

# SYRIATEL CUSTOMER CHURN ANALYSIS

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# Overview

The primary goal of this project is to **build a predictive model** that can identify customers who are likely to stop doing business with SyriaTel Mobile Network Company.

By analyzing and detecting potential churners in advance, the company can take proactive measures to retain them, thereby reducing revenue loss and increasing customer lifetime value.

# Problem Statement

## Understanding Reason for customer churn

**Context:** SyriaTel, a telecommunications company, is trying to maximize its customer retention while minimizing the retention costs which in turn maximizes profits.

**Problem:** The company experiences customer churn, which negatively impacts revenue and business stability.

**Key Question:** What are the primary factors influencing customer churn?

# Goal

## **Main Objective**

The main objective of this project is to build a predictive model that can identify customers who are likely to stop doing business with SyriaTel.

## **Secondary objectives**

1. To analyze customer usage patterns and behaviors that indicate a higher risk of churn.
2. To optimize the hyperparameters of our chosen model to improve performance and reduce false positives/negatives.
3. To evaluate how customer service interactions influence churn rates.

# Data Overview

## The Data

The data was sourced from a published kaggle repo. [Click Here](#) to get the dataset. It contains 3333 records and 21 features

## Key Features:

- **Customer Information:** state, account length, area code, phone number
- **Subscription Plans:** international plan, voice mail plan
- **Usage Metrics:** number voice mail messages, total day minutes, total eve minutes, total night minutes, total intl minutes
- **Call Records:** total day calls, total eve calls, total night calls, total intl calls, customer service calls
- **Billing Details:** total day charge, total eve charge, total night charge, total intl charge
- **Churn Label:** churn (Boolean, True = churned, False = not churned)

# Analysis Steps

## **Our Analytical Approach**

In general, a couple of python libraries(pandas, seaborn, numpy, matplotlib)was used for the data preparation, analysis and visualization part of this project. Tablaeu was also used to create more interactive visualizations. Scikit-learn and XGB python libraries were used to build our predictive models.

### **1. Data Understanding**

- The completeness and quality of the dataset.

### **2. Data Preparation**

- Cleaning the data by removing or handling missing values and outliers.

- The distribution of churn rates over a couple of factors like customer service calls and such.

# Analysis Steps

## **3. Visualization**

- Bar plots for to analyze how customer behavior affect churn turn out.
- Heat map to see the correlation between the features and how they affect the churn turnout.

## **4. Modeling**

- A couple of models built and trained.
- The best performing model optimized.

## **5. Insights**

- After analyzing which features matters most when it comes to customers churning, recommendations were drawn from that.

# Challenges

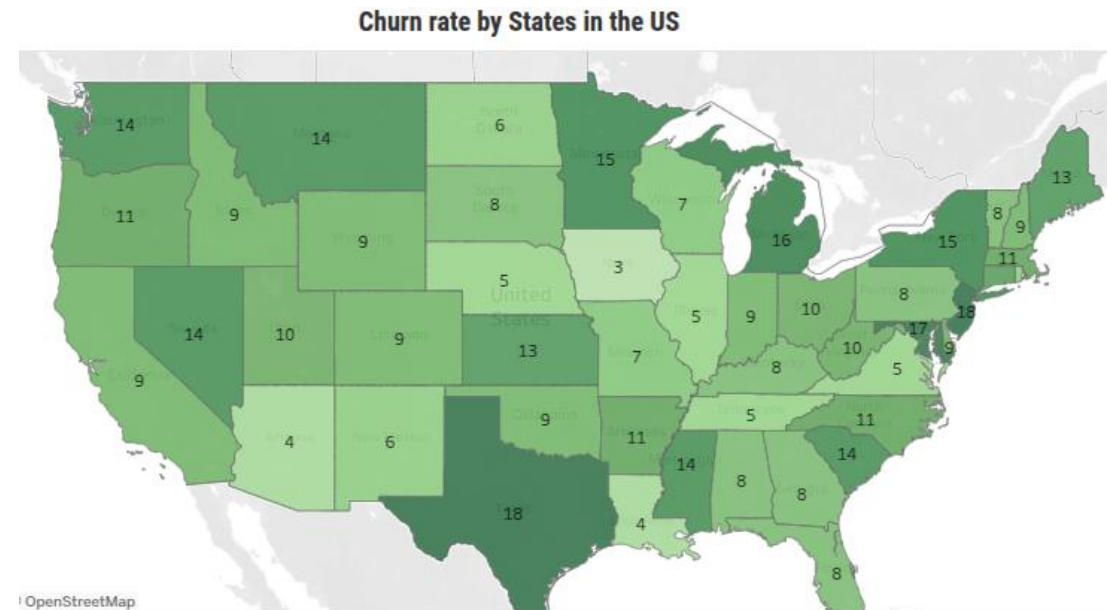
- The data had a huge class imbalance with 85.51% of the sample did not churn and 14.49% of the sample churned.
- Little to no domain knowledge to help us understand what is really important to the business.



