



# SyriaTel Customer Churn Analysis

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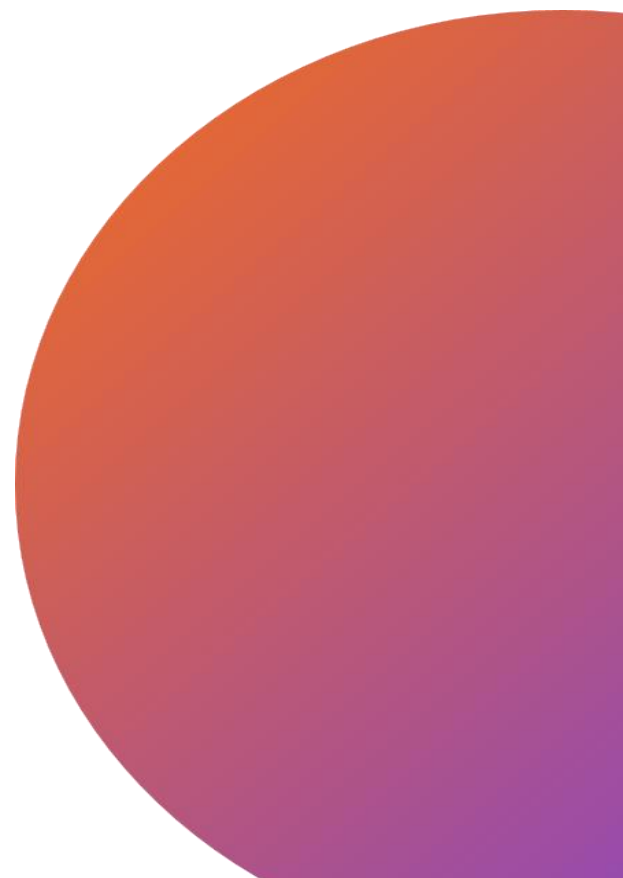




# BUSINESS PROBLEM



Customer churn poses a significant threat to SyriaTel and the telecommunications industry at large. The loss of customers not only leads to immediate revenue reduction but also incurs additional costs associated with acquiring new customers.





# PROJECT OBJECTIVES



01

Build a precise churn prediction model to reduce customer attrition effectively.

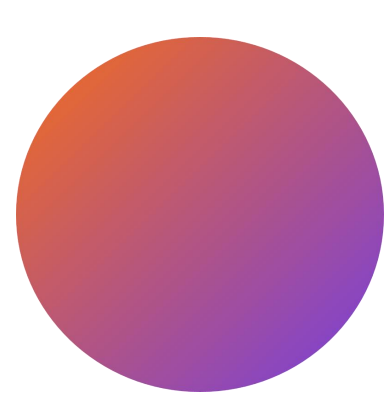
02

Utilize the model's predictions to implement strategies that effectively reduce customer attrition at SyriaTel.

03

Optimize SyriaTel's retention strategies and resources to reduce customer churn, enhance loyalty, and boost profitability.





# DATA UNDERSTANDING

The SyriaTel Dataset was retrieved from [Kaggle](#). It contains information on about 3,333 customers.

The data includes various details like the state the customer is from, how long they've been a customer, whether they have an international plan or voice mail plan, how many customer service calls they've made, and many more.

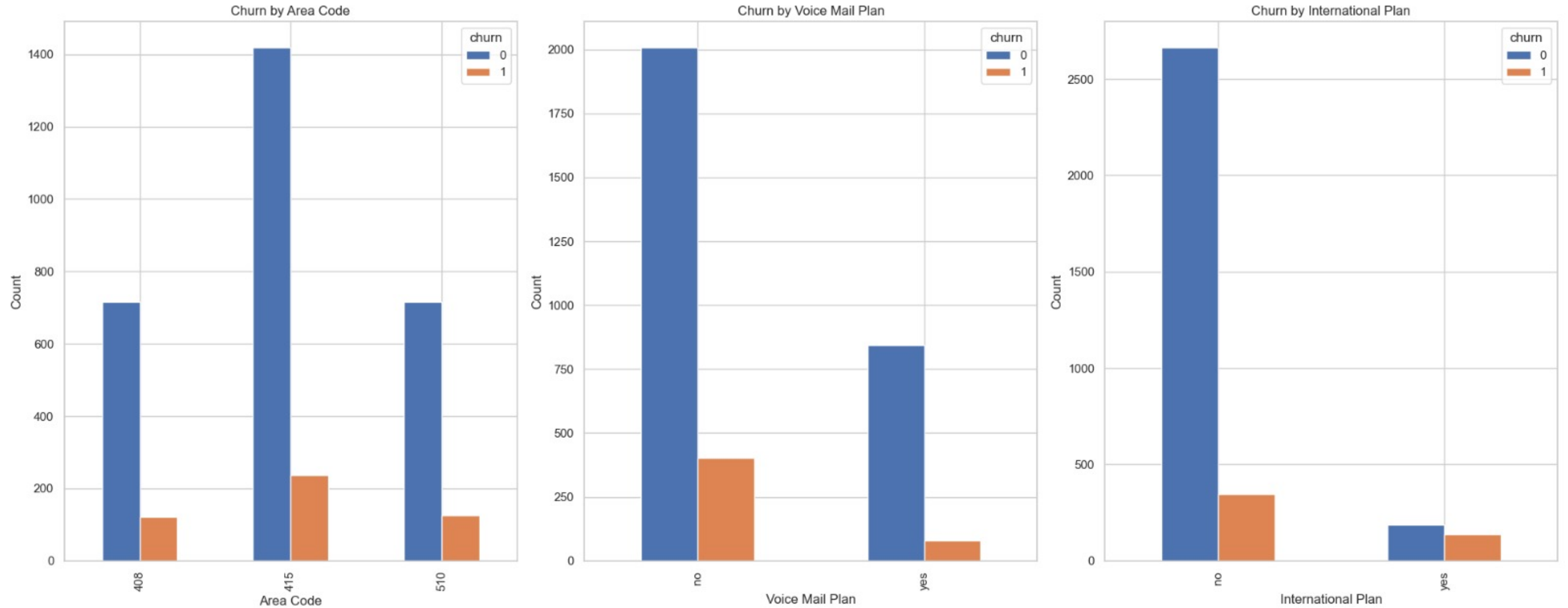
## Assumptions made:

