



# SyriaTel Customer Churn Prediction


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# Project Overview

In a highly competitive telecommunications market, understanding customer behavior is essential for business sustainability. This project focuses on performing customer churn analysis for SyriaTel, one of Syria's leading mobile network operators.

This project aims to develop a predictive model capable of identifying patterns associated with customer churn. The insights derived from this model will guide the development of effective customer retention strategies.





# Project Workflow

**01.** Business Understanding

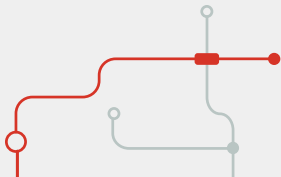
**02.** Data Understanding

**03.** Modeling

**04.** Model Evaluation

**05.** Conclusion

**06.** Recommendations





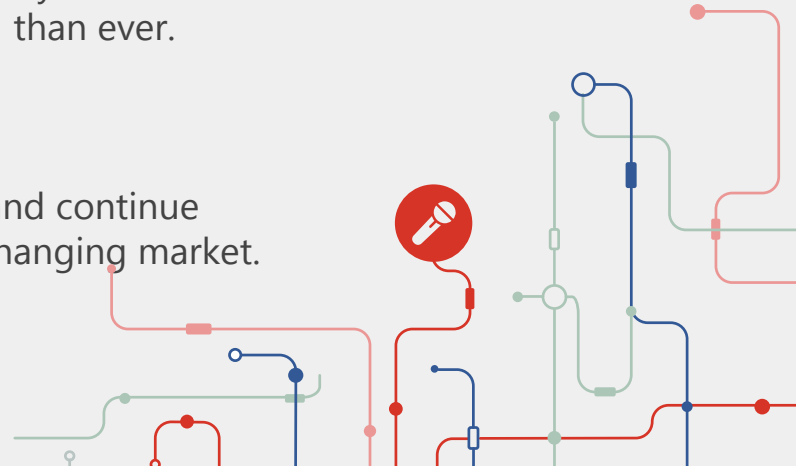
01

# Business Understanding

Defining project goals in alignment  
with business objectives.

## (a) Company Background

- SyriaTel is a leading telecommunications provider in Syria, delivering essential services to millions of customers, including voice call services, SMS and messaging, GSM technology-based services, Internet and data connectivity as well as News and media service. Since its establishment in 2000, SyriaTel has played a significant role in the digital transformation of Syria's telecommunications sector; having about 3,500 employees and 8 million subscribers. In light of increasing market competition majorly from a new entrant, Wafa Telecom, and shifting customer preferences, SyriaTel's focus and evolution on customer retention has become more critical than ever.
- This evolution is crucial to maintain its competitive edge and continue providing exceptional customer experiences in a rapidly changing market.



# (b) Key Stakeholders



## Business and Marketing executives

Responsible for customer engagement, promotional strategies, and market segmentation.



## Senior Management Team

Understand the broader implications of churn on company revenue, customer lifetime value, and growth projections.



## Customer Service Team

Directly involved with at-risk customers hence can benefit by personalizing their outreach and retention tactics.



## Potential Investors and Partners

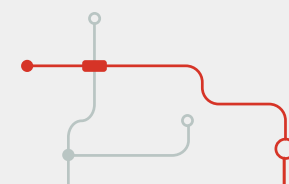
Investors and business partners have a vested interest in SyriaTel's market performance and strategic direction. They are essential as they fund and drive SyriaTel's technological advancements





## **(c) Business Problem Statement**

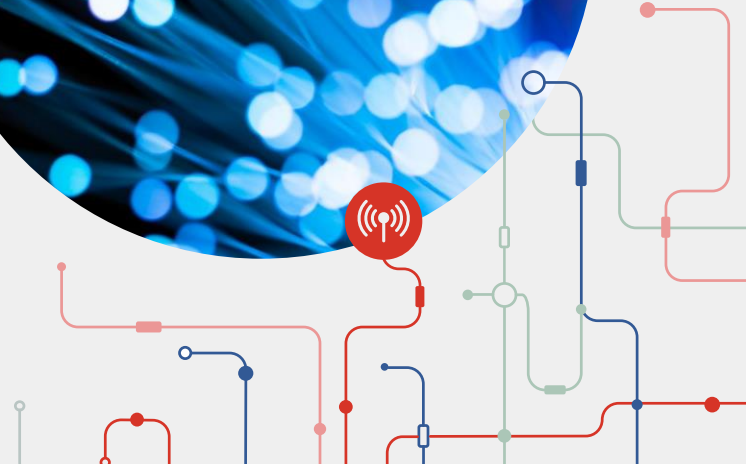
SyriaTel currently lacks the capability to identify customers who are on the verge of churning. The primary objective of this project is to develop a predictive model that can accurately forecast customer churn. Gaining this predictive insight will enable the organization to monitor churn risk on a continuous basis and respond swiftly with targeted incentives and retention strategies, ultimately improving customer loyalty and reducing revenue loss.





## (d) Objectives

1. Which customer features and behaviors are most strongly associated with churn?
2. Which machine learning model is best suited for accurately predicting customer churn?
3. What strategies can Syriatel implement to effectively retain customers and minimize churn?







# 02

## Data Understanding

Exploring and familiarizing with the dataset to uncover initial insights.

# 1. Data Preparation

- Source: **SyriaTel Dataset**

SyriaTel company is rich in customer data which will be useful in the customer churn analysis; containing 21 columns and 3333 rows of data.

It contains both numeral and categorical values.

It contains customer demographics, billing information and service usage records.

We are going to analyze this dataset to help us uncover patterns, correlations, and trends that can help us identify the key factors influencing churn.



Key data variables that we are going to analyze here include; the state where the customer resides, the customers area code, international plan, voice mail plan, billing information which includes;

- Total day charge
- Total evening charge
- Total night charge
- Total international charge
- Customer service calls



## 2. Exploratory Data Analysis(EDA)

We conducted EDA on preprocessed data making use of the variables we had mentioned.



Let's observe their relationship with churn.

