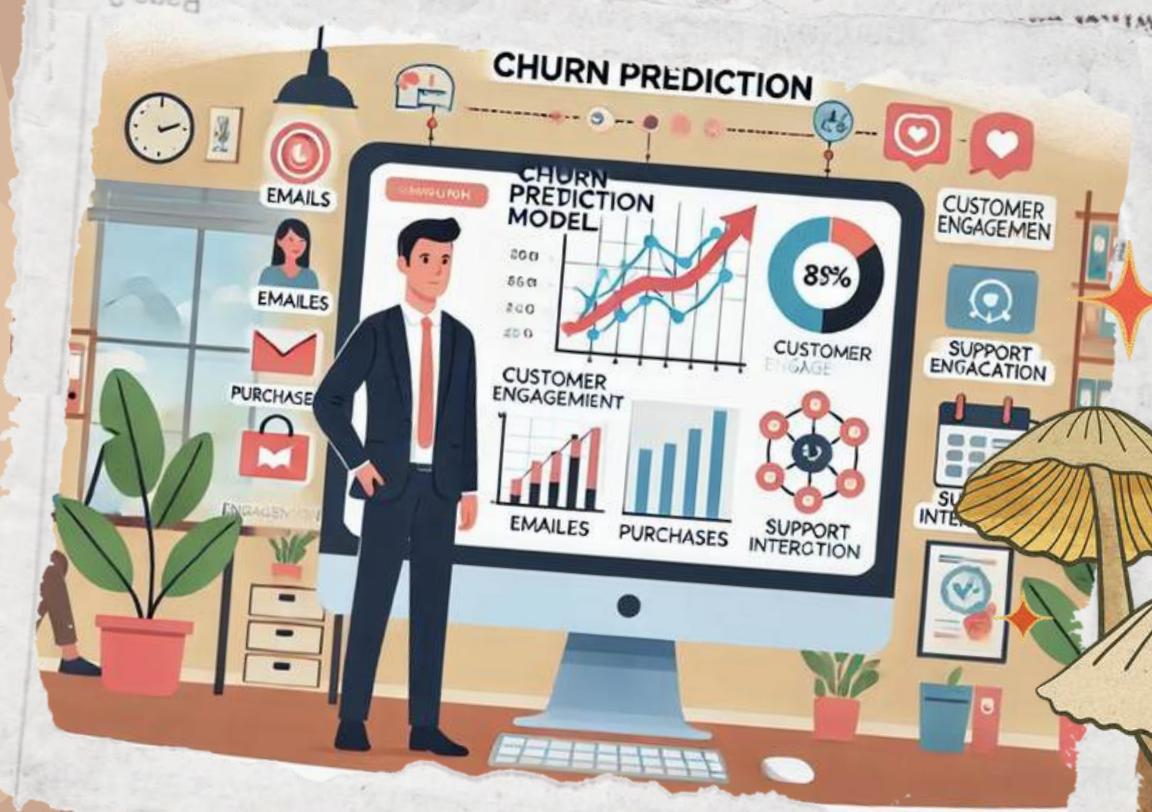
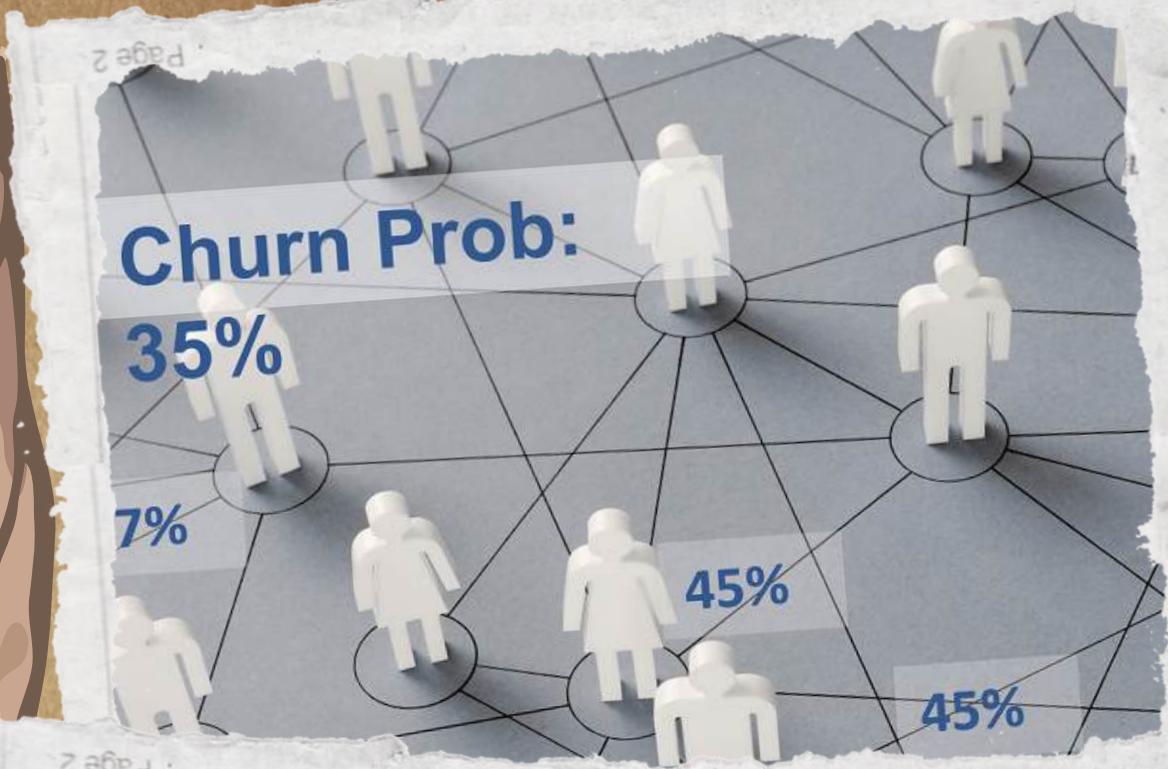


TELECOM CHURN PREDICTION

Presented by Yashika Upadhyay

INTRODUCTION

- In the highly competitive telecom industry, retaining customers is crucial for business sustainability and growth. Customer churn, the phenomenon where customers stop using a company's services, has a direct impact on a telecom provider's revenue and market share. With increasing customer acquisition costs, telecom companies must focus on reducing churn to maintain profitability.
- This project focuses on building a machine learning model to predict churn based on customer data. Accurate predictions can help telecom providers implement proactive retention strategies, reduce churn rates, and improve customer satisfaction.