- All of the data was captured at one point in time.
- The data represents a bill over a one month duration.
- Each phone number represents one account.
- The company is charging in dollars.
- Account length is in terms of months.

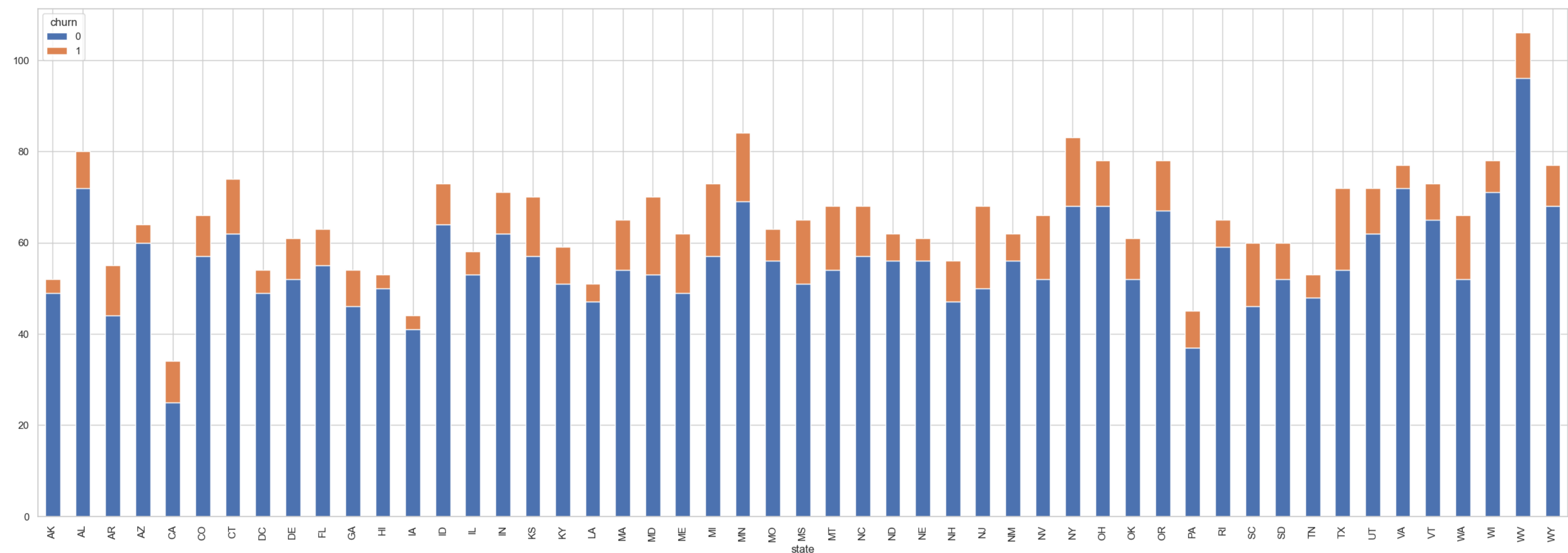


# EXPLORATORY DATA ANALYSIS

## Churn Rate By Area Code , Voice Mail Plan And International Plan



# CHURN