Summary

This project analyzes a telecom dataset of **7,043 customers** with **21 features**, focusing on identifying drivers of customer churn. Data preprocessing included handling missing values, encoding categorical variables, and converting numerical attributes into more interpretable formats.

#### **Key Findings**

* **Overall Churn Rate:**
  + Approximately **26.5% of customers churned** while **73.5% remained**.
  + This indicates that about **1 in 4 customers leave**, a significant challenge for customer retention.
* **Customer Demographics:**
  + **Gender:** Churn is nearly balanced across genders (**27% male vs 26% female churn**), showing no strong gender bias.
  + **Senior Citizens:** Senior customers churn at **41%**, almost **2.5x higher** than younger customers (**17%**).
* **Services & Subscriptions:**
  + Customers without **Online Security** had a churn rate of **42%**, compared to **15%** for those with it.
  + Lack of **Tech Support** also drove churn up to **42%**, versus **15%** for those subscribed.
  + Streaming services (TV/Movies) showed weaker influence, with churn rates hovering around **30%**.
* **Contracts & Billing:**
  + **Month-to-Month Contracts:** Highest churn at **43%**.
  + **One-Year Contracts:** Lower churn at **11%**.
  + **Two-Year Contracts:** Lowest churn at **3%**.
  + **Payment Method:** Customers using **Electronic Checks** churned at **45%**, compared to **20%–25%** for other methods.
  + **Paperless Billing:** Churn was **34%** with paperless billing, vs **17%** without.
* **Tenure & Charges:**
  + **Tenure:**
    - Customers with **<12 months** tenure churned at **52%**.
    - Customers with **>24 months** tenure churned at **12%**.
  + **Monthly Charges:**
    - High-charging customers (**>$80/month**) churned at **42%**.
    - Low-charging customers (<$40/month) churned at **16%**.

#### **Conclusion**

The analysis clearly shows that **contract type, tenure, and add-on services (security, tech support)** are the strongest predictors of churn. Short-term customers, especially those on month-to-month contracts with high monthly charges and no added services, are most at risk.

**Recommendations:**

1. Introduce **incentives for customers to switch from month-to-month to yearly contracts**.
2. Bundle critical services like **Online Security and Tech Support** at discounted rates.
3. Launch **special retention programs for senior citizens and high-bill customers**.
4. Address dissatisfaction with **paperless billing and electronic check payment methods** by improving customer experience and communication.