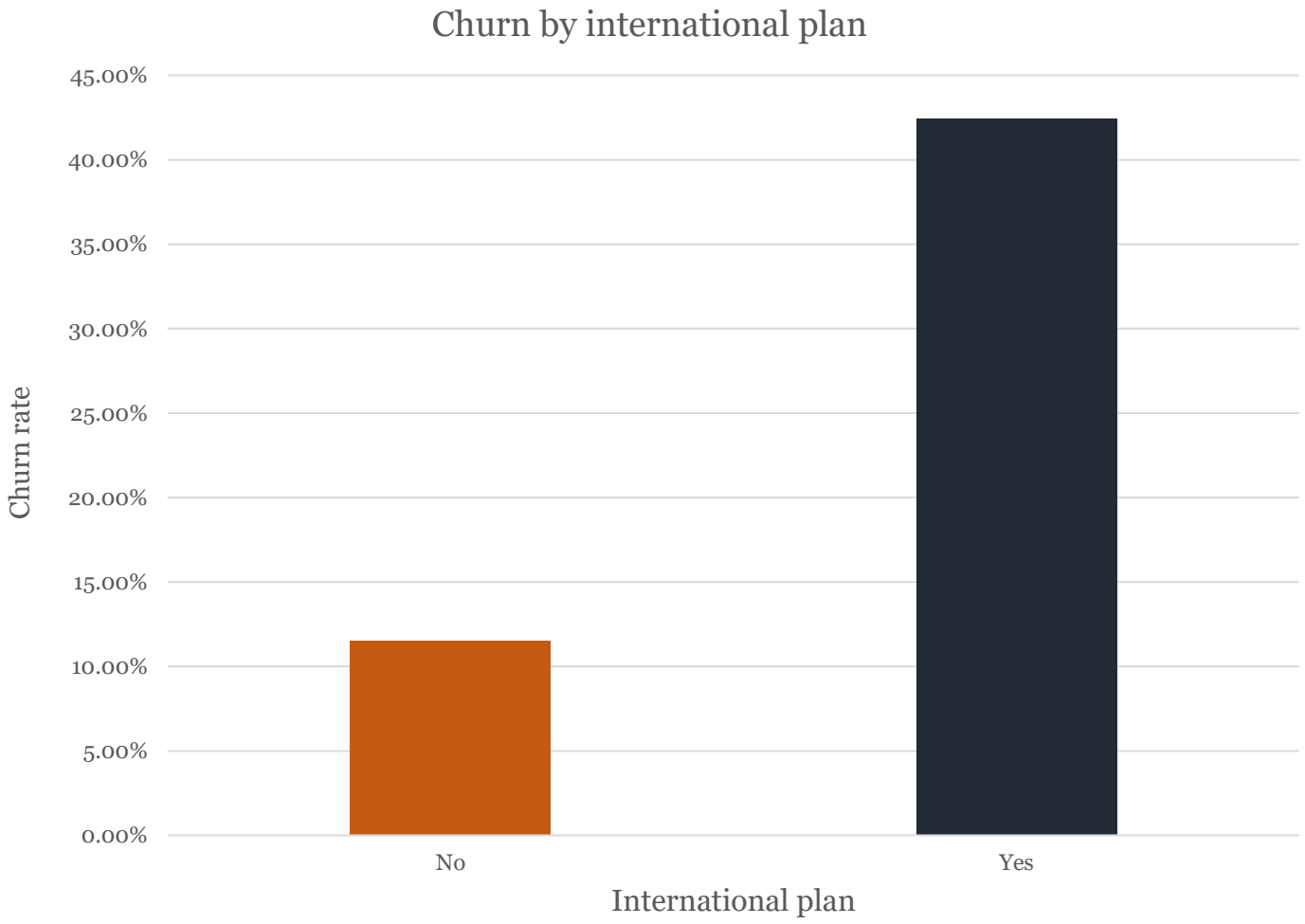

- **California** and **New Jersey** exhibit the highest churn rates, **surpassing 25%**
- **Alaska** and **Hawaii** have the lowest rates, both **below 6%**

# Churn by area code




- **Area code 415 (San Francisco City ) in California state** exhibits the highest percentage of account terminations