BY STATE

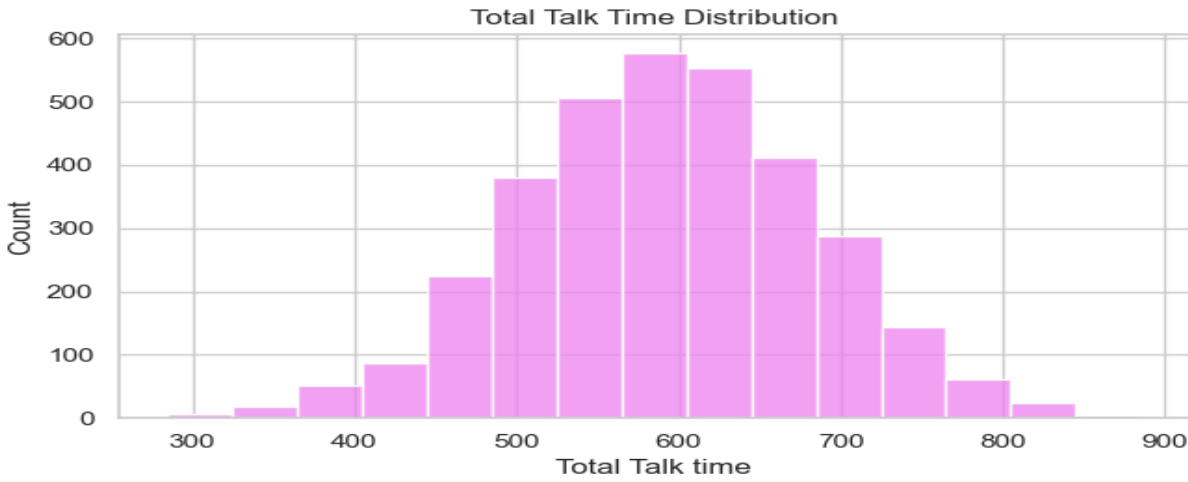
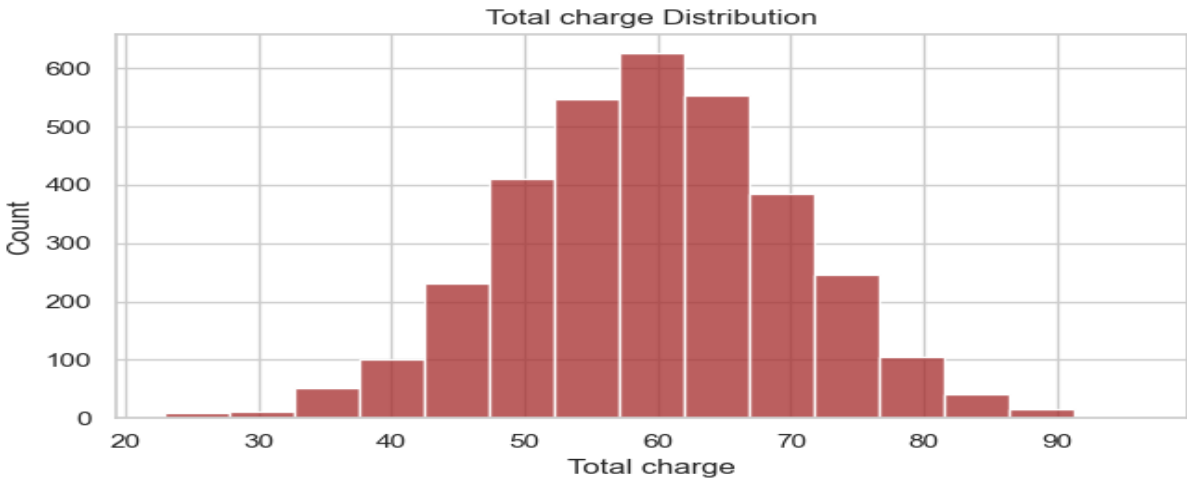
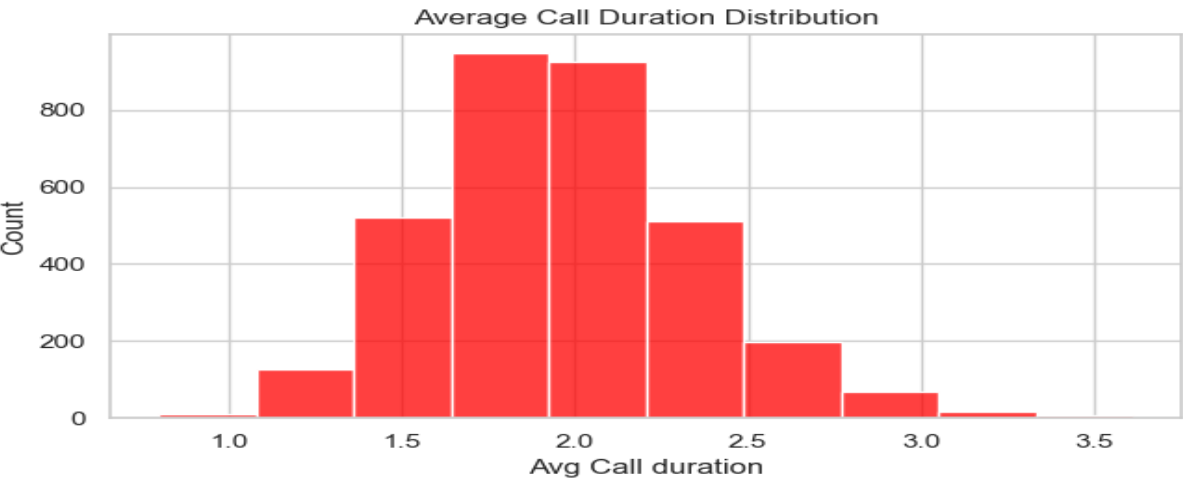
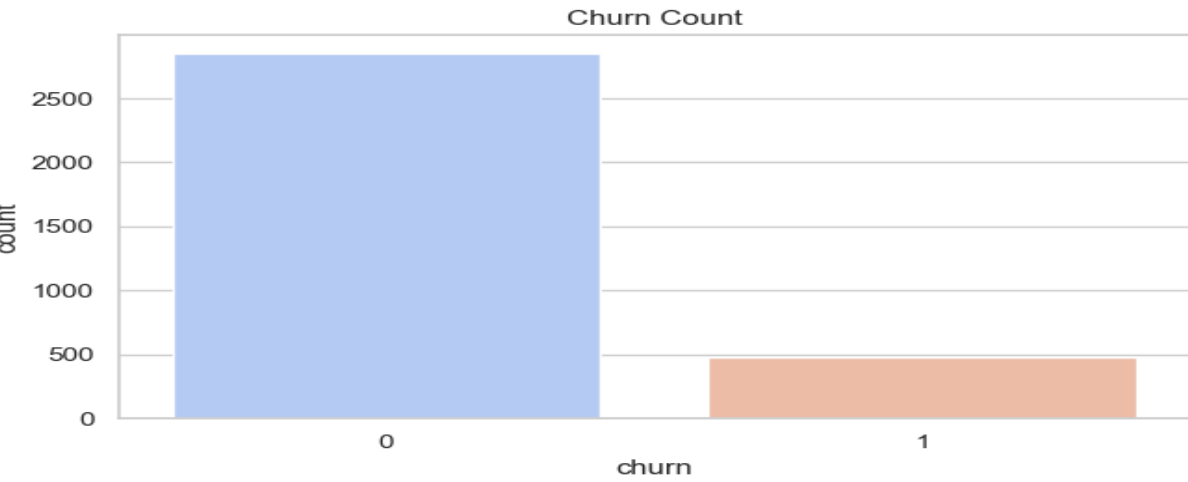
