

# **SYRIATEL CUSTOMER CHURN PREDICTION PROJECT**

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# Overview

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The aim of this project is to utilize machine learning to forecast the probability of customer churn for SyriaTel, a telecom company. By employing machine learning models, the project seeks to offer SyriaTel a practical plan to enhance its customer retention tactics and elevate overall customer satisfaction.

# Business Understanding

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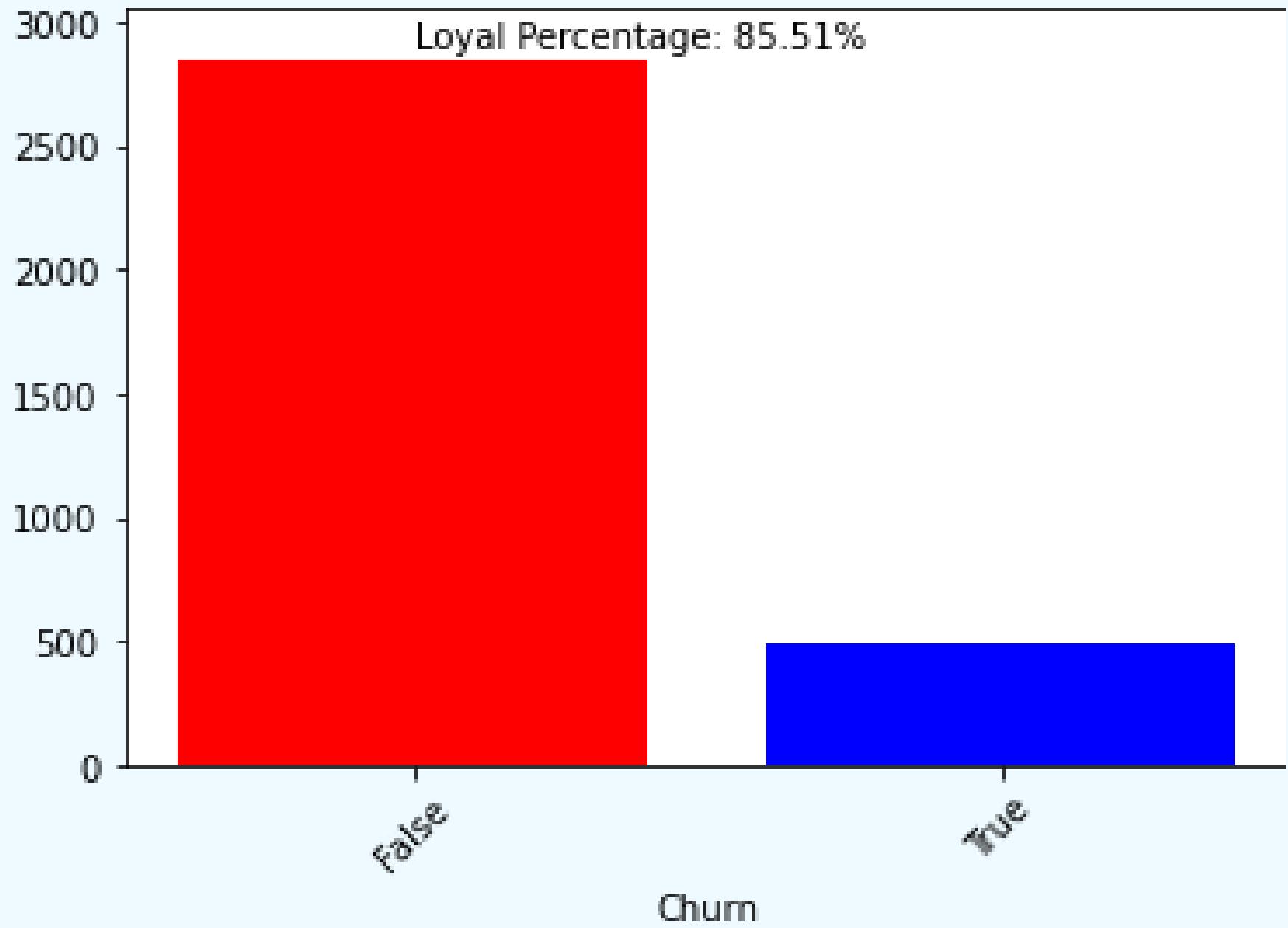
- SyriaTel faces intense competition in the telecom industry, necessitating accurate customer churn prediction for a competitive edge.
- Customer retention is a priority, given its cost-effectiveness compared to acquiring new customers.
- SyriaTel seeks to use data analysis and predictive analytics to detect trends and signals for proactive churn reduction.
- The company is in need of machine learning models to predict customer churn, allowing for preemptive retention measures.
- Data includes customer demographics, location, and usage patterns, including call history and charges.
- Continuous model adaptation is vital to stay aligned with evolving customer behavior and market dynamics for effective retention strategies.

