

Customer Churn Analysis

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Abstract

In today's competitive market, customer retention is a crucial task for any long-term business. The objective of this project is to analyse the trends of customer behaviour and predict possible churn using machine learning technique. By understanding the factors that cause the customer disengagement, the business can implement various strategies to enhance customer loyalty and satisfaction.

This project uses an online available historical customer churn dataset to build a predictive model that helps in forecasting potential churn, resulting in possible insights to reduce problems and increase retention efforts. The outcome of this analysis will allow the business to proactively address churn and increase customer lifetime value.

Introduction

- Objective: Predict which customers are likely to churn using their service usage patterns and account information.
- Churn refers to customers leaving a service, which can lead to revenue loss.
- The goal is to develop a model that accurately predicts customer churn using machine learning.

Data Description

- The dataset contains details like:
 - State, Phone number
 - Call durations (day, evening, night, international)
 - Number of calls
 - Charges for various services (day, evening, international)
 - The target variable is **Churn**, which indicates whether a customer left the service.

Data Preprocessing

- Key steps:
 - Handle categorical features such as **International Plan** and **Voice Mail Plan**.
 - Feature engineering: create a **tenure_group** based on account length.
 - Encode categorical variables and scale numerical features to prepare for model training.

Modelling

- Various machine learning models were tested, including:
 - Gradient Boosting Classifier
 - Support Vector Machines (SVM)
 - Random Forest Classifier
 - K nearest neighbour classifier
 - Decision tree classifier
 - Logistic Regression
- Metrics used for evaluation:
 - Confusion Matrix
 - Accuracy
 - Precision
 - Recall
- Feature importance analysis to identify key drivers of customer churn.

Results

- The model performed well, with key features influencing churn:
 - Total day minutes (high usage might reduce churn risk).
 - Customer service calls (more calls tend to correlate with higher churn rates).
 - International plan usage (affects churn likelihood).
- High accuracy and good performance metrics were achieved.

Conclusion

- The machine learning model successfully predicted customer churn.
- Key insights for actionable recommendations to decrease client attrition:
 - Customers with more interactions with customer service are more likely to churn.
 - Higher usage customers and those on international plans are more likely to stay.
- Future Steps for the project: Continue refining the model and implement customer retention strategies.