

Syria Tel Customer Churn Analysis

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Full Time/ Remote.

Business Understanding.

- ▶ Customer churn is a major challenge for telecom companies like Syria Tel. When too many customers leave, it can mean big financial losses, higher marketing and acquisition costs, and a shrinking market share. To stay competitive, Syria Tel needs to understand why customers leave and what patterns lead to churn. By identifying these factors, they can take action to keep their customers happy and reduce revenue loss.

Problem Statement

- ▶ This project is focused on developing predictive models to identify customers who are likely to stop using Syria Tel's services in the near future. By recognizing these at-risk customers early, Syria Tel can take proactive steps to address their concerns, improve their experience, and encourage them to stay. The goal is to reduce customer churn and strengthen customer loyalty, ultimately helping the company maintain a stable and satisfied customer base.

Objectives.

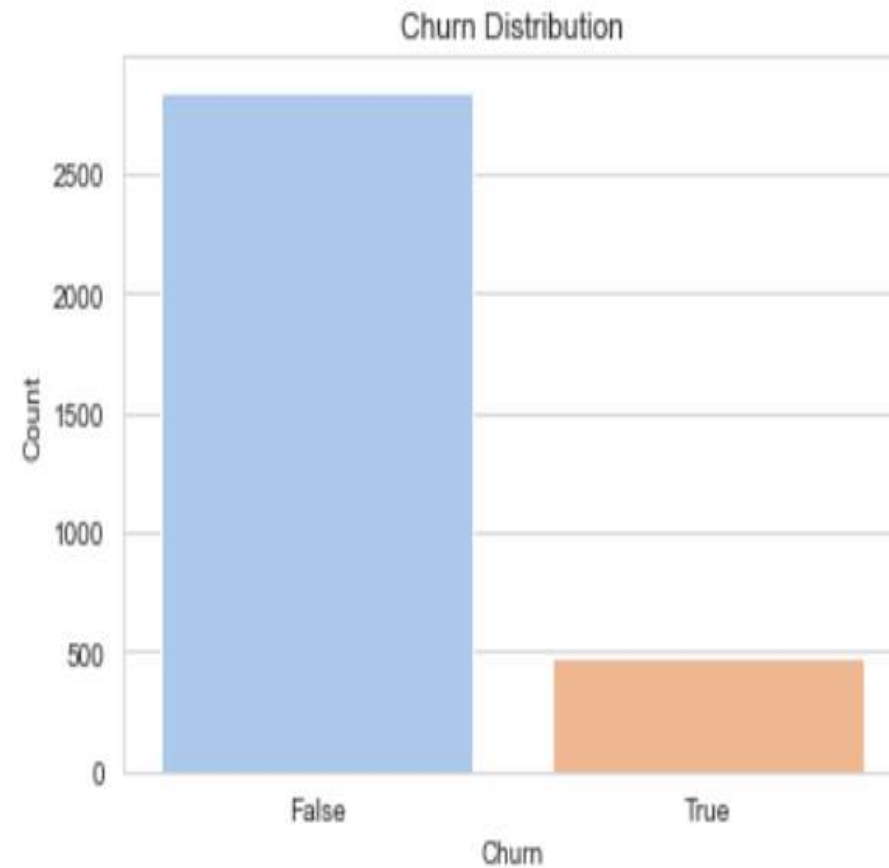
Primary objective- This project aims to create a predictive model that can spot customers who might leave Syria Tel soon.

Minor Objectives

- ▶ Provide factors leading to customer churn
- ▶ Create models that predict churn
- ▶ Recommend how to reduce customer churn

