Customer Retention Analysis: Predicting Customer Churn

Agenda

- Introduction

- Customer Segmentations

- Feature Importance and Model Interpretation

- Approach: Performance Analysis and Model Comparison

- Executive Summary

  - Key Findings

  - Business Recommendations

Executive Summary

Telco has challenges in retaining existing customers. Classification model predictions were used to determine whether a customer would leave based on their usage patterns and demographics.

Key Findings:

- **New customers** (< 12 months) are more likely to leave.

- Some high-paying, **longer-term customers** are high-value customers.

- Customers who have **fiber optic** internet service are more likely to leave, possibly due to dissatisfaction with the service.

Target Customer Profiles:

- High-value, long-term customers

- New customers with high charges and fiber optic internet service

Introduction: Problem Definition

- Telco provides phone and internet services
- Current Business Impact
  - Losing 1,869 customers every month (26%)
  - $139K monthly revenue at risk
  - $1.7M annual revenue at risk
- Churn analysis
  - Identify at-risk customer segments
  - Understand why they leave
  - Develop targeted retention efforts

Customer Retention Rates

Churned Customer Distribution (%)
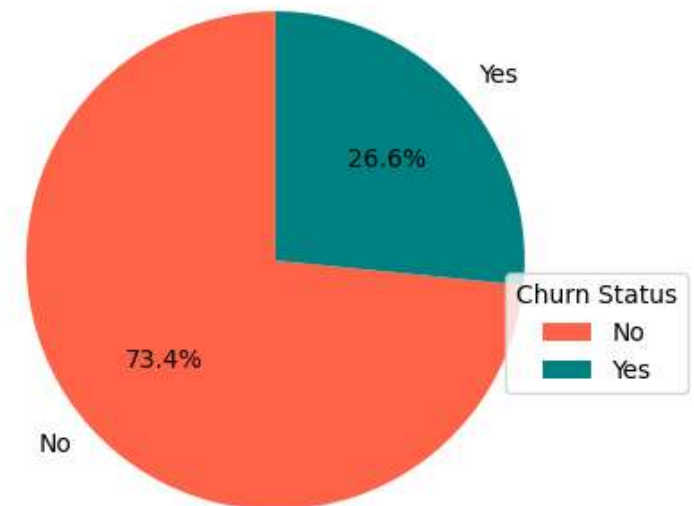
Data

Churn

    Customers who left the services last month

        7,043 customers with 21 features each

        3 numerical and 18 categorical features

Segmentation and features

    Services – phone, internet, security, tech support, streaming, etc.

    Customer accounts – tenure, contract type, payment methods, monthly and total charges.

    Demographic – gender, age range, partners, dependents

Data source: https://www.kaggle.com/datasets/blastchar/telco-customer-churn

Data & Customer Segments

Customers

7,043 customers
Churned – Yes/No

Services

phone, internet, security, tech support, TV & movie streaming
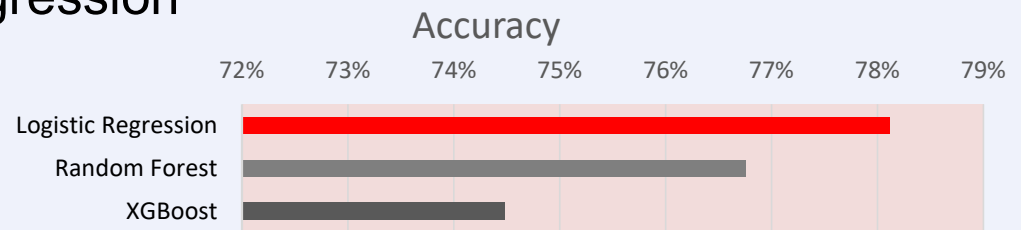
Accounts