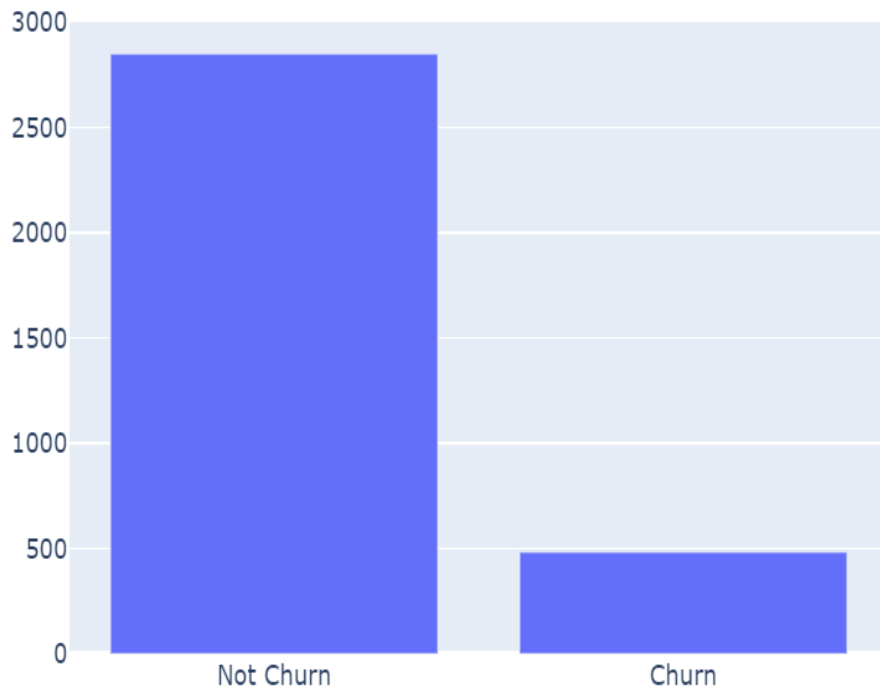


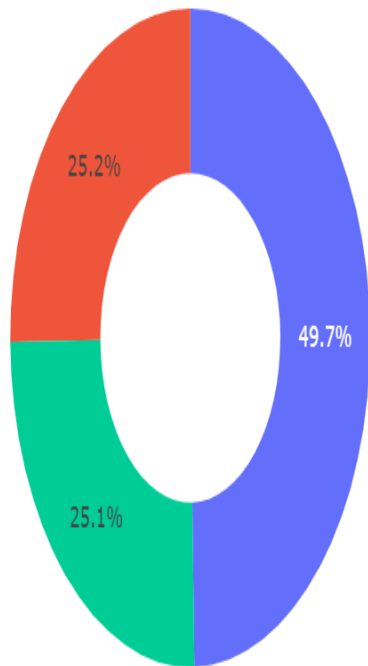
# 01

## Number of customers who have churned

Out of the 3,333 customers in the dataset, 483 have ended their contracts. This represents a churn rate of about 15%

Churn Distribution



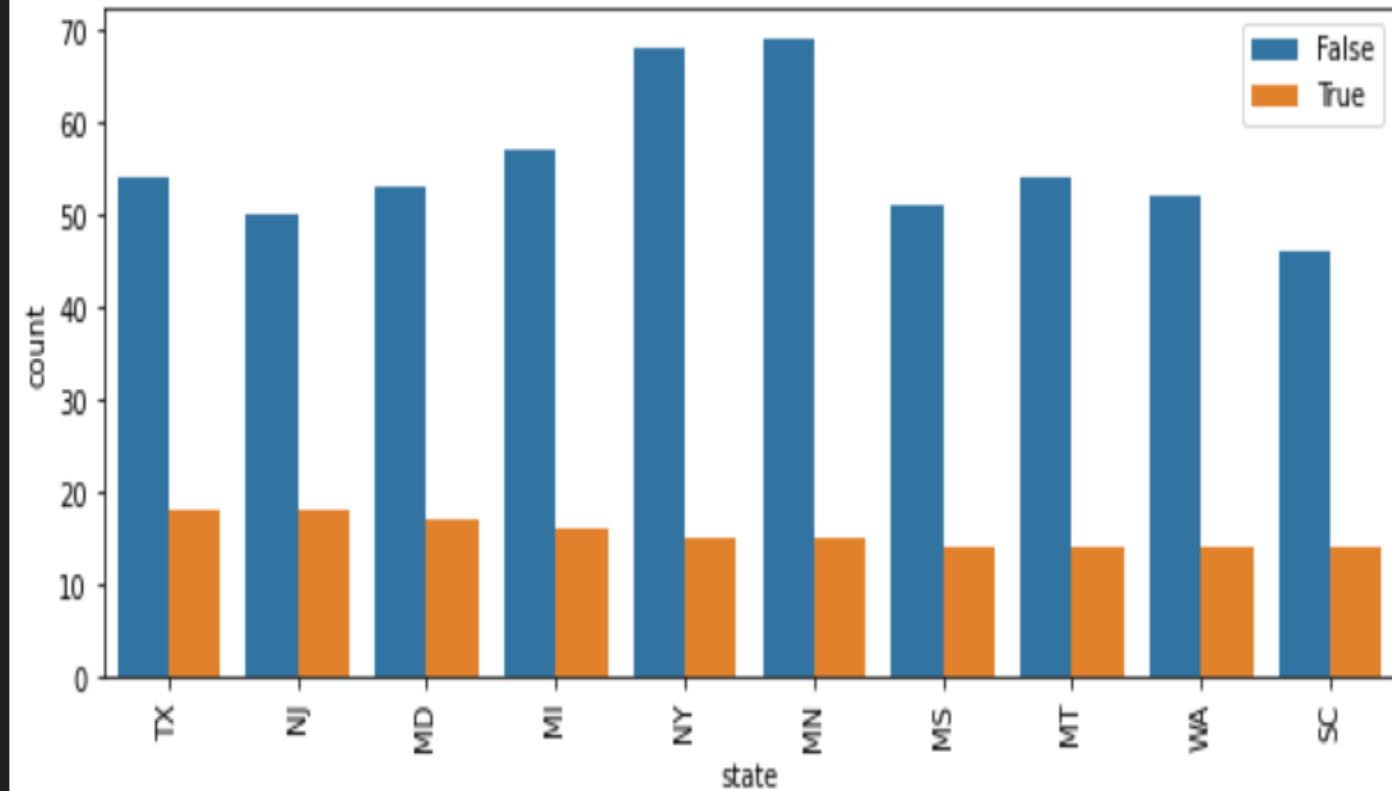


## Area Code Distribution

Around half of the customers are in area code 415.

A quarter of the customers are in area code 510 and another quarter are in area code 408.