# Objectives

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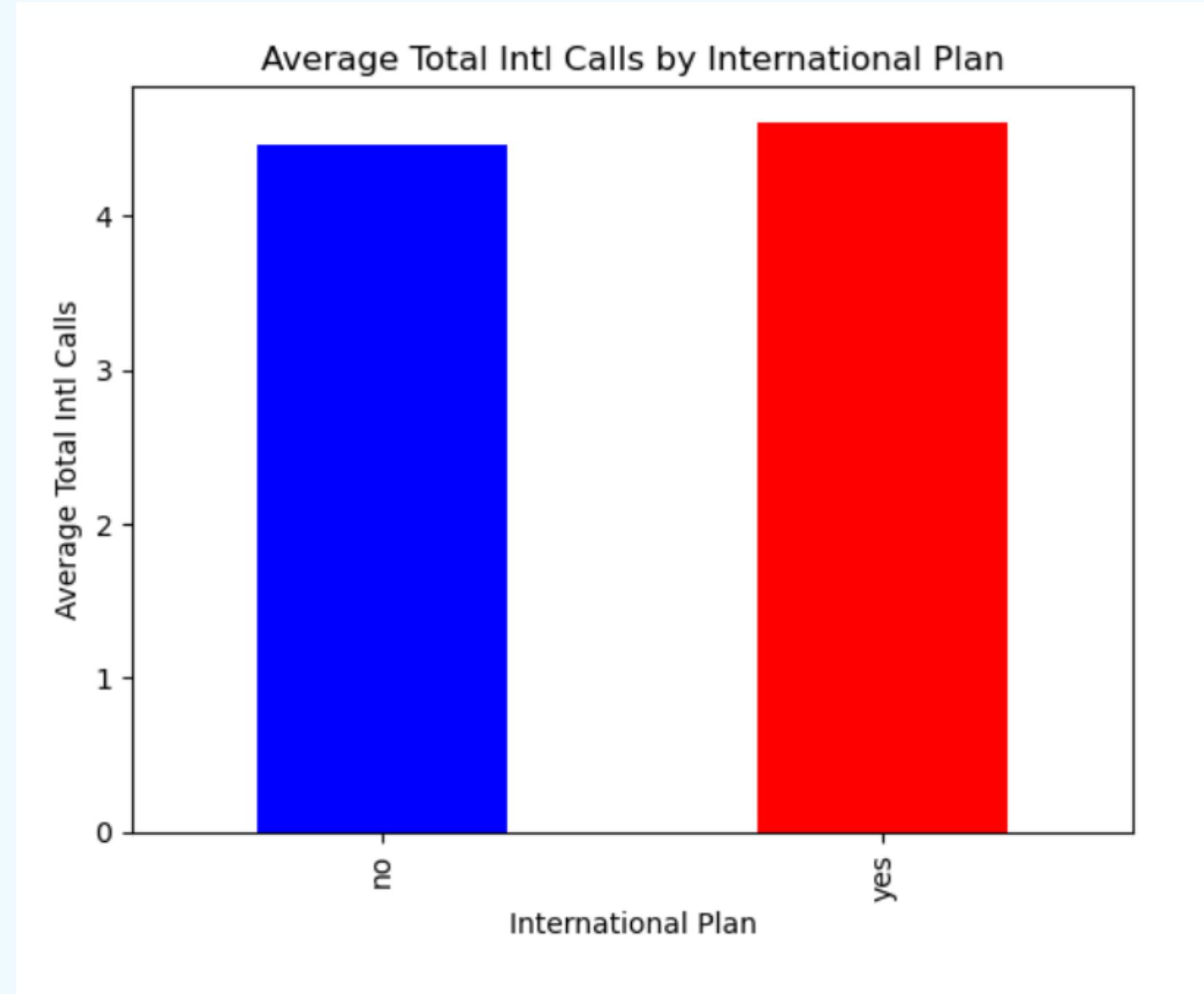
- 1. Create machine learning models that can predict customer churn by using data to analyze customer features.
- 2. Comparing the built machine learning models and determining the most accurate model in prediction.
- 3. The analysis aims to identify the specific features that significantly impact the customer churn rate in SyriaTel, provide valuable recommendations based on the findings, and help mitigate churn rates in the company and improve customer retention.

