

Executive Summary: Telecom Customer Churn Analysis

This analysis aims to identify and understand the patterns behind customer churn using a telecom customer dataset. Comprehensive preprocessing and multiple visual explorations have been employed to uncover the key factors contributing to churn.

Data Preparation & Cleaning

- **Missing and Blank Values:** The `TotalCharges` column had blank entries (likely due to zero tenure). These were replaced with 0 and cast to float for accurate analysis.
 - **Duplicates:** No duplicate customer records based on `customerID` were found.
 - **Senior Citizen Labeling:** The numeric `SeniorCitizen` column was mapped to "Yes"/"No" for better interpretability.
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Churn Rate Overview

- **Overall Churn Rate:**
 - **26.54%** of customers have **churned**, while **73.46%** have remained.
 - This is significant and points to a substantial retention opportunity.
 - **Visualization:** A countplot and pie chart effectively show this ratio.
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Demographic Insights

- ◆ **Gender**
- Churn is **evenly distributed** between males and females.

- **No significant gender-based churn bias** was found.
 - ◆ **Senior Citizens**
 - **42%** of **senior citizens** churned compared to **24%** of non-senior customers.
 - This indicates that **senior citizens are nearly twice as likely** to churn.
 - ◆ **Tenure**
 - Customers with **1–2 months of tenure** show the **highest churn rate**.
 - Customers with **longer tenure (20+ months)** are **far less likely** to churn.
 - This suggests that **early retention strategies** can significantly impact churn reduction.
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Contract Type & Churn

- **Month-to-Month Contracts:** Over **40% churn rate**, the highest among all.
- **One-Year Contracts:** ~**11% churn**.
- **Two-Year Contracts:** Only **3% churn**, indicating **strong retention power** in long-term contracts.

Insight: Promoting longer contracts could significantly reduce churn.

Services & Churn Patterns

A subplot of service-related features (Phone, Internet, Streaming, Security, etc.) showed:

- **Lower churn** among customers using:
 - **PhoneService**
 - **DSL-based InternetService**

- **OnlineSecurity, TechSupport, and OnlineBackup**
- **Higher churn** among:
 - Customers **without** these services
 - Those using **Fiber optic** internet

Insight: Customers with **multiple support/utility services** are **more loyal**.

Payment Method Insights

- Customers using **Electronic Checks** have the **highest churn rate** (around **45%**).
- Churn is **lowest** among those using **Bank Transfers** and **Credit Cards** (around **20–25%**).

Suggestion: Incentivize auto-payment methods like bank transfers or card payments for better retention.

Strategic Recommendations

1. **Target Early-Stage Customers:** Offer onboarding incentives and personalized engagement for those in their first few months.
2. **Promote Long-Term Contracts:** Discounts or benefits for yearly plans can drastically reduce churn.
3. **Bundle High-Retention Services:** Encourage packages that include security, tech support, and backups.
4. **Discourage Electronic Check Usage:** Transition customers to digital payment modes with rewards.
5. **Senior Citizen Focus:** Provide age-friendly support and tailored offers to reduce churn in this segment.