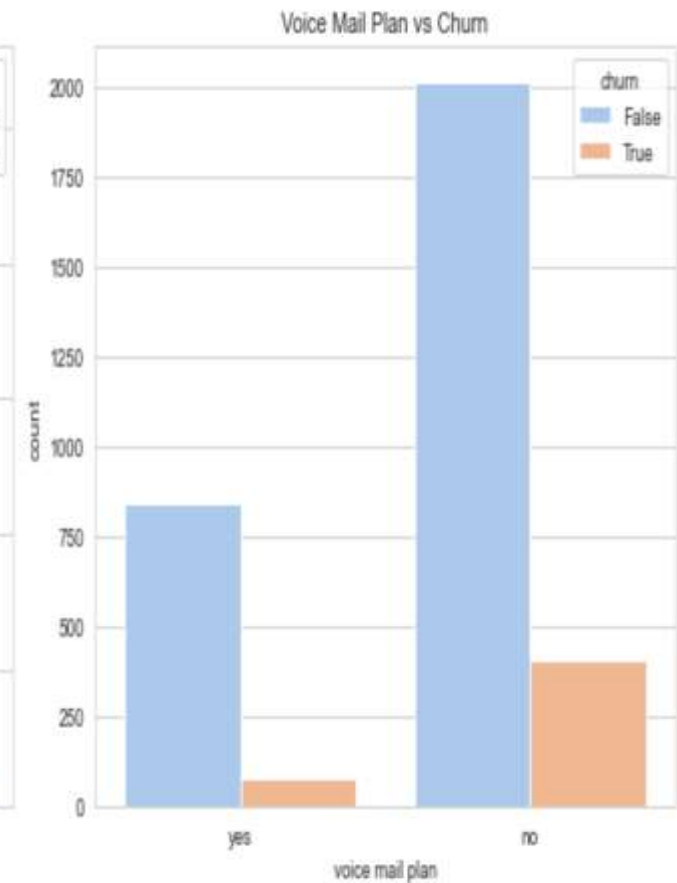
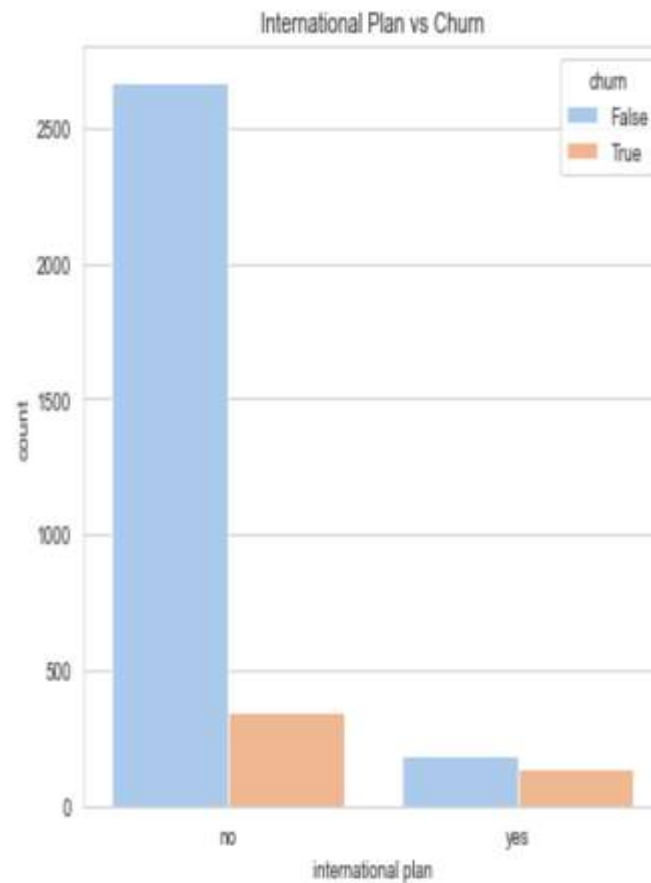
Churn Distribution

- The churn distribution shows an imbalance, with significantly fewer customers churning than staying.
- 483 out of 3333 have canceled their contract with Syria Tel. That means the company has lost 14.5% of its customers.



