

# Telco Customer Churn EDA Report

## 1. Summary of Exploratory Data Analysis

- The dataset was preprocessed to handle missing or invalid entries, particularly in the `TotalCharges` column.
  - The `SeniorCitizen` field was converted into a categorical Yes/No format for easier interpretation.
  - Univariate analysis was done on features like `tenure`, `MonthlyCharges`, and `Churn`.
  - Bivariate relationships (e.g., `Contract` vs `Churn`, `tenure` vs `Churn`) were visualized with count plots and histograms.
  - A heatmap of correlation was generated for numeric features.
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## 2. Key Insights from EDA

- **Churn Rate:** Approximately 26–30% of customers have churned.
  - **Contract Type:** Month-to-month customers show a significantly higher churn rate than those on one- or two-year contracts.
  - **Tenure:** Most churned customers are new (low tenure), indicating difficulty in customer retention early in the relationship.
  - **Monthly Charges:** Higher monthly charges correlate with higher churn, especially without bundled service discounts or long-term commitments.
  - **Services Impact:** Customers subscribed to services like Online Security, Tech Support, and Streaming TV showed lower churn.
  - **Payment Method:** Those using Electronic Check had the highest churn, possibly indicating lower satisfaction or unstable payment preferences.
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### 3. Suggestions for Improvements

- **Feature Engineering:**
    - Bin the **tenure** column to segment customer loyalty stages (e.g., New, Mid-term, Long-term).
    - Create a “bundle score” to measure how many services a customer subscribes to.
  - **Handling Imbalanced Data:**
    - Use techniques like SMOTE or assign class weights during model training to handle the imbalance in churn distribution.
  - **Missing Data:**
    - Double-check that all blanks in **TotalCharges** are handled via coercion to numeric followed by removing rows with **NaN**.
  - **Customer Lifetime Value (CLV):**
    - Incorporate CLV calculations to prioritize retaining high-value customers.
  - **Customer Segmentation:**
    - Apply clustering (e.g., K-Means) based on features like tenure, charges, and services to tailor marketing/retention strategies.
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### 4. Conclusion

This EDA provides actionable insights into what drives customer churn. Major churn contributors include short contract durations, high charges, and lack of support services. By strategically bundling services, offering long-term contracts, and using predictive modeling, Telco companies can significantly improve customer retention.