PROBLEM STATEMENT

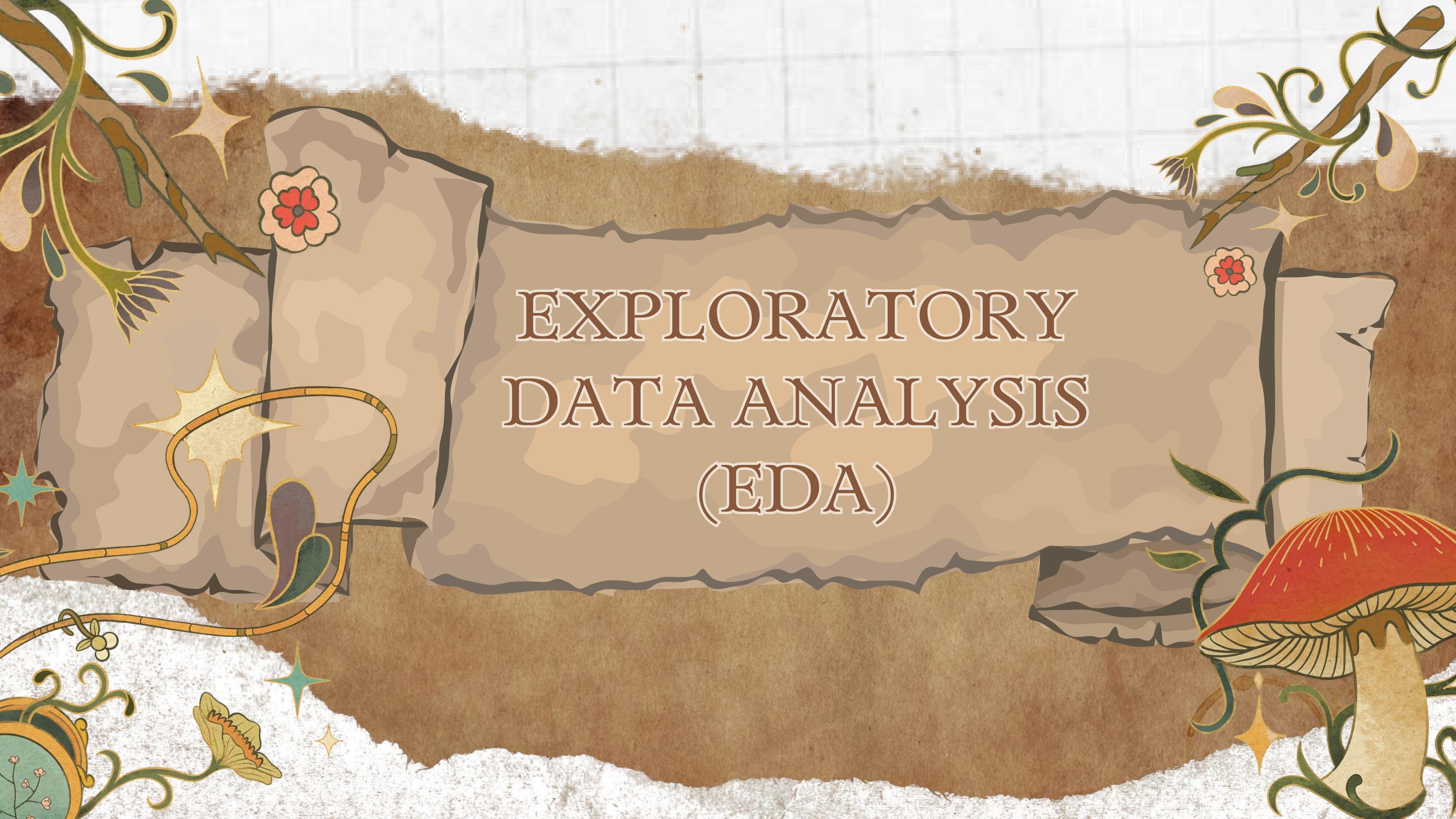
01 Impact on Revenue and Customer Retention:

High churn rates directly affect revenue, as losing customers results in lost income and increased acquisition costs for new ones.

Retaining existing customers is often more cost-effective than acquiring new ones, making churn management vital for profitability.

02 Challenges in Predicting Churn:

- Data Complexity: Managing vast amounts of customer data from various sources can complicate analysis.
- Behavioral Insights: Understanding customer behavior and accurately identifying the factors that lead to churn is complex.
- Dynamic Market Conditions: Rapid changes in technology and customer preferences can make predictions unreliable.