# Data Analysis: Customer Churn



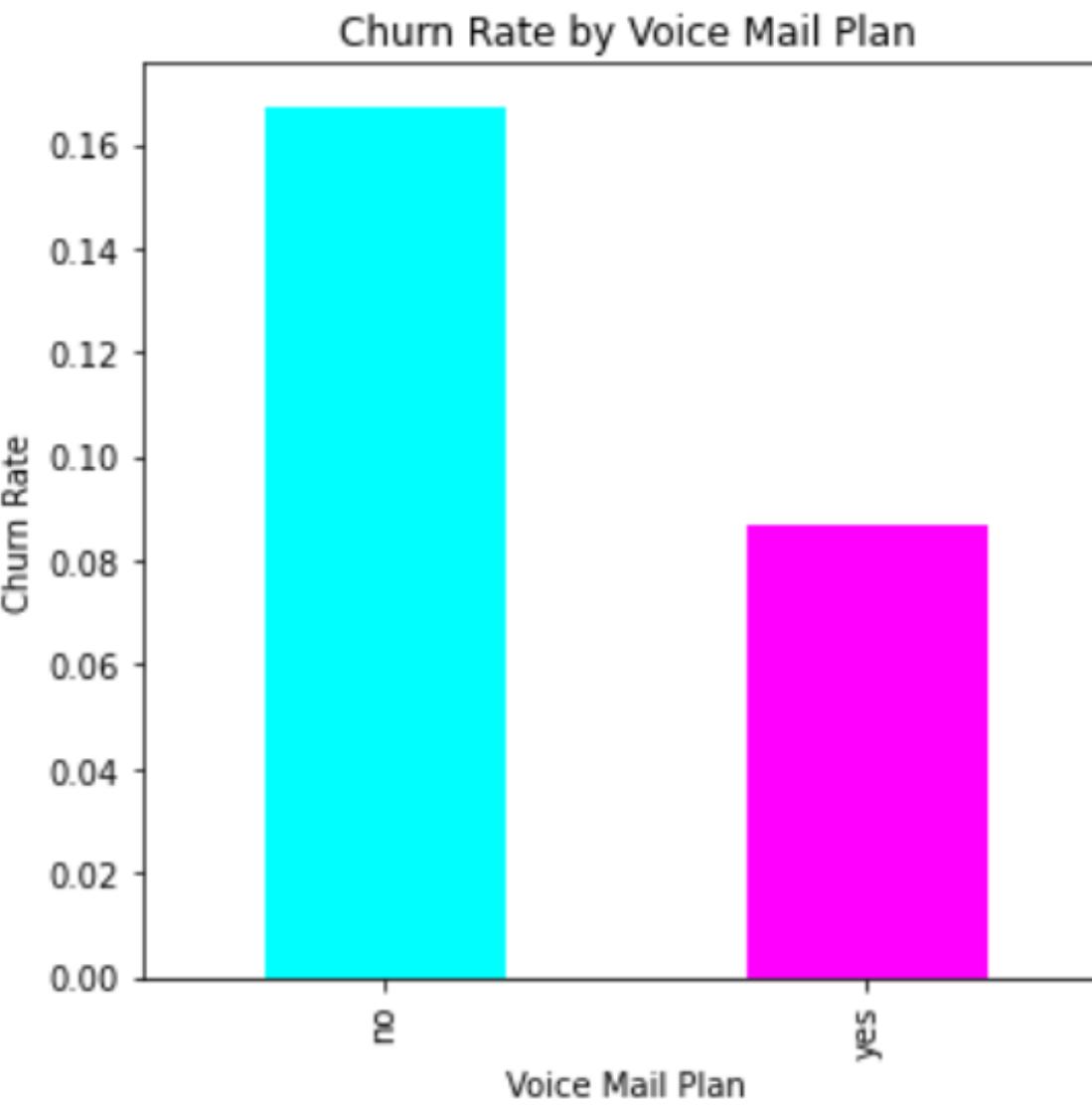
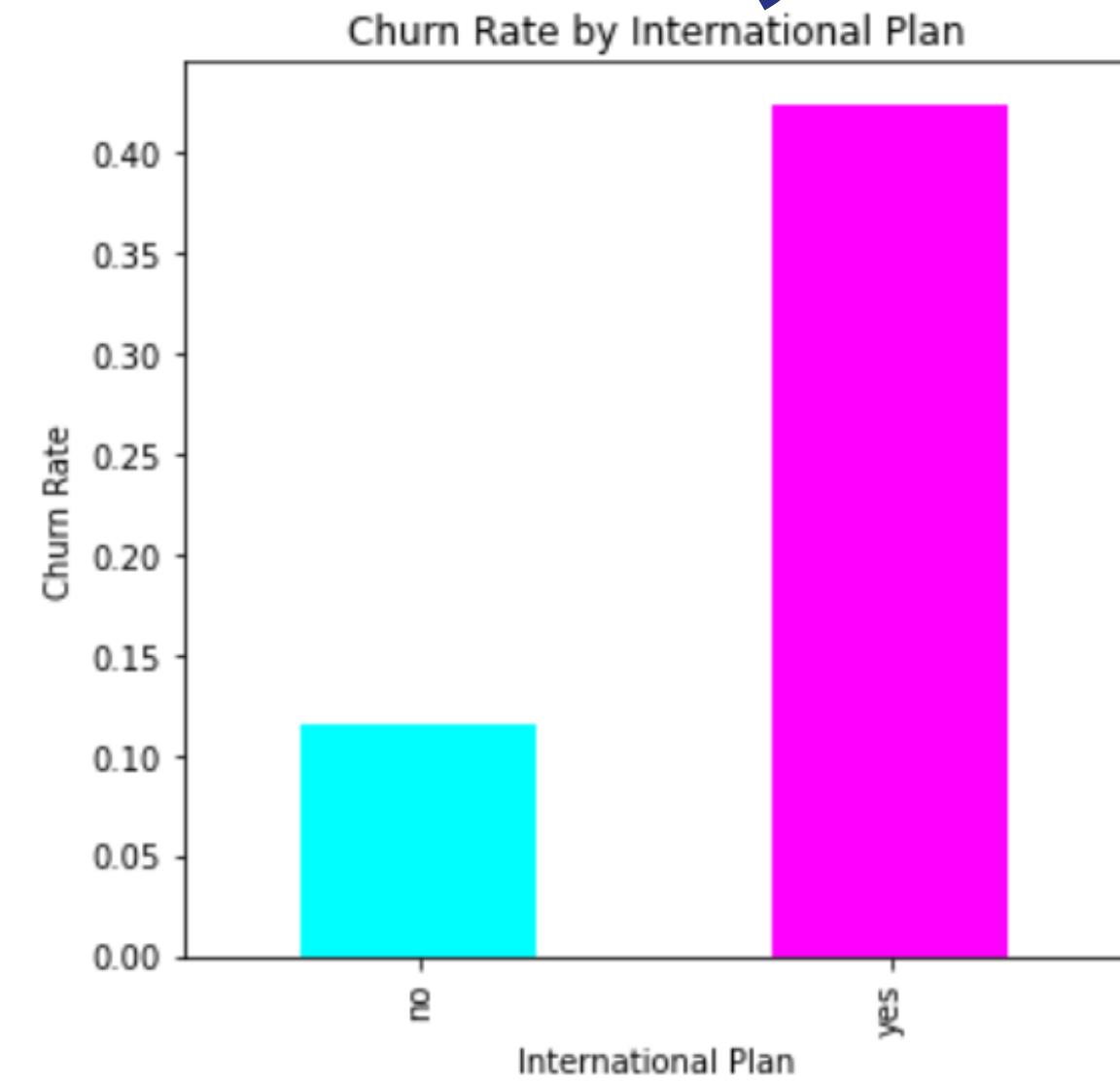
- It can be seen that most of the customers are loyal to the SyriaTel company
- This is because most of the counts are false based on the churn rate count