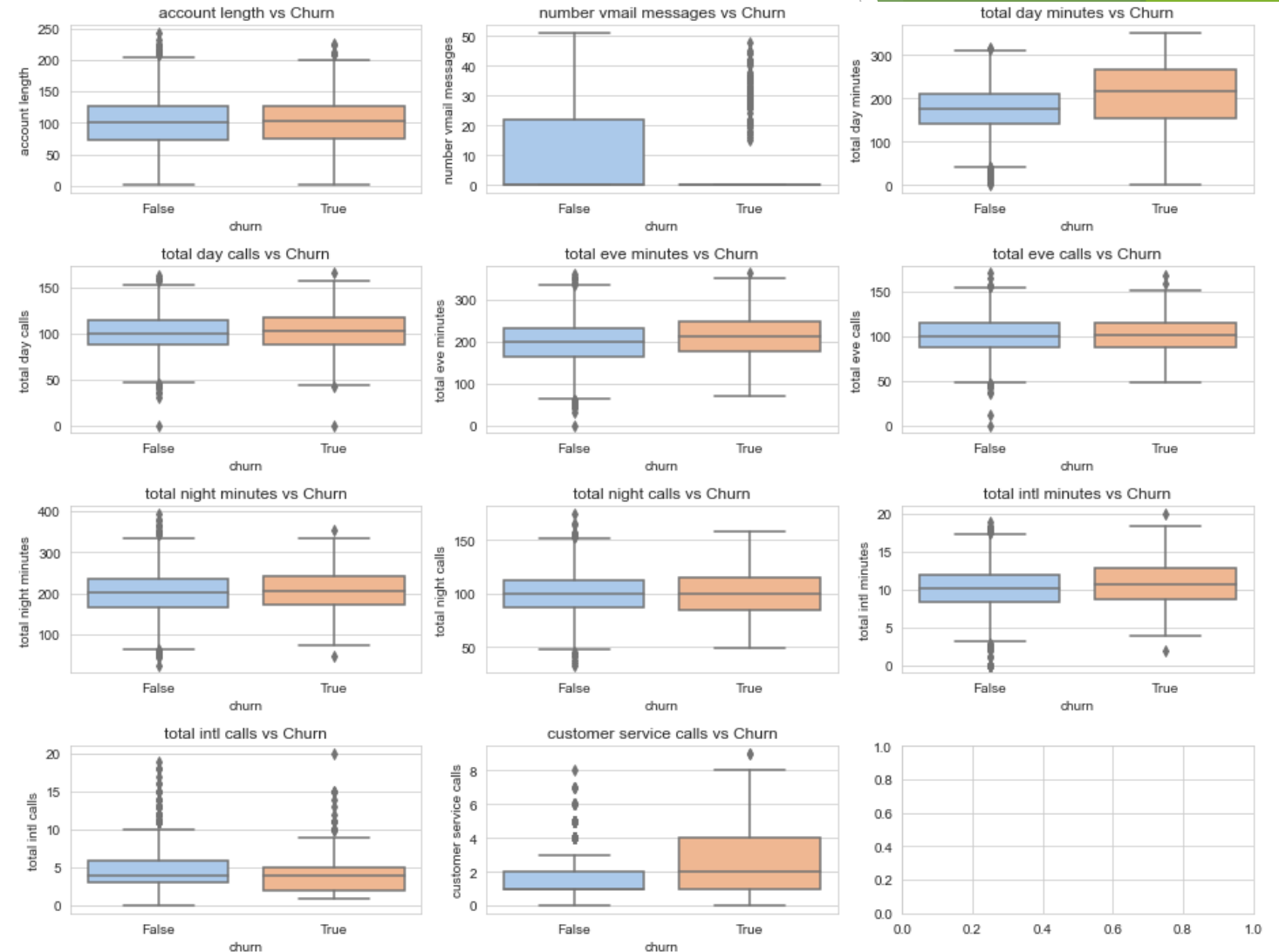
Analyzing categorical features like international plan and voice mail plan in relation to churn.

- Having an international plan appears to be associated with a higher churn rate. This suggests that customers with international plans might be more likely to leave the service.
- Having a voice mail plan appears to be associated with a lower churn rate. This suggests that customers with voice mail plans might be more likely to remain with the service.



Analysing numerical features in relation to churn

- total day minutes, total intl minutes, and especially customer service calls appear to be strong predictors of churn. Higher values in these features are associated with a higher probability of churn.
- total eve minutes and total night minutes show a moderate tendency for higher values to be associated with churn.
- account length, total day calls, total eve calls, total night calls, and total intl calls have little to no impact on churn.