tenure, contract types, payment methods, monthly and total charges

Demographic

gender, age, partners, dependents

Approach: Performance Analysis and Model Comparison
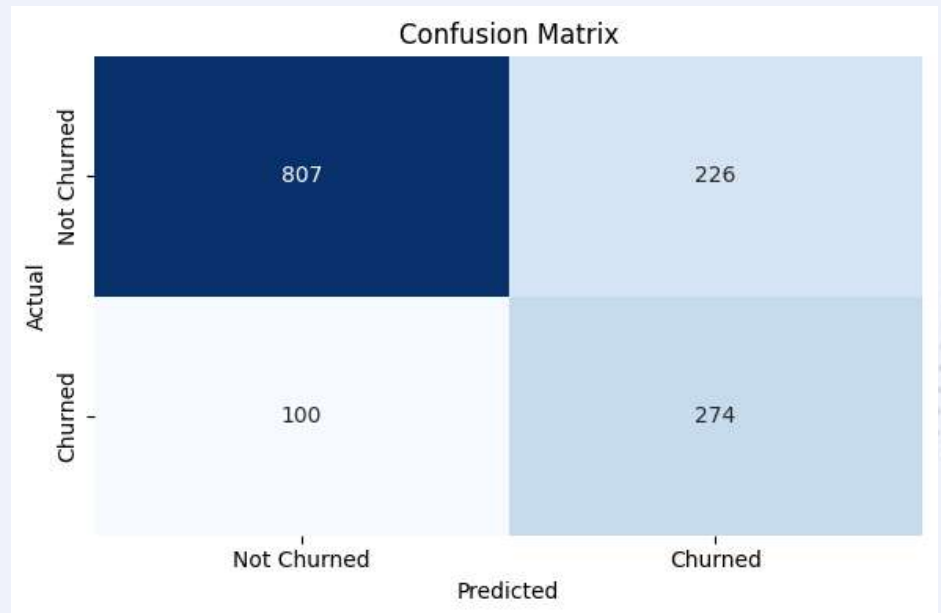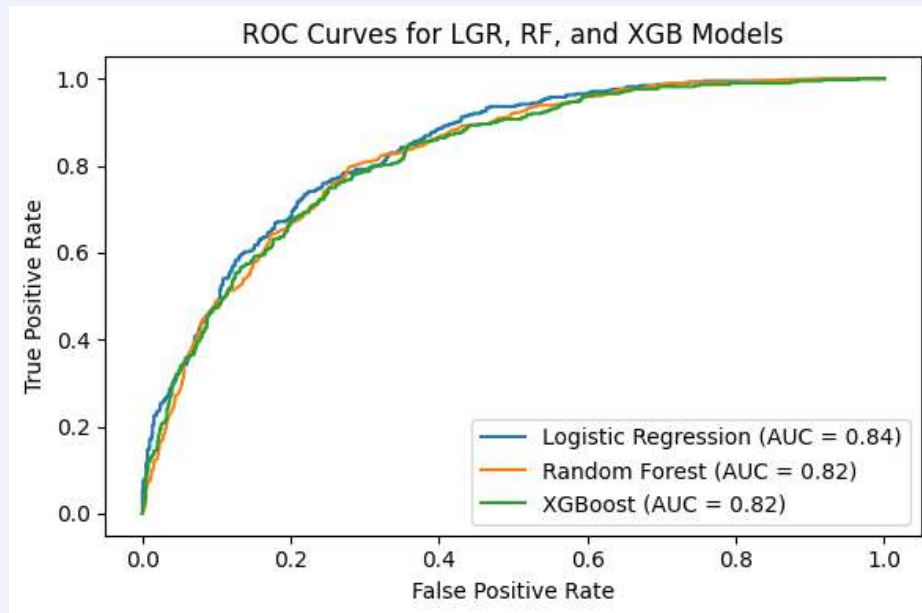
🏆 **Best Model**: Logistic Regression

Accuracy

| | 72% | 73% | 74% | 75% | 76% | 77% | 78% | 79% |

Logistic Regression
Random Forest
XGBoost

Model	AUC Ranking power	F1-Score Balance Score	Precision False negative	Recall True positive	Accuracy Overall Correctness
Logistic Regression	**84.1%**	**63.6%**	**57.0%**	**71.9%**	**78.1%**
Random Forest	80.9%	60.2%	55.3%	66.0%	76.8%
XGBoost	80.6%	59.2%	51.5%	69.5%	74.5%

