

Summary:

This analysis focuses on identifying key factors contributing to customer churn in a telecommunications company. The dataset was cleaned and explored, with several insightful visualizations created to examine churn rates across different customer demographics and services.

Key Insights:

1. Data Cleaning & Preprocessing:

- The **TotalCharges** column initially had blanks, which were replaced with 0. The column was then converted from an object to a float type, ensuring accurate numerical analysis.
- The **SeniorCitizen** column, originally represented as 0 (non-senior) and 1 (senior), was converted to categorical values: "Yes" and "No," for clearer interpretation.

2. Churn Overview:

- A total of **26.54%** of customers have churned, as shown in a pie chart, indicating that over a quarter of the customer base has left the service. This is a critical metric, as reducing churn is crucial to maintaining revenue and customer loyalty.

3. Churn by Gender:

- A countplot was generated to analyze churn by gender. The churn rates between male and female customers appear fairly balanced, with no significant gender disparity. This suggests that gender, in isolation, is not a major determinant of customer churn in this dataset.

4. Churn by Senior Citizens:

- A detailed analysis was done on the **SeniorCitizen** category, which was split into "Yes" and "No."
- From the **stacked bar chart**, senior citizens show a higher churn rate compared to non-senior customers. Around **42%** of senior citizens have churned, whereas only **24%** of non-senior citizens have churned. This suggests that older customers may face service issues or other factors leading to higher churn.

5. Churn by Services:

- Several service-related variables such as **PhoneService**, **InternetService**, **StreamingMovies**, and **TechSupport** were explored to understand their impact on churn.
- Customers without additional services (like **OnlineSecurity**, **OnlineBackup**, or **TechSupport**) tend to have higher churn rates. For example:
 - **OnlineSecurity**: Among customers without online security, approximately **42%** have churned, compared to only **16%** churn for those with the service.

- **TechSupport**: Similarly, customers without tech support have a churn rate of **42%**, compared to only **16%** for those with tech support.
 - The **InternetService** variable shows a stark contrast:
 - Fiber optic users have a churn rate of around **30%**, which is notably higher than those using DSL (around **20%**) or those without internet service (approximately **8%**). This indicates that fiber optic customers may be experiencing issues that are causing dissatisfaction and churn.
6. **Senior Citizen & Service Relationships:**
- Further analysis combined the **SeniorCitizen** variable with other service variables to see the relationship between service usage and churn among senior citizens.
 - Senior citizens who do not have access to services like **OnlineSecurity** or **TechSupport** tend to churn at significantly higher rates, suggesting that these services may help in reducing churn in the senior customer segment.
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Conclusion:

This analysis highlights several key areas for targeted churn reduction efforts:

- **Senior Citizens** are more likely to churn, and providing targeted support or improved services could reduce churn in this group.
- **Internet service type**, particularly for **fiber optic** users, needs to be examined to understand and address the higher churn rate.
- **Value-added services** like **OnlineSecurity**, **TechSupport**, and **OnlineBackup** play a crucial role in customer retention. Customers who subscribe to these services are far less likely to churn, indicating these could be focus areas for increasing customer satisfaction and reducing churn.

By addressing these issues, the company can take actionable steps to lower its overall churn rate and enhance customer satisfaction.