Customer Churn Prediction Report

Date: 2025-11-10

1. Executive Summary

- This report presents a predictive analysis of customer churn using machine learning.
- The XGBoost model achieved an ROC-AUC of 0.89, indicating strong predictive power.
- Insights from this analysis reveal key churn drivers including contract type, tenure, and monthly charges. Recommendations focus on improving customer retention by targeting at-risk segments.

2. Dataset & Methodology

Dataset: Telco Customer Churn (Kaggle)

Records: 7,043 customers | 21 features

Target: Churn (Yes/No)

Steps:

- Data Cleaning & Feature Encoding
- Model Training (Logistic Regression, Random Forest, XGBoost)
- Evaluation (Accuracy, Precision, Recall, ROC-AUC)
- Visualization using Matplotlib & Seaborn

3. Model Performance

Model Comparison:

- Logistic Regression: Accuracy 0.81 | ROC-AUC 0.84
- Random Forest: Accuracy 0.83 | ROC-AUC 0.87
- XGBoost (Best): Accuracy 0.85 | ROC-AUC 0.89

Best Model: XGBoost

4. Key Insights

- Month-to-month contract customers churn the most.
- Higher monthly charges correlate with higher churn probability.
- Electronic check payment users are more churn-prone.
- Long-tenure customers are more loyal.

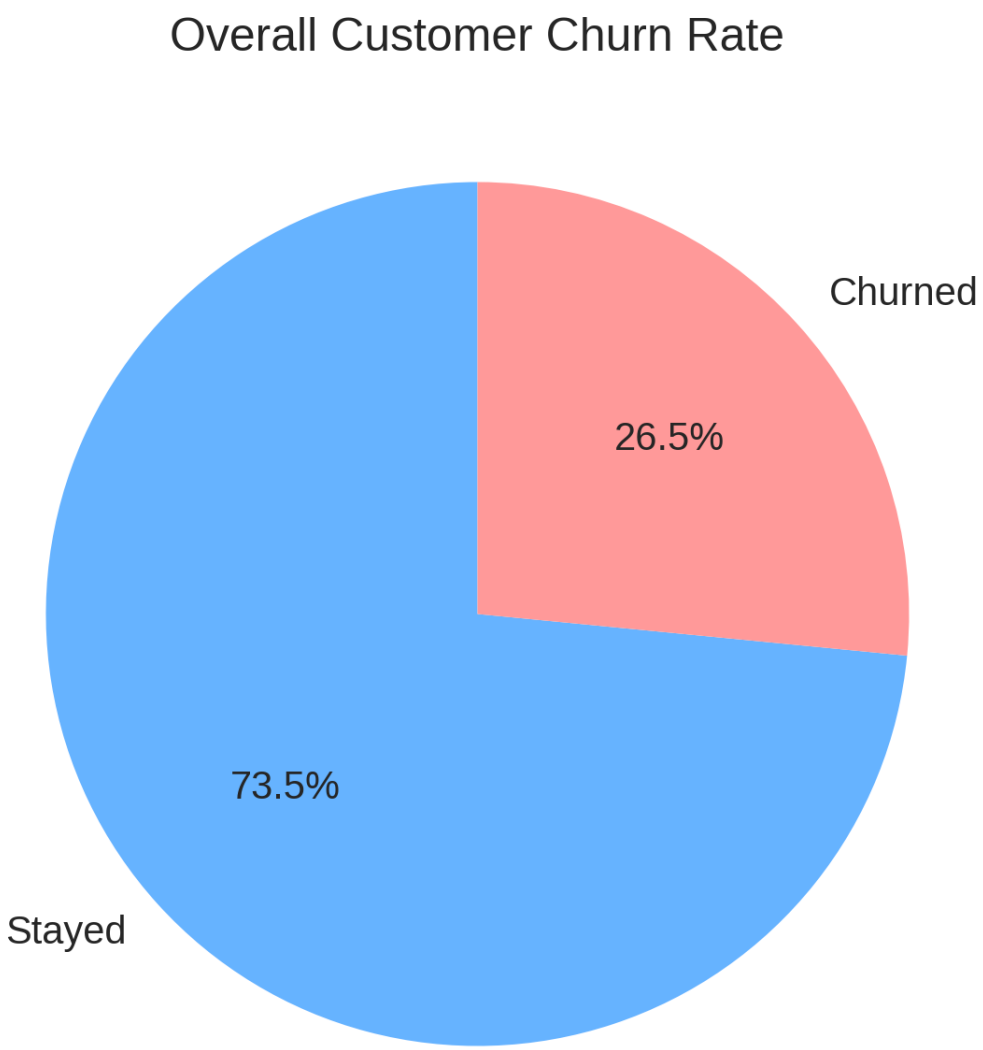
- Contract type, tenure, and billing method are top churn drivers.