➢ Logistic Regression provides the best balance of accuracy and interpretability for churn prediction.
➢ Recall (true positive) is highest. It helps to focus on the targeted customers.
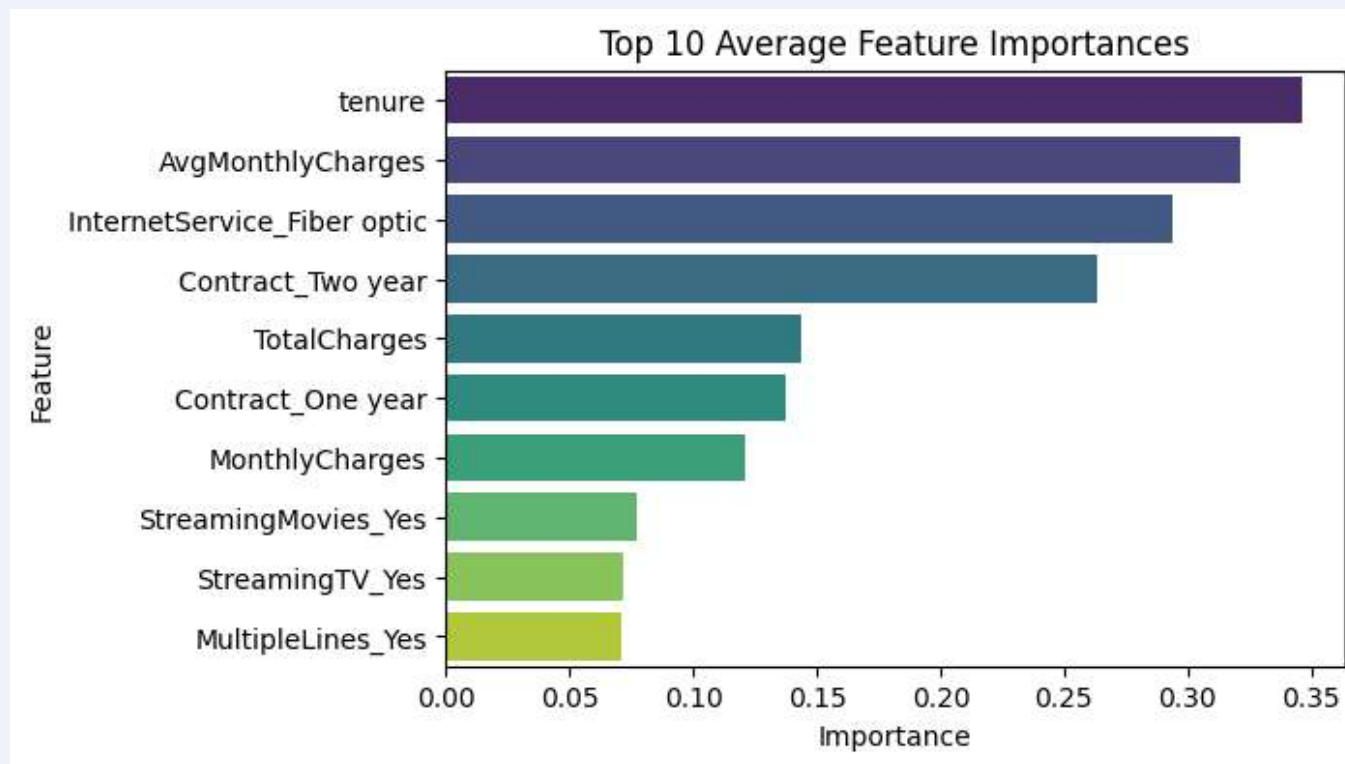
Model Comparison Results

Model	AUC	F1-Score	Precision	Recall	Accuracy
Logistic Regression	**0.8412**	**64%**	**57%**	**72%**	**78.11%**
Random Forest	0.8090	60%	55%	66%	76.76%
XGBoost	0.8064	59%	51%	70%	74.48%

ROC Curves for LGR, RF, and XGB Models

- Logistic Regression (AUC = 0.84)
- Random Forest (AUC = 0.82)
- XGBoost (AUC = 0.82)

