**1. Data Preprocessing**

* **Loading Data**: Customer churn data was loaded for analysis.
* **Column Details**: Data contains columns related to customer demographics, account information, subscription details, and churn status.
* **Cleaning**:
  + Missing or incorrect data handling.
  + Conversion of numerical columns like TotalCharges from strings to numeric values (if applicable).
  + Encoding categorical variables for analysis.

**2. Exploratory Data Analysis (EDA)**

* **Churn Distribution**:
  + The Churn column was analyzed to understand the percentage of customers who churned.
* **Univariate Analysis**:
  + Count plots and histograms were created for features like Contract, PaymentMethod, InternetService, and SeniorCitizen.
* **Bivariate Analysis**:
  + Relationships between churn and categorical features (e.g., Contract type, PaymentMethod) were explored using stacked bar charts and percentage-based counts.
* **Key Observations**:
  + Customers on month-to-month contracts have the highest churn rates.
  + Customers using electronic checks as a payment method churn more often compared to other payment methods.

**3. Visualization Summary**

* Multiple count plots and bar charts were created to analyze customer churn against:
  + **Contract Type**: Month-to-month contracts show significantly higher churn.
  + **Payment Method**: Electronic check has the highest churn rate.
  + **Internet Service Type**: Fiber optic users churn more compared to DSL users.
* Insights were clearly labeled with bar percentages using bar\_label for better readability.

**4. Statistical Analysis**

* Calculations such as mean, median, standard deviation, and overall statistics of columns like tenure and TotalCharges were computed to describe the dataset quantitatively.

**5. Potential Modeling or Predictions**

* The dataset appears ready for machine learning if that’s the next step, with all features analyzed and preprocessed for predictive modeling.