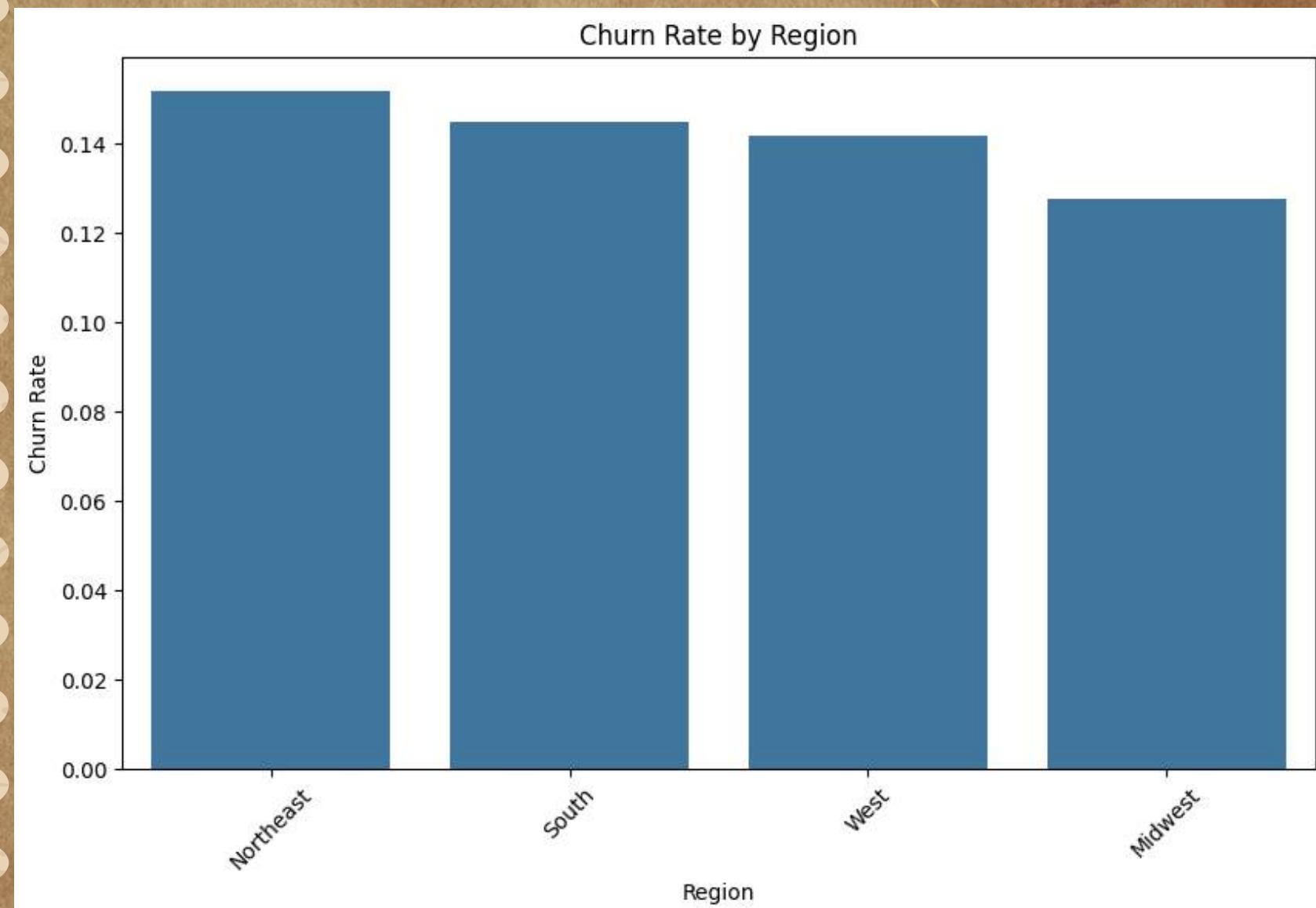


EXPLORATORY DATA ANALYSIS (EDA)

CHURN RATE COMPARISON ACROSS REGIONS

This shows the churn rates across four regions: Northeast, South, West, and Midwest. Each bar represents the proportion of customers who churned in that region.

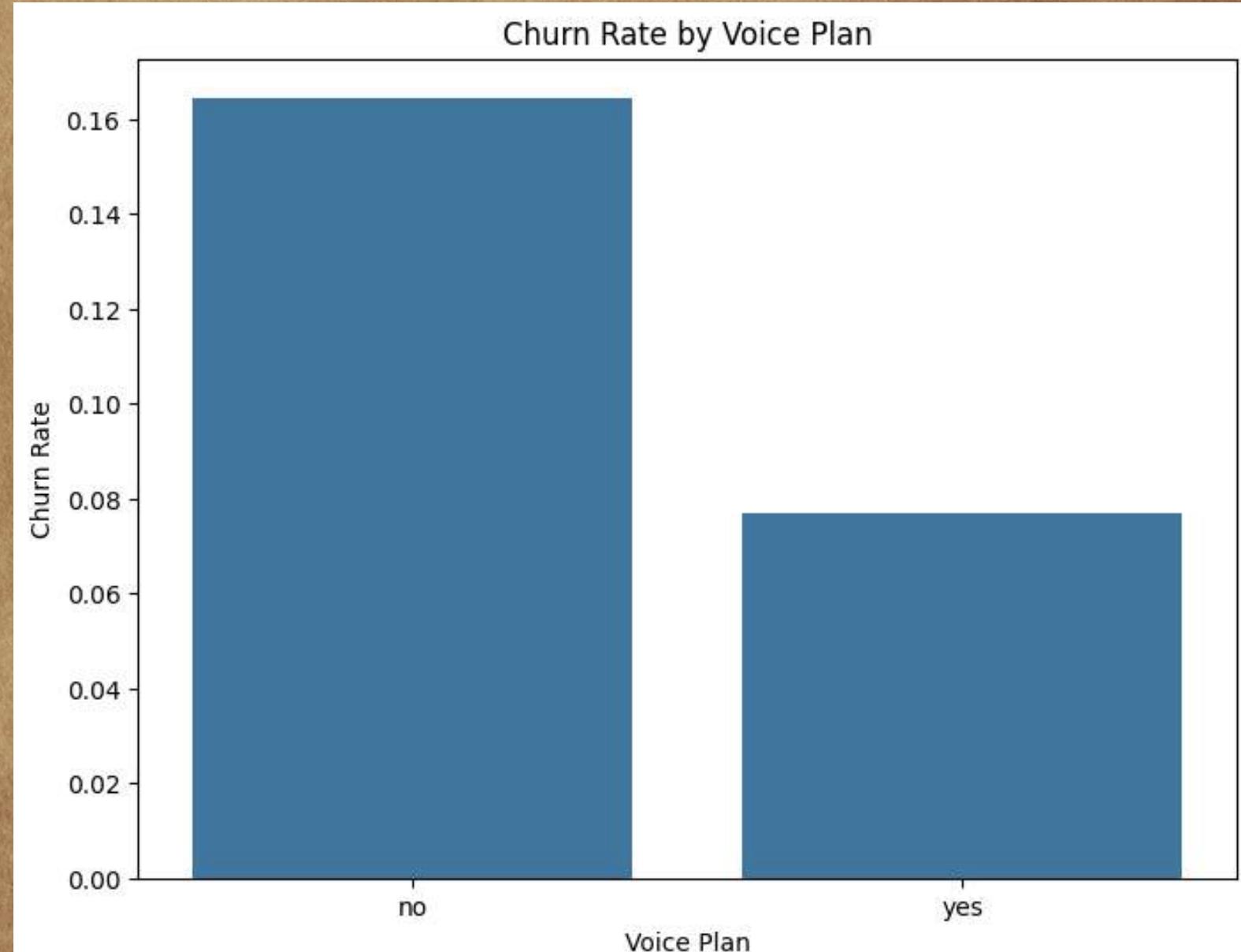
- Northeast and West regions have slightly higher churn rates, close to 0.14.
- South follows closely behind with a similar churn rate.
- Midwest has the lowest churn rate, slightly above 0.12.



