



CUSTOMER CHURN PREDICTION FOR SYRIATEL

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OVERVIEW

Syriatel is a leading Syrian mobile network provider, offering GSM, 3G, and 4G/LTE services. Established in 2000, it has expanded nationwide coverage, ensuring reliable connectivity. The company remains committed to enhancing customer experience and adapting to market trends.

BUSINESS UNDERSTANDING

Customer churn threatens revenue and growth, making retention more cost-effective than acquisition. This project uses machine learning to predict churn, helping businesses understand key drivers like service quality, pricing, competitor influence, and usage patterns





DATA SELECTION


this data set provides a 9-month record of customer behavior, including call activity, service usage, and social network analysis (SNA) features. These rich variables support high-accuracy churn prediction and enable data-driven decision-making.

THE DATA SET PROVIDES:

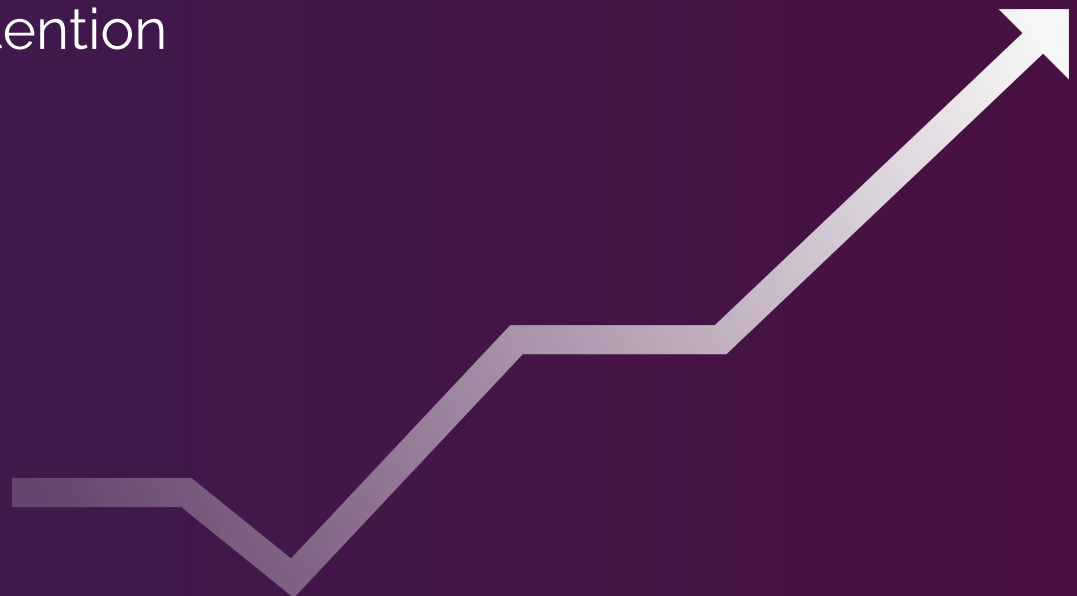
- Customer Demographics: Age, location, and subscription type.
- Service Usage Patterns: Call duration, data consumption, and international call frequency.
- Billing & Payment History: Monthly charges, overdue payments, and contract type.
- Customer Interaction Data: Frequency of customer support requests and complaints.
- Subscription Features: Voice mail usage, premium service adoption, and loyalty program enrollment.
- Churn Label: Whether a customer has left or stayed, used for model training.