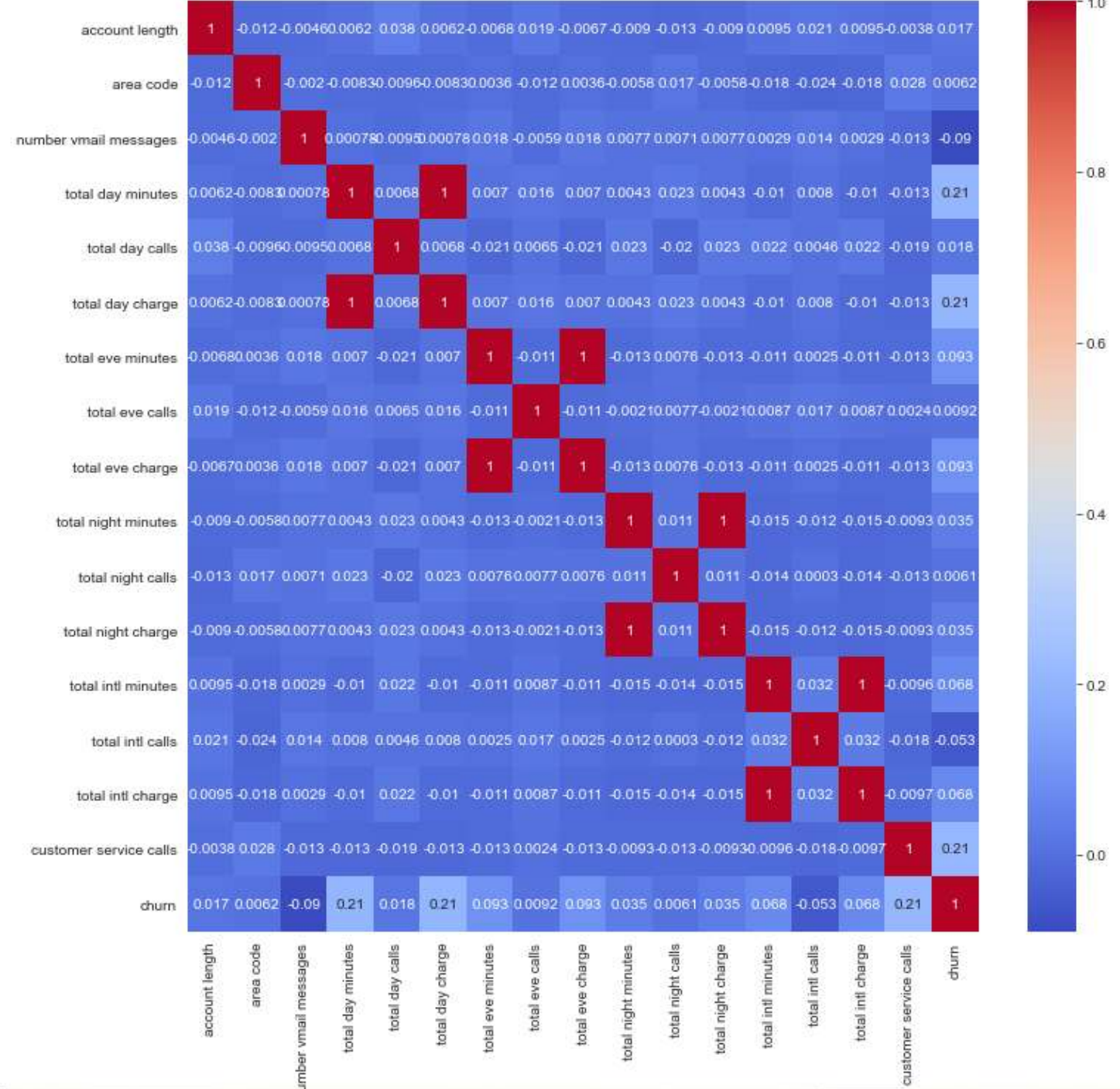
Correlation Matrix

Total Day Charge (0.21 correlation with churn): A higher total day charge is associated with an increased likelihood of churn.

Total Day Minutes (0.21 correlation with churn): Customers with more daytime usage also show a higher tendency to churn.

Customer Service Calls (0.21 correlation with churn): More interactions with customer service correlate with higher churn, suggesting dissatisfaction or issues with the service.

International Charges (0.068 correlation with churn): Customers with higher international charges may be at higher risk of churn, though the effect is relatively weak.



Models used:

- ▶ Logistic Regression
- ▶ Decision trees
- ▶ Random forest.

Logistic Regression

The model achieves an overall accuracy of 79%, indicating correct predictions for 79% of the instances.

The model performs better at detecting "No Churn" cases (higher specificity).