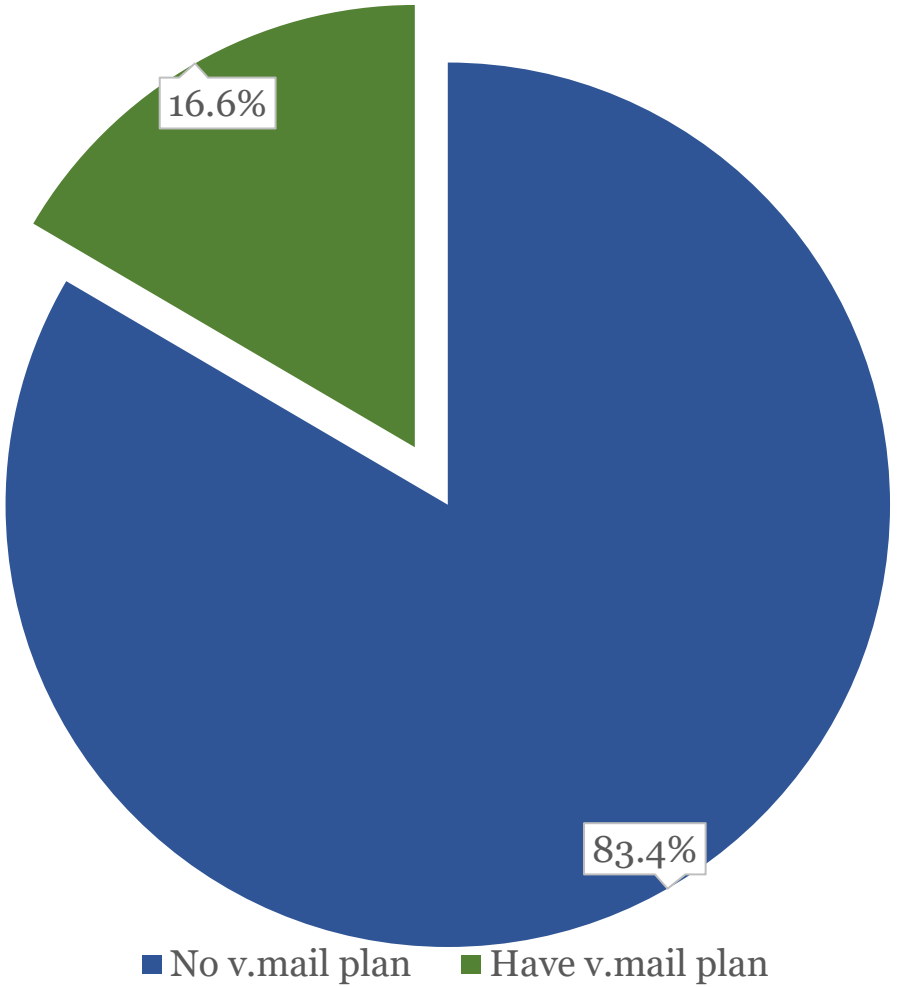
# How does an international plan affect churn?




- Out of the customers that had an international plan, **42.4%** terminated their accounts