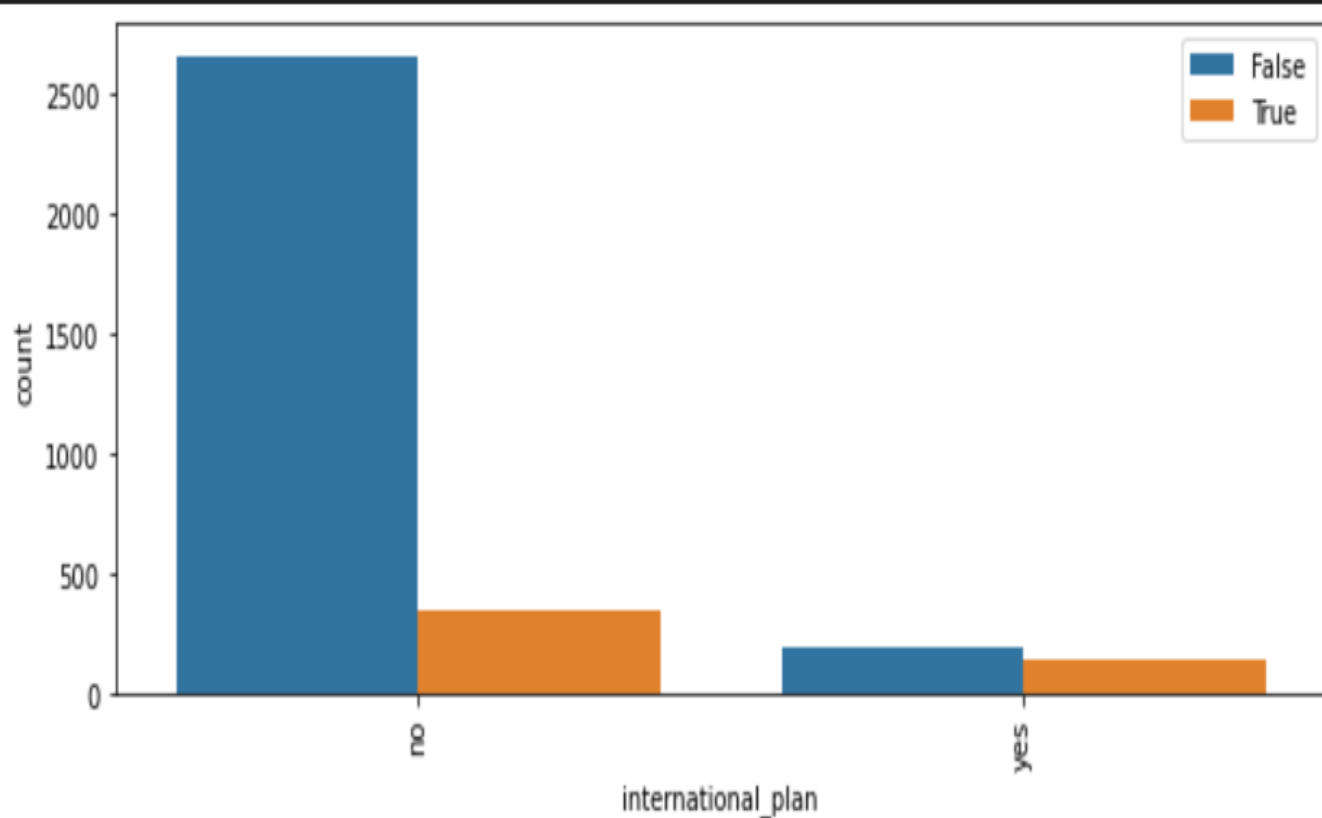
# 03 Which states have the highest churn rate



Amongst all the customers that churned, most of them are from Texas, New Jersey, Maryland, Miami and New York.

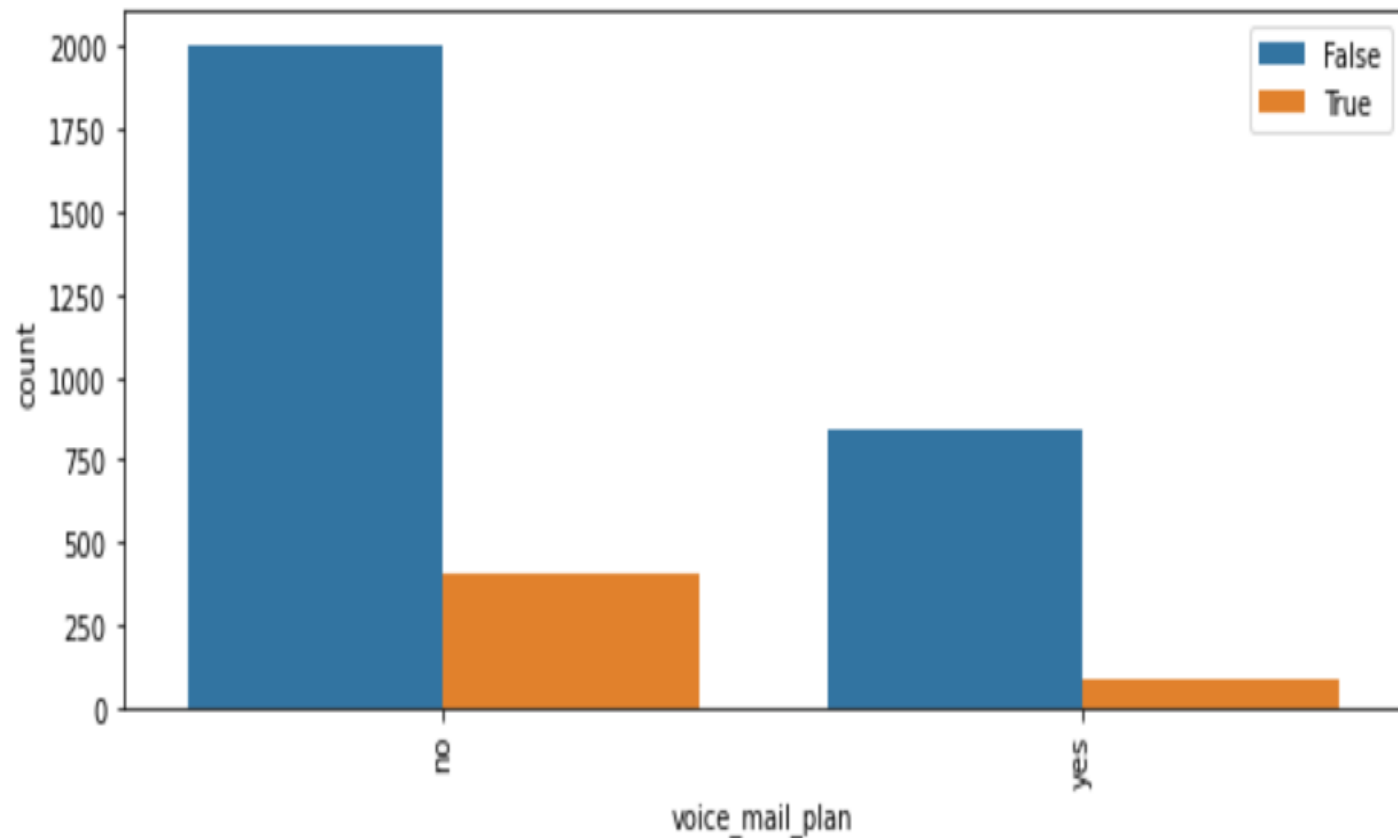
# 04 How does International Plan affect churn

Most of the customers who churned didn't have an international plan.