Confusion Matrix

	Not Churned	Churned
Not Churned	807	226
Churned	100	274

What Drives Customer Churn?
Important Features

What Drives Customer Churn?
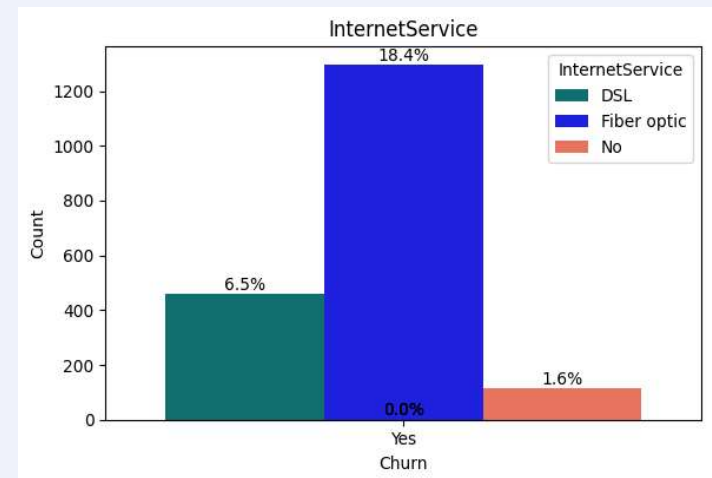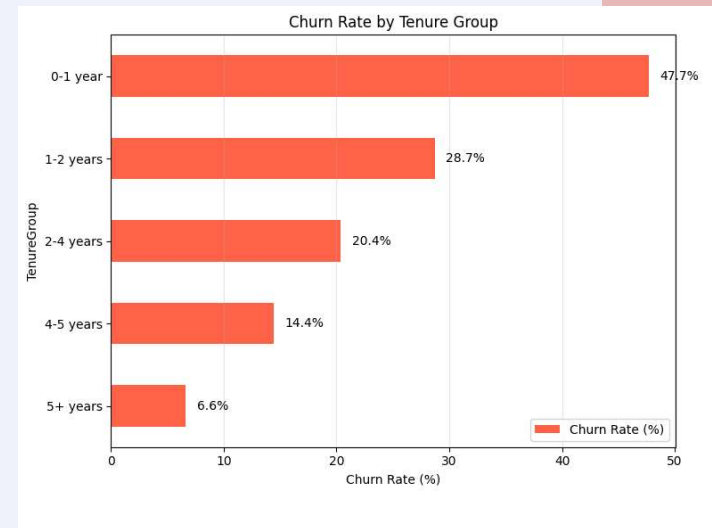# Top 3 Drivers that May Cause Churn

1. **Tenure** (How long customers have been with Telco)

