Customer Churn Analysis – EDA Project Report

---

1. Project Objectives

The primary objective of this project is to **analyze customer churn patterns** within a telecom dataset and identify the factors influencing churn. Specifically, the analysis seeks to:

- Explore how **contract type, payment method, tenure, internet service, and demographics** affect churn.
- Provide **data-driven insights** that can help reduce customer churn and improve retention strategies.
- Demonstrate skills in **data cleaning, visualization, and insight generation** using Python libraries (Pandas, NumPy, Matplotlib, and Seaborn).

---

2. Methodology & Approach

🔹 Step 1: Data Collection

- Dataset: *Telco Customer Churn* (sourced from Kaggle).
- Rows: 7,043 | Columns: 21.

🔹 Step 2: Data Cleaning

- Replaced blank entries in `TotalCharges` with **0** and converted datatype to `float`.
- Converted `SeniorCitizen` (0/1) into categorical values (“Yes/No”) for clarity.
- Checked for duplicates → **none found**.
- Verified missing values → **0 nulls** after cleaning.

🔹 Step 3: Exploratory Data Analysis (EDA)

- **Descriptive Statistics** (mean, median, percentiles).
- **Univariate Analysis** (count plots, pie charts).
- **Bivariate Analysis** (churn vs contract type, churn vs payment method, churn vs tenure, churn vs senior citizen).
- **Multivariate Visualizations** (stacked bar charts, boxplots, correlation heatmaps).

🔹 Step 4: Visualization Tools

- **Seaborn** for countplots, barplots, histograms, and heatmaps.
- **Matplotlib** for pie charts and custom plots.

---

3. Findings & Outcomes

📌 Churn Distribution

- Overall churn rate: **26.5%** of customers.

📌 Contract Type & Churn

- **Month-to-month contracts** → churn rate of **42%**.
- **One-year contracts** → churn rate of **11%**.
- **Two-year contracts** → churn rate of **3%**.
  ➡️ Longer contracts strongly reduce churn.

📌 Payment Method & Churn

- **Electronic check** → churn rate of **45%**.
- Other payment methods (credit card, bank transfer, mailed check) → **15–18% churn**.
  ➡️ Electronic check users are almost **3× more likely** to churn.

📌 Tenure & Churn

- Customers with **<1 year tenure** → churn rate of **50%**.
- Customers with **1–3 years tenure** → churn rate drops to **35%**.
- Customers with **>3 years tenure** → churn rate reduces further to **15%**.
  ➡️ Early engagement in the first year is critical.

📌 Internet Service Type

- Fiber optic customers churn at **30%**, compared to **20%** for DSL.
  ➡️ Fiber optic service users may be dissatisfied with cost or quality.

📌 Senior Citizens

- Senior citizens churn rate: **41%**.
- Non-senior customers churn rate: **26%**.
  ➡️ Older customers are significantly more likely to leave.

---

4. Recommendations

1. **Promote Long-Term Contracts**
   - Offer discounts, loyalty points, or free upgrades for customers choosing yearly or bi-annual contracts.
2. **Address Payment Method Concerns**
   - Encourage electronic check users to switch to more stable payment options (credit card, bank transfer).
3. **Improve Early Tenure Experience**
   - Focus on first-year customers with welcome programs, proactive support, and personalized offers.
4. **Targeted Retention for Senior Citizens**
   - Provide senior-friendly customer support, dedicated offers, and easy payment solutions.

5. **Improve Fiber Optic Service Satisfaction**
    - Investigate quality concerns, pricing issues, and provide better packages to reduce dissatisfaction.

---

5. Conclusion

This analysis highlights the **key drivers of customer churn**: short tenure, month-to-month contracts, electronic check payments, fiber optic services, and senior citizen demographics.

By addressing these factors through **strategic retention initiatives**, the telecom company can significantly reduce churn and improve customer loyalty.