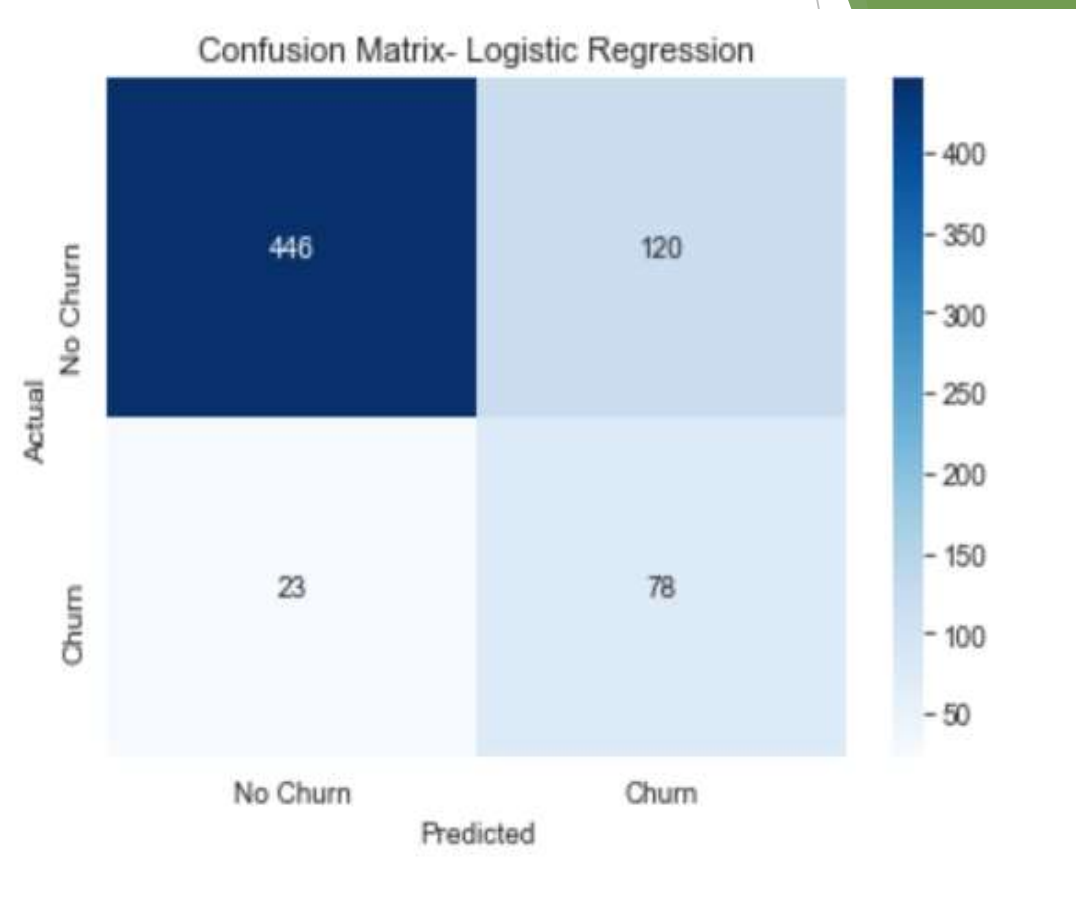
The high number of false positives (120) means many customers are incorrectly classified as churn, which could lead to unnecessary retention efforts.

The missed churn cases (23 false negatives) could be problematic if the goal is to minimize customer loss.

The low precision (39%) for churn indicates that the model is not reliable in identifying churners correctly.

Address Class Imbalance: If churn cases are fewer, apply oversampling (SMOTE) or undersampling.

Tune Decision Threshold: Adjust the probability threshold for classifying churn to balance recall and precision.



