Summary

Objective:

The primary objective of this analysis is to **understand customer churn behavior** using the **Telco-Customer-Churn** dataset. By examining customer demographics, tenure, and subscription characteristics, we aim to identify **factors leading to customer attrition** and recommend actionable insights for improving customer retention.

📁 Dataset Overview:

- **File:** `Telco-Customer-Churn.csv`
- **Total Records:** ~7,043 customers
- **Key Features:**
    - **Demographic:** `gender`, `SeniorCitizen`, `Partner`, `Dependents`
    - **Account Info:** `tenure`, `MonthlyCharges`, `TotalCharges`
    - **Service Info:** `InternetService`, `OnlineSecurity`, `TechSupport`, etc.
    - **Target Variable:** `Churn` (Yes/No)

🧹 Data Cleaning & Preprocessing Highlights:

1. **TotalCharges** had some empty string entries (likely customers with 0 tenure). These were:
    - Replaced with `0` (0.11% of data)
    - Converted to `float` for analysis
2. **SeniorCitizen** column was encoded from numeric (0/1) to categorical (`Yes`, `No`) for better readability.
3. Verified:

- **No missing values**
- **No duplicate `customerID`**
- **Balanced categorical types**

📊 Churn Distribution:

- **Churned Customers: 1,869** out of 7,043 → **26.54%**
- **Non-Churned Customers: 5,174 → 73.46%**

🧠 **Insight:** Roughly 1 in 4 customers is churning, which is a significant metric for business losses.

> ✔️ This sets the foundation for understanding **why** this group is leaving.

📈 Visual Insights & Key Findings:

📌 1. Churn by Gender

- **Males:** 50.5% of customers | Churn Rate: ~26.6%
- **Females:** 49.5% of customers | Churn Rate: ~26.4%

> **Conclusion:** Gender **does not significantly impact churn**. Both genders behave similarly.

📌 2. Churn by Senior Citizen Status

- **Senior Citizens (Yes):** 16.2% of customers
    - **Churned:** ~42.2%
- **Non-Seniors (No):** 83.8% of customers
    - **Churned:** ~23.1%

Conclusion: Senior citizens are **~1.8 times more likely to churn** than non-senior customers. This could be due to affordability, tech adoption, or support.

📌 3. Tenure vs Churn

- Customers with **tenure < 10 months** had the **highest churn rate**.
- **Churn steadily decreases as tenure increases.**

Conclusion: Retaining users in the **first year** is crucial. Long-term customers are **much more loyal**.

📉 Potential Areas to Explore Further:

- Contract type, paperless billing, monthly charges, and other service-specific attributes may show strong churn patterns.
- Use clustering or predictive modeling (logistic regression, random forest) to build a churn prediction model.

🛠️ Tools & Libraries Used:

- **Language:** Python
- **Libraries:** `pandas`, `seaborn`, `matplotlib`, `numpy`
- **Techniques:** Data cleaning, grouped bar plots, pie charts, stacked bar charts, histograms

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✅ Final Notes:

This EDA has provided **actionable insights** into customer churn. Notably:

- Churn is a **serious issue affecting over 26%** of the customer base.
- Senior citizens and new users (low tenure) are **high-risk segments**.

- Gender is not a discriminatory factor.

The analysis creates a solid foundation for:

- Building a **predictive churn model**
- Designing **targeted retention strategies**