IMPACT OF VOICE PLAN ON CHURN RATE

This bar chart shows the churn rate based on whether customers have a voice plan or not.

- Customers without a voice plan have a significantly higher churn rate, above 0.16.
- Customers with a voice plan have a much lower churn rate, around 0.08.



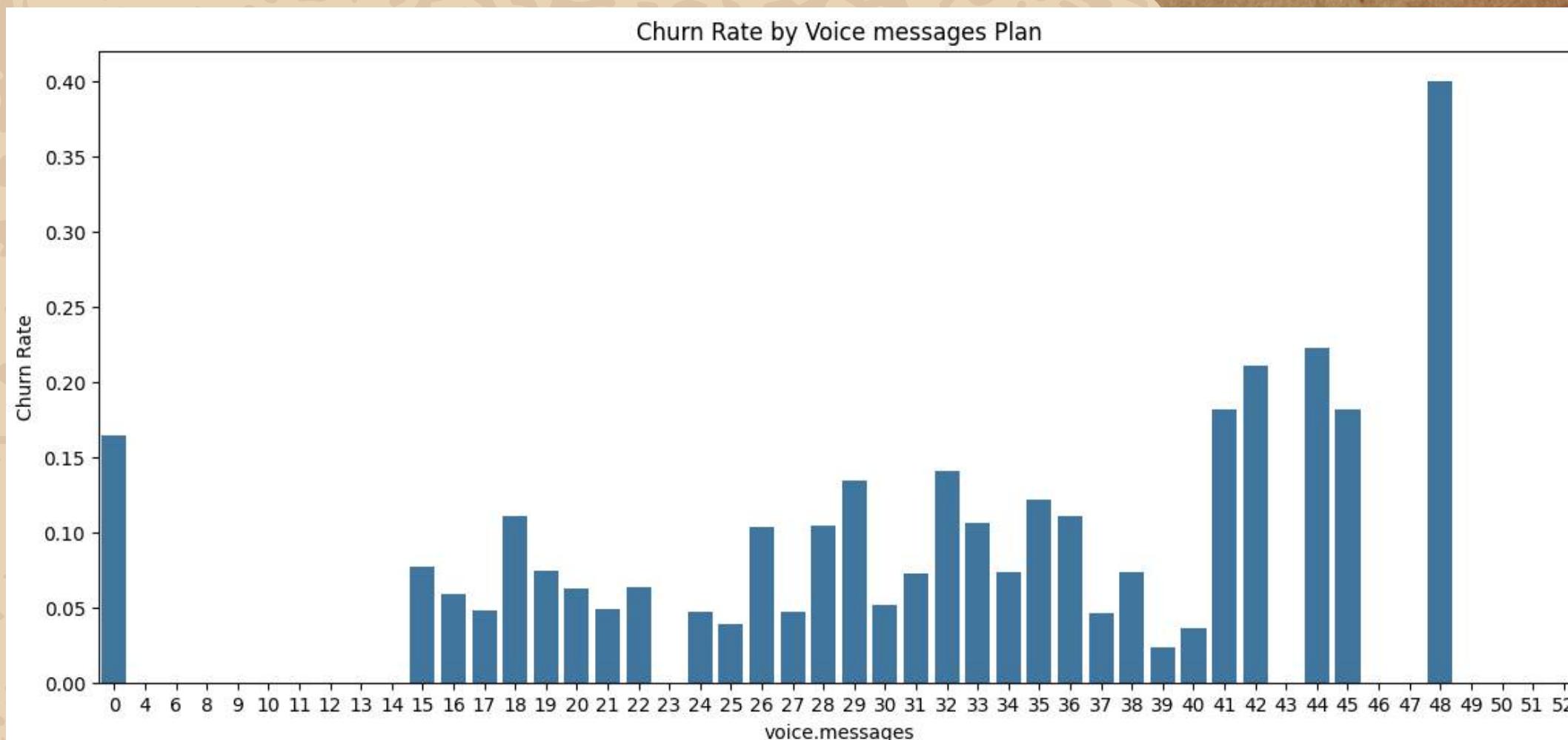
CHURN RATE BY VOICE MESSAGES PLAN

Churn at Zero Usage:

Customers with zero voice message usage show a higher churn rate, indicating they may not find value in the service or are using alternatives.

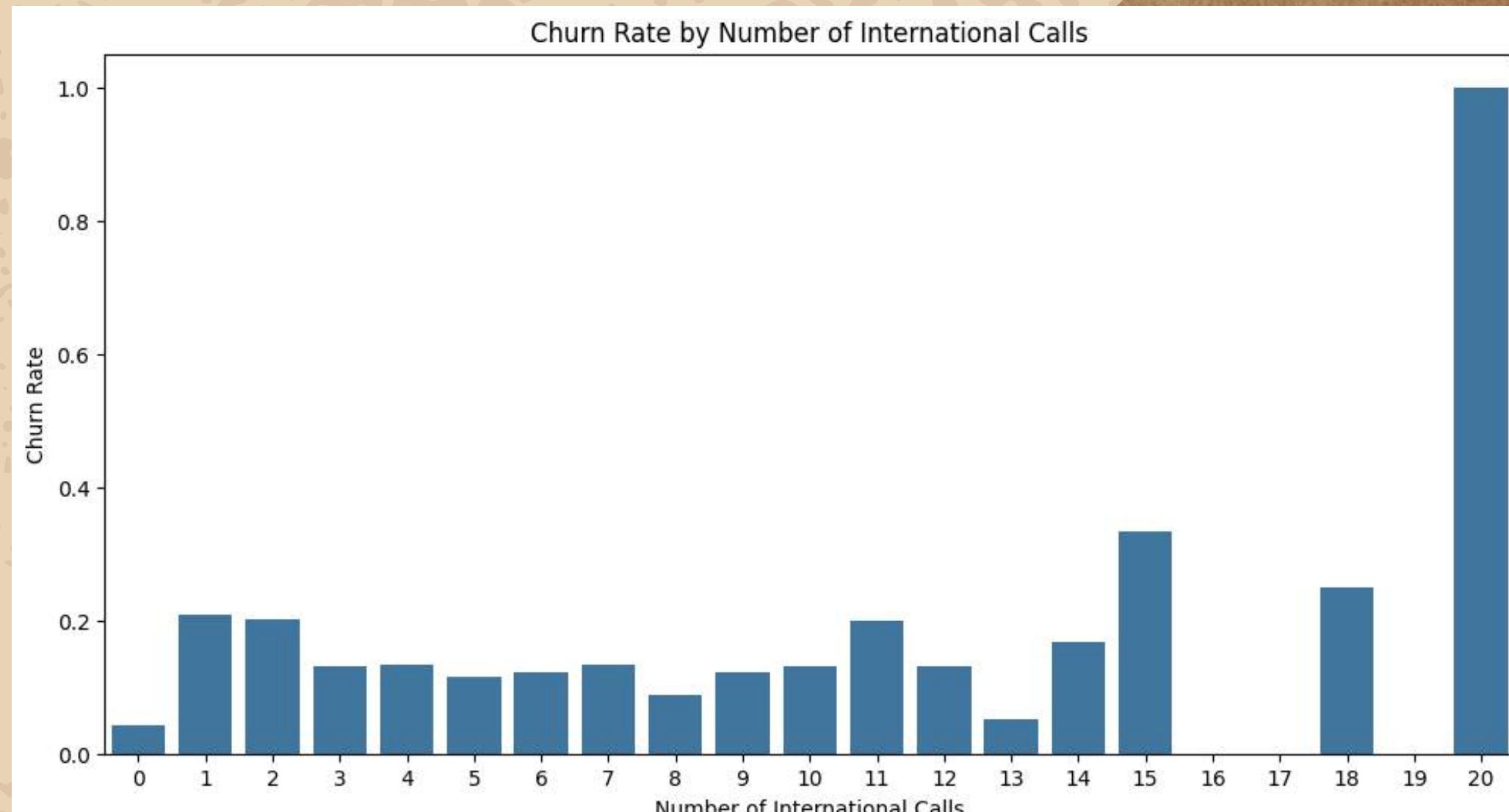
Churn at High Usage:

A significant churn spike occurs for customers using 50 or more voice messages, possibly due to unmet needs, cost concerns, or dissatisfaction with the service quality.



CHURN RATE BY INTERNATIONAL CALLS

- Low Churn for Most International Call Counts: Customers making 0 to 14 international calls exhibit a low churn rate (under 0.25), indicating that small to moderate international calling does not correlate with higher churn.
- Spike at 15 and 20 Calls: A noticeable churn increase occurs at 15 international calls, suggesting potential dissatisfaction from high usage. At 20 calls, churn approaches 100%, indicating severe unmet needs or dissatisfaction with international services.
- Minimal Impact at Intermediate Counts: Churn rates remain steady and low for 2 to 14 calls, suggesting that moderate international calling does not significantly influence customer churn.



CHURN RATE BY NUMBER OF CUSTOMER CALLS

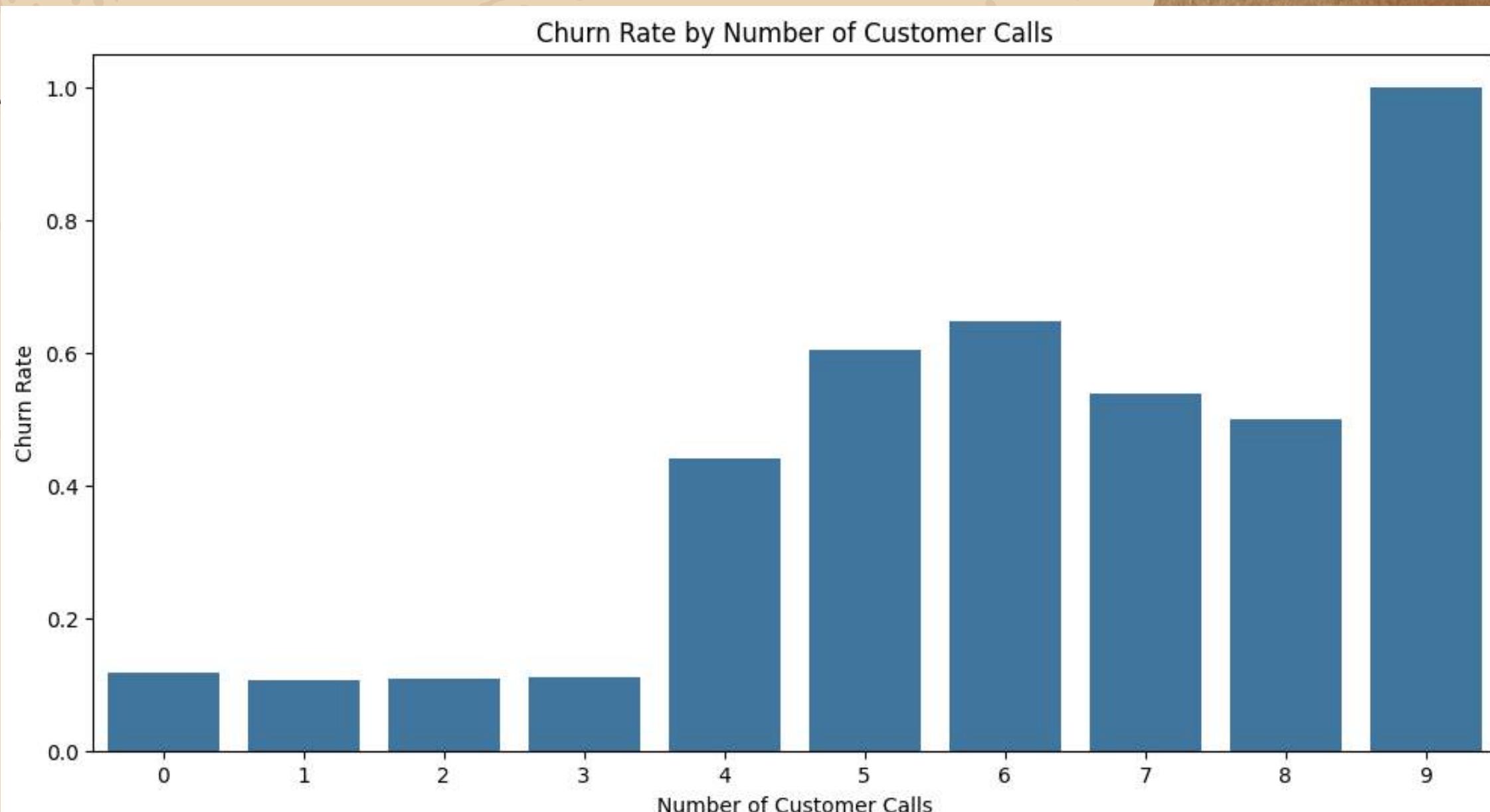
1. Low Churn with Few Calls: Customers making 0 to 3 calls have a low and stable churn rate, indicating fewer service interactions correlate with higher satisfaction.