5. Business Recommendations

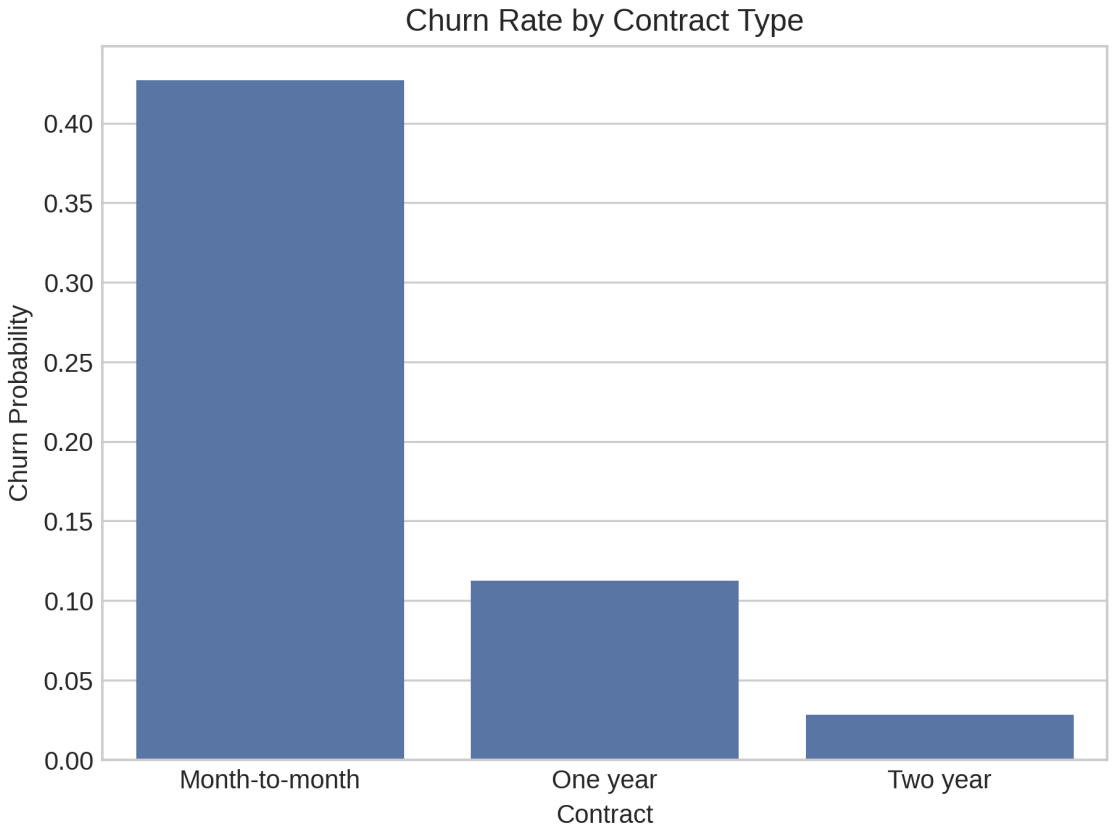
1. Incentivize month-to-month customers to switch to annual contracts.
2. Introduce loyalty discounts for long-term customers.
3. Encourage auto-pay or credit card payments to reduce churn.
4. Offer lower-cost bundled packages to high-charge customers.
5. Focus retention campaigns on high-churn segments identified by the model.