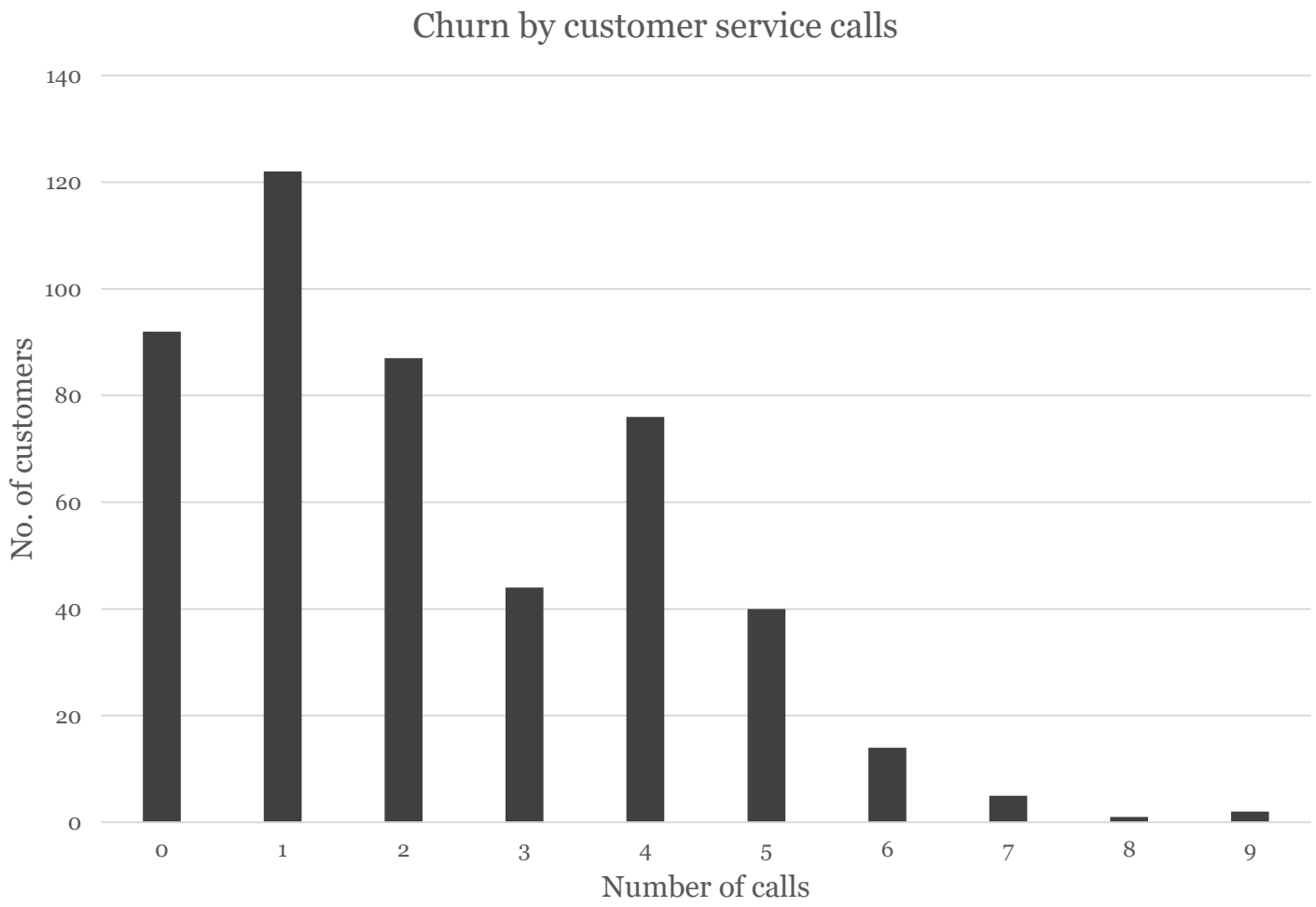
- Out of the customers that did not have an international plan, **11.5%** terminated their accounts