- Increasing Churn with More Calls:

Starting at 4 calls, churn rates increase significantly, suggesting that frequent customer service interactions signal unresolved issues and potential dissatisfaction.

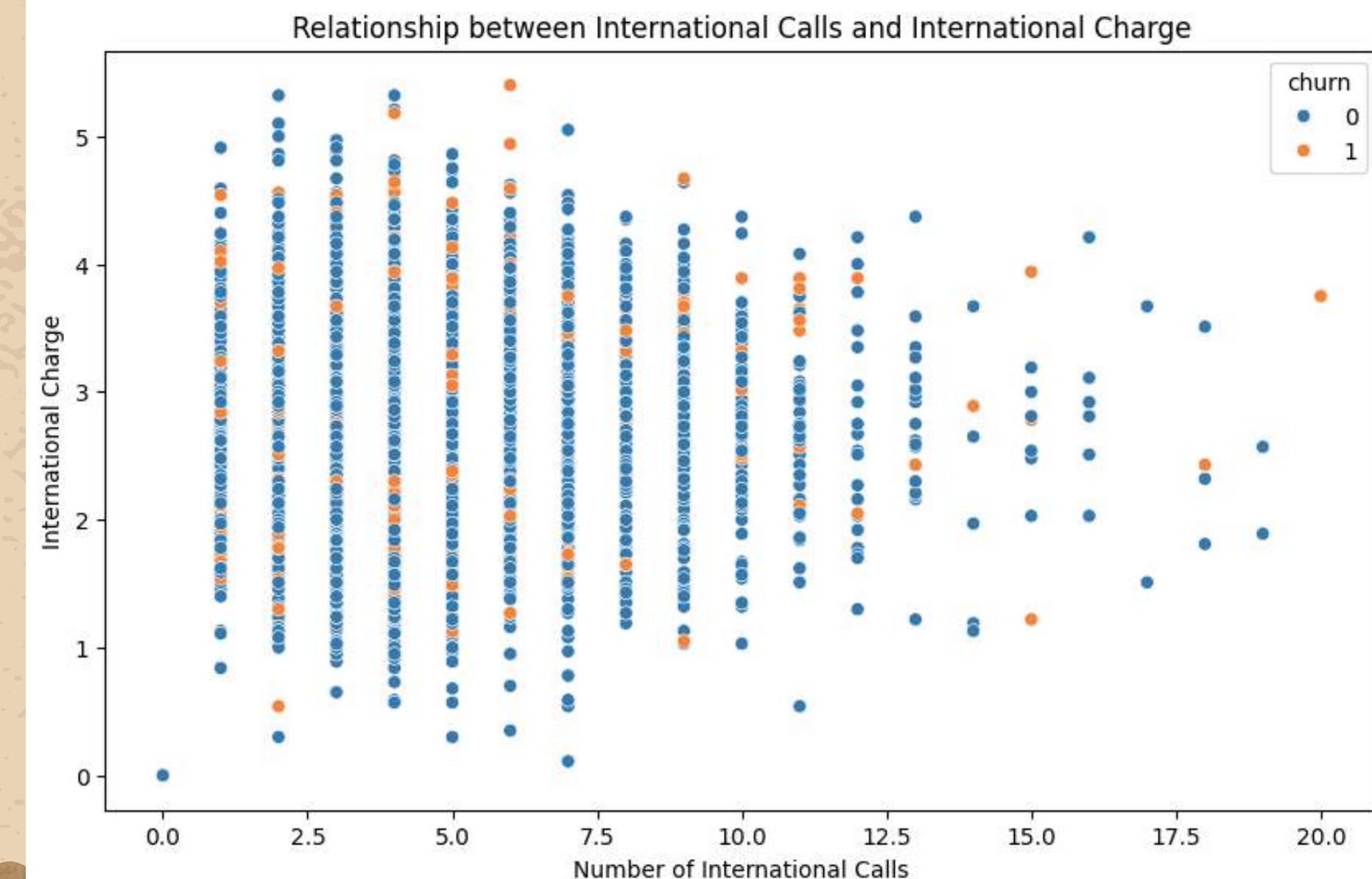
- Extremely High Churn with 9 Calls:

Customers making 9 calls show a near 100% churn rate, indicating severe dissatisfaction or persistent problems leading to their departure.