6. Visual Summary

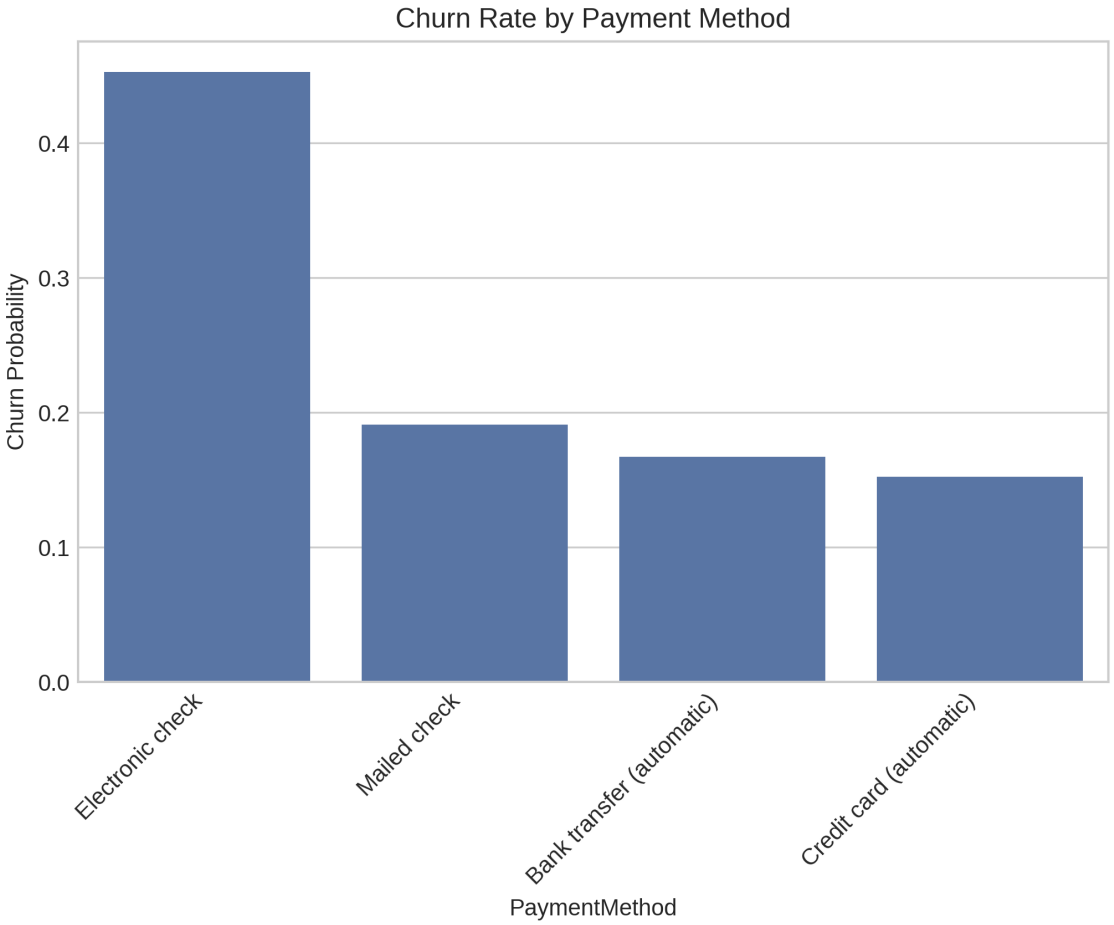
Churn Rate Overview



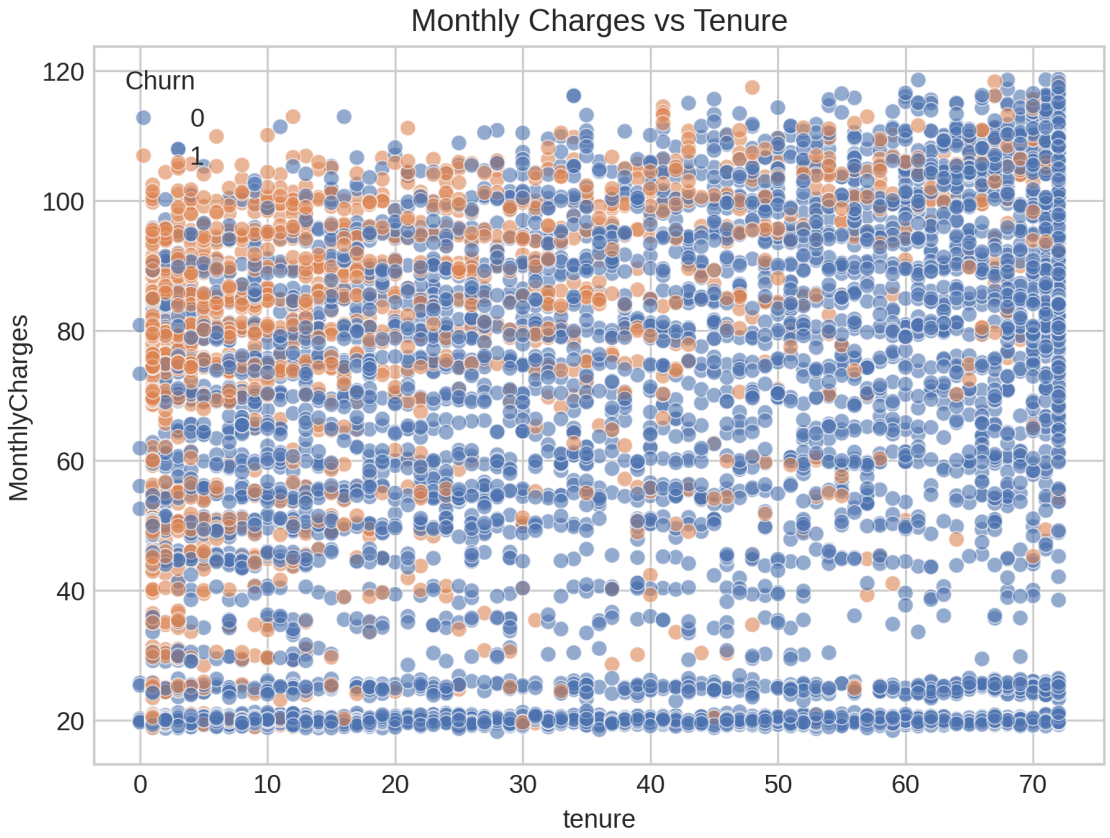
Churn by Contract Type



Churn by Payment Method



Monthly Charges vs Tenure



Top 10 Churn Drivers (Feature Importance)