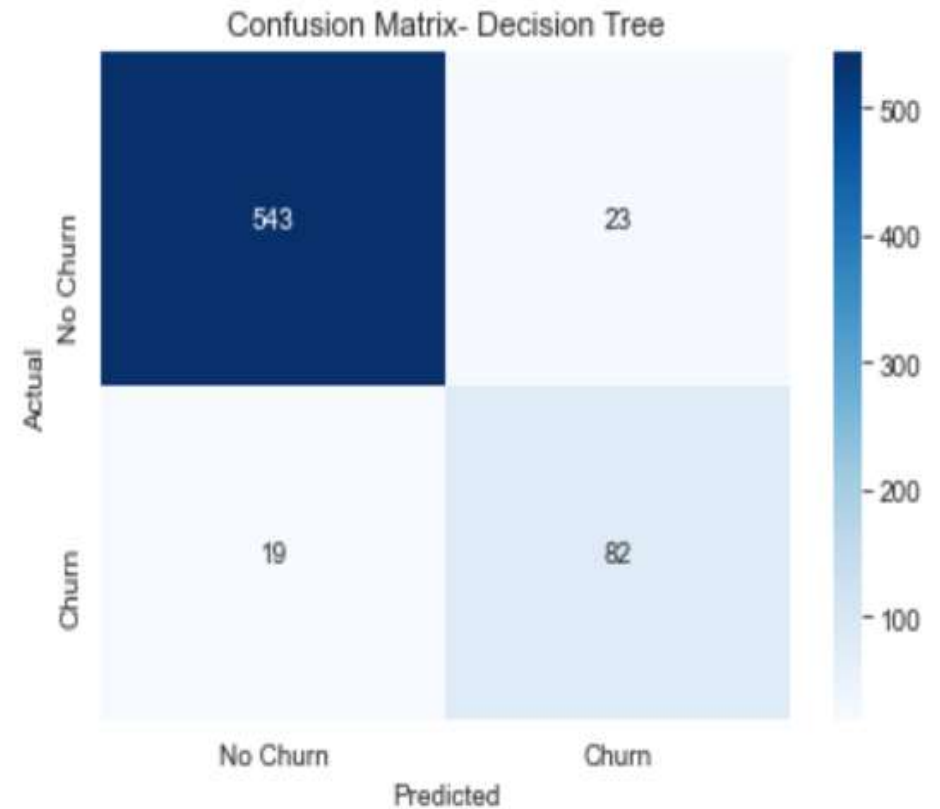
Decision Tree

The model correctly classifies 94% of the total instances, showing strong overall performance.

78% of predicted churn cases were correct, meaning fewer false alarms

96% of non-churn cases were correctly classified, minimizing unnecessary retention efforts.

Prune the Decision Tree: Prevent overfitting by limiting depth or using regularization.



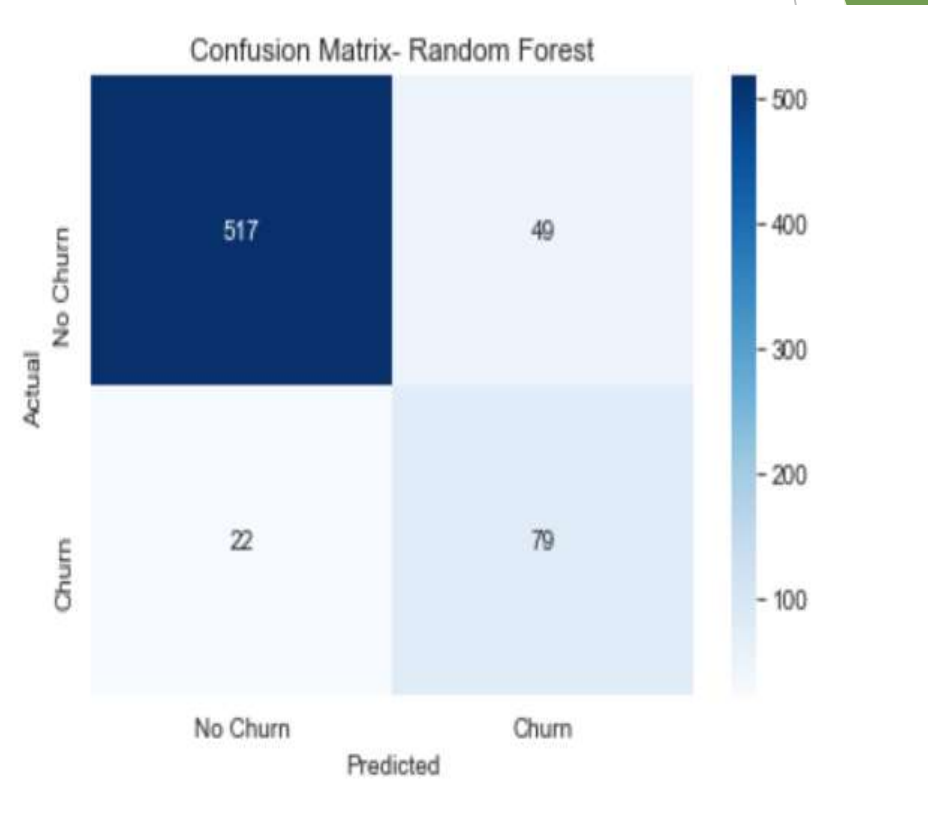
Random Forest

The model correctly classifies 89% of the total instances, showing strong overall performance.

62% of predicted churn cases were correct, meaning a moderate false positive rate.

Random Forest balances between Logistic Regression and Decision Tree, with good recall but lower precision.

Tune Random Forest Hyperparameters: Adjust the number of trees, depth, and feature selection to improve precision.



Model Evaluation

Model Performance Summary (AUC Scores):
Random Forest: AUC = 0.91 (Best performance).

Decision Tree: AUC = 0.90 (Strong, slightly behind Random Forest).