DATA PREPARATION & MODELLING

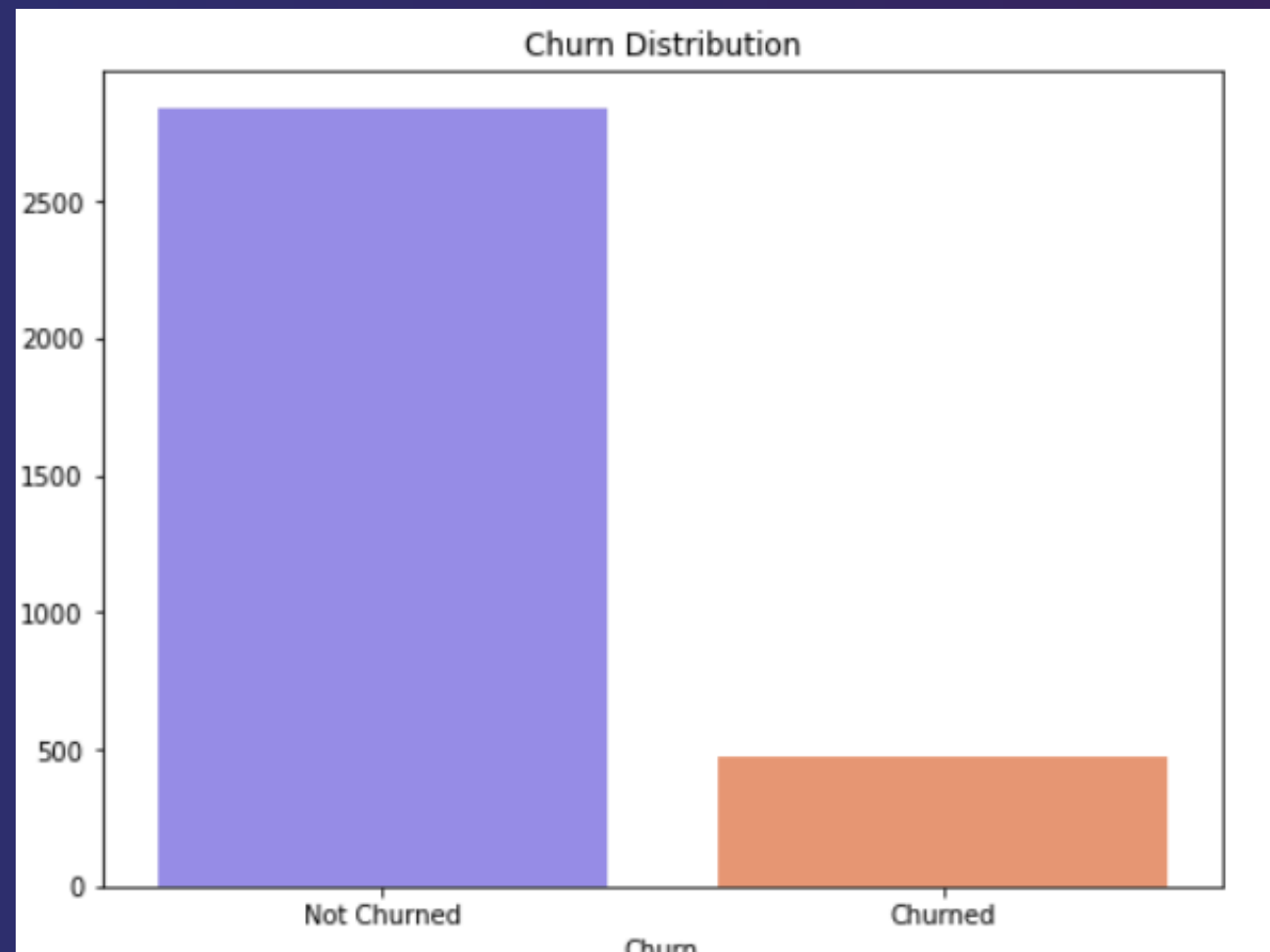
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- **Handling Missing Values:** Imputed missing entries to maintain dataset integrity and avoid biases in model training.
 - **Removing Duplicates:** Eliminated redundant records to prevent skewed predictions and improve data quality.
 - **Feature Scaling:** Normalized numerical variables for balanced model performance, ensuring consistent input values.
 - **Categorical Encoding:** Converted text-based features into numerical representations for compatibility with machine learning models.
 - **Feature Selection & Importance Analysis:** Identified key churn drivers, such as service usage, pricing, and customer complaints, to enhance model performance.
 - **Model Training & Evaluation:** Compared XGBoost, Random Forest, and Logistic Regression using precision, recall, F1-score, and accuracy metrics.
 - **Hyperparameter Tuning & Threshold Adjustment:** Optimized model performance by fine-tuning parameters and adjusting thresholds to balance recall and precision, reducing false churn predictions.

