Executive Summary: Telecom Customer Churn Analysis (Python EDA)

Overview:

This project performs a detailed Exploratory Data Analysis (EDA) on a telecom customer dataset using Python. The primary objective is to identify key patterns and factors contributing to **customer churn**, enabling the business to make informed decisions to improve customer retention.

Project Objective:

To analyze customer demographics, service usage, and billing information in order to understand the factors behind churn and to generate actionable business insights.

Tools & Technologies Used:

- **Python**, **Jupyter Notebook**
- **Pandas** for data manipulation
- **Matplotlib** and **Seaborn** for visualizations
- **NumPy**, **warnings**, and style customization (plt.style.use("seaborn"))

Dataset Overview:

- **Total Customers:** 7,043
- **Churned Customers:** 1,869 (~26.5%)
- **Retained Customers:** 5,174 (~73.5%)

Key Analysis Performed:

1. Data Cleaning & Preprocessing

- Identified and handled null values in the TotalCharges column.
- Converted data types and standardized categorical variables for analysis.

2. Churn Distribution

- Created bar and pie charts showing ~26.5% churn rate, which is a business-critical level.

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- Gender has no significant impact on churn, but Senior Citizens show a slightly higher churn (42%) compared to non-seniors (24%).

3. **Contract Type vs Churn**
   - Over 43% of customers on Month-to-Month contracts have churned.
   - Only 11% churn rate for One-Year contracts, and 3% for Two-Year contracts.
   - Insight: Long-term contract customers are significantly more loyal.
4. **Internet & Service Features**
   - Fiber optic users show a churn rate of ~41% vs. 18% for DSL.
   - Customers without Online Security or Tech Support are more likely to churn.
   - Suggests bundling these services could improve retention.
5. **Tenure and Monthly Charges**
   - Customers with tenure < 10 months account for ~70% of all churned customers.
   - Churn increases sharply for customers paying > ₹70/month, especially those with short tenure.
   - Consider discounts or onboarding rewards for new high-paying users.
6. **Payment Method vs Churn**
   - Mailed Check users have 40% churn rate.
   - In contrast, Automatic Payment (Bank/Wallet) users have only ~15% churn.
   - Insight: Encourage auto-pay options to reduce churn risk.

Key Insights:

- Customers on **month-to-month contracts** have significantly higher churn compared to those on annual or two-year contracts.
- **Fiber optic internet users** tend to churn more, possibly due to pricing or service quality.
- Lack of **Tech Support and Online Security** services correlates with higher churn.
- **Higher monthly charges** increase the likelihood of churn, especially when paired with fewer services.
- Customers who churn tend to have **shorter tenure**, indicating poor early engagement.

Business Recommendations:

- **Encourage long-term contracts** to reduce churn (e.g., offer discounts on annual plans).
- **Bundle tech support and security services** with base plans.

- Identify and engage **at-risk new customers** (tenure < 10 months) through loyalty programs or personalized support.
- Review and adjust pricing strategies for customers with high monthly charges and fewer services.