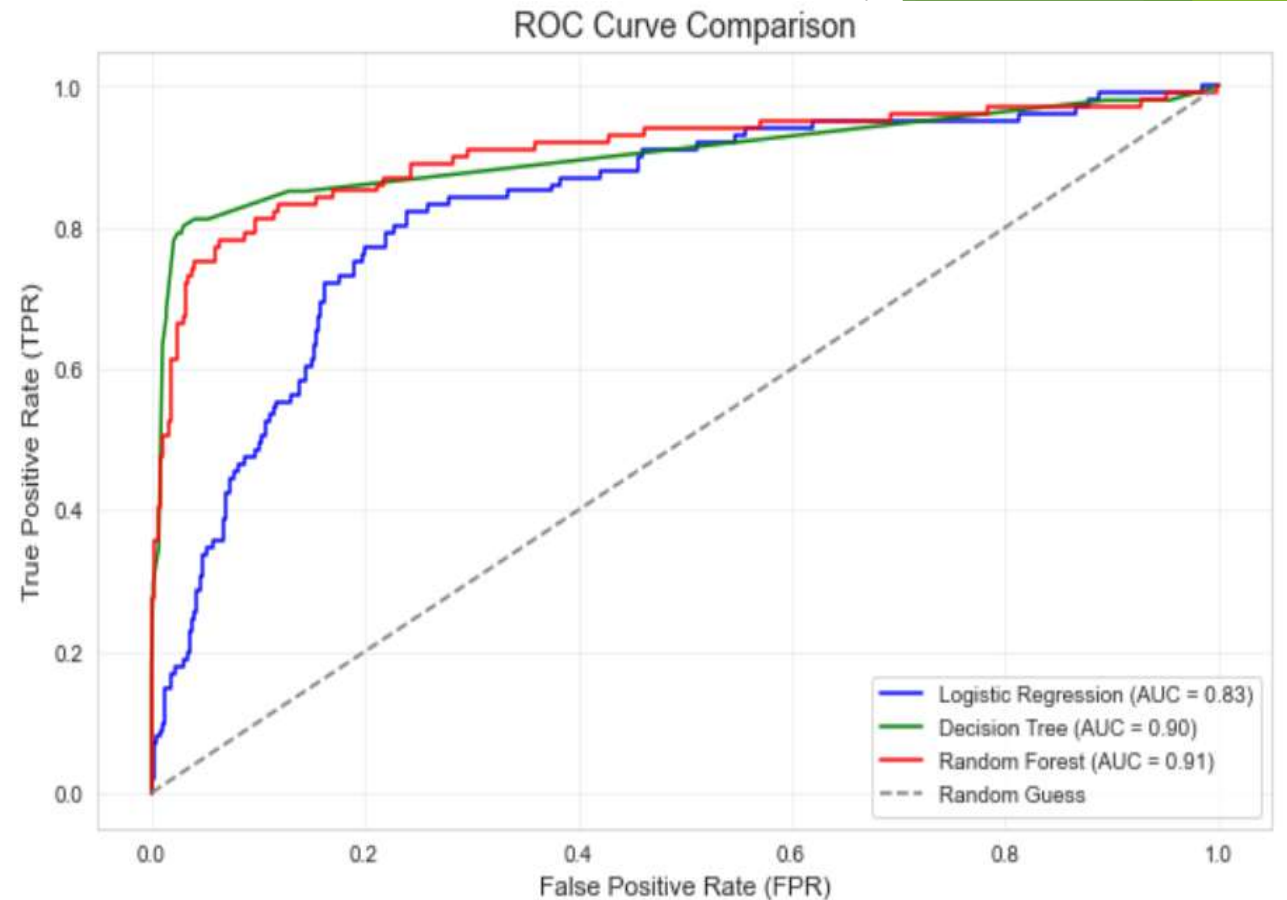
Logistic Regression: AUC = 0.83 (Good, but weakest among the three).

Random Forest Model: Closest to the top-left corner. Highest True Positive Rate (TPR). Maintains a low False Positive Rate (FPR).

Random Forest and Decision Tree outperform Logistic Regression, likely due to their ability to capture complex patterns and interactions in data.

Logistic Regression shows a smoother curve but performs worse, which suggests that it struggles with capturing non-linear relationships in the data.

Random Forest has a slight edge over Decision Tree, indicating better generalization and robustness.