   o New customers (<12 months) are 7x more likely to leave vs. longer-term customers (5+ years)
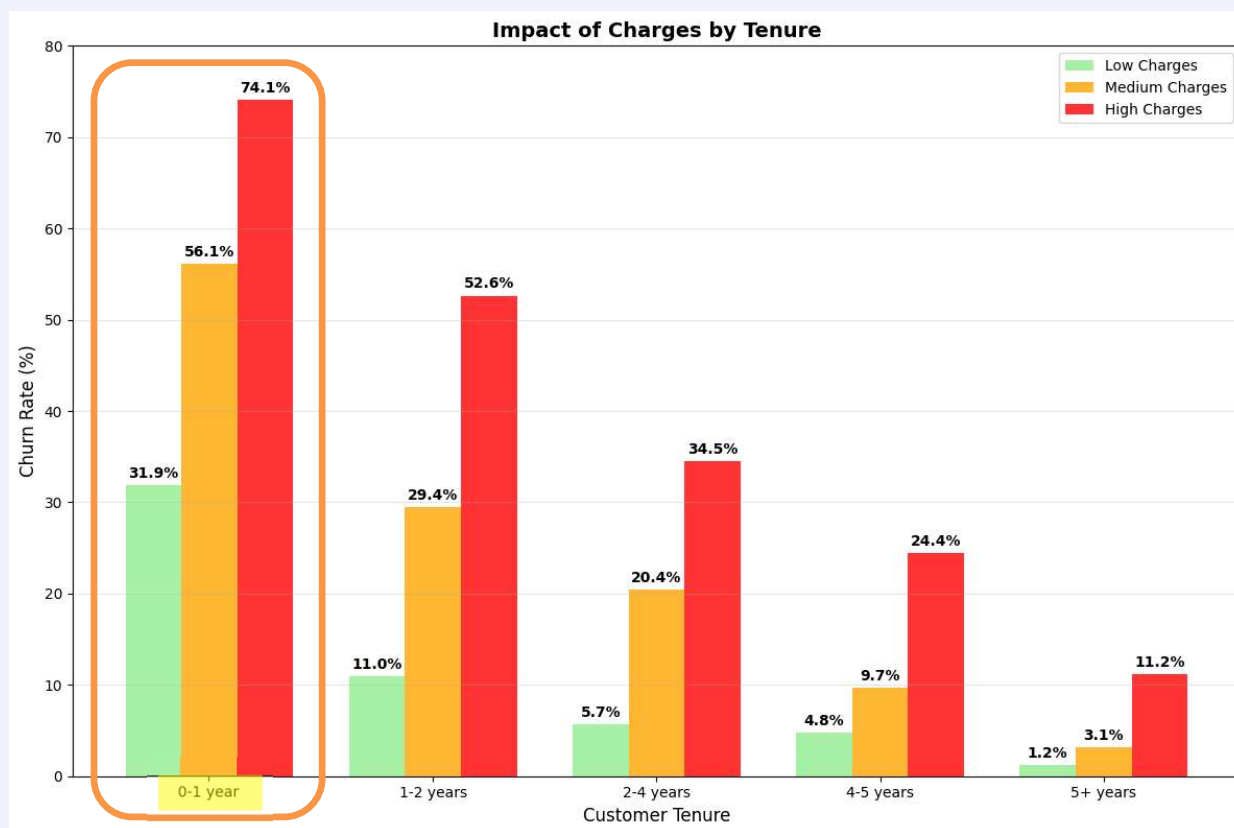
2. **Average Monthly Charges**

3. **Fiber Optic Service**

   o High-paying customers have fiber optic

   o Possible service quality issues

What Drives Customer Churn?
Churn Rates: Avg Monthly Charges & Customer Tenure

Range of Monthly Charges:
- Low charges: $18.25-51.75
- Medium charges: $51.80-85.25
- High charges: $85.30-118.75

Segments by Financial Impact

Top 5 Revenue Impacts Segments

Segment Index	Tenure (months)	Ave Monthly Charges	Fiber Optic	Long-term (2-Yr) Contract	# of customers	Monthly Revenue at Risk
256	72	$106.13	Yes	Yes	145	$15,389
255	72	$58.30	No	Yes	198	$11,544
2	1	$39.70	Yes	No	235	$9,329
4	2	$53.66	Yes	No	109	$5,849
7	3	$62.33	Yes	No	90	$5,609

Target Customer Profiles:
- High-value, long-term customers
- New customers with high charges and fiber optic internet service

Churn Reduction Simulation
Reduction Scenarios

Reduce by	Customers Retained	Revenue Saved Monthly	Revenue Saved Annually
10%	687	$41,425	$497,104
20%	1,374	$82,850	$994,208
30%	2,061	$124,276	$1,491,312

Recommendations

Focus on retention efforts on high-value royal customers

- Target 350 top high-value, long-term customers.
- Retention efforts are less expensive than getting new customers.

Offer promotions for new customers to incentivize them to sign long-term contracts

- Target new customers with attractive onboarding offers
- Offer discounts for onboard, multi-year contracts, bundled services, etc.
- Provide frequent promotions and early engagement to build loyalty.

Assess fiber optic internet service quality & support

- Investigate why customers are dissatisfied with fiber optic internet service.
  - Possible service quality issue
  - Possible competitor offering better deals

Leverage Data Analytics

- Gain deeper insights into customer behavior and preferences.
- Targeted marketing efforts and improve overall customer satisfaction.

Thank You

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