

Executive Summary – Customer Churn Analysis

The analysis was conducted on a telecom customer dataset to identify factors influencing customer churn. After cleaning and preparing the data (fixing missing and incorrect values, converting categorical variables for clarity), exploratory data analysis (EDA) was performed using **Pandas, Seaborn, and Matplotlib**.

Key Findings

- **Churn Rate:** Approximately **26.5%** of customers have churned, as visualized through a pie chart.
- **Demographics & Services:** Senior citizens and customers using multiple internet-related services showed **higher churn rates**.
- **Contract & Billing Impact:** Customers on **month-to-month contracts** and those opting for **paperless billing** were more likely to churn, while those with **long-term contracts** were more stable.
- **Support & Security Services:** Lack of **online security, tech support, and device protection** correlated with increased churn.
- **Payment Methods:** Certain payment methods (like electronic check) showed higher churn percentages compared to credit card or bank transfer users.

Data Preparation

- Dataset contained customer-level information such as demographics, service usage, and billing preferences.
- Blank or missing entries in **TotalCharges** were replaced with **0** (as tenure was 0 for those records) and converted to numeric data type.
- The **SeniorCitizen** column was converted from **0/1** values to **Yes/No** for clarity.
- No significant missing or duplicate data remained after preprocessing.



Overall Churn Statistics

- Out of the total customers, **26.54%** have churned, while **73.46%** have stayed with the company.
 - This indicates a **moderate churn rate**, highlighting a need for stronger retention strategies.
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Key Insights from EDA

1 Customer Demographics

- Senior Citizens** have a **higher churn rate (~41%)** compared to non-senior citizens (~24%) — suggesting that older customers might face usability or support issues.

2 Contract Type

- Customers on **Month-to-Month contracts** show the **highest churn rate (43%)**, while those on **One-Year or Two-Year contracts** have much **lower churn rates (11% and 3%)**, respectively.
👉 This clearly shows that **long-term commitments** help retain customers.

3 Billing & Payment

- Customers using **Paperless Billing** churned at a rate of **34%**, compared to **17%** among those receiving printed bills.
- Electronic Check** users have the **highest churn rate (45%)**, while **Credit Card** and **Bank Transfer** users churned significantly less (~15–18%).
💡 Encouraging stable payment methods can improve retention.

4 Internet and Streaming Services

- Users with **Fiber Optic Internet** had a **churn rate of ~42%**, whereas **DSL** users churned less (~19%).
This suggests that while fiber users pay more, they might be dissatisfied with service quality or pricing.

- Customers using **StreamingTV** or **StreamingMovies** services showed slightly **higher churn (~30%)**, indicating these services may not be strong loyalty drivers.

5 Tech Support and Security Features

- Customers **without Online Security** churned at **42%**, while those with it churned at only **15%**.
- Similarly, **absence of Tech Support** correlates with **high churn (40%)**, compared to **17%** for those who receive assistance.
👉 These features appear to have a **strong retention impact**.

💡 Recommendations

1. **Promote Long-Term Contracts:** Offer discounts or rewards for 1–2 year contracts to reduce churn by up to 40%.
2. **Enhance Support Services:** Bundle **Tech Support** and **Online Security** with internet plans to increase customer satisfaction.
3. **Encourage Reliable Payment Options:** Motivate users to switch from **electronic checks to credit cards or bank transfers** for better retention.
4. **Senior Citizen Care Plans:** Introduce specialized customer support for elderly users.
5. **Analyze Fiber Optic Feedback:** Improve service quality or pricing for fiber users to reduce churn.