Outcome: A robust churn prediction framework with clean, high-quality data that enables accurate forecasts, proactive retention strategies, and improved business decision-making



KEY FINDINGS

CHURN DISTRIBUTION



Churn Rate:

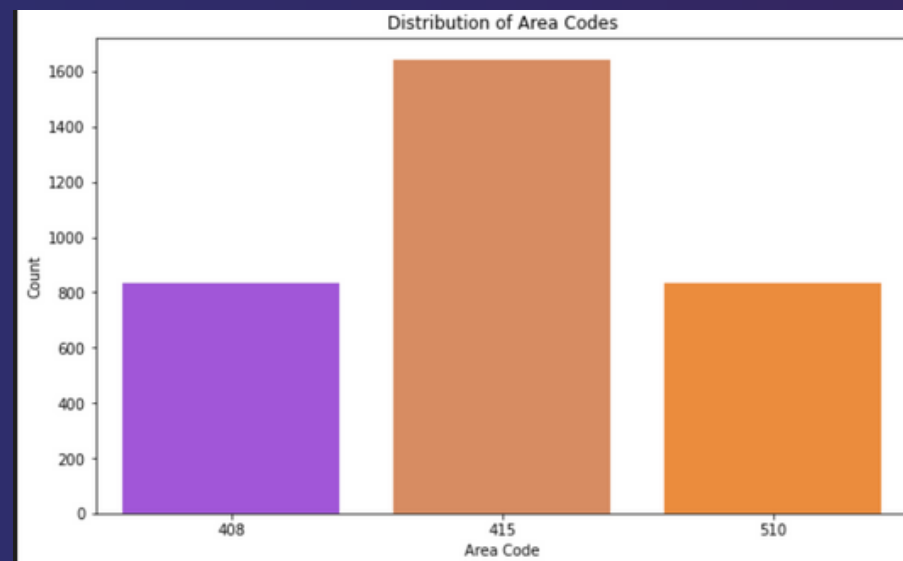
- 14.24% of customers have discontinued their service.
- 85.76% of customers have retained syriatel services

Possible reasons for churning:

- Product Dissatisfaction
- High Pricing
- Competitor Influence
- Lack of Engagement
- Poor Customer Support
- Billing & Contract Issues

CHURN DISTRIBUTION

BY AREA CODE

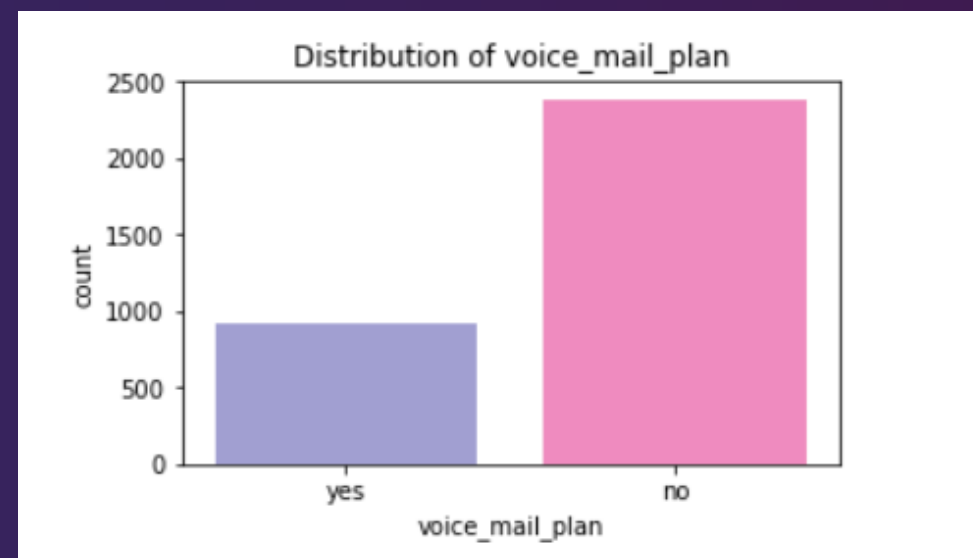


Area code 415 has the highest count, with approximately 1600 customers.

Area code 510 follows with around 1000 customers.