# 05 How does Voicemail Plan affect churn

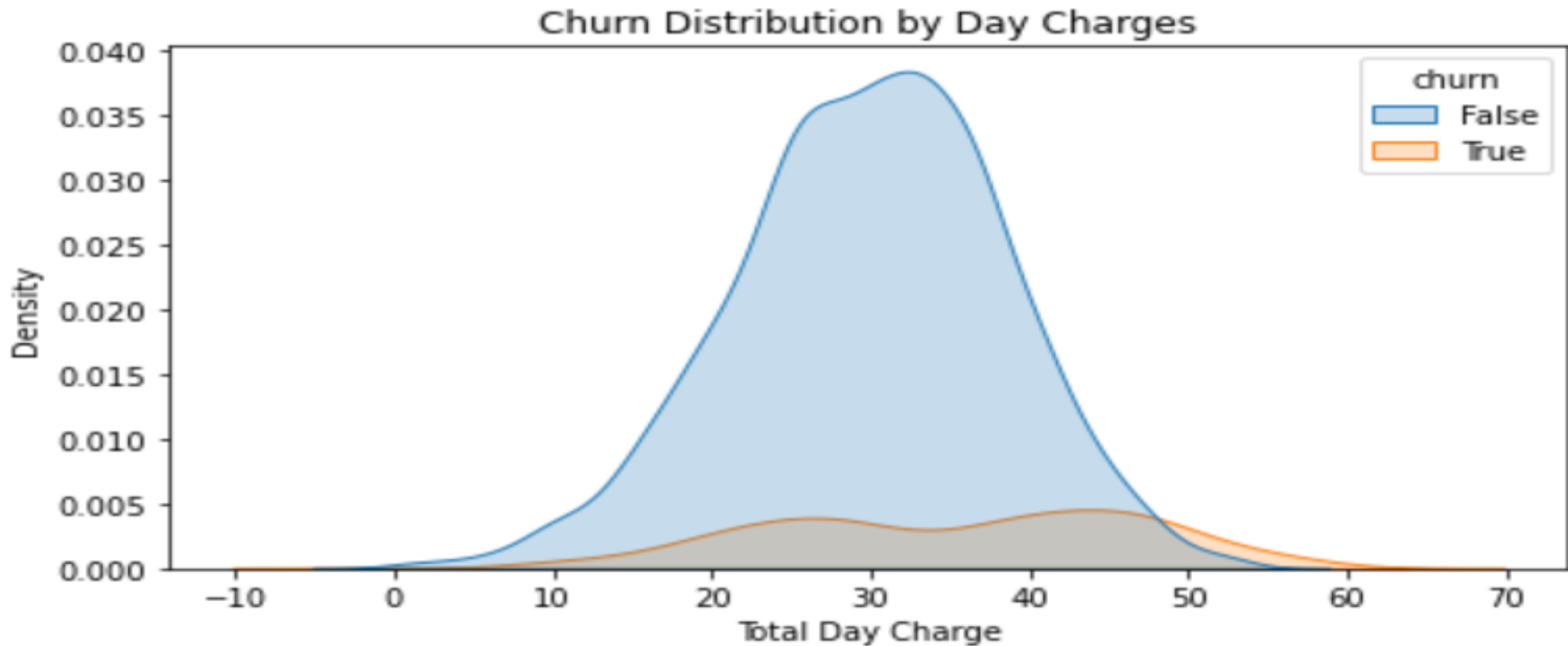


Most of the customers who churned didn't have a voicemail plan.

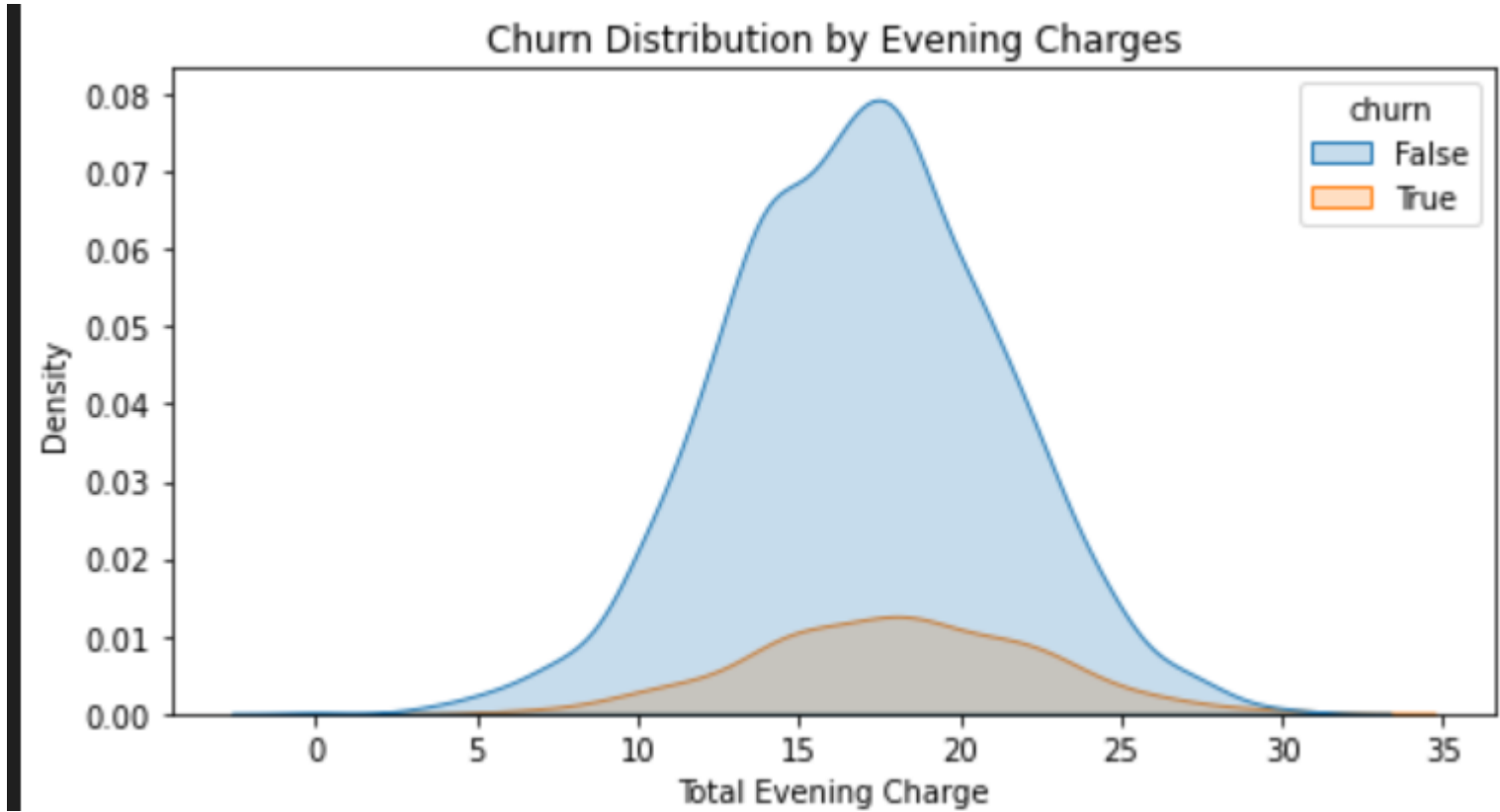
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## Relationship of Churn with total day, evening and night charges