# How does a voicemail plan affect churn?



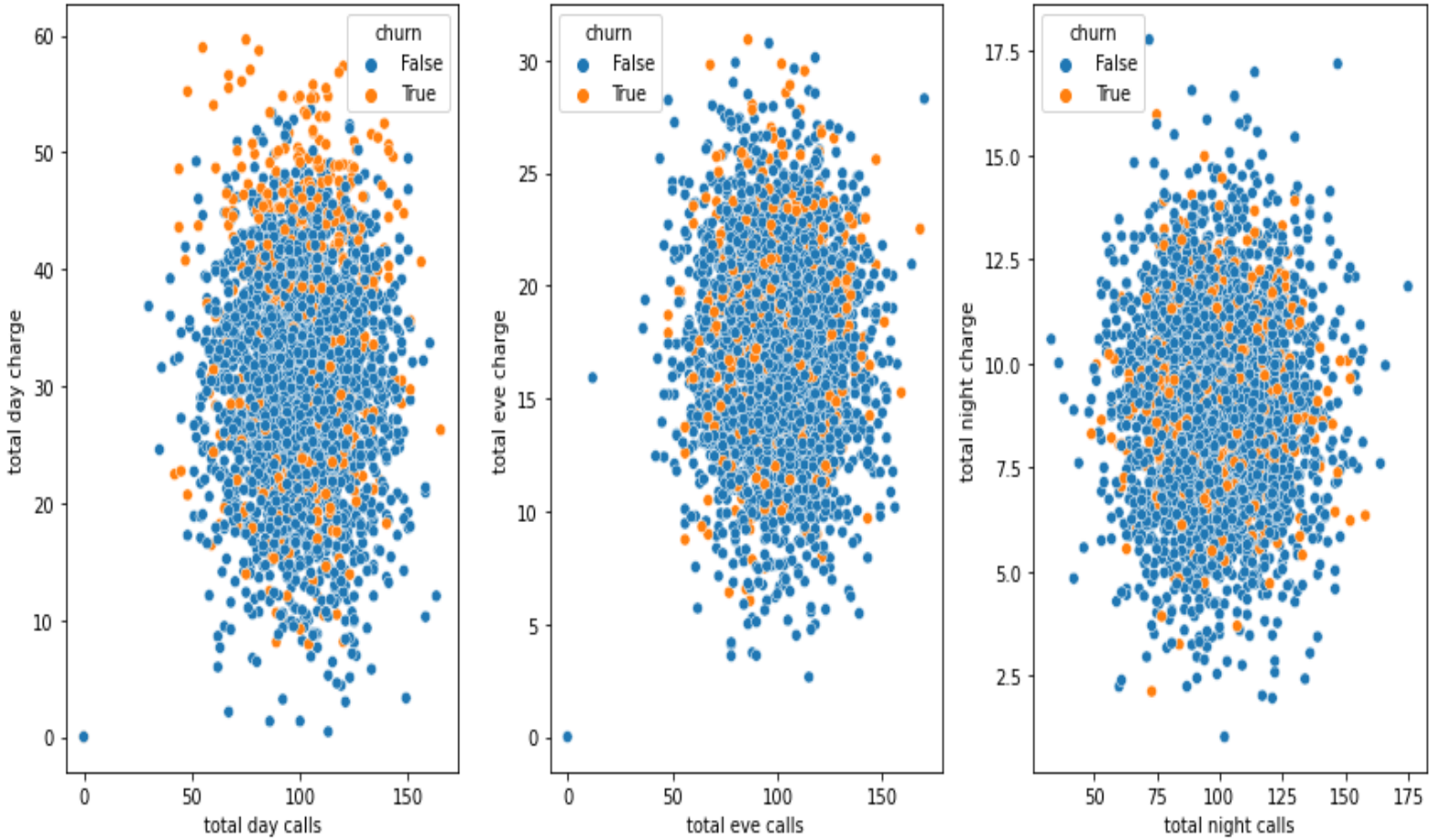

- Of the 483 customers that terminated their accounts, **83.4%** did not have a voicemail plan

# Churn by customer service calls



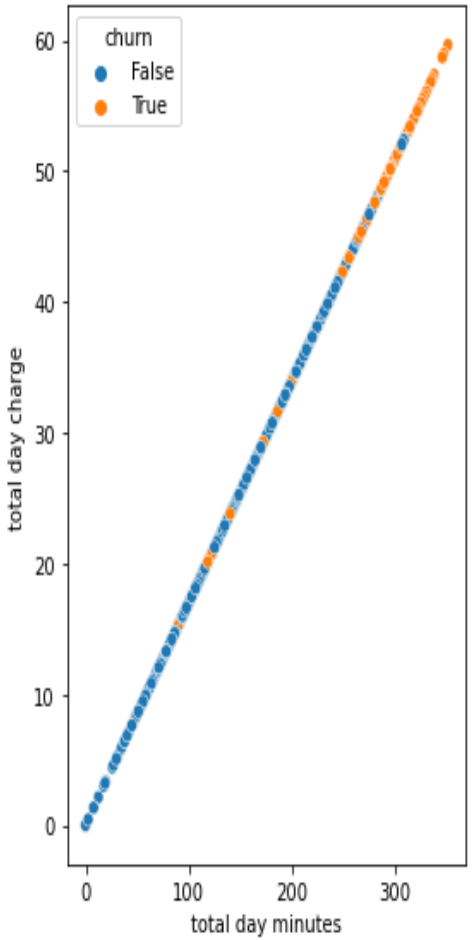

- Majority of account terminations are associated with customers who made only one call to customer service
- A considerable proportion of customers terminated their accounts without contacting customer service

