Telecom Customer Churn Prediction

A Data Analysis Project Using Python

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1. Introduction

In today's highly competitive telecom industry, customer retention is a critical challenge. This project aims to explore customer churn behavior and identify patterns that can help telecom companies take proactive steps to reduce churn rates.

2. Objective

The primary objective is to analyze customer data, perform data cleaning and preprocessing, and derive actionable insights that help understand why customers are leaving the telecom service provider.

3. Tools and Technologies Used

- Language: Python

- Environment: Jupyter Notebook

- Libraries: Pandas, NumPy, Matplotlib, Seaborn

4. Dataset Description

- Source: Kaggle (Telecom Customer Churn Dataset)

- Rows: 7043

- Columns: 21

- Key Features Include:

  CustomerID, Gender, SeniorCitizen, Partner, Dependents, Tenure, PhoneService, InternetService, Contract, PaymentMethod, MonthlyCharges, TotalCharges, Churn (Target variable)

5. Data Cleaning & Preprocessing

- Handled missing values in the TotalCharges column

- Converted SeniorCitizen to categorical (Yes/No)

- Removed duplicates and irrelevant columns (if any)

6. Exploratory Data Analysis (EDA)

- Analyzed churn rate distribution

- Compared churn across gender, contract types, internet services, etc.

- Visualized churn vs monthly charges, tenure, and total charges

- Found patterns like:

  Customers with month-to-month contracts tend to churn more

  Higher monthly charges are often associated with churn

  Customers with fiber optic internet showed higher churn rates

7. Insights and Observations

- Tenure: Customers with longer tenure are less likely to churn

- Contract Type: One-year and two-year contracts reduce churn

- Payment Method: Electronic check users tend to churn more

- Senior Citizens: Slightly higher churn rate

- Targeted retention strategies can be designed based on these patterns

8. Conclusion

Through data analysis and EDA, we identified key factors influencing customer churn. These insights can help telecom companies personalize offers and improve customer retention strategies.