Area code 408 has the lowest count, with about 800 customers

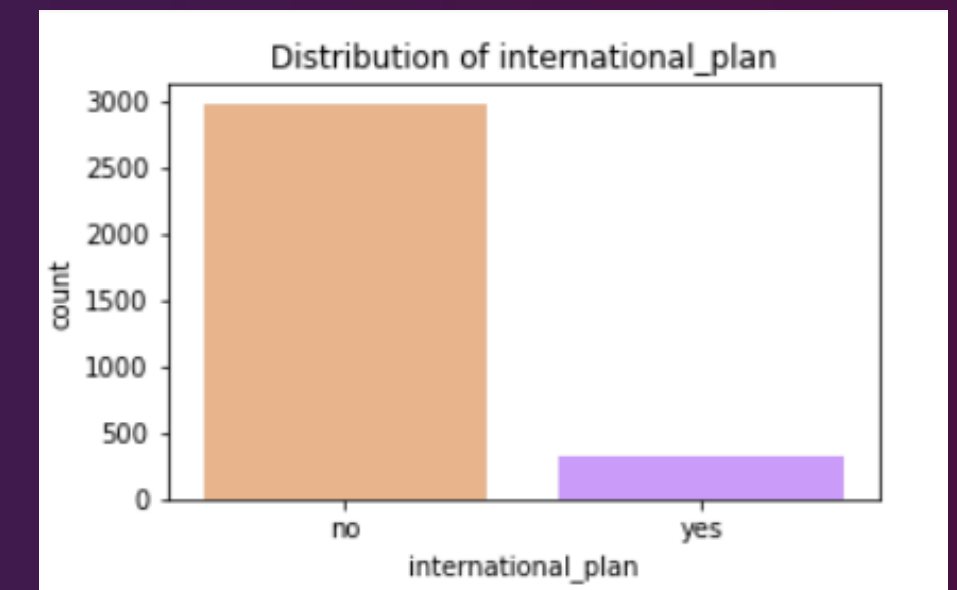
BY VOICE MAIL PLAN



The majority of customers (around 2300) do not have a voice mail plan. Only about 1000 customers have a voice mail plan

Customers without voicemail plans might be less engaged or see less value in the service.

BY INTERNATIONAL PLAN



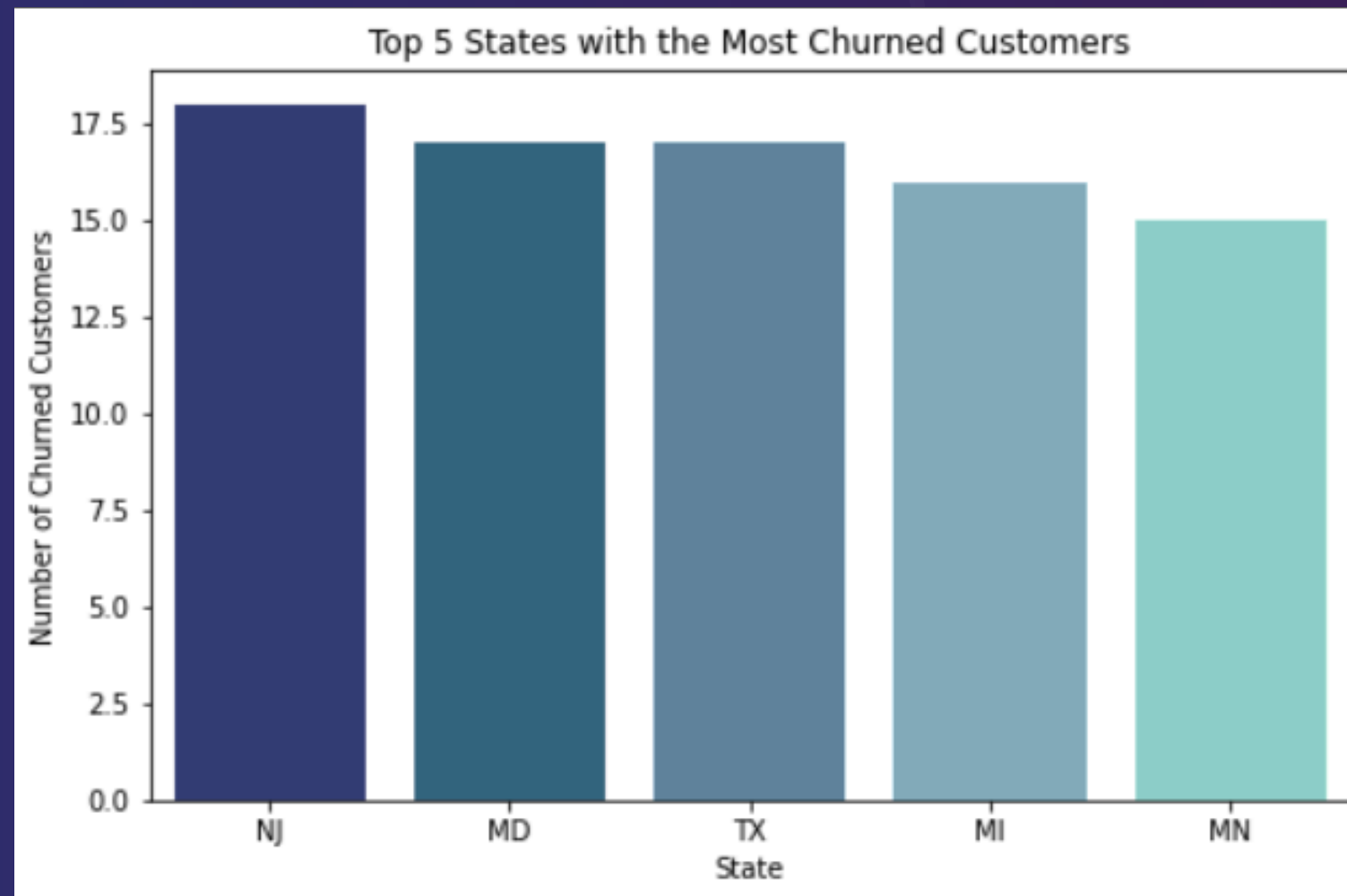
The majority of customers (around 3000) do not have an international plan.

