Executive Summary

This report provides an in-depth analysis of customer churn patterns using data from a telecommunications company. The dataset includes various service-related and demographic features such as phone services, internet usage, security features, and contract types. The objective is to identify the factors influencing customer churn and provide insights that can help reduce churn rates and improve customer retention strategies.

The analysis involved thorough data preprocessing, including handling missing or inconsistent values, transforming categorical variables for better readability, and exploring feature distributions. Visualizations were primarily created using countplots to understand customer preferences and their association with churn.

🔍 Data Overview

The dataset consists of **7,043 customer records** and **21 columns** covering demographic details, service subscriptions, and billing information. Some key statistics:

- **Average Monthly Charges:** $64.76
- **Average Tenure:** 32.37 months
- **Churn Rate:** Approximately **26.5%** of customers left the service

Numerical features were summarized using descriptive statistics, while categorical variables were explored visually.

📑 Key Variables Analyzed

1. Phone Service

- Around **90.3%** of customers have phone service.
- Among those without phone service, churn is significantly lower, likely due to minimal service usage.

2. Multiple Lines

- **47.6%** of customers with multiple lines churned, compared to **21.4%** with a single line.
- Customers with no phone service showed very low churn.

3. Internet Service

- **Fiber optic users** show the highest churn (**41.6%**), followed by DSL (**18.6%**).
- Customers without internet service had a very low churn rate (**7.4%**).

4. Online Security, Backup, Device Protection, Tech Support

- In each category, customers **without these features** had churn rates **between 35-45%**, while those **with the features** had churn rates around **15-20%**.
- These patterns suggest that **value-added services** contribute positively to customer retention.

5. StreamingTV & StreamingMovies

- Churn rates among customers with streaming services were slightly higher (**37-40%**) than those without.
- Indicates that while streaming is popular, it doesn't necessarily correlate with loyalty.

6. Contract Type

- **Month-to-month contracts** show a churn rate of **43.9%**, significantly higher than **1-year (11%)** and **2-year contracts (2.8%)**.
- This reinforces the importance of long-term contracts for retention.

7. Paperless Billing and Payment Methods

- Customers using **electronic checks** showed higher churn (**45%**) compared to those using **automatic payments** (under **20%**).
- **Paperless billing users** also showed elevated churn rates.

📈 Visual Insights

A series of **stacked and grouped bar plots** were created to illustrate churn behavior across multiple services. Key insights:

- Countplots revealed that churn rates increase when customers are not subscribed to security or support services.
- Fiber optic users have significantly higher churn than DSL users, possibly due to higher costs or service instability.
- Senior citizens churn slightly more than younger customers, though tenure plays a bigger role overall.

Each visual chart contributed to identifying behavioral patterns in churn and highlighted at-risk customer segments.

✅ Recommendations

1. **Incentivize Long-Term Contracts:** Offer discounts or loyalty points for switching from month-to-month to yearly contracts.
2. **Promote Value-Added Services:** Bundling security, backup, and tech support may reduce churn.

3. **Target Fiber Optic Users:** Investigate quality of service and pricing competitiveness.
4. **Switch to Auto-Pay:** Encourage electronic bank transfers to reduce churn.
5. **Personalized Retention Offers:** Use predictive churn models to proactively reach out to high-risk customers.

💡 Conclusion

The analysis confirms that **contract length, payment method, and access to support services** significantly influence churn behavior. Visualizations make it evident which service combinations promote loyalty and which demographics are more likely to leave.

These findings can help design targeted retention strategies that reduce churn, improve customer satisfaction, and increase long-term profitability.