

# Summary of Customer Churn Analysis

This analysis explores a customer churn dataset containing 7,043 entries with 21 columns, detailing customer demographics, services, billing, and churn status. The dataset was cleaned by replacing blank TotalCharges values with 0 (where tenure is 0) and converting them to float type. No missing values or duplicate customerIDs were found, ensuring data integrity. The SeniorCitizen column was transformed from binary (0/1) to categorical ("Yes"/No) for better interpretability.

## Key Descriptive Insights:

- **Tenure:** Average of 32.37 months, ranging from 0 to 72 months.
- **Monthly Charges:** Mean of \$64.76, with a range of \$18.25 to \$118.75.
- **Total Charges:** Average of \$2,279.73, varying from \$0 to \$8,684.80.
- **Senior Citizens:** 16.2% of customers are senior citizens.

## Exploratory Data Analysis (EDA) - Churn by Services:

A set of count plots was created to visualize churn patterns across various services, using the Churn column as the hue. The chart, comprising 3x3 subplots, highlights the following trends:

1. **PhoneService:** Most customers have phone service, with a higher retention rate (more "No" churn) than churn.
2. **MultipleLines:** Customers without multiple lines show higher retention, while those with multiple lines have a balanced churn rate.
3. **InternetService:** DSL users exhibit higher retention compared to Fiber optic users, who show significant churn. Customers with no internet service have the lowest churn.
4. **OnlineSecurity:** Customers with online security tend to stay, while those without it have a higher churn rate.
5. **OnlineBackup:** Retention is slightly higher for customers with online backup, though churn remains notable.
6. **DeviceProtection:** A balanced churn pattern, with neither "Yes" nor "No" dominating retention or churn.
7. **TechSupport:** Customers with tech support show higher retention, while those without it are more likely to churn.
8. **StreamingTV:** Balanced churn, with a significant number of customers leaving regardless of subscription.
9. **StreamingMovies:** Similar to StreamingTV, churn is evenly distributed among subscribers and non-subscribers.

## Key Observations:

- Services like **InternetService (DSL)**, **OnlineSecurity**, and **TechSupport** are associated with higher retention, suggesting these features may enhance customer satisfaction or loyalty.
- **Fiber optic InternetService**, **StreamingTV**, and **StreamingMovies** show higher churn, indicating potential dissatisfaction or cost-related issues.
- Churn rates vary significantly by service, with no single service universally preventing churn, highlighting the need for targeted retention strategies.