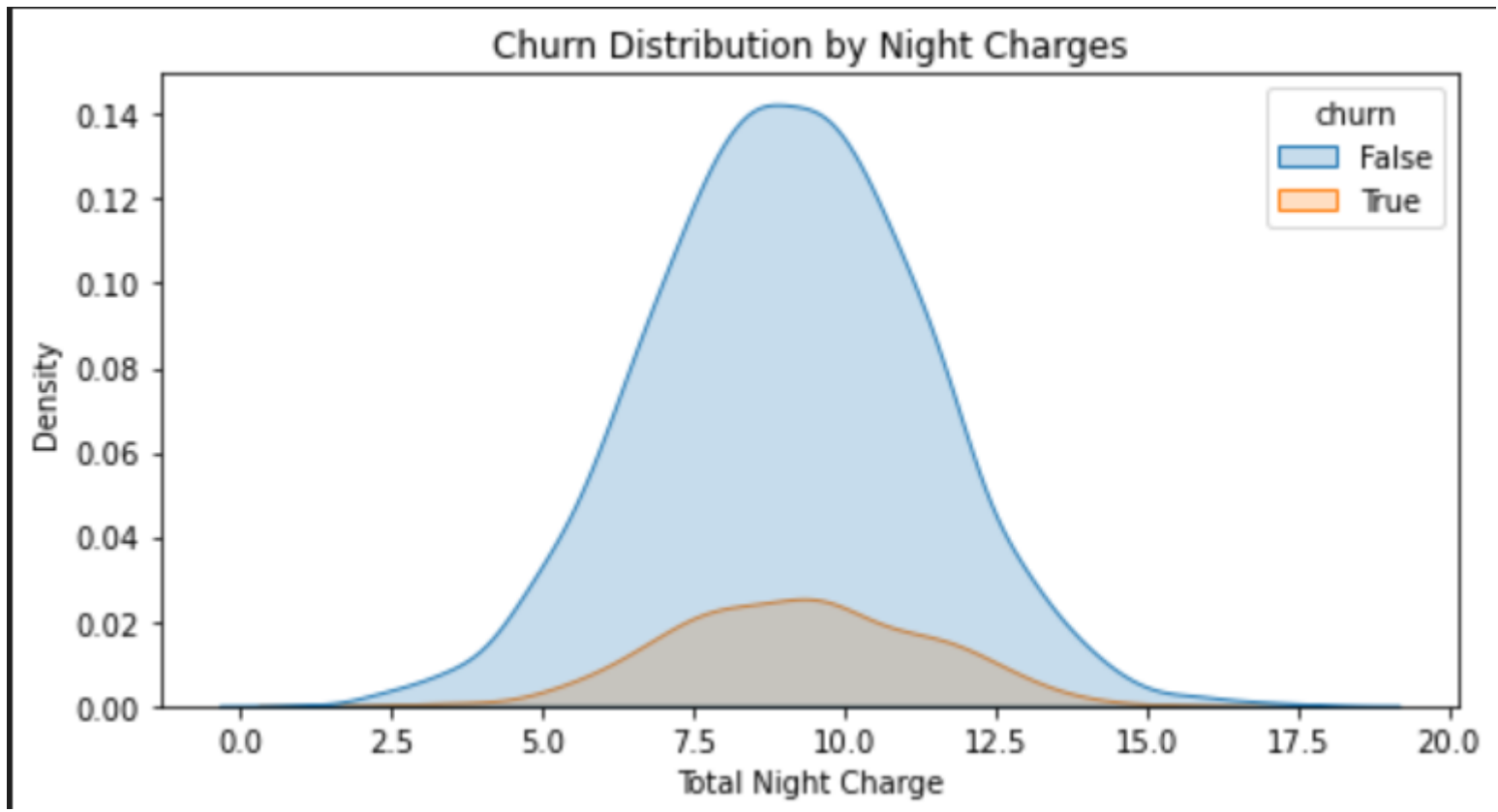
(a) With total day charges



(b) With total evening charges

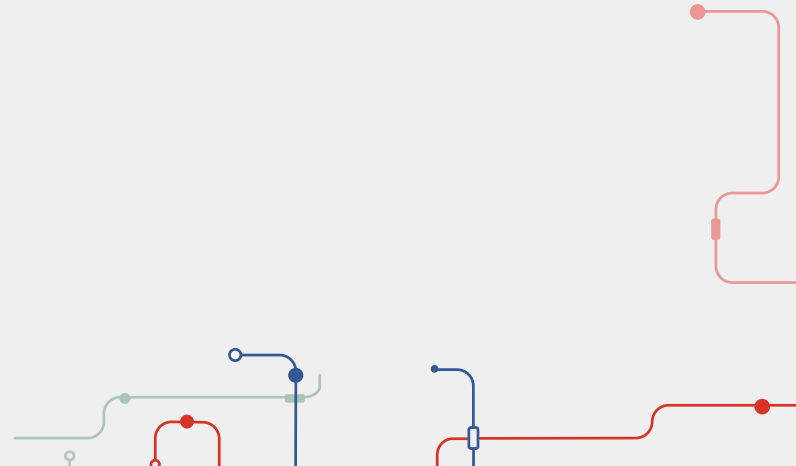


(c) With total night charges



The KDE plots of churn versus total day charges, total evening charges and total night charges indicate that customers who have churned generally incur higher charges on all the features in focus compared to those who stayed.

This pattern suggests that higher charge costs may be a contributing factor to customer dissatisfaction and could increase the likelihood of churn.







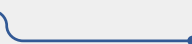
# 03

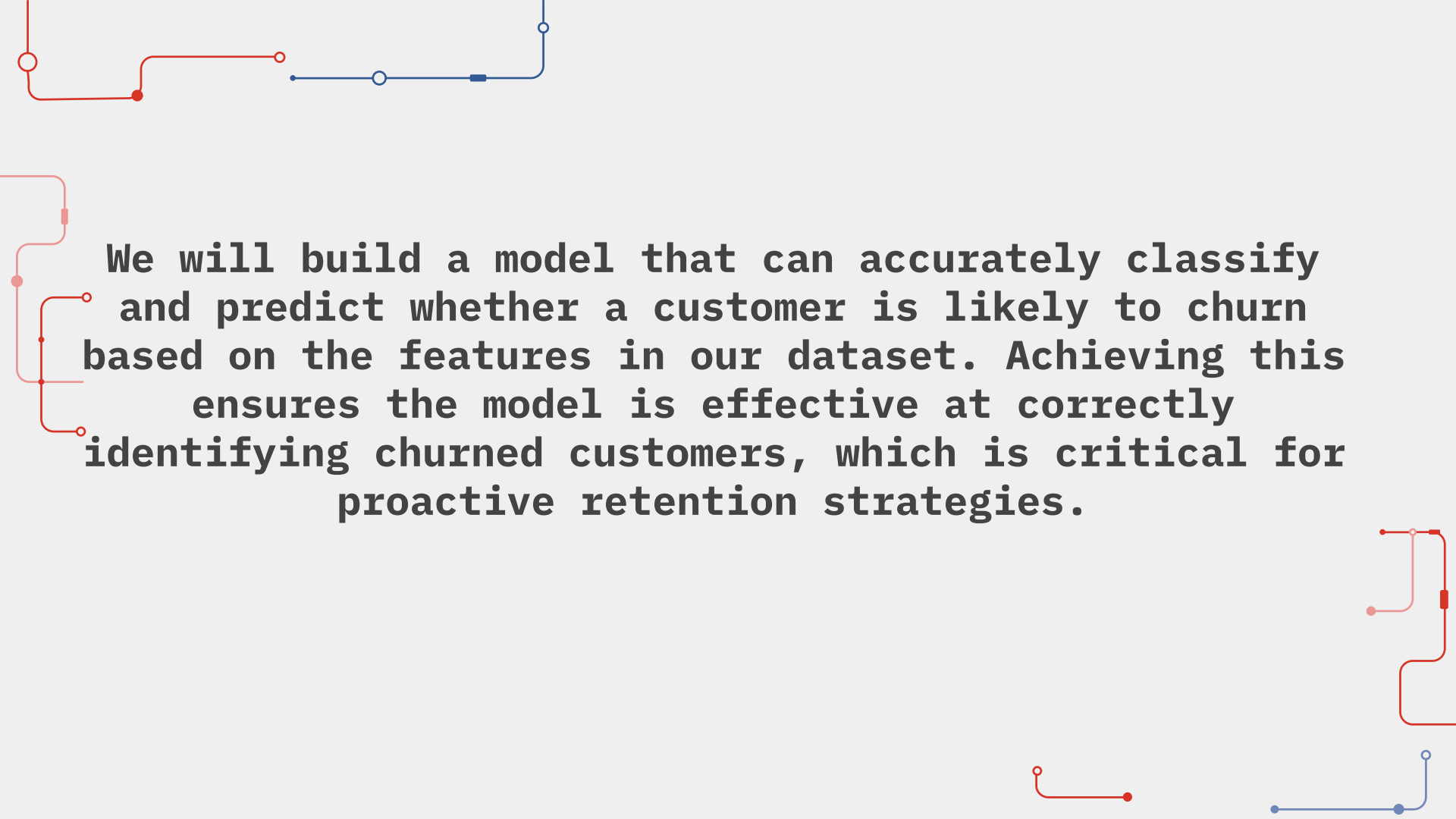


## Modeling



Building and training predictive models to classify churn behavior.