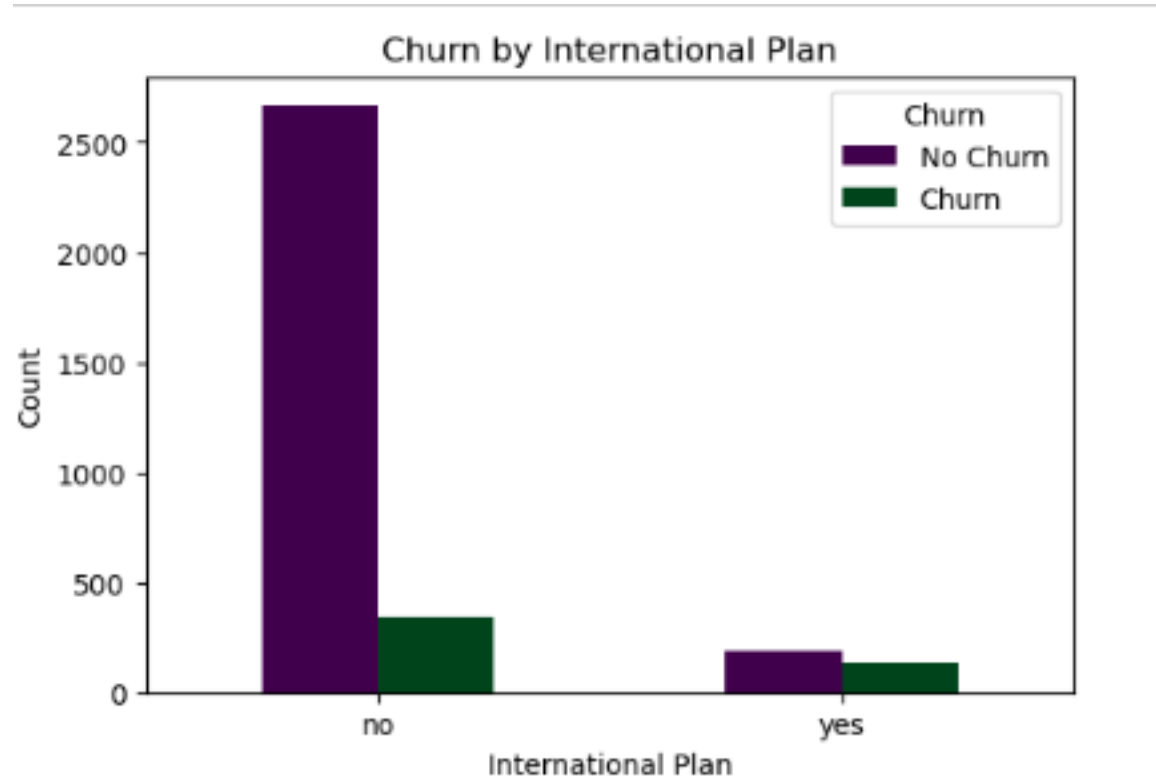
# Observations

## Key Insights

- Texas (18), New York (16), and California (14) have the highest churn rates, suggesting possible dissatisfaction or competitive markets.
- States with lower churn (e.g., South Dakota, Nebraska, and Kansas) may have more stable customer bases.
- Targeted retention efforts should focus on high-churn states to understand and address the causes.