Only about 500 customers have an international plan.

This suggests that international calling services are not widely adopted. Customers without international plans may see little value in international services.

CHURN DISTRIBUTION

BY STATE



Churn rates vary significantly across different states due to factors such as service quality, pricing, competition, and customer satisfaction. Some states experience higher churn rates due to poor network coverage, pricing dissatisfaction, or strong competitor presence, while others maintain lower churn rates due to better customer engagement and retention strategies.

Understanding state-wise churn trends helps businesses tailor retention strategies and optimize customer engagement efforts

MODEL SELECTION

WHY DO PREDICTION?

forecasting customer behavior enables the company to identify at-risk customers before they leave, allowing for targeted retention strategies such as personalized offers, improved customer service, or loyalty programs.

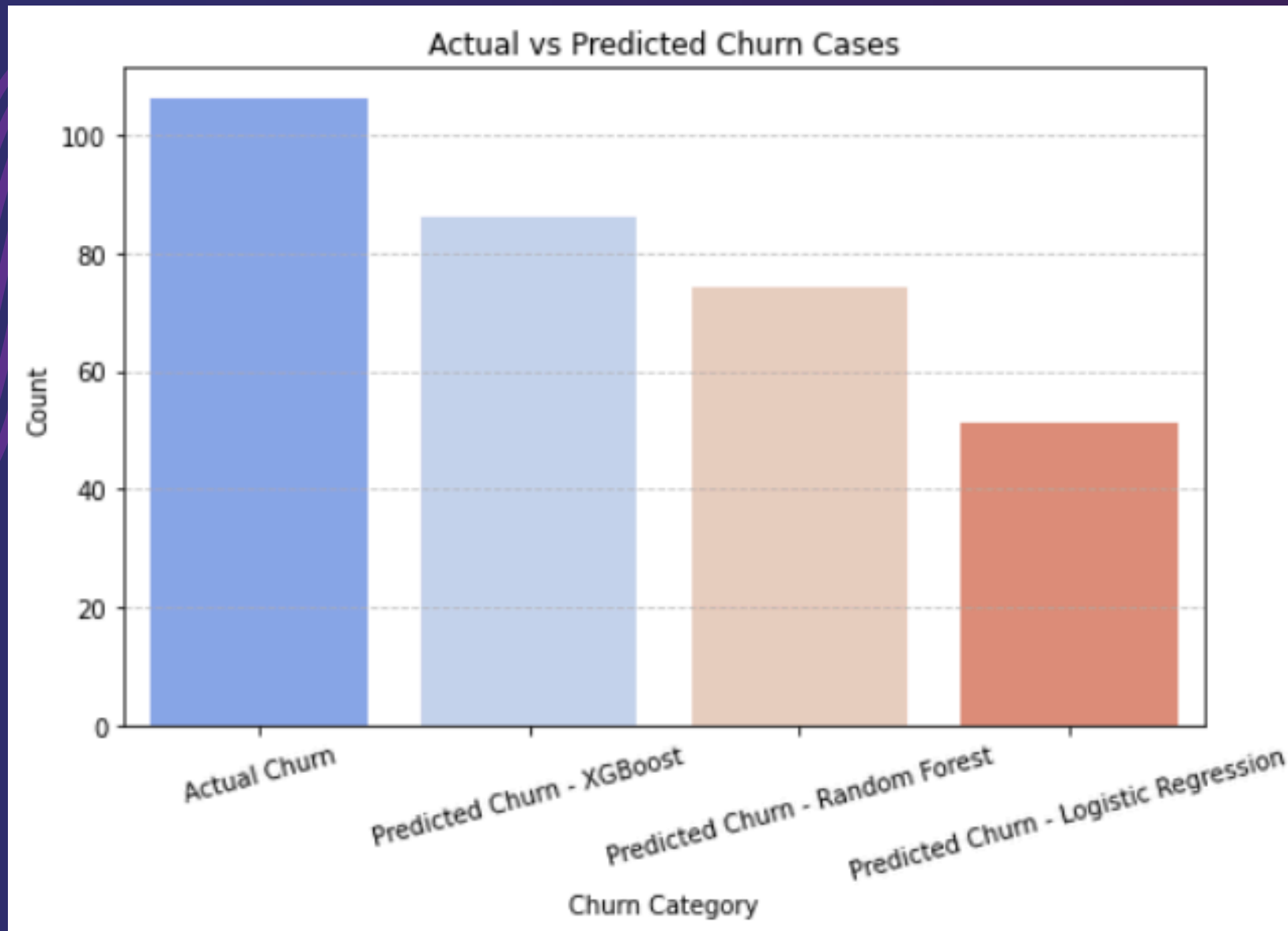
MODELS TESTED

- XGBoost (Best Model) – Demonstrated highest recall (81%) and precision (91%), ensuring a balanced churn prediction approach.
- Logistic Regression (baseline) – Provided general insights but failed to accurately capture churners due to low recall.
- Random Forest – Improved performance but struggled with precision in detecting minority churn cases.

FINDINGS

Through feature importance analysis, we discovered that pricing dissatisfaction, poor service quality, and competitor presence were the primary drivers of churn. The findings support strategic retention initiatives, such as personalized customer engagement, loyalty programs, and optimized service plans, helping Syriatel reduce churn and strengthen customer loyalty.

MODEL EVALUATION



From the analysis of model comparisons, XGBoost stands out as the most effective model for predicting churn

- ✓ **Highest Recall (81%)** → Effectively captures actual churn cases.
- ✓ **High Precision (91%)** → Reliable predictions with fewer false positives.