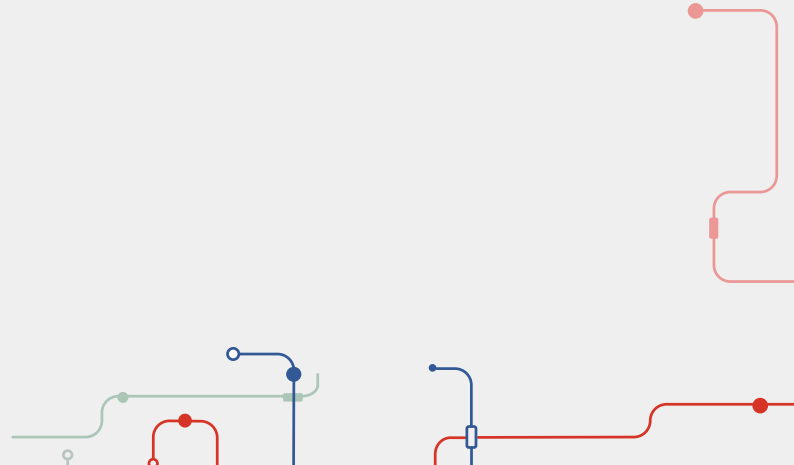




**We will build a model that can accurately classify and predict whether a customer is likely to churn based on the features in our dataset. Achieving this ensures the model is effective at correctly identifying churned customers, which is critical for proactive retention strategies.**

# Algorithms used

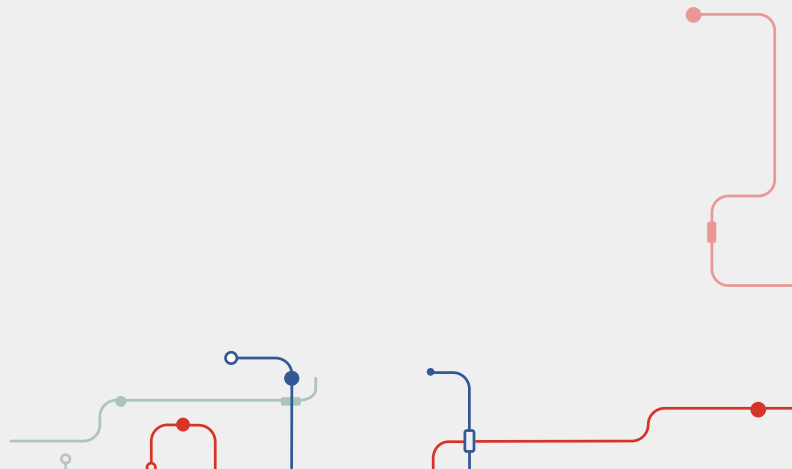
- Logistic Regression
- Decision Tree
- Random Forest
- XG Boost





# Metrics used

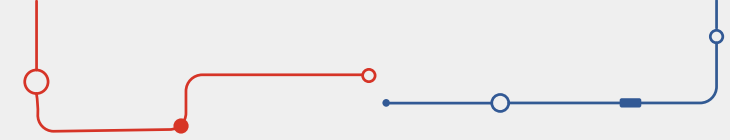
- Recall - Model is analyzed based on its focus in identifying positive cases.
- ROC\_AUC Curve Plots
- True positive rate(sensitivity) against False positive rate(1-specificity) at various classification thresholds.



# 04

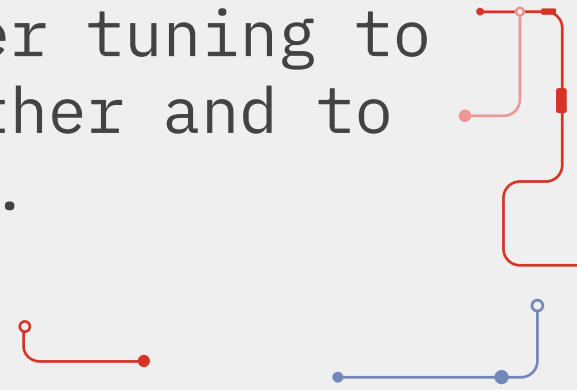
## Model Evaluation

Assessing model performance using appropriate metrics to ensure reliability.

