Customer Churn Analysis

Project Overview

This project aims to analyze customer churn patterns to identify key factors contributing to customer attrition. The insights derived from this analysis will help guide customer retention strategies and improve overall business performance.

Objective

- Explore customer churn patterns focusing on factors such as payment methods, contract types, tenure, and demographic attributes.
- Identify which factors are most strongly associated with higher churn rates to develop targeted retention strategies.

Data Description

The dataset includes information on customers' contract types, payment methods, tenure, and demographic details. Key variables include:
- **Customer ID**: Unique identifier for each customer
- **Contract Type**: Month-to-month, one-year, or two-year contracts
- **Payment Method**: Electronic check, credit card, bank transfer, mailed check
- **Tenure**: Duration of customer relationship with the company
- **Internet Service Type**: Fiber Optic, DSL
- **Senior Citizen**: Indicates if the customer is aged 65 or older
- **Churn**: Whether the customer has left the service or not

Methodology

1. **Data Cleaning & Preprocessing**:
   - Handled missing values and inconsistencies.
   - Converted categorical variables into numerical format for analysis.
   - Standardized data formats where necessary.
2. **Exploratory Data Analysis (EDA)**:
   - Identified trends and correlations between churn and customer attributes.
   - Created visualizations to highlight key insights.
3. **Statistical Analysis & Machine Learning (if applicable)**:
   - Applied logistic regression and decision tree models to predict churn likelihood.

Key Insights & Findings

1. **Contract Type and Churn**:

   - Customers on month-to-month contracts have the highest churn rate (42%).

   - Churn rates drop significantly for customers on one-year (11%) and two-year contracts (3%).

   - **Implication**: Longer contract periods act as a strong retention tool.

2. **Payment Methods and Churn**:

   - Customers paying via electronic checks have the highest churn rate (45%).

   - Customers using credit cards, bank transfers, or mailed checks show lower churn rates (15-18%).

   - **Implication**: Encouraging a shift to stable payment methods could reduce churn.

3. **Churn by Tenure**:

   - Customers with less than one year of tenure exhibit the highest churn rate (50%).

   - Churn reduces for customers with 1-3 years of tenure (35%) and drops further for those with more than three years (15%).

   - **Implication**: Early engagement, especially in the first year, is critical.

4. **Churn by Internet Service Type**:

   - Customers using Fiber Optic services have a higher churn rate (30%) compared to DSL customers (20%).

   - **Implication**: Higher churn in Fiber Optic services may be due to competition or dissatisfaction with speed and reliability.

5. **Senior Citizens and Churn**:

   - Senior citizens (aged 65+) have a churn rate of 41%, compared to 26% for non-senior citizens.

   - **Implication**: Special retention programs tailored for senior customers may help reduce churn.

Recommendations

1. **Promote Long-Term Contracts**:

   - Offer incentives such as discounts or added benefits to encourage customers to commit to longer contracts.

2. **Address Payment Method Concerns**:

   - Launch campaigns to educate and encourage customers to switch from electronic checks to more secure payment methods.

3. **Customer Engagement in Early Tenure**:

   - Enhance the customer experience and engagement in the first year through loyalty programs, onboarding assistance, and personalized offers.

4. **Special Senior Citizen Retention Programs**:

   - Develop targeted retention strategies for senior customers, such as personalized offers, enhanced customer service, or dedicated support programs.

Installation & Usage

1. Install required dependencies:

   ```bash
   pip install pandas numpy matplotlib seaborn scikit-learn
   ```

2. Run the data preprocessing script:

   ```bash
   python scripts/data_cleaning.py
   ```

3. Open and explore the analysis in Jupyter Notebook:

   ```bash
   jupyter notebook notebooks/churn_analysis.ipynb
   ```

4. Run the machine learning model (if applicable):

   ```bash
   python scripts/model_training.py
   ```

License

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Acknowledgments

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