📊 Customer Churn Analysis — Exploratory Data Analysis Summary

🔹 Project Overview

This project focuses on analyzing customer churn behavior for a telecom service provider using Exploratory Data Analysis (EDA). The objective was to identify **key factors influencing customer churn**, uncover behavioral patterns, and derive **actionable business insights** that can help reduce churn and improve customer retention.

The analysis was performed using **Python**, leveraging libraries such as **Pandas, NumPy, Matplotlib, and Seaborn**.

🔹 Data Understanding & Preparation

- The dataset consists of **7,043 customer records** with demographic, service usage, contract, and payment-related attributes.
- Data quality checks revealed **no duplicate customer IDs**.
- Missing values in the `TotalCharges` column were handled by identifying blank entries caused by **customers with zero tenure**, and safely converting the column to a numeric format.
- The `SeniorCitizen` variable was transformed from binary (0/1) to categorical (`yes/no`) for improved interpretability.

🔹 Key Insights from EDA

1️⃣ Overall Churn Rate

- **26.54% of customers have churned**, indicating a significant retention challenge and a strong need for targeted churn-reduction strategies.

2️⃣ Demographics & Churn

- **Gender does not have a significant impact** on churn, as churn rates are fairly consistent across male and female customers.

- **Senior citizens exhibit a noticeably higher churn rate** compared to non-senior customers, highlighting an at-risk customer segment.

3️⃣ Tenure & Customer Retention

- Customers with **short tenure (1–2 months)** show the highest churn rates.

- Customers who have stayed longer are **far more likely to remain loyal**, indicating that early customer experience is critical.

4️⃣ Contract Type Influence

- Customers on **month-to-month contracts are significantly more likely to churn**.

- Long-term contracts (1-year and 2-year) are strongly associated with higher retention, suggesting contract duration plays a key role in churn prevention.

5️⃣ Services & Churn Behavior

- Customers who **do not use value-added services** such as:
    - Online Security
    - Online Backup
    - Tech Support
    - Streaming TV / Movies
      show **higher churn rates**.

- Customers using **InternetService (especially DSL)** and **PhoneService** tend to stay longer, indicating these services increase customer stickiness.

6️⃣ Payment Method Risk

- Customers using **Electronic Check** as a payment method show **the highest churn rate**
- Other payment methods (credit card, bank transfer, auto-pay) are associated with better retention.

🔹 Business Implications & Recommendations

- **Improve early customer onboarding**, especially during the first 1–2 months.
- Introduce **incentives to move customers from month-to-month to long-term contracts**.
- Target **senior citizens** with tailored support, simplified plans, or dedicated assistance.
- Promote **value-added services** (Online Security, Tech Support) as retention drivers.
- Encourage customers to switch from **electronic check to automated payment methods** through discounts or rewards.

🔹 Tools & Techniques Used

- **Python**: Pandas, NumPy
- **Data Visualization**: Matplotlib, Seaborn
- **Techniques**: Data cleaning, feature transformation, univariate & bivariate analysis, percentage-based comparisons

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🔹 Final Conclusion

This EDA successfully identified **high-risk churn segments and behavioral patterns** that directly impact customer retention. The insights derived can help business stakeholders make **data-driven decisions** to reduce churn, improve customer satisfaction, and increase long-term revenue.