

Customer Churn Analysis

Executive Summary:

This project provides a comprehensive analysis of customer churn using structured data exploration and visualization techniques. The dataset was preprocessed, ensuring accuracy by handling missing values, data inconsistencies, and categorical transformations for better interpretation. The analysis includes various data visualizations to understand churn patterns, service usage, customer demographics, and payment behaviors.

Key insights were extracted through various exploratory data analysis (EDA) techniques, including count plots, pie charts, and bar graphs, to highlight factors influencing churn.

Notably:

- Service-based features (e.g., OnlineSecurity, TechSupport, and StreamingServices) exhibit strong correlations with customer retention.
- Senior citizens show a distinct churn pattern, analyzed through categorical transformations.
- TotalCharges and tenure have been investigated to understand customer lifetime value and its impact on churn.

These insights suggest that enhancing value-added services and improving customer engagement could significantly reduce churn. The project offers a solid foundation for further predictive modeling or strategic interventions.

Key Findings from Visualizations

1. Overall Churn Rate (Pie Chart & Count Plot)

- The pie chart indicates that 26.54% of customers have churned, providing a clear view of churn severity.
- The count plot confirms the imbalance, showing a significantly higher number of non-churned customers.

2. Churn by Senior Citizen (Stacked Bar Chart & Count Plot)

- The stacked bar chart shows that senior citizens have a higher churn percentage compared to non-senior customers.
- The count plot confirms that senior citizens make up a smaller portion of the customer base but have a disproportionately high churn rate.
- Recommendation: Introduce loyalty programs or personalized offers for senior citizens to improve retention.

3. Churn by Tenure (Histogram & Boxplot Analysis)

- A histogram reveals that customers with shorter tenure (1-2 months) have the highest churn rate.
- The boxplot further confirms that longer-tenure customers are more stable and less likely to churn.
- Recommendation: Target new customers within the first few months with engagement strategies to improve retention.

4. Churn by Contract Type (Bar Chart)

- The bar chart demonstrates that customers on month-to-month contracts experience the highest churn.
- In contrast, those with 1-year or 2-year contracts have significantly lower churn rates.
- Recommendation: Offer discounts or incentives for customers switching to long-term contracts.

5. Impact of Additional Services on Churn (Stacked Bar Charts)

- Online Security, Tech Support, and Device Protection significantly impact churn.
 - Customers who lack these services churn at much higher rates.
 - Those who have these services tend to stay longer.
- StreamingTV and StreamingMovies show less correlation with churn, indicating that entertainment services are not the main decision factor for retention.
- Recommendation: Upsell security and tech support services to increase retention.

6. Churn by Internet Service Type (Grouped Bar Chart)

- Fiber optic internet users have the highest churn rate, despite being a popular choice.
- DSL users show moderate churn, while customers with no internet service churn the least (likely because they have fewer digital interactions).
- Recommendation: Investigate fiber optic service quality issues and improve customer satisfaction.

7. Churn by Payment Method (Bar Chart & Stacked Chart)

- Customers who use electronic checks have the highest churn rate.
- Those using credit cards or bank transfers churn at much lower rates.

- Recommendation: Encourage secure autopay options to reduce churn among electronic check users.
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Conclusion & Recommendations

1. Target high-risk groups: Focus on senior citizens and new customers within the first few months.
2. Promote long-term contracts: Offer discounts or loyalty perks to shift customers from month-to-month plans.
3. Improve service quality: Address concerns with fiber optic internet and encourage add-on services like Tech Support and Online Security.
4. Optimize payment methods: Reduce churn among electronic check users by promoting secure autopay options.
5. Personalized retention strategies: Use predictive modeling to identify and engage customers likely to churn.