



SyriaTel Customer Churn Prediction
Model

Overview of the Project, Objectives, and Importance

- **Project Overview:** The project aims to develop a machine learning model to predict customer churn for SyriaTel, one of the leading telecom providers in Syria.
- **Significance:** Predicting customer churn allows SyriaTel to take proactive measures, enhancing customer retention and reducing revenue losses.
- **Objectives:** The main objectives include developing an accurate predictive model, identifying key factors influencing churn, and optimizing retention strategies.



Business Problem

Understanding the Impact of Customer Churn on SyriaTel

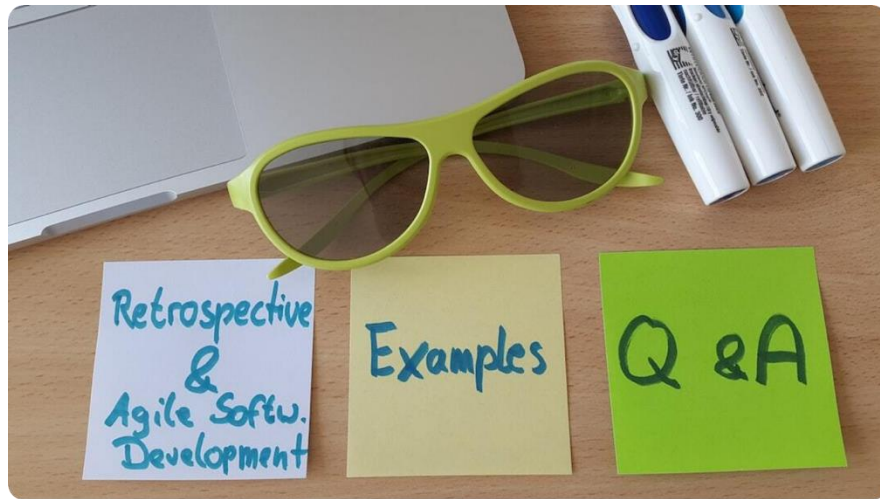
- **Revenue Loss:** Customer churn directly impacts SyriaTel's revenue, as each lost customer represents a loss of income.
- **Customer Acquisition Costs:** The cost of acquiring new customers is higher than retaining existing ones, making churn a significant financial burden.
- **Competitive Pressure:** With new entrants in the market, such as Wafa Telecom, reducing churn is critical to maintaining market share.



Project Objectives

Key Goals of the Churn Prediction Model

- **Develop Predictive Model:** Create a robust model that accurately predicts customer churn based on historical data.
- **Identify Churn Drivers:** Analyze key factors that contribute to customer churn to inform business strategies.
- **Optimize Retention Strategies:** Use predictive insights to design targeted retention strategies that reduce churn.



Data Overview

Summary of the Dataset Used



Dataset Description

The dataset includes 3,333 customers with 21 features each, representing various aspects of customer behavior and account information.



Key Features

Important features include total day minutes, customer service calls, and international plan, which have significant correlations with churn.



Target Variable

The target variable is 'churn,' a binary indicator of whether a customer has left SyriaTel.

Exploratory Data Analysis (EDA)

Key Findings from the Data Exploration

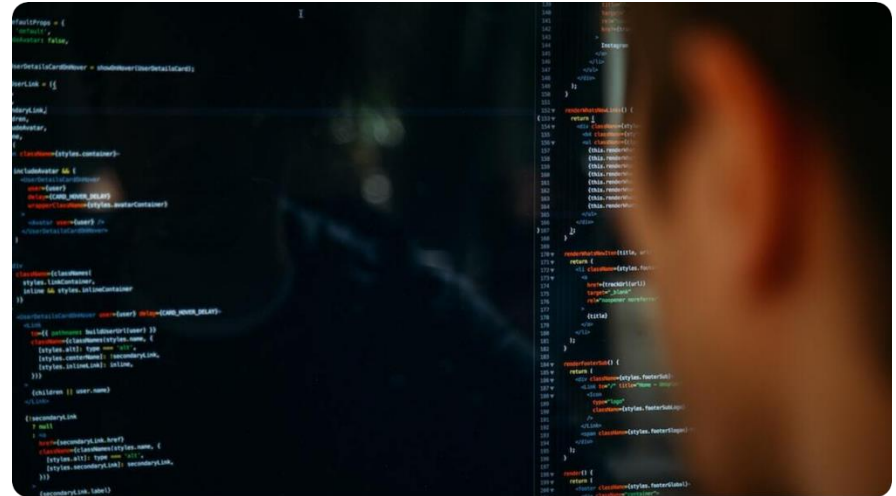
- **Churn Distribution:** The data reveals a churn rate of approximately 14.5%, highlighting an imbalance in the target variable.
- **Geographic Impact:** Certain states show higher churn rates, indicating geographic factors could influence customer behavior.
- **Key Features:** Features like 'international plan' and 'customer service calls' show significant differences between churned and non-churned customers.



Modeling Approach

Overview of Models Used and Their Performance

- **Logistic Regression:** Chosen for its simplicity and interpretability, with a baseline accuracy of 85.46%.
- **Decision Tree:** Performed better with a test accuracy of 90.25%, but showed signs of overfitting.
- **Model Evaluation:** Used metrics such as accuracy, precision, recall, and F1 score to evaluate model performance.



Model Evaluation

Accuracy, Precision, Recall, and F1 Scores



Accuracy

The Decision Tree model achieved the highest test accuracy at 90.25%, compared to 85.46% for Logistic Regression.



Precision and Recall

Precision for the Decision Tree was 0.6860, while recall was 0.6082, indicating balanced performance.



F1 Score

The Decision Tree had an F1 score of 0.6448, outperforming Logistic Regression, which scored lower in capturing true positives.

Conclusion

Key Takeaways from the Model



Effective Churn Prediction

The Decision Tree model proved to be the most effective in predicting customer churn, despite its overfitting risk.



Feature Importance

Features like 'international plan' and 'customer service calls' were crucial in determining churn likelihood.



Balanced Evaluation

The combination of accuracy, precision, recall, and F1 score ensured a balanced evaluation of model performance.

Recommendations

Future Steps Based on Model Outcomes



Implement Retention Strategies

Focus on customers identified as high risk by the model, offering tailored incentives to retain them.



Monitor Model Performance

Regularly evaluate the model's performance to ensure it continues to provide accurate predictions as customer behavior changes.



Explore Advanced Models

Consider testing more advanced models or ensemble methods to further improve prediction accuracy.