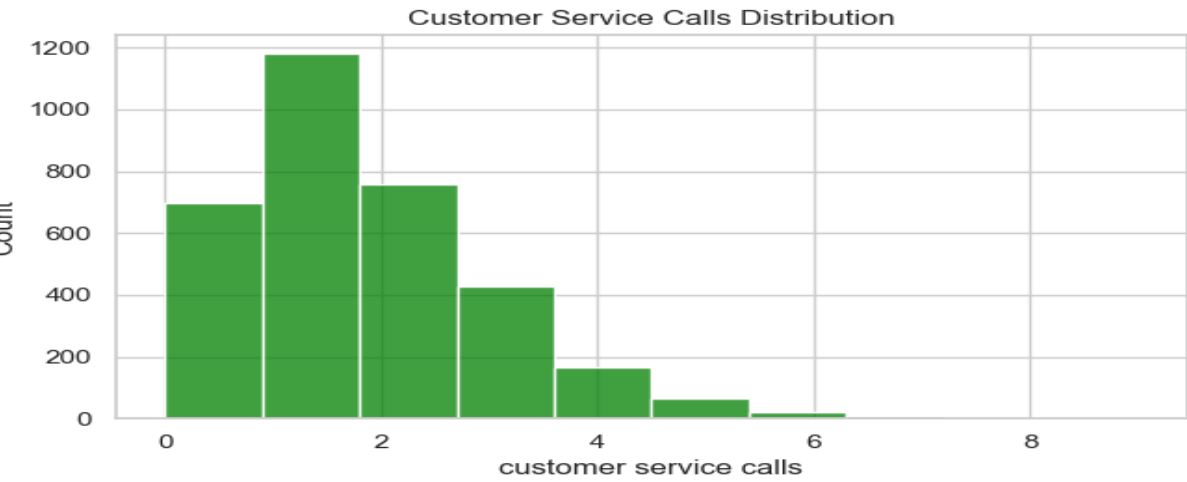
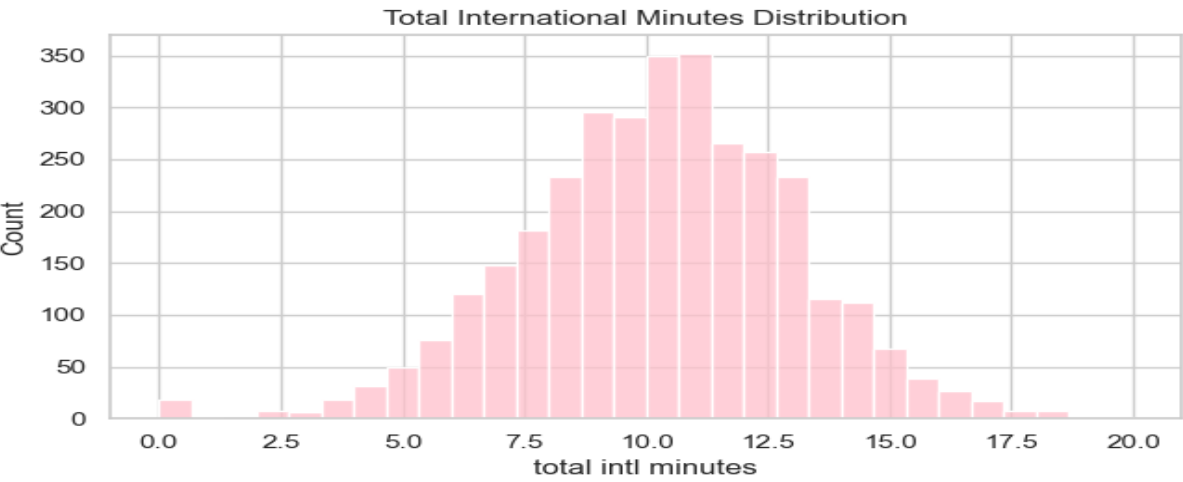
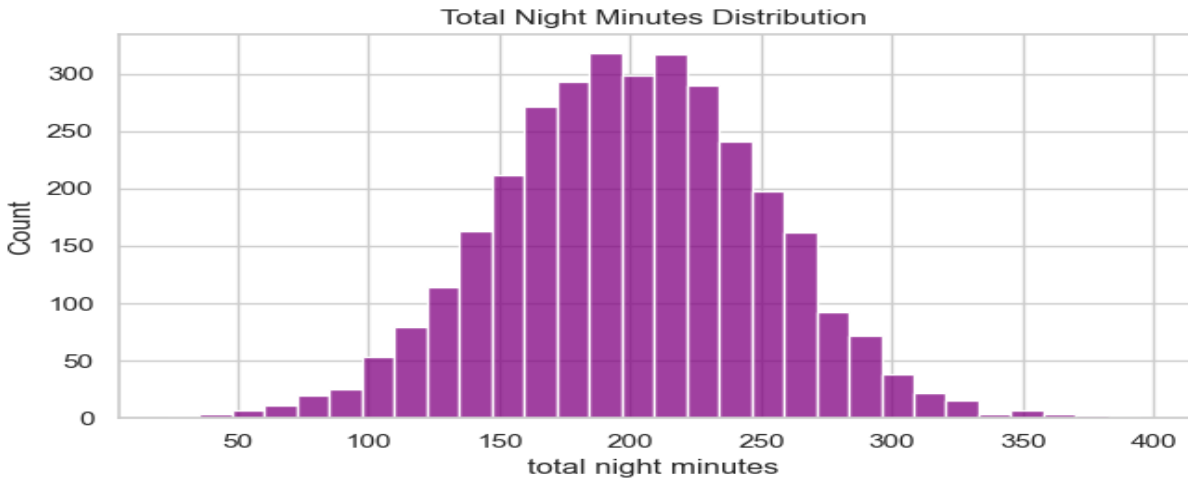
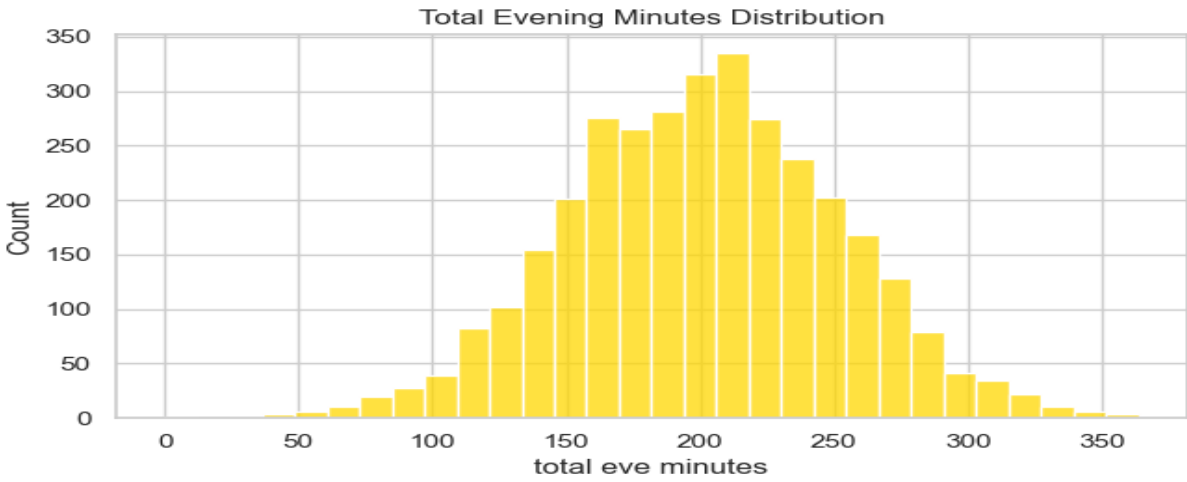
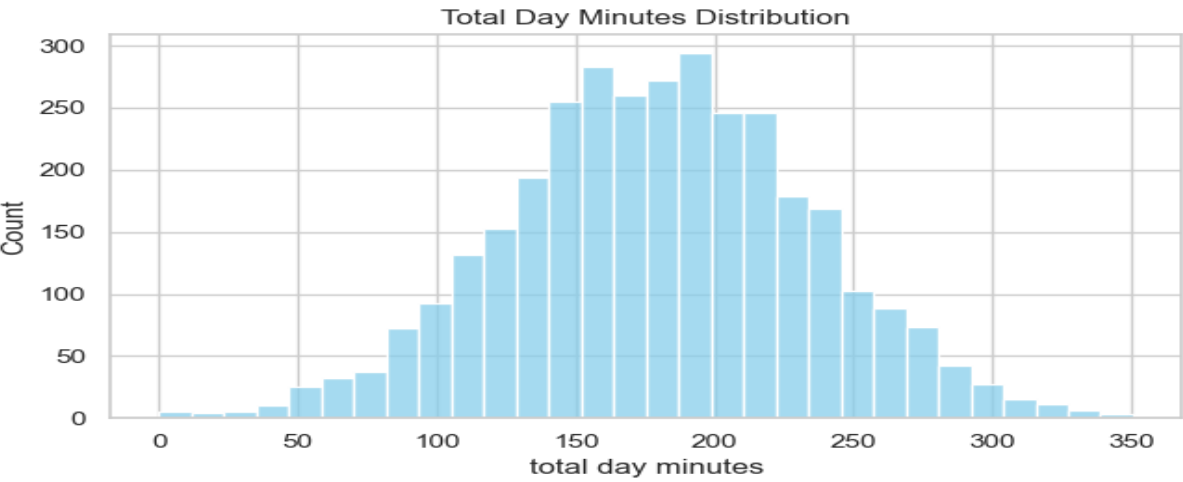