# Data Analysis: Calls by International Plan



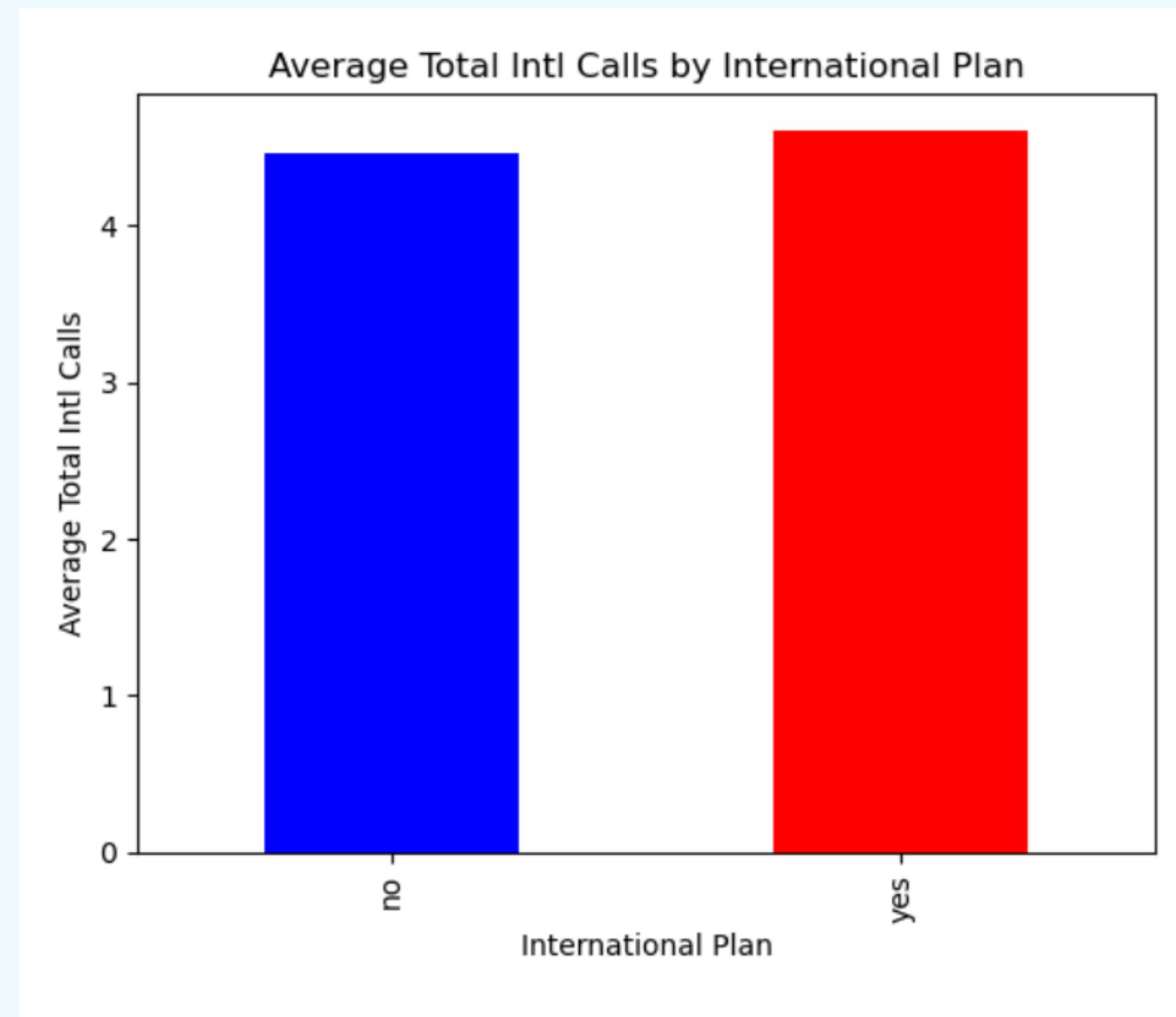
- There is not much difference between people who make international calls in terms of getting international plan.
- On average there are almost the same number of people getting international plan from the most international calls compared to the ones who do not make international calls often.

