Telecom Customer Churn Analysis Using Python

This project is a **telecom customer churn analysis** conducted using Python and several popular data analysis libraries. The purpose of the project is to explore customer data to identify which factors are most strongly associated with customer churn. The insights gained can help the company reduce churn by addressing the reasons customers leave.

Tools & Technologies Used

- **Python**
- **Pandas** for data manipulation and analysis
- **Seaborn & Matplotlib** for visualization
- **Dataset**: Real-world telecom customer data (around 7,043 records)

Key Analyses & Insights

1. **Churn Distribution**

   - **26.5% of customers have churned**. That means more than **1 in 4 customers** left the service.
   - This high churn rate is a serious concern, especially for a subscription-based business model.

2. **Contract Type vs Churn**

   - Customers with:
     - **Month-to-Month** contracts: **43.9% churned**
     - **One Year** contracts: **11.5% churned**
     - **Two Year** contracts: **2.8% churned**

   Insight:
   Long-term contract holders are significantly less likely to churn. Offering discounts for annual or bi-annual contracts could reduce churn substantially.

3. **Payment Method vs Churn**

   - Churn rate by payment method:
        - **Electronic Check**: **45.2% churned**
        - **Mailed Check**: **19.2% churned**
        - **Bank Transfer (Auto)**: **15.0% churned**
        - **Credit Card (Auto)**: **14.4% churned**

   Insight:
   Electronic Check users have **more than double** the churn rate compared to auto-pay users. Promoting auto-pay could reduce involuntary churn and improve customer stickiness.

4. **nternet Service vs Churn**

   - Churn rate by internet type:
        - **Fiber Optic**: **41.3% churned**
        - **DSL**: **19.8% churned**
        - **No Internet**: **7.3% churned**

   Insight:
   Fiber optic customers show the **highest churn rate**, likely due to issues with cost or service quality. Improvement efforts or value-added offers should target this group.

5. **Tenure vs Monthly Charges (Bivariate Analysis)**

   - New customers with **<10 months tenure** and **monthly charges > $70** had the **highest churn rate**.
   - Customers with **tenure > 50 months** showed **very low churn**, regardless of charges.

   Insight:
   Early-stage customers facing high monthly bills are more likely to leave. Offering early loyalty rewards, price-locks, or onboarding support may improve retention.

6. Senior Citizens and Churn

- **Senior Citizens** (aged 65+):
    - Make up **16%** of total customers.
    - Have a churn rate of **41%** — higher than the **overall average of 26.5%**.

Insight:
Senior citizens are more likely to churn. This group might benefit from simplified plans, better customer service, or dedicated support lines.

7. Gender vs Churn

- Churn is nearly identical across gender:
    - **Male**: ~27%
    - **Female**: ~26%

Insight:
Gender has **no significant impact** on churn. Focus should be shifted toward other more impactful features like contract type or internet service.

Visuals and Data Storytelling

You created impactful visualizations using Seaborn and Matplotlib, including:

- **Countplots** segmented by churn for multiple variables
- **Histograms and box plots** to show relationships between continuous variables
- **Heatmaps and correlation analysis** (optional extension suggestion)

These charts were well-labeled and helped communicate your findings effectively.

Recommendations for Reducing Churn

1. **Promote long-term contracts** with discounts or loyalty rewards.
2. **Incentivize auto-pay options** over Electronic Checks.
3. **Improve the experience for fiber-optic users**, potentially with customer service or infrastructure improvements.
4. **Tailor plans for senior citizens**, such as easy-to-use services or family-based bundles.
5. **Focus retention strategies** on new users during the first 3–6 months.