The plot above shows the distribution of churn for each state.

- Some states have relatively higher churn rates like WV, VT, NY, OH with a significant number of churned customers (churn 1) while other states have lower churn rates like AR, AZ, CA, CO with a higher count of customers who did not churn (churn 0)



# Distribution of Numerical Features



# Modeling Approach

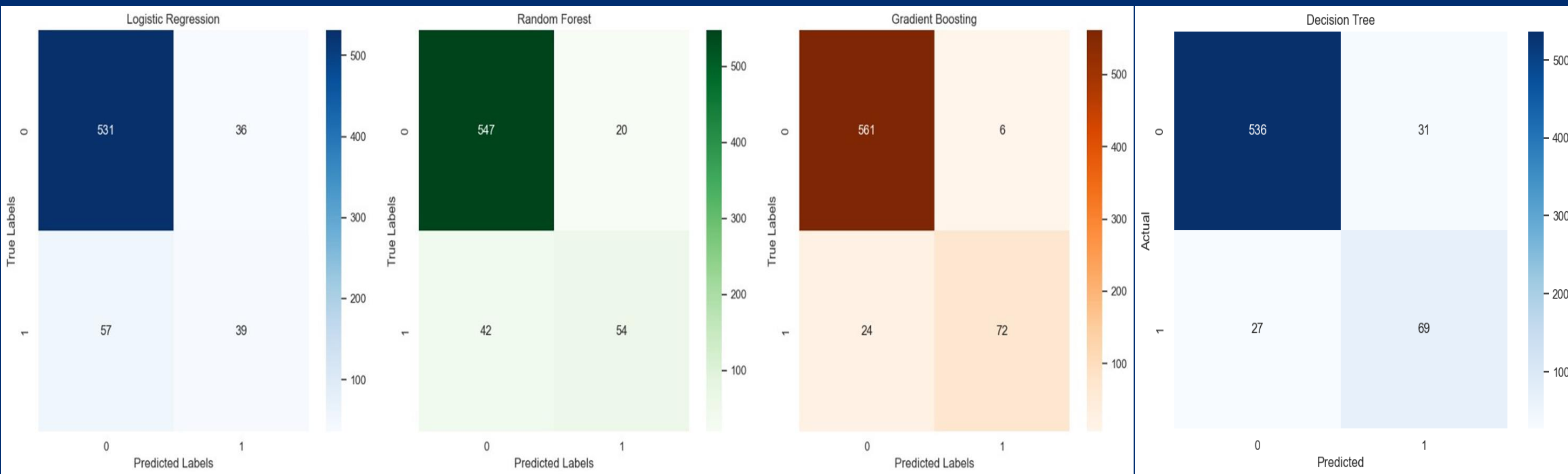
Four binary classification models - Logistic Regression, Random Forest, Gradient Boosting, and Decision Tree - were used, trained on a resampled dataset, and optimized with hyperparameter tuning.

## Tuned Results

		Accuracy	Precision	Recall	F1-score
Logistic Regression	Test	0.86	0.52	0.41	0.46
	Train	0.768592	0.326718	0.554404	0.411143
Random Forest	Test	0.91	0.73	0.56	0.64
	Train	1.000000	1.000000	1.000000	1.000000
Gradient Boosting	Test	0.95	0.92	0.75	0.83
	Train	0.975840	0.976331	0.854922	0.911602
Decision Tree Classifier	Test	0.9125	0.6900	0.7188	0.7041
	Train	0.9764	0.9887	0.9638	0.9761