# Data Analysis: Customer Plan



- There is more customer loyalty by Voice mail plan subscribers due to a lower churn rate
- Customers have a higher rate of churn and higher probability to switch from Syriatel in terms of international plan.
- This shows that customers are more happy with voice mail than international plan.

# Data Analysis: Calls by International Plan

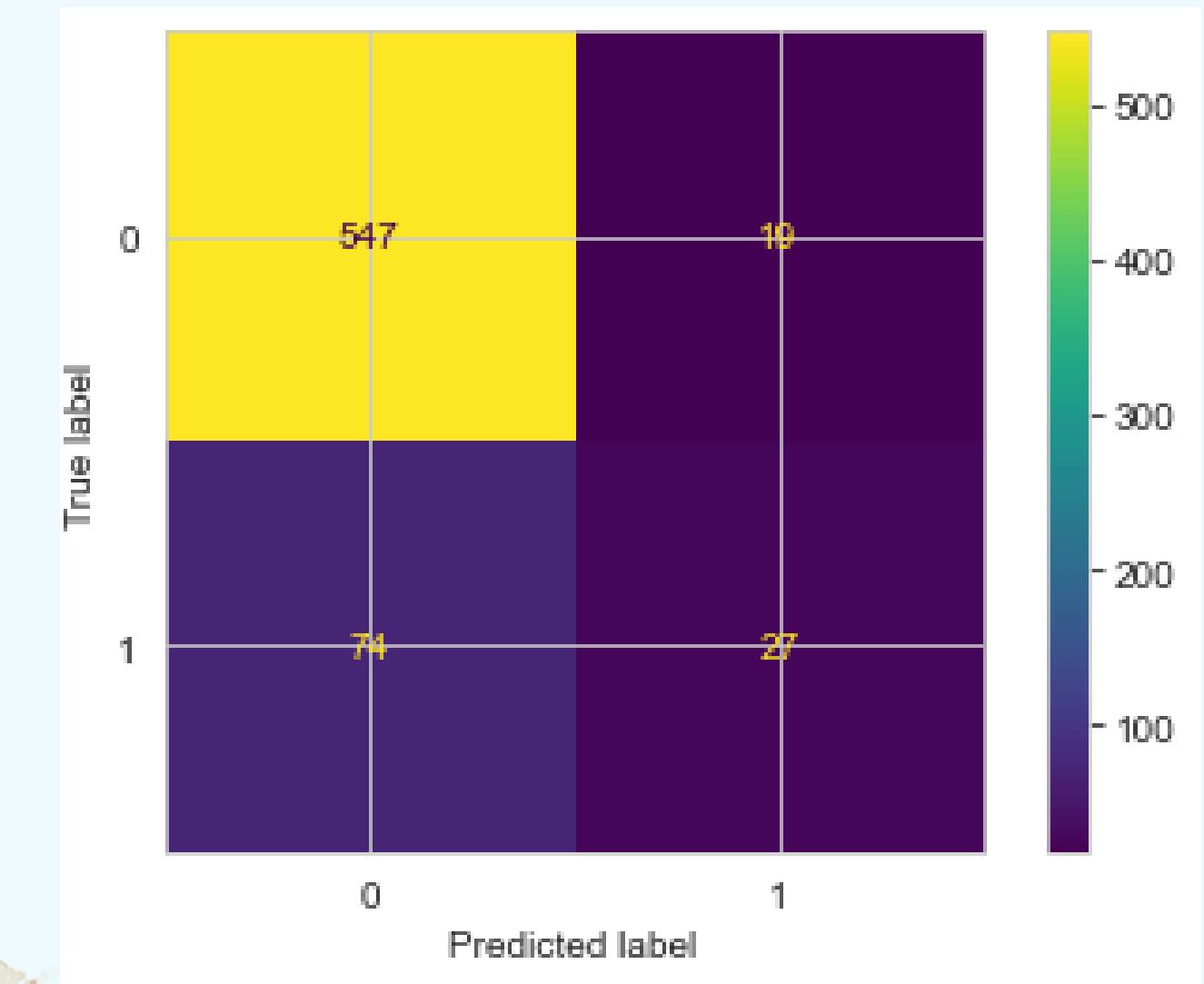


- There is not much difference between people who make international calls in terms of getting international plan.
- On average there are almost the same number of people getting international plan from the most international calls compared to the ones who do not make international calls often