- ✓ **Best F1-Score (86%)** → Strong balance between precision and recall.
- ✓ **Highest Accuracy (96%)** → Performs exceptionally well overall.

WHAT ARE THE NEXT STEPS?

Enhance Customer Service

Customers with frequent service interactions are more likely to leave. Improving responsiveness significantly lowers churn risk

Deploy the XGBoost Model for Churn Prediction

It will enable proactive retention efforts by flagging high-risk churn customers, and help us focus retention efforts on high-value customers by offering loyalty rewards, service improvements, or personalized deals

Investigate and Optimize International Plans

These plans to enhance pricing and service quality for better customer satisfaction.

Monitor international usage patterns to provide tailored packages and mitigate churn risks.

promote voicemail plan adoption

Customers who use voicemail plans tend to have lower churn rates, meaning it improves retention. Bundling voicemail with regular plans can enhance perceived value.

RECOMMENDATIONS

Business Stakeholders

- **Strategic Decision-Making:** Integrate churn prediction insights into business strategy and long-term planning.
- **Resource Allocation:** Invest in customer engagement initiatives based on churn risk areas.
- **Competitive Analysis:** Benchmark against competitors to offer better pricing, services, and customer experience.
- **Retention-Driven Policies:** Design loyalty programmes and proactive customer service improvements to reduce churn.

Marketing Teams

- **Engagement Strategies:** Implement proactive outreach, reward programs, and value-added services to maintain loyalty.
- **Brand Positioning:** Strengthen customer trust and service differentiation against competitors

Tech Team

- **Continuous Model Refinement:** Improve churn prediction by retraining models on fresh data for accuracy.
- **Deployment in Business Systems:** Integrate predictions into CRM tools for automated alerts and decision-making.



THANK YOU!

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