IMPACT OF VOICE PLAN ON CHURN RATE

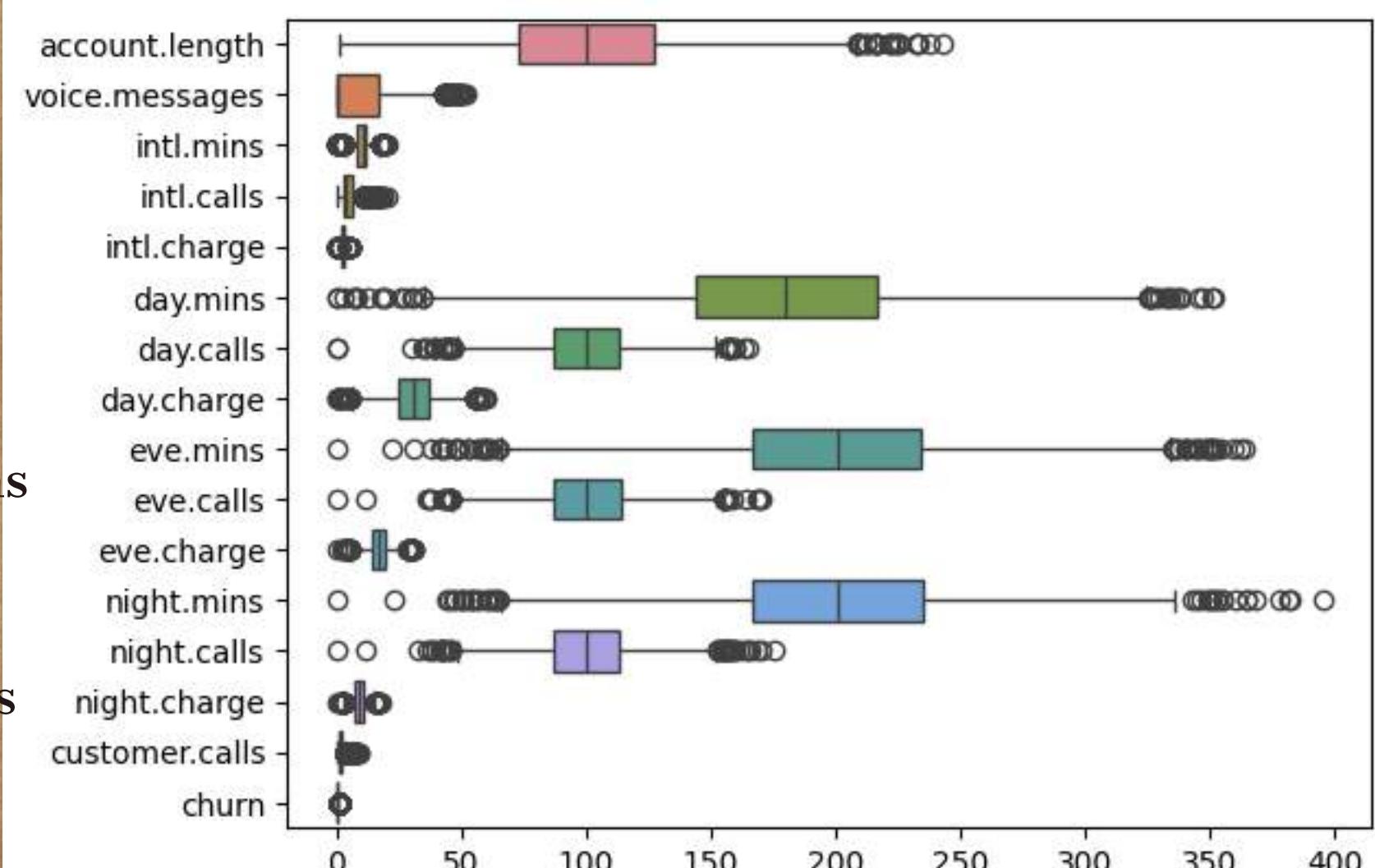
- Linear Relationship Between Calls and Charges: There is a clear linear pattern where increased international calls correlate with higher charges, as expected.
- Churn Distribution Across Charges and Calls: Customers making 0-10 international calls and incurring low charges predominantly do not churn (blue dots). However, at higher charges and call counts, the presence of orange dots indicates increased churn, suggesting that frequent callers with high charges are more likely to leave.
- Notable Churn at Extremes: Even among customers making 15-20 calls with high charges, some churn occurs, indicating that extreme international usage may lead to dissatisfaction, possibly due to high costs.



IMPORTANCE OF RETAINING OUTLIERS IN CHURN ANALYSIS

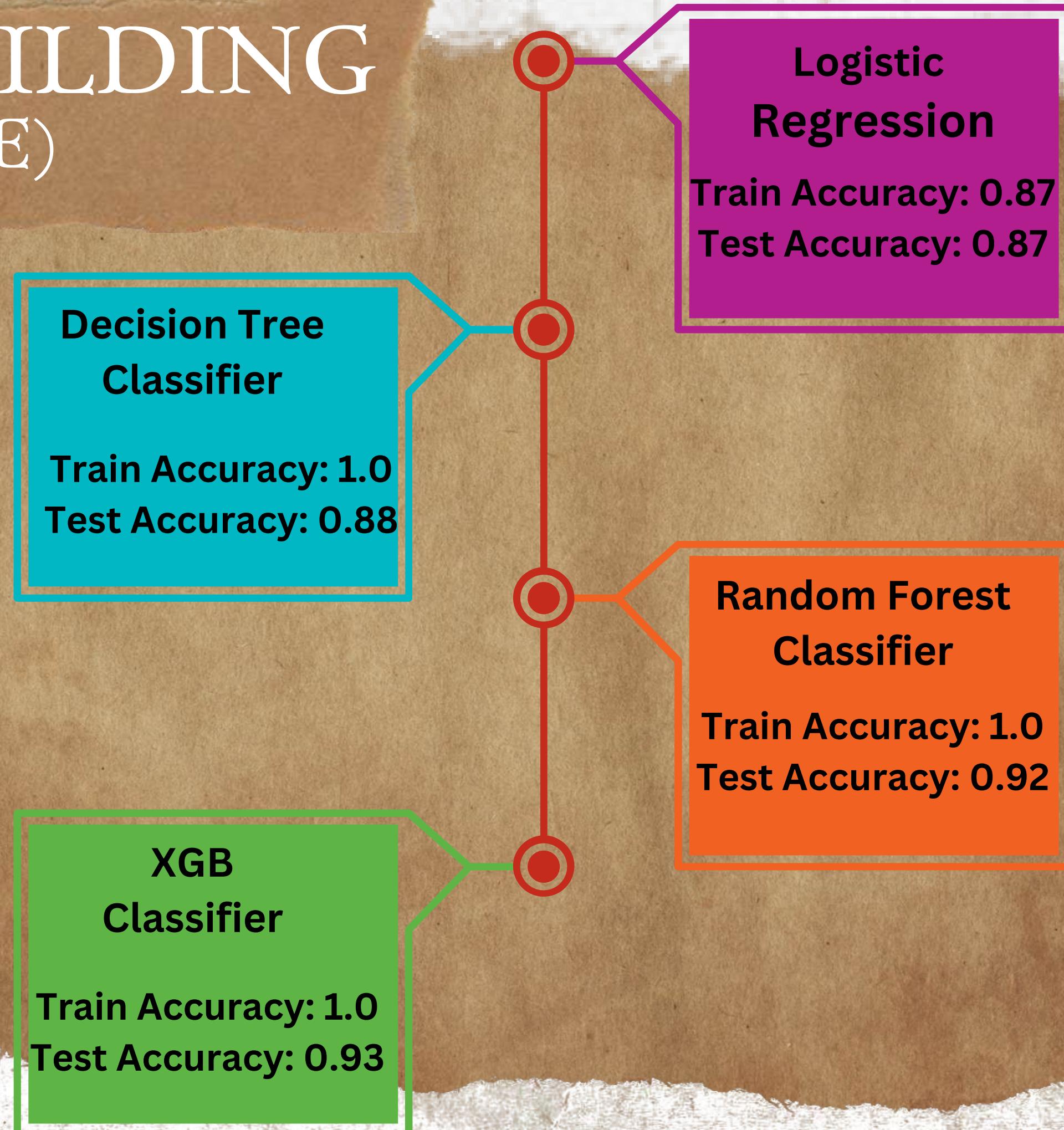
We are not removing outliers in this project because:

1. Retention of Relationships: Outliers can reveal important relationships between high charges and churn, helping us understand why certain customers leave.
2. Diversity of Data: They reflect the varied behavior of customers, highlighting unique usage patterns that may influence churn.
3. Understanding Customer Segments: Outliers can help identify specific customer segments, providing insights into motivations for leaving.
4. Real-World Implications: They represent genuine customer experiences, which are essential for making informed business decisions and improving services.



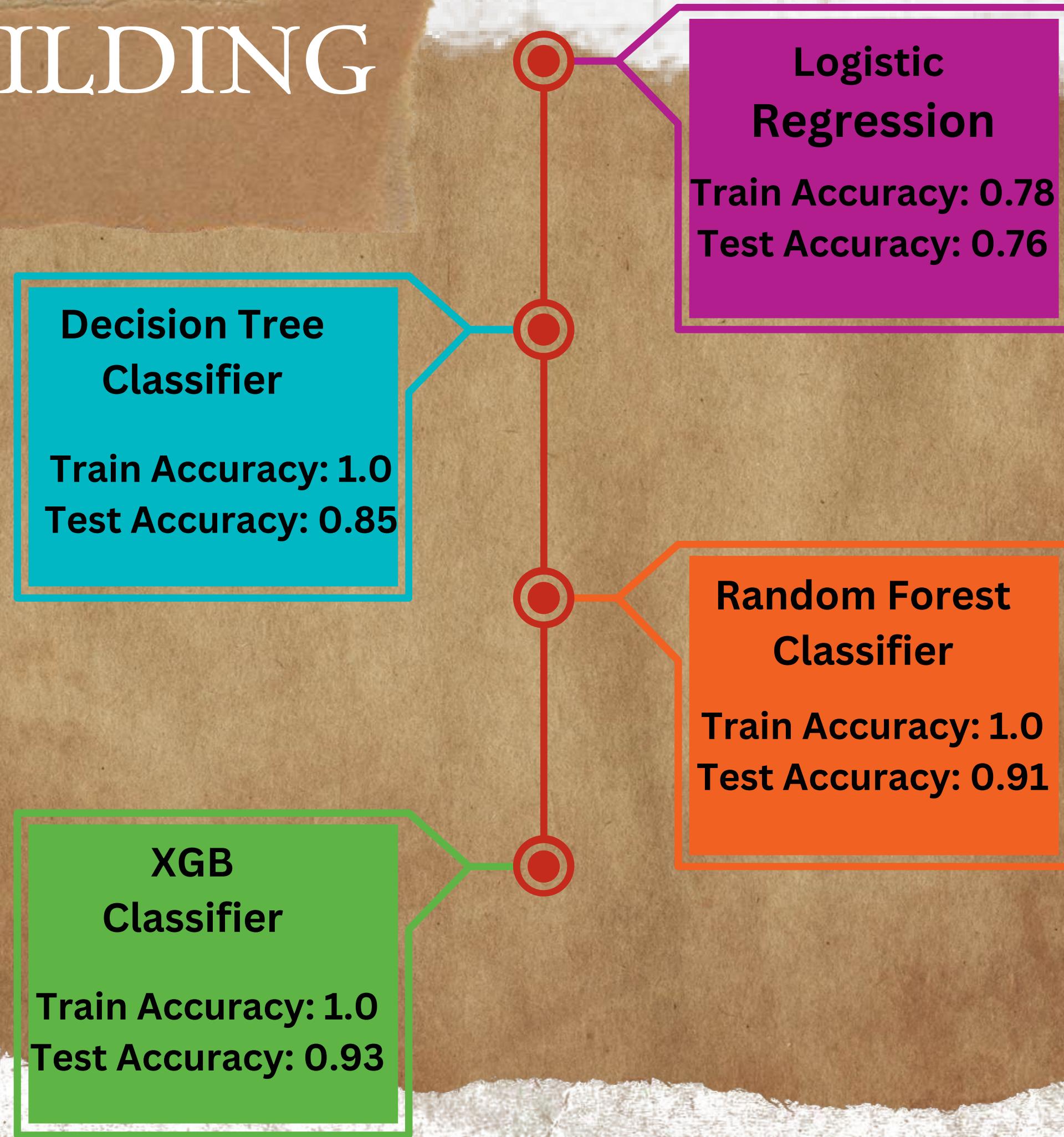
MODEL BUILDING

(without SMOTE)



MODEL BUILDING

(with SMOTE)



CONCLUSION

We will move forward with the **RANDOM FOREST CLASSIFIER** for several reasons:

1. Consistent Performance: It achieves test accuracies of 0.92 without SMOTE and 0.91 with SMOTE, indicating reliable performance across scenarios.
2. High Train Accuracy: Despite a training accuracy of 1.00, its comparable test accuracy suggests good generalization to unseen data.
3. Imbalance Handling: Random Forests effectively manage imbalanced datasets, which is crucial for churn prediction.
4. Feature Importance: This model provides insights into key factors influencing churn, aiding in strategy formulation.

MODEL DEPLOYMENT

[Website link](#)

Telecom Churn Prediction

State:-
CT

Area Code
 area_code_408
 area_code_415
 area_code_510

Account Length:-
3

Has Voice Plan

Voice Message:-
0

Has Internation Plan

International Minutes:-
0.28

International Calls:-
6

International Charges:-
0.04

Day Minutes:-
0.33

Day Calls:-
0.33

Day Charges:-
0.10

Evening Minutes:-
0.42

Evening Calls:-
1

Evening Charges:-
0.17

Night Minutes:-
0.26

Night Calls:-
3

Night Charges:-
0.11

Customer Calls:-
4

Predict...

Made By Group 1...

RESULT

[Website link](#)

Predict...

Customer will Not Churn

We put all the parameters and the
model predicted that

THE CUSTOMER WILL NOT CHURN