# Modeling

## Model 1: Logistic Regression

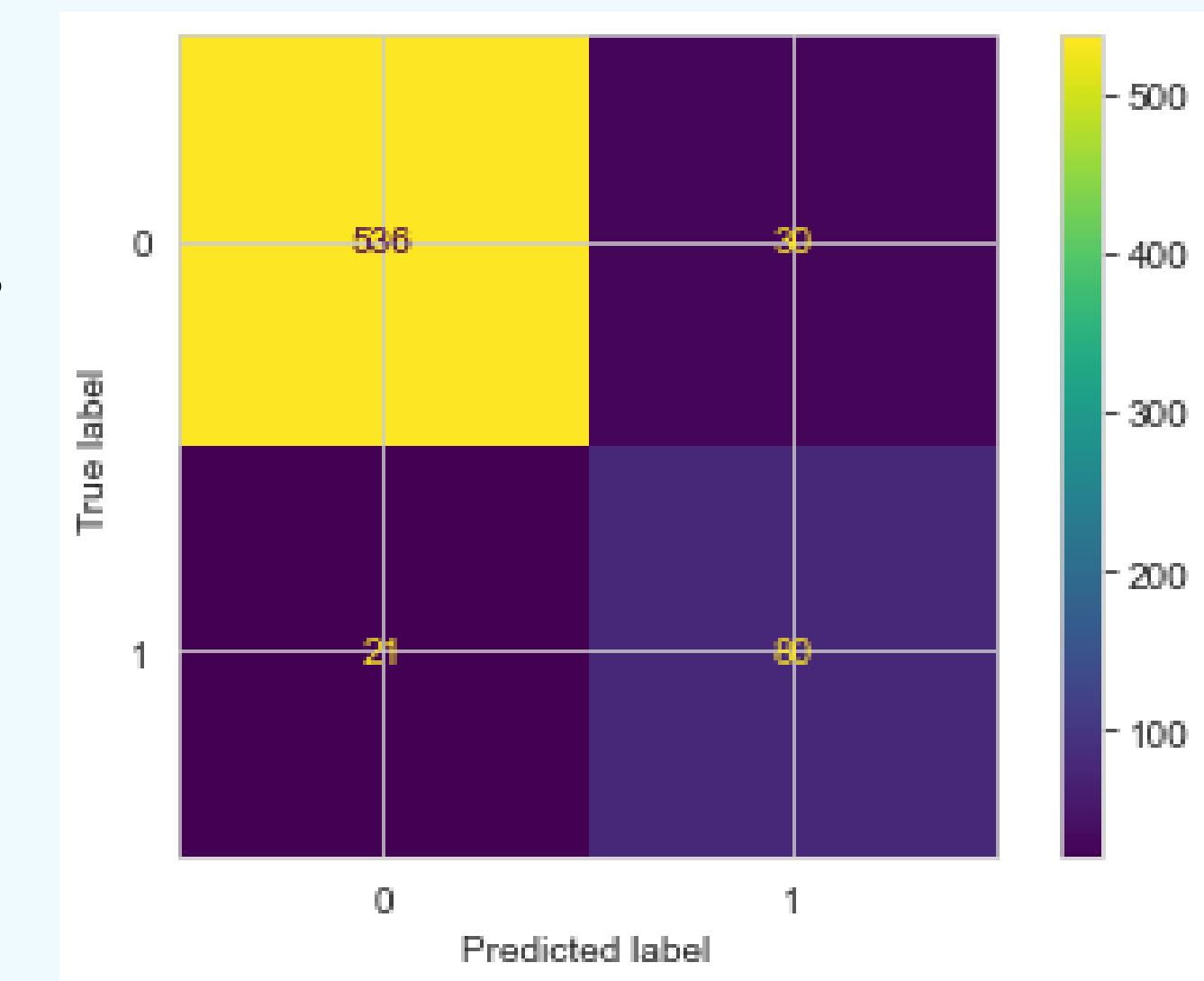
- The initial Logistic Regression model achieved an accuracy rate of 89.6% on the training data and 86.0% on the testing data.
- After applying cross-validation with 5 folds, the testing data accuracy improved to 86.2%, while training data accuracy slightly dropped to 89.2%.