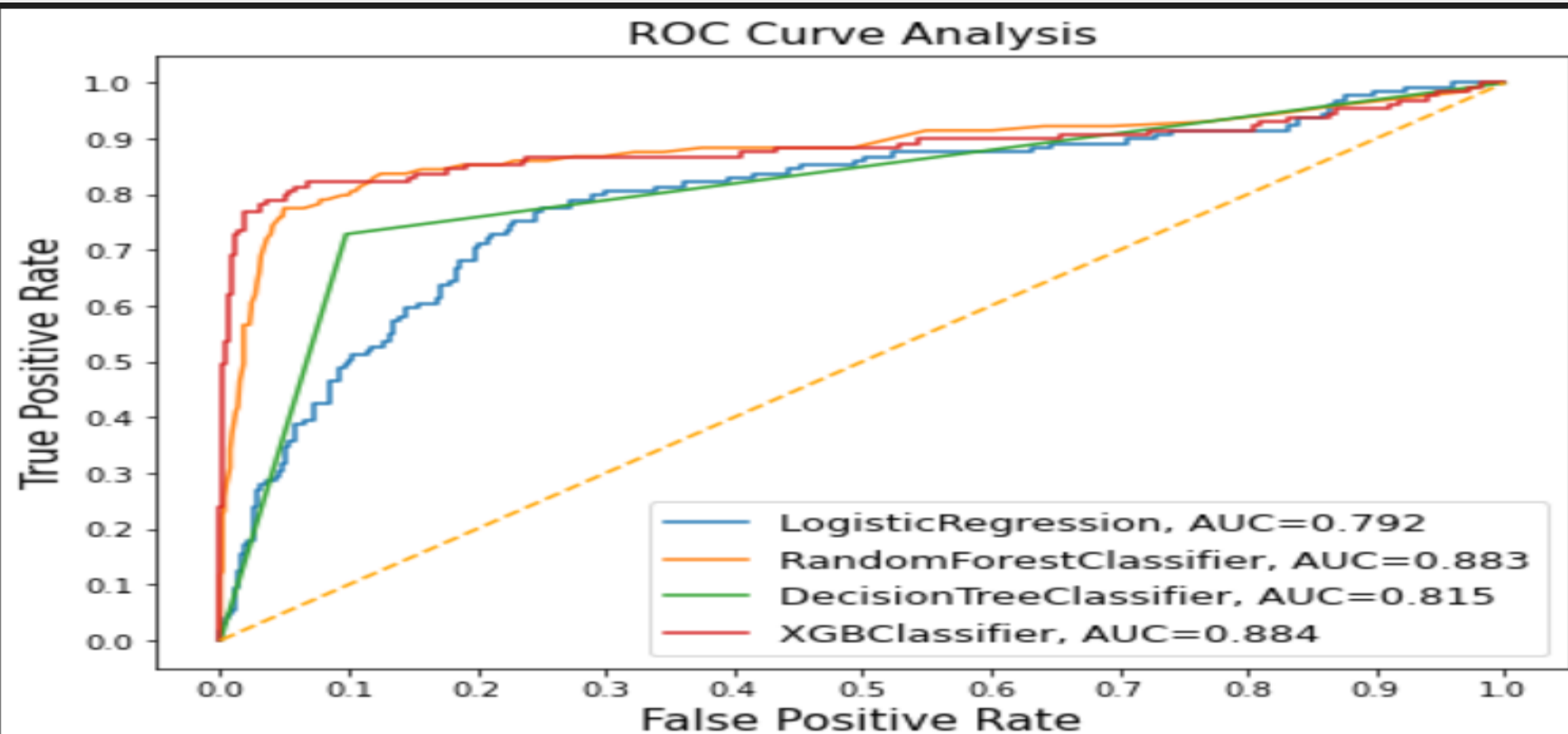


We will evaluate the performance of our models using two key metrics: Recall Score and ROC AUC which will help us determine how well each model identifies churned customers and distinguishes between the classes.

We will then apply hyperparameter tuning to optimize their performance further and to obtain the best model.



# ROC Curve Analysis



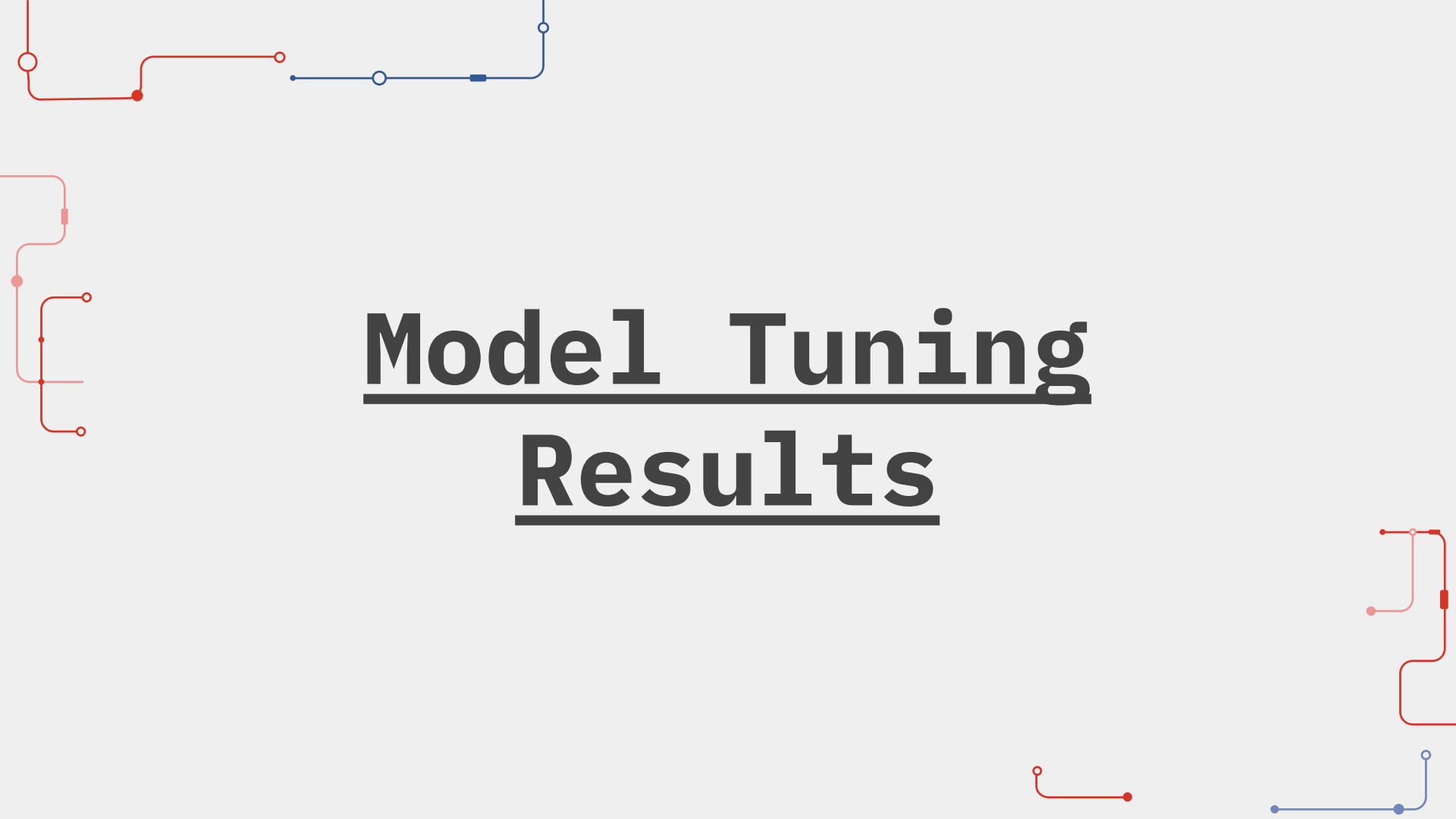
# Evaluation results

## Based on Recall score

- XGBoost - 0.77
- Random Forest - 0.74
- Logistic Regression - 0.74
- Decision Tree - 0.73

## Based on ROC\_AUC curve

- XGBoost - 0.884
- Random Forest - 0.883
- Decision Tree - 0.815
- Logistic Regression - 0.792

