**Telco Customer Churn Analysis Project**

In this project, a comprehensive exploratory data analysis (EDA) was performed on a telecom customer churn dataset to identify key drivers of churn and suggest potential strategies to retain customers.

**1. Data Cleaning and Preparation**

* The TotalCharges column contained blank entries, which were logically replaced with 0.
* The datatype of TotalCharges was converted from *object* to *float* for proper numerical analysis.
* Dataset inspection through .head(), .info(), and .describe() provided an understanding of variable types, null values, and basic distribution.

**2. Key Insights from Visualizations**

**Overall Churn Rate**

* **26.5%** of customers churned, while **73.5%** remained loyal.
* A pie chart clearly illustrated the imbalance, confirming that churn, although significant, was not the majority.

**Churn by Gender**

* **Male churn rate**: ~26.2%
* **Female churn rate**: ~26.9%
* Observation: Both genders had similar churn rates, indicating **gender was not a strong predictor** of churn.

**Churn by Senior Citizen Status**

* **Senior Citizens churned at ~42%**, compared to **24% churn** for non-senior citizens.
* Insight: Being a senior citizen **almost doubled** the likelihood of churn compared to younger customers.

**Churn by Contract Type**

* **Month-to-month contract** customers churned at a **43%** rate.
* **One-year contract** customers had a churn rate of about **11%**.
* **Two-year contract** customers had the **lowest churn rate (~3%)**.
* Insight: Longer-term commitments significantly reduced churn rates.

**Churn by Monthly Charges**

* Customers paying **higher monthly charges** (> $70) had a **churn rate above 40%**.
* Customers paying **lower charges** (< $50) showed a churn rate of **less than 20%**.
* Insight: **Higher service costs** strongly correlated with customer dissatisfaction and churn.

**Impact of Services on Churn**

* **Tech Support**:
  + Customers **without tech support** had a churn rate of **37%**.
  + Those **with tech support** churned at a much lower rate of **15%**.
* **Online Security**:
  + Customers **without online security** had a churn rate of **35%**.
  + Those **with online security** had a churn rate of **16%**.
* Insight: Offering **support and security services** helped **cut churn rates by more than half**.

**Churn by Tenure**

* Customers with a tenure of **0–12 months** had a **churn rate exceeding 45%**.
* Customers with a tenure of **24+ months** had a churn rate of **less than 10%**.
* Insight: **The first year** is **critical** for customer retention.

**3. Overall Conclusions**

* **High-Risk Churn Profiles**:
  + Month-to-month contract customers.
  + Senior citizens.
  + Customers without tech support or online security.
  + Customers in their first year with the company.
  + Customers paying high monthly charges.
* **Retention Strategy Recommendations**:
  + Promote longer contracts through discounts or benefits.
  + Offer free or discounted tech support/security services to vulnerable groups.
  + Provide loyalty programs for first-year customers to encourage tenure extension.
  + Focus on senior citizens with tailored plans and better support.

**4. Quality of Visualizations**

* Effective use of **Seaborn** and **Matplotlib** libraries.
* Well-labeled pie charts, bar plots, and histograms enhanced understanding.
* Smart color coding (e.g., highlighting churners distinctly) improved visual storytelling.

**Final Summary and Recommendation Statement:**

"**Through a systematic EDA approach and impactful visualization, this churn analysis project revealed critical customer behaviors and risk factors. It identified major churn drivers such as short tenure, higher charges, lack of services like tech support, and seniority. The insights derived can serve as a foundation for targeted marketing and retention initiatives aimed at reducing customer attrition and improving lifetime value.**"