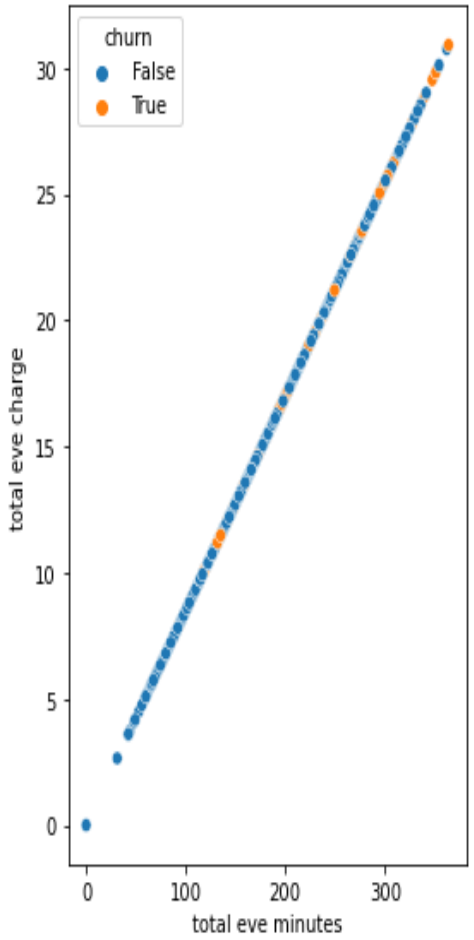
# Churn by Total calls vs. Total charges

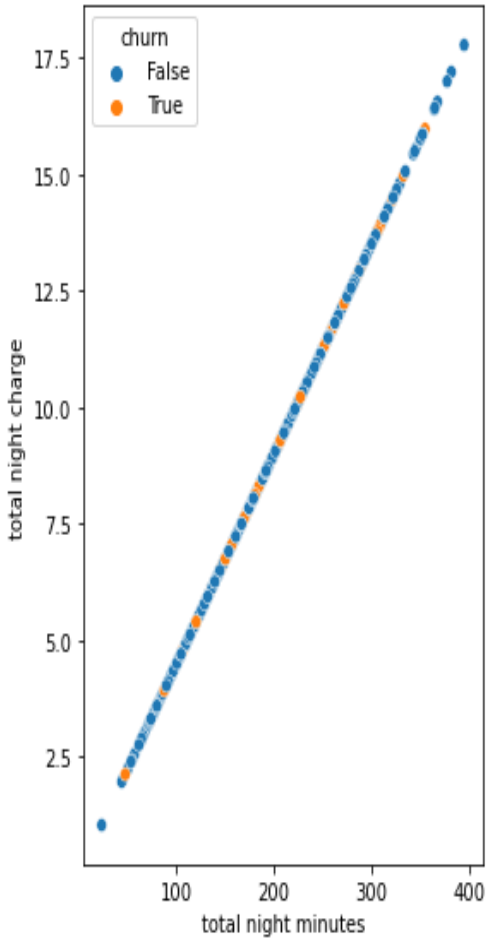



- Churn rates are higher during the day due to the relatively higher call charge rates compared to the cheaper evening and night calls
- Call charges for daytime, evening, and nighttime are higher even with fewer calls made