# Observations



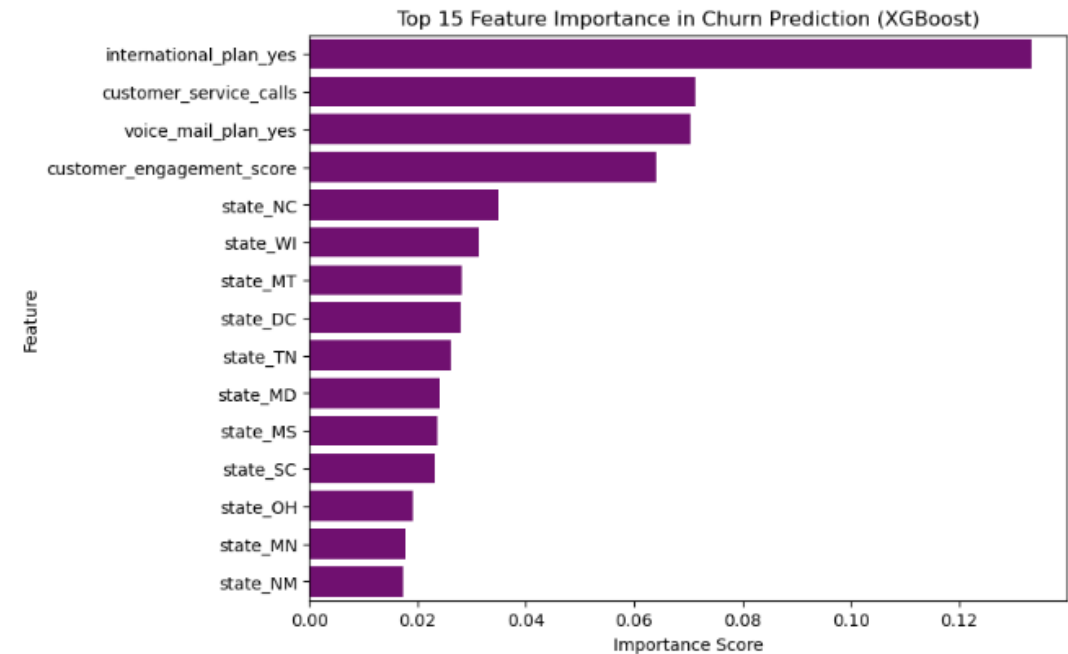
## Key Insights

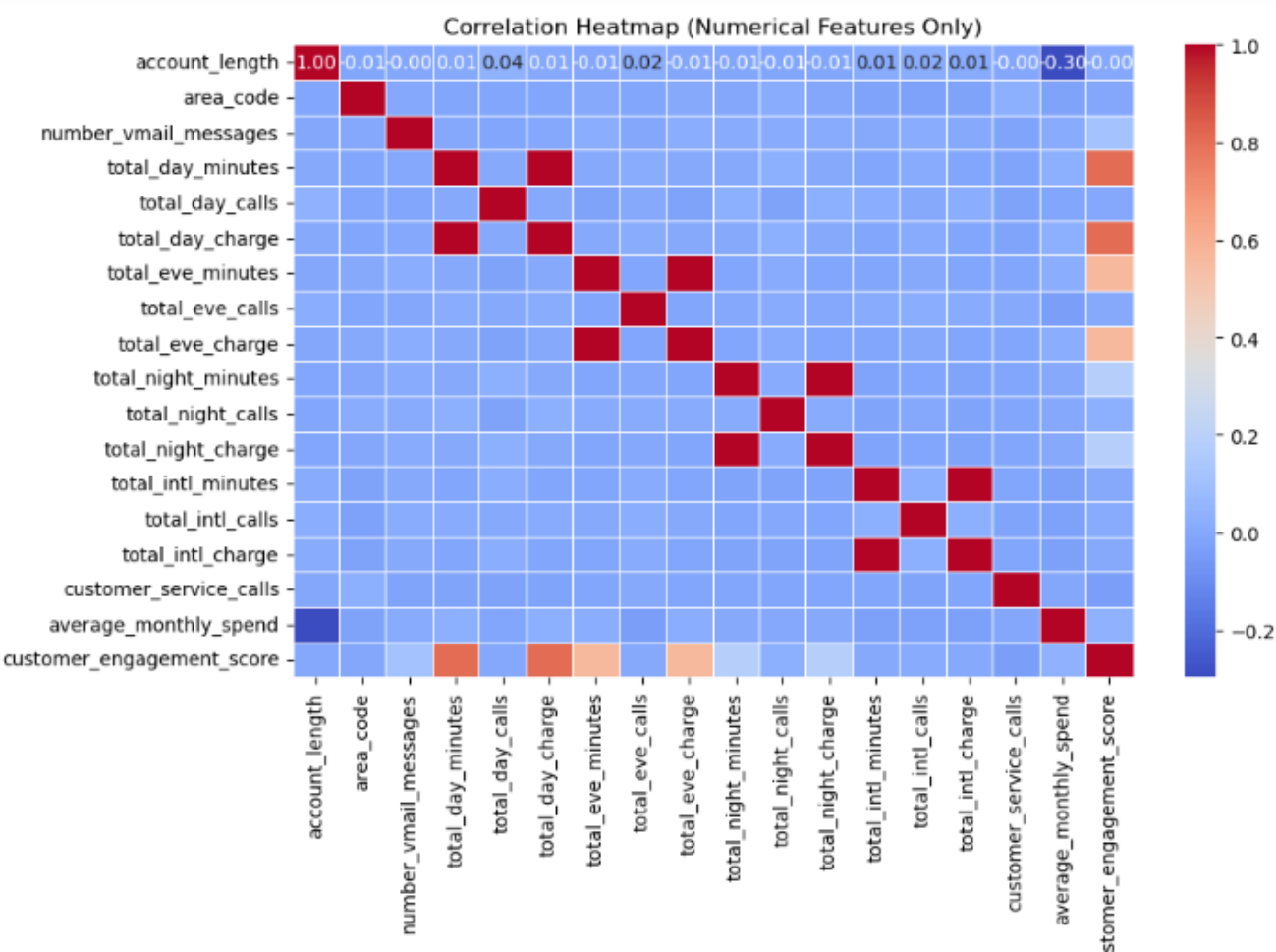
Customers with an **international plan churn at a higher rate** than those without one.