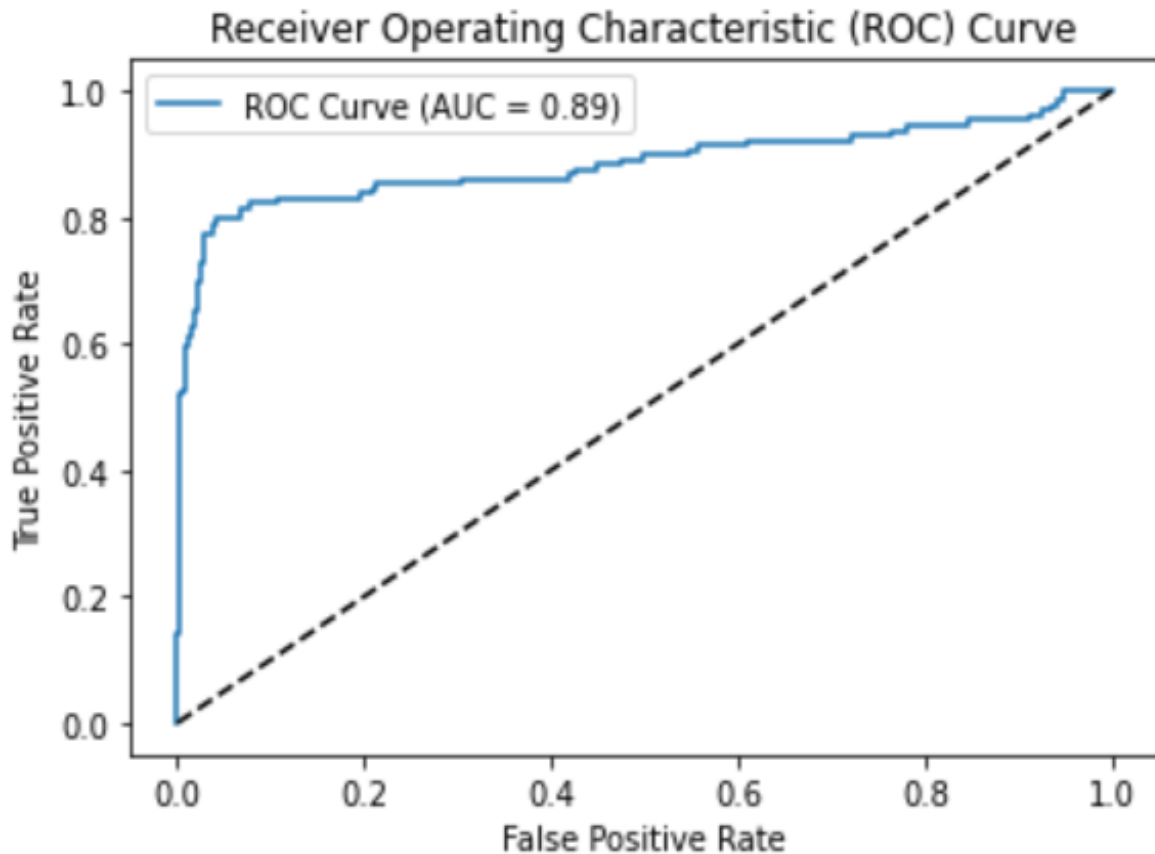


# Model Tuning Results

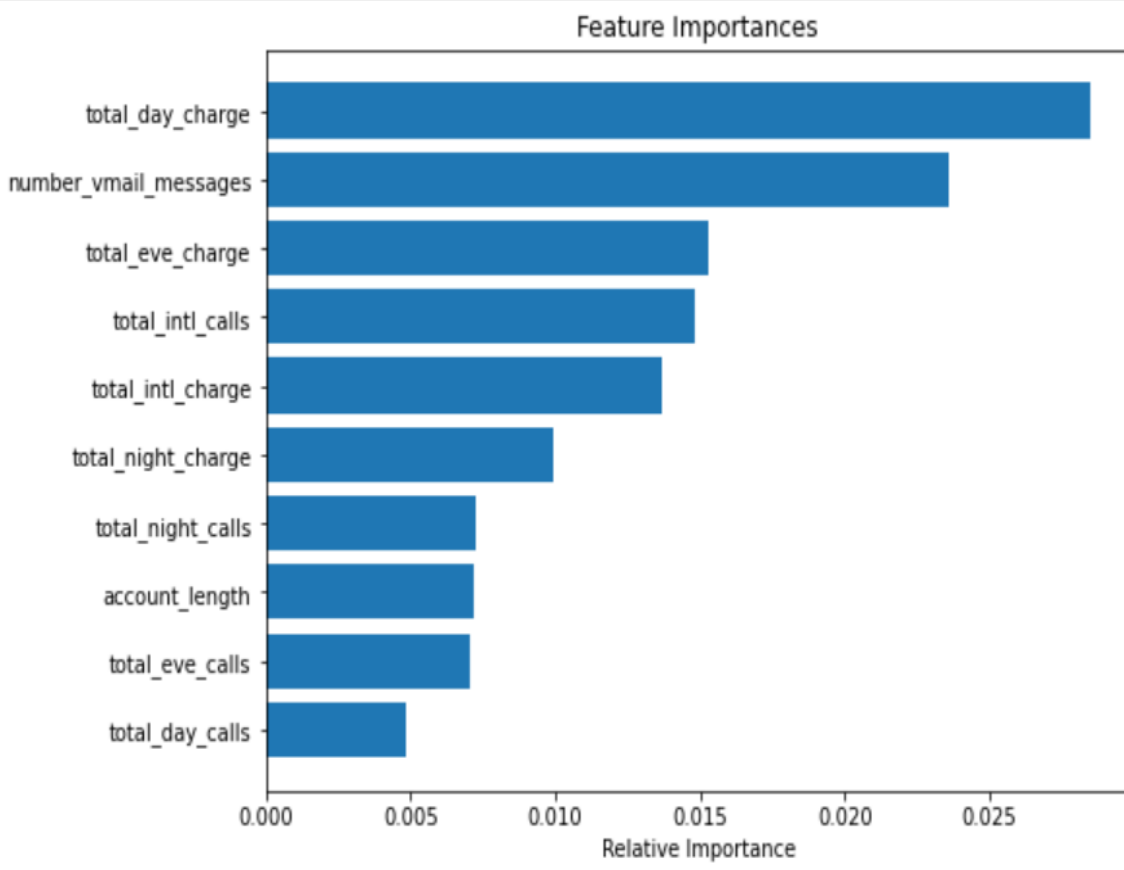
# XGBoost Model

Based on the ROC curve and the recall metric, the tuned XGBoost model outperforms every other model in distinguishing between churned and non-churned customers.

With a recall score of 0.79, it correctly identifies 79% of actual churned customers. This strong performance highlights XGBoost's effectiveness in predicting customer churn and supporting proactive retention efforts.



# Features that impacted churn



Based on the model's feature importance scores, the top three drivers of churn prediction are:

- Total day charges
- Number of voicemail messages
- Total evening charges.






05

# Conclusion



General assessment.





This project aimed to build a predictive model to identify customers likely to churn, enabling Syriatel to proactively implement customer retention strategies. By following a comprehensive data science workflow – from business understanding to model evaluation – we uncovered valuable insights into customer behavior and developed high-performing classification models.

Our analysis suggests that a machine learning-based approach is viable for identifying customers at churn risk. The fine-tuned XGBoost model stands out with its predictive proficiency.

The key features associated with churn prediction were total day charge, number of voicemail messages and total evening charges.




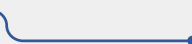


# 06



## Recommendations

Translating analytical findings into actionable business strategies.



SyriaTel Company should implement the following:

1. Make use of XGBoost as the primary model for predicting customer churn in a real-time system that flags high-risk customers that are likely to churn.
2. Offer discounts or promotional offers to customers in area code 415 and 510, as these areas have a higher churn rate. This can help incentivize customers to stay with the company.
3. Improve customer service quality and reduce the number of customer service calls by enhancing training programs for customer service representatives to ensure prompt and effective resolution of customer issues, leading to higher customer satisfaction and reduced churn.
4. Evaluate the pricing structure for day, evening, night, and international charges. Consider introducing customized bundles or discounts for these segments to reduce dissatisfaction related to billing.
5. Focus on customer retention strategies in states with higher churn rates, such as Texas, New Jersey, Maryland, Miami, and New York. This can involve targeted marketing campaigns, personalized offers, or improved customer support.
6. Promote Voicemail and International Plans with targeted offers to increase stickiness and engagement.





**AOB'S**



# THANK YOU

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