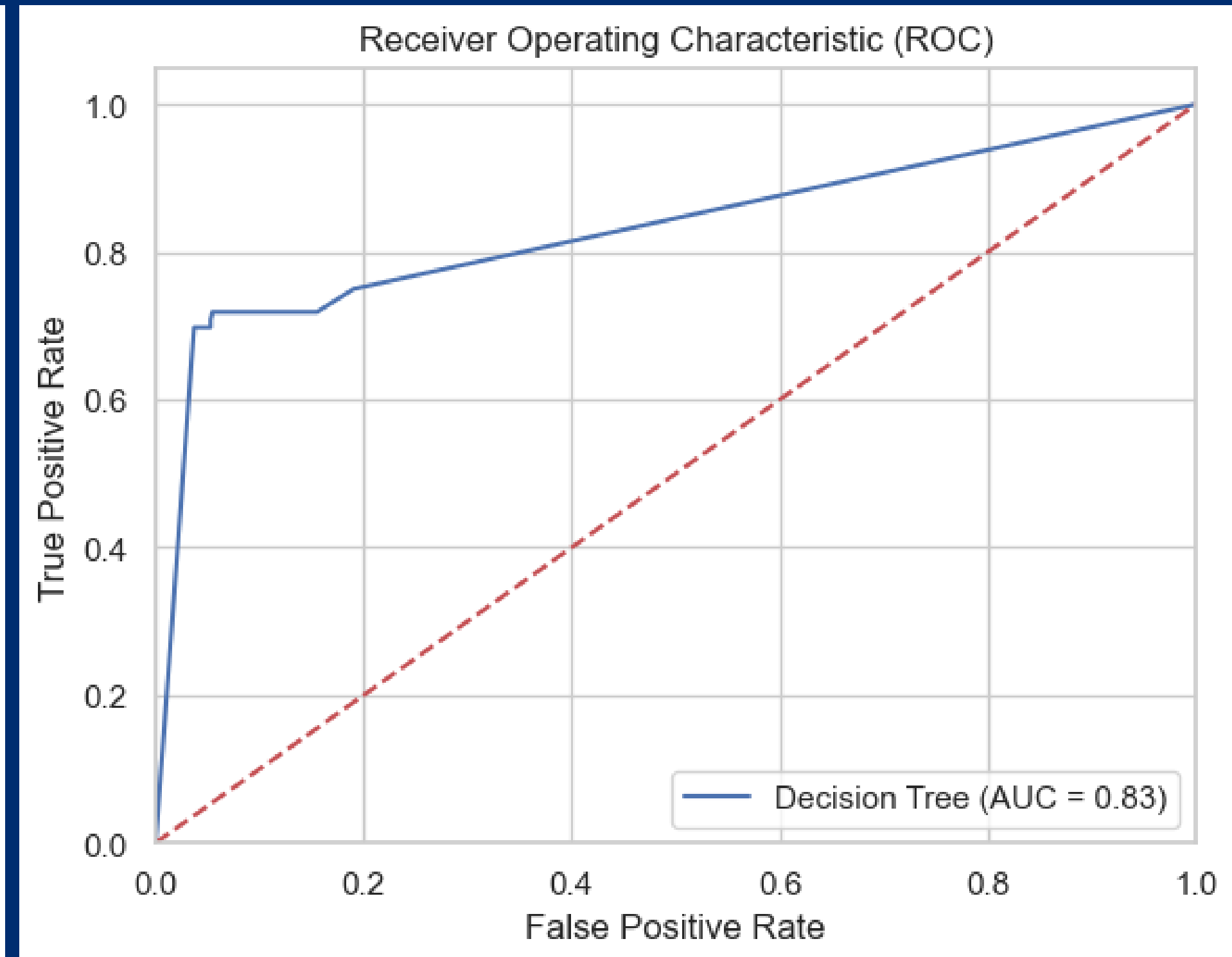
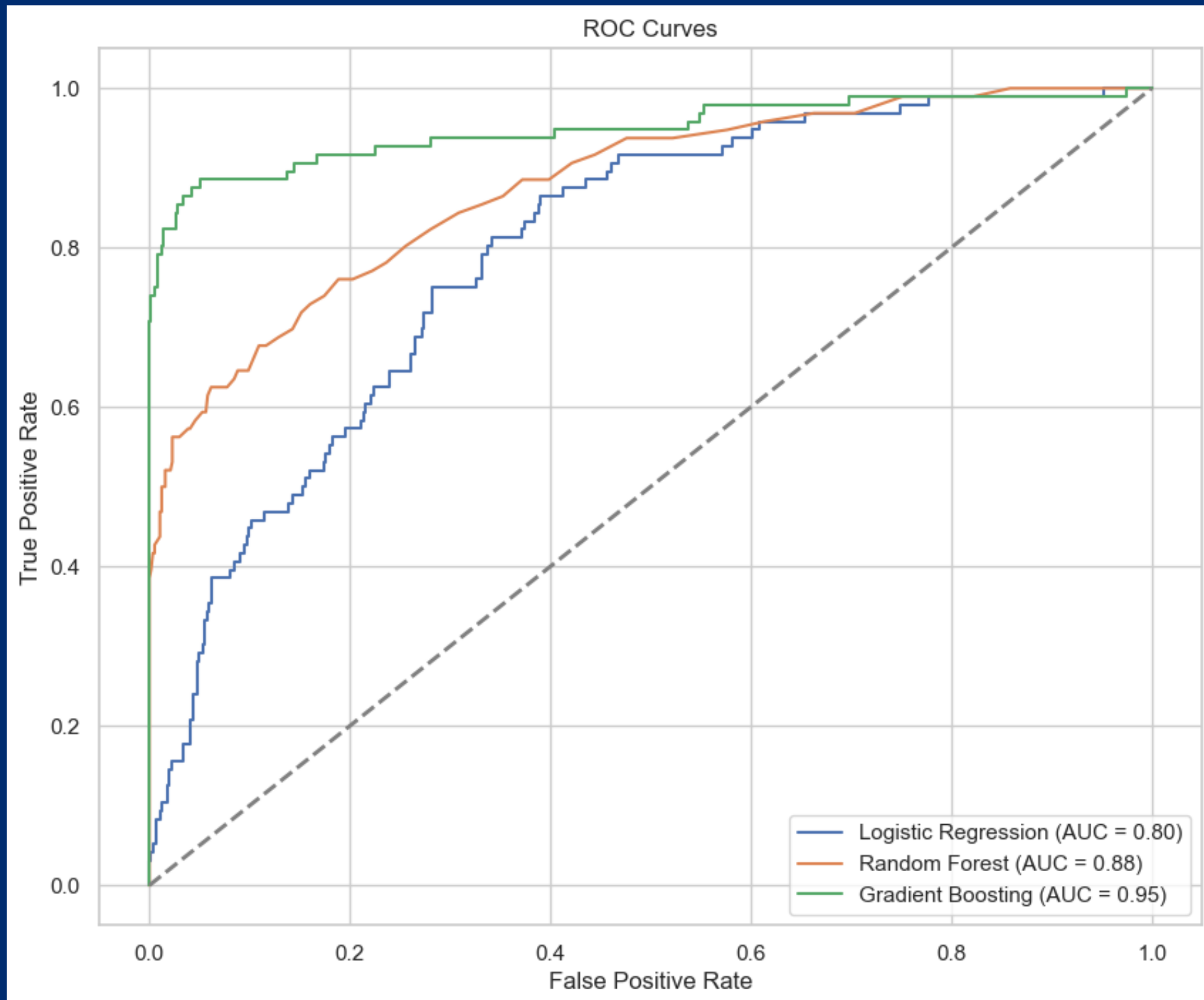