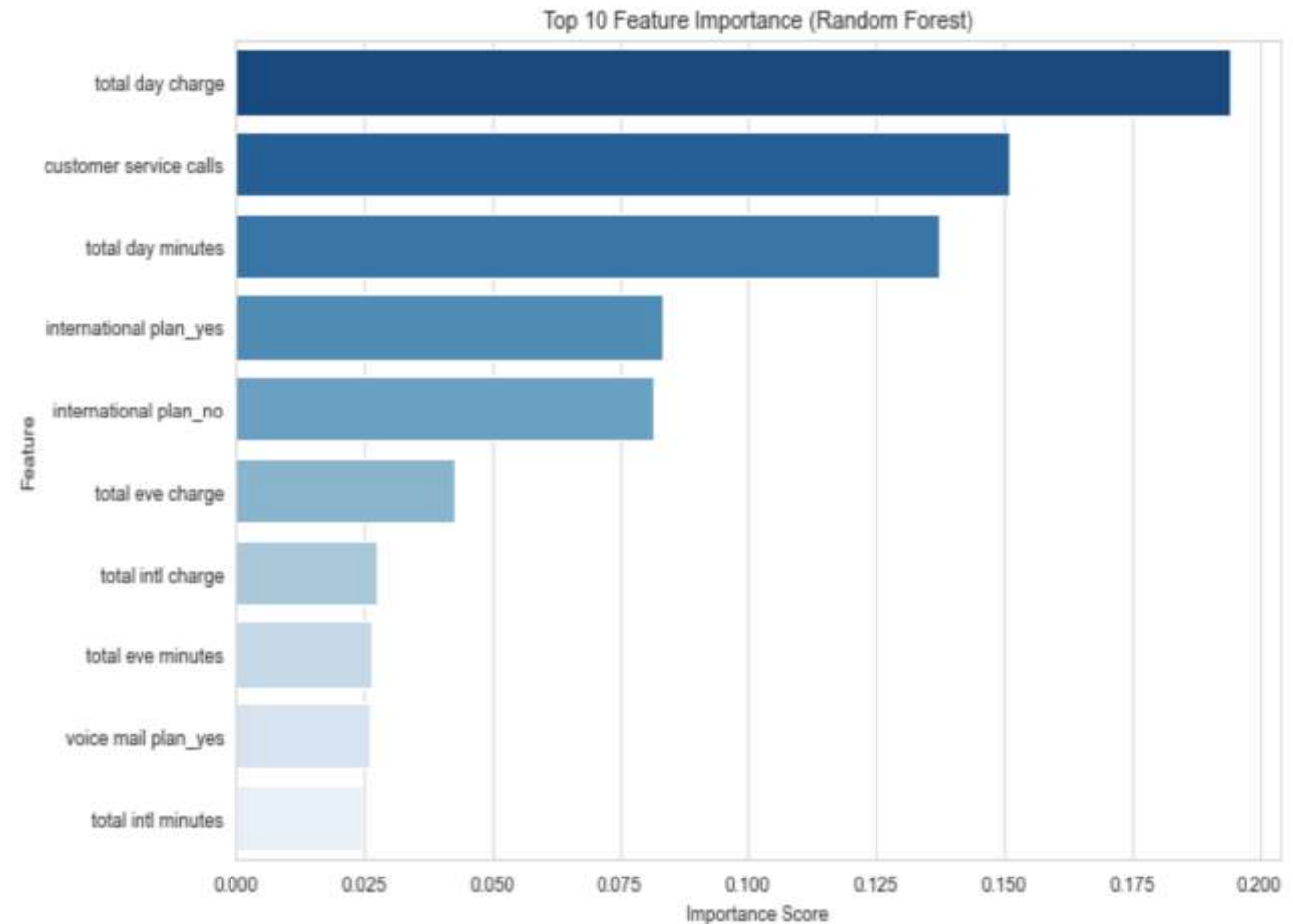


Observations made from highest rated model: It confirms previous observations made such as

Total day charge and total day minutes are critical predictors, likely reflecting customer usage patterns.

Customer service calls (second highest) strongly indicate dissatisfaction or potential churn.

International plan status highlights the significance of international services in the model.



Recommendations.

- ▶ Focus on customers with high daytime usage and frequent customer service interactions for churn prevention. By offering better charges they can help reduce customer churn rate.
- ▶ Investigate international plan offerings and customer service processes to address pain points. This will in turn help make sure that international users retain their communication plans.
- ▶ Improving customer support. By not being reactive but rather pro active the company can reach out to customers and receive feedback on ways to improve service.

Next steps

- ▶ Continuous monitoring and improving of the model. This will help in identifying and predicting factors that lead to churning earlier.
- ▶ Continuous gathering of customer feedback. By continuing to gather feedback the company can create and implement strategies that ensure customer retention.