# Churn by Total minutes vs. Total charges

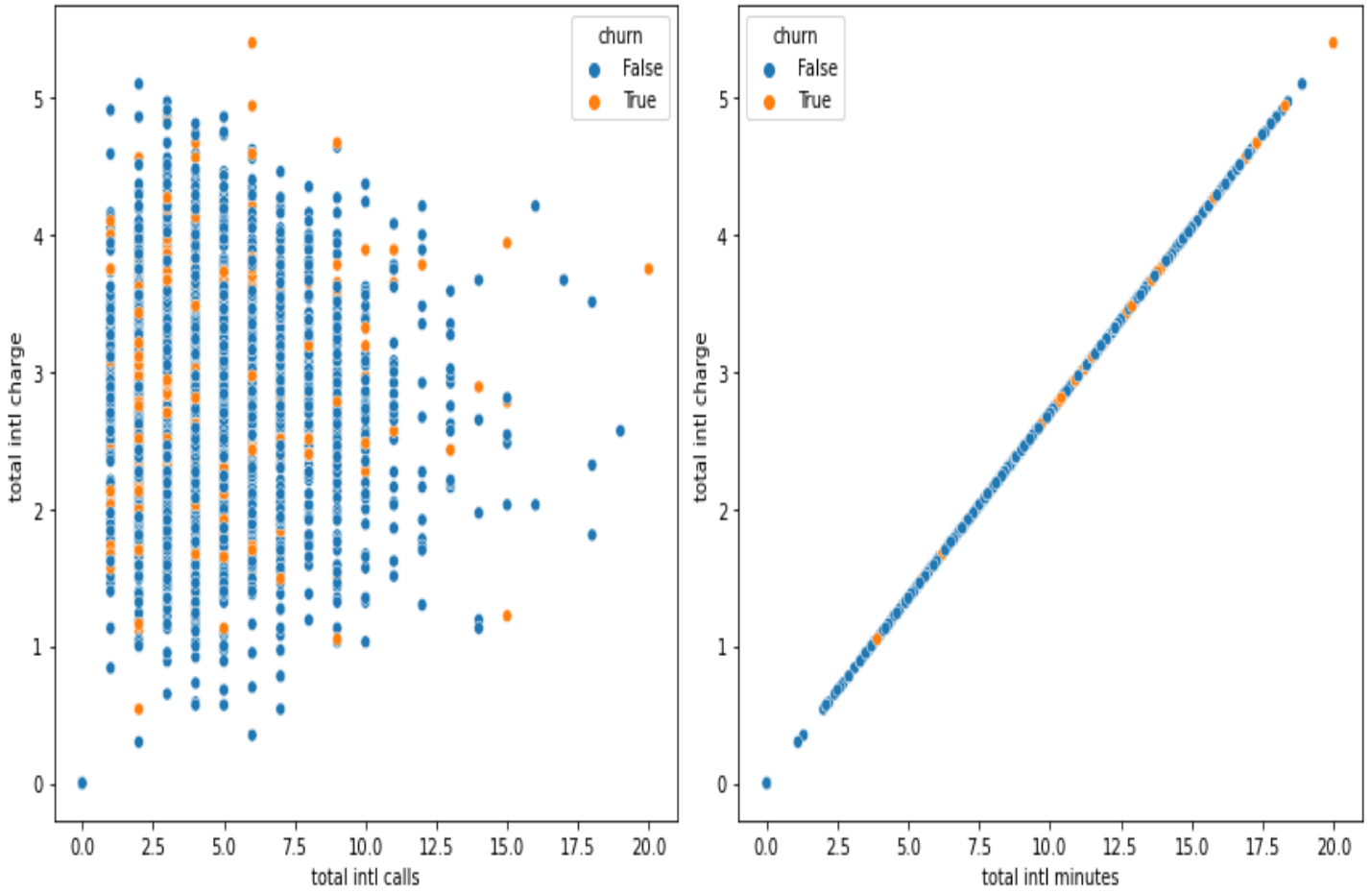



- On average, customers who terminated their accounts appear to have subscribed to more day minutes, leading to higher charges

# Churn by Total international calls and minutes vs. Total international charges







- A significant number of account terminations are linked to higher charges on fewer international calls

# Modeling

Classification modeling algorithms used:

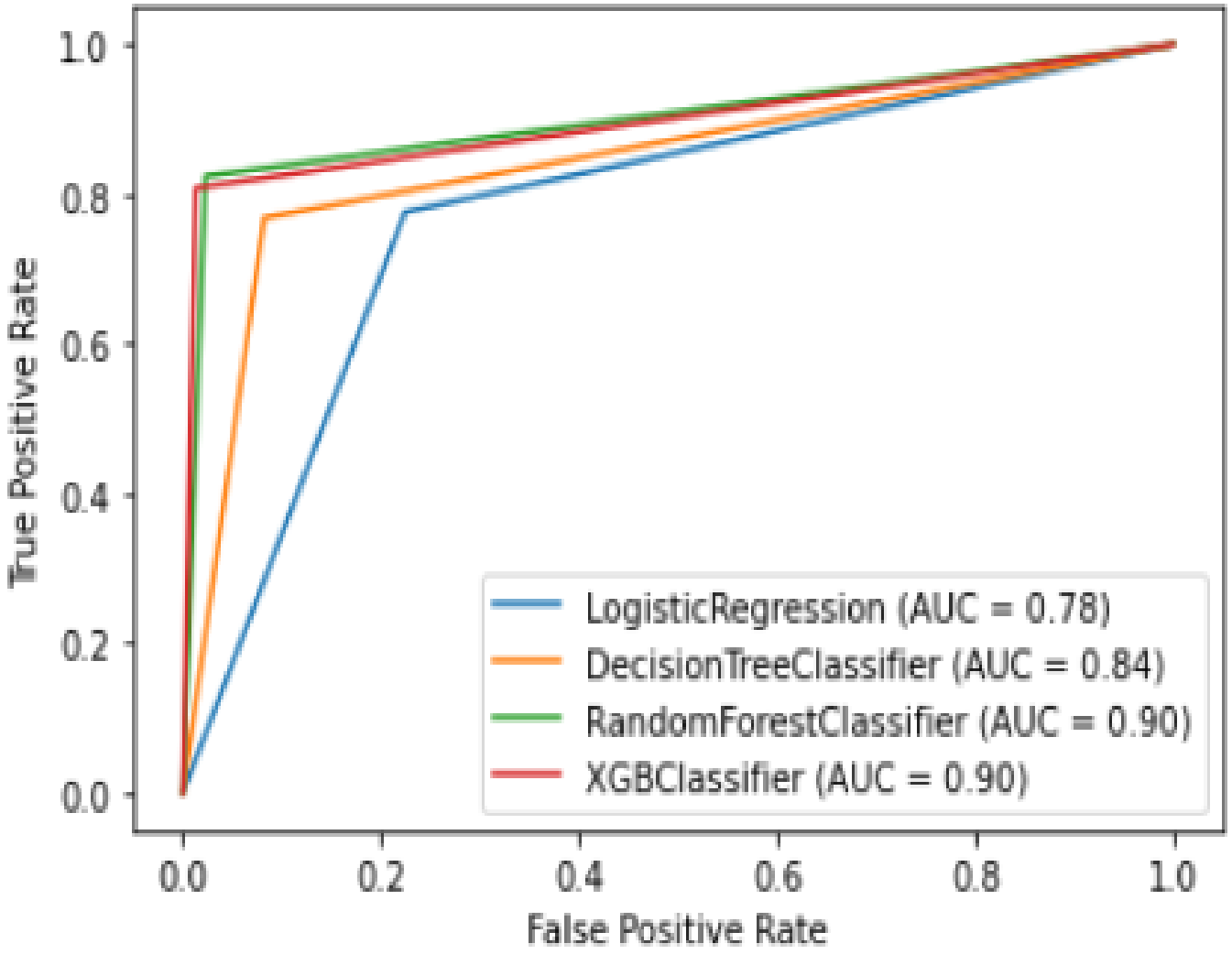
- Logistic Regression
- Decision Tree
- Random Forest
- XG Boost

# Evaluation

Based on:

- **ROC_AUC curve** – shows how efficient the model is in distinguishing between customers who churned and those who did not
- **Recall** - quantifies the model's capacity to accurately detect customers who are likely to churn among all the customers who churn
- **Accuracy** – measures the ability of the model to classify customers correctly

# ROC-AUC results




Out of the 4 algorithms used, **XGB classifier** and **Random Forest Classifier** achieve the highest efficiency rates in churn prediction at **90%**

# Recall results

| classifiers | accuracy | recall |
|---|---|---|
| LogisticRegression | 0.775779 | 0.776 |
| RandomForestClassifier | 0.954436 | 0.832 |
| DecisionTreeClassifier | 0.894484 | 0.744 |
| XGBClassifier | 0.960432 | 0.808 |

Based on recall, Random Forest Classifier achieves **83.2%** accuracy in detecting customers that are likely to churn

# Winning model: Tuned Random Forest Classifier

1

Surpassed other models with an **89% AUC score,** highlighting its robust capability to distinguish between churned and active customers

2

Has a good balance between **sensitivity** (recall) and **specificity**, capturing a high proportion of both churned and active customers accurately