# Modeling

## Model 2: Decision Tree

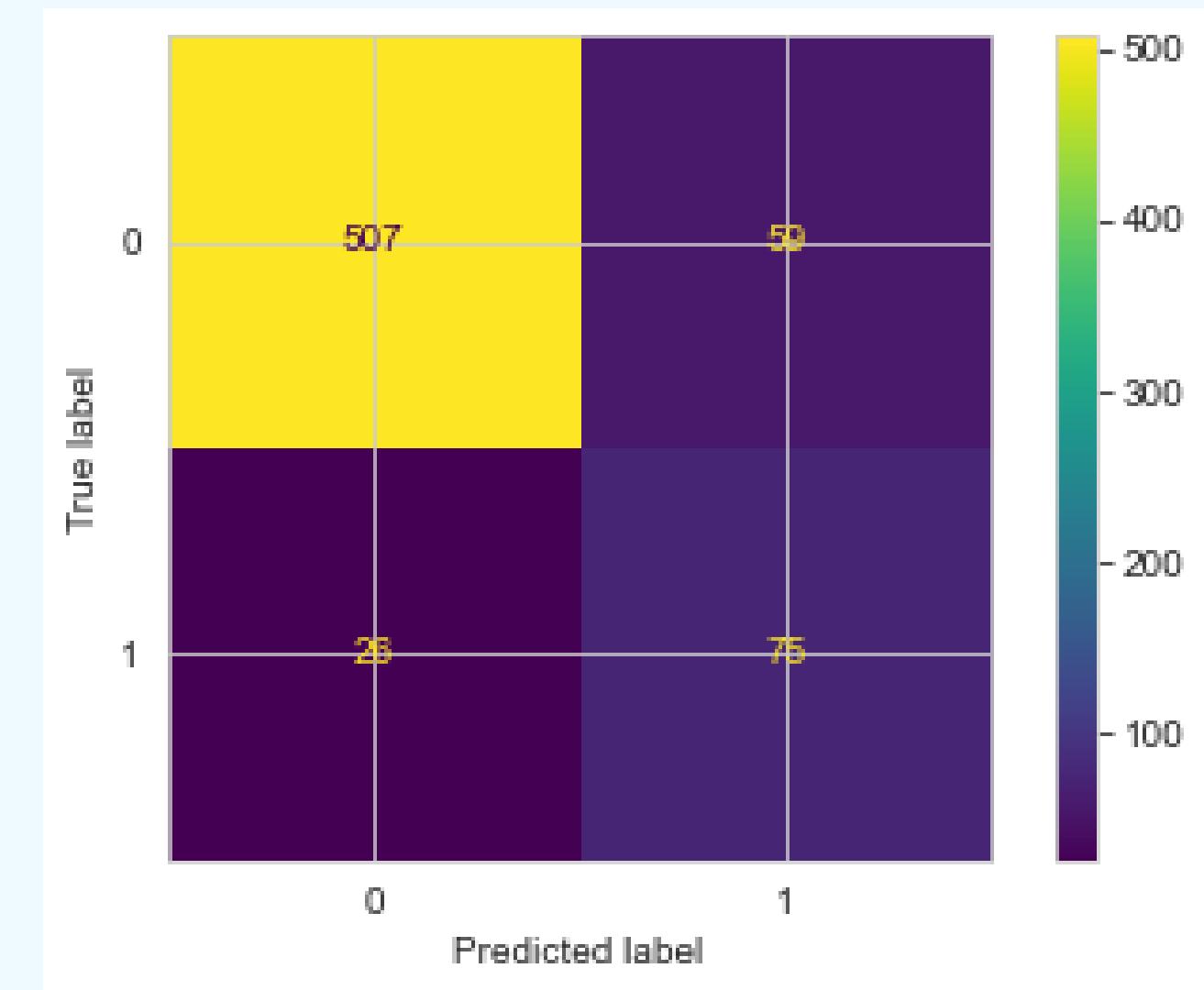
- The Decision Tree Classifier exhibited an accuracy of 88.6% on the training data and 92.5% on the testing data for predicting customer churn.
- After fine-tuning with grid search, the training accuracy saw an improvement to 90.4%, and testing accuracy surged to an impressive 93.6%..