# Model Performance Evaluation

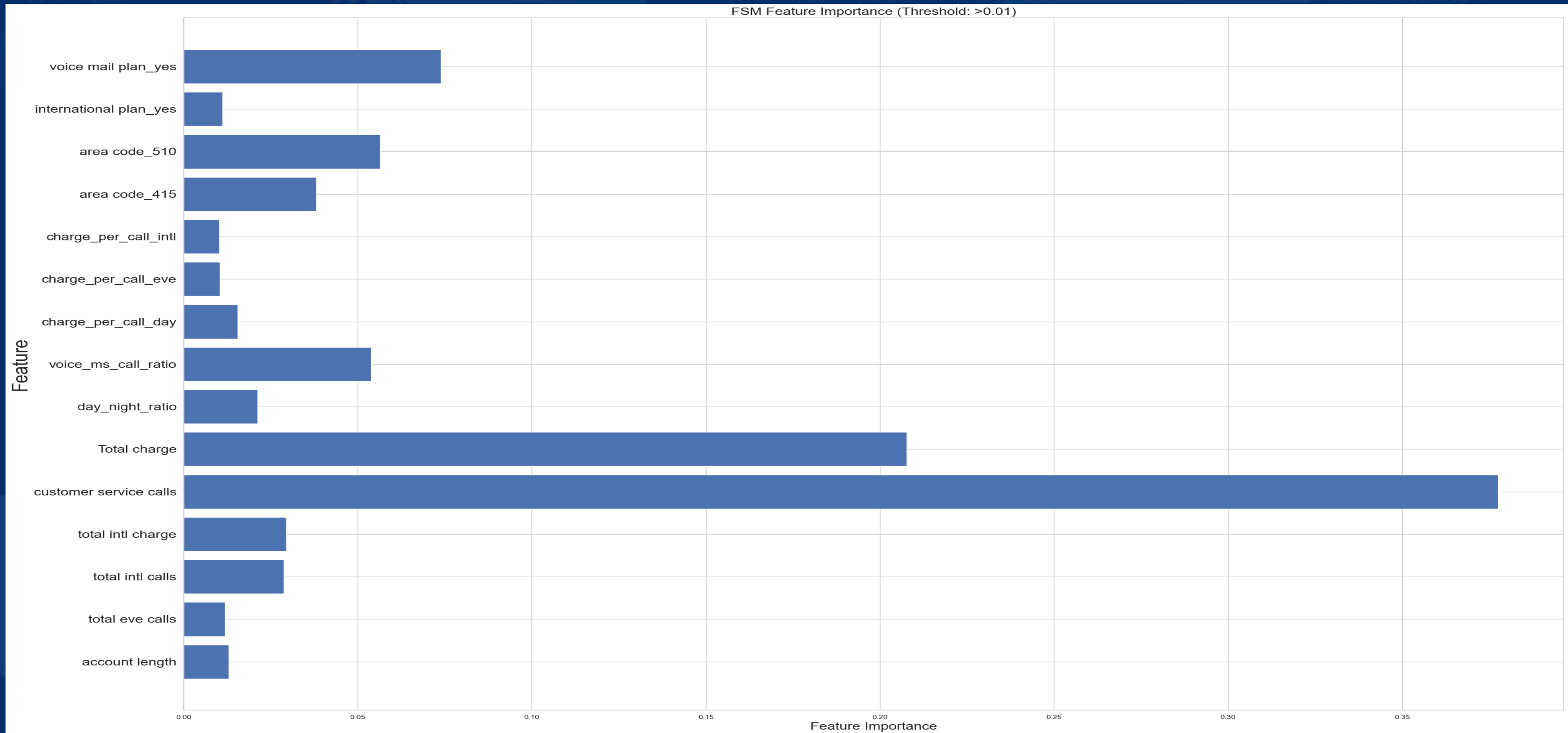


The Gradient Boosting model demonstrates excellent performance with an accuracy of 96.08% and a balanced F1-score of 85.87%, indicating effective identification of churn cases while minimizing false positives.

# ROC Curves for the Tuned Models



# IMPORTANT FEATURE SELECTION





# CONCLUSION

## Model Performance:

- The models, especially Gradient Boosting, show good performance with an accuracy of 96.07% and recall of 82.2%. Decision Tree's tuning improved accuracy but reduced recall.

## Key Features:

- 'International\_plan', voicemail plan, 'total\_charge', and 'customer\_service\_calls' are the top features influencing churn prediction. This suggests that customers with an international plan, those who have a high total charge, and those who have made more customer service calls are more likely to churn

# RECOMMENDATIONS

Based on our findings, we recommend the following:

- **Review Voice Mail Plan**
- **Review International Plan:**
- **Improve Customer Service:**
- **Analyze Pricing Structure:**



# **FUTURE WORK:**

## **Deep Dive into Churn Reasons:**

- A more in-depth analysis of the reasons behind churn could be beneficial. This could involve surveys or interviews with customers who have churned to understand their reasons for leaving.

## **Predicting Churn Well in Advance:**

- It could be beneficial to not only predict which customers will churn but also when they will churn. This could allow Syriatel to intervene with retention strategies before it's too late.

## **Retention Strategy Implementation & Evaluation:**

- After identifying customers who are likely to churn, the next step would be to implement retention strategies and then evaluate their effectiveness. This could involve A/B testing or other methods to measure the impact of these strategies on customer retention.





# Thank You