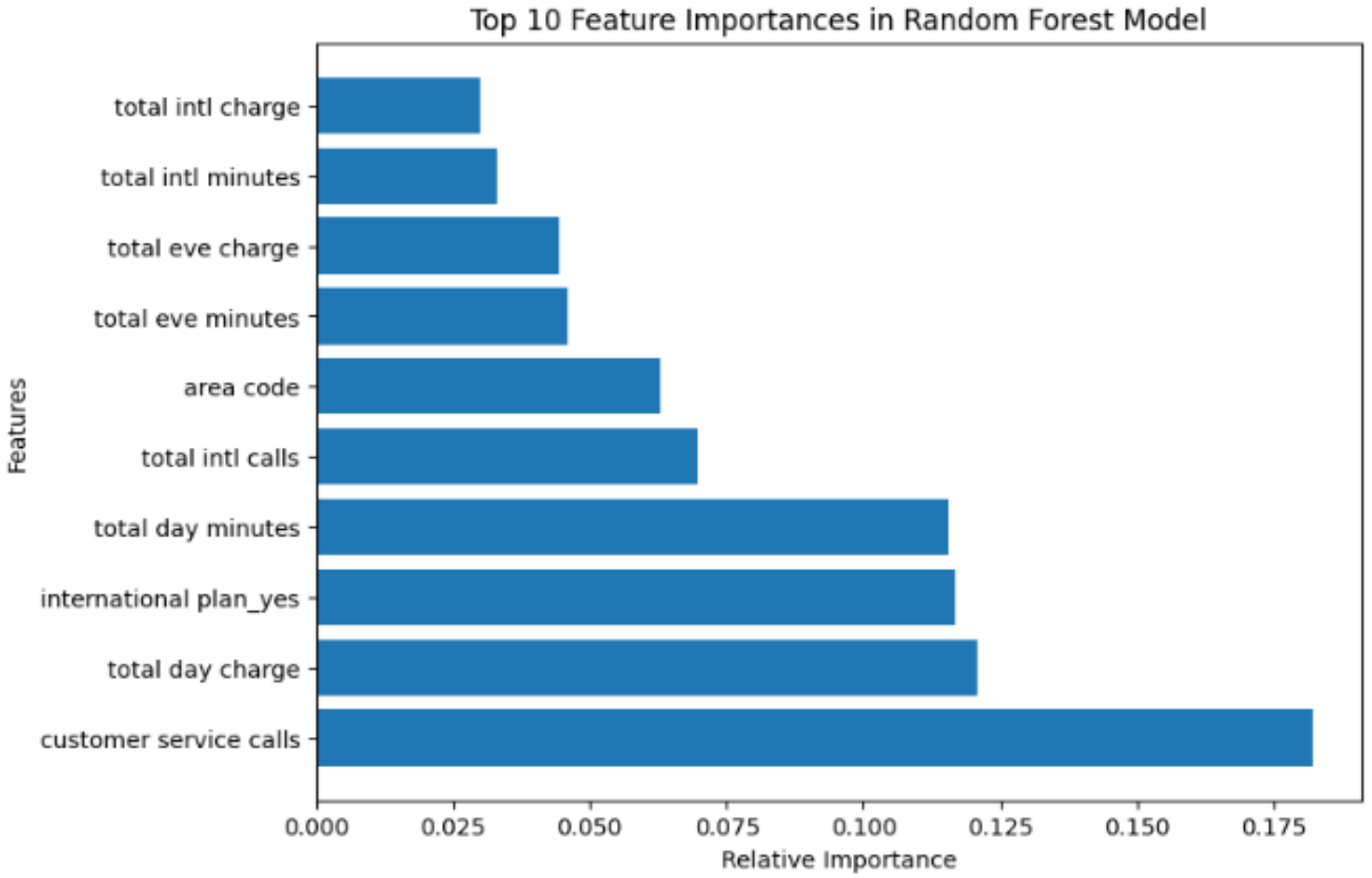
3

At **82% recall** score, performed marginally better in identifying churned customers

4

Achieved **95% accuracy** in correctly classifying the total number of customers

# Which features contribute most to customer churn?




- **Customer service calls** is the key factor contributing to high customer churn

- Other important features: **total day charge**, having an **international plan**, **total day minutes**, **total international calls**, and **area code**

# Conclusions

- **Poor customer service** was the leading cause of account terminations by customers
- **Customers with an international plan churn more** than those with no plan
- **Customers with higher charges on day calls**, especially those who have subscribed to more day minutes, are significantly more likely to churn
- The significantly **higher charges observed for total daytime calls and minutes**, in comparison to evening and night-time calls and minutes, were a contributing factor to customer churn
- There is **a lack of proportionality** between the total number of international calls made and the corresponding charges, with higher charges even for fewer calls made

# Recommendations

**Prioritize customer service** initiatives to strengthen customer loyalty and satisfaction

**Review cost** of daytime calls and minutes charges

**Review pricing** plans to align with the market and retain price-sensitive customers

**Tailor personalized data and voice plan** products for international customers based on their unique needs

Regularly **gather customer feedback** to understand pain points and areas of improvement

# THANK YOU!

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