

Executive Summary Telecom Customer Churn Analysis

This customer churn analysis leverages a combination of exploratory data analysis (EDA) and visual storytelling to identify the key factors influencing customer retention and churn in a telecom company. The primary goal was to uncover hidden patterns, identify risk groups, and support strategic decisions aimed at improving customer loyalty.

Data Preprocessing & Cleanup

- The dataset had 7,043 records and 21 features including demographics, account details, and service usage.
- We handled missing values most notably in the TotalCharges column by identifying and removing 11 rows with blank or non-numeric entries.
- Duplicate records were checked using `df.duplicated().sum()` and confirmed as zero, ensuring clean data.
- The SeniorCitizen column (originally 0/1) was converted into "Yes"/"No" for better readability in visualizations.

Key Customer Demographics & Behavior

- Senior Citizens make up only 16% of customers, yet their churn rate is 42%, significantly higher than the 26% churn among younger customers.
- Customers with a tenure of 0-2 months accounted for over 50% of total churn, suggesting dissatisfaction during the onboarding or early service phase.
- Gender showed no significant correlation with churn, indicating equal behavior across male and female customers.

Visual Insights from Service Features (Countplots)

Nine crucial service features were visualized using `sns.countplot()` with `hue="Churn"` to identify service-related churn triggers. Here's what stood out:

Internet Service

- Fiber Optic users represent 44% of the customer base but contribute to 59% of total churn.
- DSL users showed a churn rate of 27%, and customers with no internet service had a much lower churn rate of just 7%.

Phone Services & Multiple Lines

- Customers with no phone service had negligible churn.
- Those with multiple lines churned more (32%) than those without (22%).

Online Security & Tech Support

- Customers without online security had a churn rate of 45%, compared to 26% for those with it.
- Similarly, lack of Tech Support led to a 41% churn rate, whereas customers with tech support only churned at 24%.

Entertainment Features (Streaming TV/Movies)

- Streaming services showed moderate impact:
 - Churn was 38% among those without StreamingTV, and 35% for those without StreamingMovies.
 - Those with both services churned slightly less (~30%), suggesting minimal retention effect.

Each of these plots was creatively arranged in a 3 3 grid of subplots, making it easy to visually compare the impact of each feature.

Strategic Takeaways

1. Prioritize retention in the first 2 months: Over 50% of churning customers were in their first quarter of service. This suggests the need for onboarding improvements, welcome offers, and customer satisfaction checks early in the lifecycle.

2. Re-evaluate Fiber Optic plans: High churn among these users (59%) indicates possible issues in pricing, service quality, or value perception. Customer feedback surveys or competitor analysis might reveal more.
3. Upsell value-added services: Services like OnlineSecurity, TechSupport, and DeviceProtection are linked to 15 20% lower churn. These should be bundled or promoted more aggressively, especially to new customers.
4. Targeted engagement for seniors: With a 42% churn rate, senior citizens may need simplified support, personalized outreach, or loyalty programs tailored to their needs.

Visual Strategy Recap

Your use of:

- Countplots with Churn hue for direct churn comparison.
- Subplot grids for side-by-side insights across multiple service categories.
- Pie charts and grouped bar charts for distribution summaries

made the analysis both intuitive and data-rich, making it easier for non-technical stakeholders to grasp patterns at a glance.