

Customer Churn Prediction with Actionable Insights

Project Overview

This project focuses on predicting customer churn and translating model outputs into clear business actions.

The goal is not just to identify who will churn, but why they churn and what the company should do to retain them.

Business Problem

Customer churn leads to revenue loss and wasted acquisition costs.

The key questions addressed are:

1. Which customers are likely to churn?
2. What factors drive churn?
3. How can the business reduce churn proactively?

Data

The analysis uses the IBM Telco Customer Churn dataset, including:

- Customer demographics
- Service usage and subscriptions
- Contract and billing details
- Satisfaction scores and revenue metrics

A single, feature-engineered dataset was created for modeling and analysis.

Dataset Link: <https://www.kaggle.com/datasets/mertkesenci/telco-customer-churn-ibm-separated-data>

Methodology

- **Data Cleaning & Feature Engineering**
 - Created behavioral, value, contract, and satisfaction-based features
- **Exploratory Data Analysis (EDA)**
 - Identified churn patterns by tenure, contract type, revenue, usage, and satisfaction
- **Modeling**
 - Baseline Logistic Regression model
 - Evaluated using Recall and ROC-AUC (accuracy was avoided due to class imbalance)
- **Model Explainability**
 - Interpreted coefficients and SHAP values to identify key churn drivers

Key Insights

- Low customer satisfaction is the strongest driver of churn
- Month-to-month contracts have significantly higher churn rates
- High revenue customers still churn, making them costly to lose
- Customers with lower engagement or fewer value-added services are more likely to churn
- Newer customers churn at much higher rates than long-tenure customers

Model Performance

- Recall (churners): 86%
- ROC-AUC: ~0.98

This indicates the model is effective at identifying customers at risk of churn.

Business Recommendations

- Prioritize retention efforts for high-risk, high-value customers
- Convert month-to-month contracts to longer-term plans using incentives
- Intervene early for customers with low satisfaction scores
- Increase adoption of value-added services to improve engagement
- Use the model as an early warning system for proactive outreach

Outcome

This project demonstrates how churn can be predicted, explained, and acted upon.

The approach provides a practical framework for reducing churn, protecting revenue, and improving customer lifetime value.