# Modeling

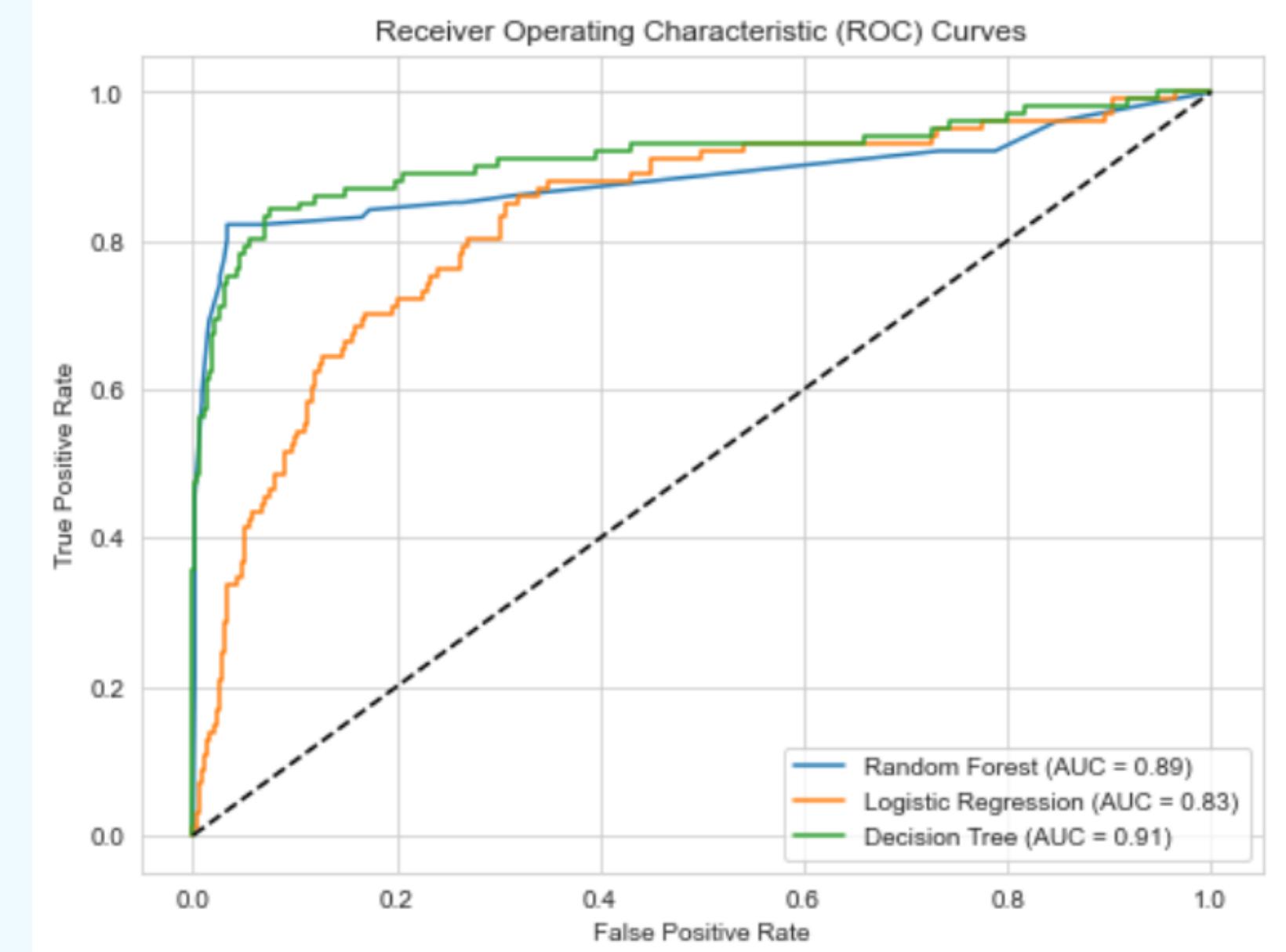
## Model 3: Random Forest

- The Random Forest model achieved an initial accuracy of 87.1% on the training data and 87.2% on the testing data.
- Following hyperparameter tuning, the model's accuracy significantly improved to 93.6% on the training data and 92.7% on the testing data.



# Evaluation

- The Decision tree is the best model to be used by SyriaTel in predicting customer churn due to its good performance.
- After utilizing ROC curve to evaluate the ROC accuracy and area under the curve, we found the ROC score for logistic regression, decision tree, and random forest classifier as 0.83, 0.88, and 0.91 respectively.
- After hyperparameter tuning, we picked the decision tree classifier as indeed the best model for predicting customer churn for Syriatel since its accuracy improved after tuning with grid search.
- Random forest is a good model too but it is too complex, time-consuming, expensive, and in this case overfitted after grid search tuning.



# Conclusion and Recommendation

Syriatel can use the Decision Tree model for:

- Precise Customer Churn Prediction: The model's high accuracy ensures the effective identification of customers at risk of churning. This capability empowers SyriaTel to take proactive steps to retain these customers, potentially reducing attrition and associated costs.
- Cost-Efficient Strategies: SyriaTel can strategically allocate resources for targeted retention efforts, such as personalized offers, loyalty programs, and improved customer service, specifically for at-risk customers. This targeted approach can lead to cost savings compared to deploying retention strategies across the entire customer base.
- Enhanced Customer Retention: The churn prediction enables the company to implement proactive measures to retain valuable customers. By addressing customer concerns, resolving issues, and providing incentives before churn occurs, SyriaTel has the opportunity to maintain a loyal customer base, potentially increasing customer satisfaction and loyalty.
- Informed Business Strategy: The churn prediction offers insights into customer behavior and patterns, enabling the company to better understand the factors contributing to churn. This information informs data-driven business decisions, including product or service enhancements, improvements in the customer experience, and targeted marketing campaigns. These strategies are designed to reduce churn and enhance customer retention.

# Next Steps

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- Investigate Alternative Algorithms: Explore different machine learning algorithms to enhance churn prediction accuracy.
- Augment Data Collection: Gather additional data to boost the accuracy of churn prediction models.
- Ongoing Model Assessment and Refinement: Continuously evaluate model performance, fine-tune parameters, and maintain models to ensure their accuracy and effectiveness in predicting customer churn.



A background featuring a large, abstract blue and white wash at the top, resembling marbled paper. Below it, there are two gold-colored geometric shapes: a hexagon on the left and an octagon on the right, both with internal lines forming star-like patterns. Scattered throughout the composition are numerous small, gold-colored circles of varying sizes, some with intricate patterns.

**THANK YOU**