# Observations

## Key Insights

- Having an international plan is the strongest indicator of churn, reinforcing earlier findings.
- High customer service call frequency suggests dissatisfaction, making it a critical churn predictor.
- Voice mail plan and customer engagement score also impact churn, indicating service usage patterns matter.
- Geographic location (various states) plays a role, possibly due to regional service differences.





# Observations

## Key Insights

- Strong correlations exist between total minutes, total calls, and total charges for day, evening, and night categories but this is expected since charges are based on usage.
- Customer service calls show little correlation with other features, meaning complaints might not be linked directly to call usage.

# Conclusion

Based on the analysis of SyriaTel's customer data, the following conclusions can be drawn:

## **1. Primary Factors Influencing Churn**

- Customers with international plans exhibit a higher churn rate compared to those without.
- Customers with higher total day and evening call charges are more likely to churn.
- High usage of customer service calls correlates with increased churn probability, indicating dissatisfaction.
- States like DC, Wisconsin, Montana and North Carolina have a higher churn rate compared to the other states.

# Conclusion

## 2. Predictive Model Performance

- The machine learning model developed successfully predicts customer churn with a high degree of accuracy. The XGBooster performed well with an F1 score of 86.63%
- Feature importance analysis highlights that total charge metrics, international plans, and customer service call frequency are key indicators of churn.

- Model F1 scores:

**Logistic Regression:** F1 score = 48.32%

**Decision Tree:** F1 score = 78.10%

**Random Forest:** F1 score = 82.42%

**XGBooster:** F1 score = 86.63%

# Conclusion

## 3. Business Impact

- The predictive model enables proactive identification of customers at risk, allowing targeted retention efforts.
- Insights from the model provide actionable areas where SyriaTel can improve customer satisfaction and reduce churn.

# Recommendation

To address the customer churn issue and improve customer retention, the following recommendations are proposed:

## **1. Customer Service Improvement**

- Implement a proactive customer service approach to address concerns before they escalate.
- Improve response quality and reduce the number of interactions required to resolve customer issues.

## **2. Personalized Retention Offers**

- Provide targeted discounts or benefits to high-risk customers identified by the model.
- Offer customized plans based on customer usage patterns to enhance satisfaction and engagement.



# Recommendation

## **3. International Plan Optimization**

- Reevaluate international plan pricing and benefits to increase customer retention.
- Conduct surveys to understand why customers with international plans have higher churn rates.

## **4. Customer Engagement Strategies**

- Launch loyalty programs to increase customer commitment to SyriaTel services.
- Improve communication with customers through personalized messaging and engagement campaigns.

# Recommendation

## **5. Regional Strategy Implementation**

- Investigate state-based churn trends to identify regional issues since some states have a higher churn rate than others. (e.g., service quality, competitor influence).
- Customize marketing and retention strategies for high-churn regions to improve customer experience.



Q&A



The End

