Customer Churn Analysis Report

1. Introduction

Customer churn is a critical metric for businesses, especially in industries such as telecommunications, where retaining customers is crucial for long-term growth. This project aims to analyze customer churn in a telecommunications company using SQL, Python, and Power BI. By exploring key factors contributing to churn, we aim to uncover actionable insights that can help reduce churn and enhance customer retention strategies.

2. Data Collection and Preparation

The dataset used in this project contains information about customers' demographic details, contract types, services used, and whether they have churned or not. The key columns of the dataset include:

- **Customer ID**: Unique identifier for each customer
- **Gender**: Gender of the customer (Male/Female)
- **Churn**: Whether the customer has churned (Yes/No)
- **Tenure**: Duration of the customer's stay with the company
- **Contract**: Type of contract (e.g., month-to-month, one-year, two-year)
- **InternetService**: Type of internet service used (DSL, Fiber Optic, etc.)
- **PaymentMethod**: Payment method used by the customer (e.g., Bank Transfer, Credit Card)

Data Preparation

- Missing values were handled appropriately.
- Categorical variables were encoded as necessary.
- Data was cleaned to ensure accurate analysis.

3. Exploratory Data Analysis (EDA)

Exploratory Data Analysis (EDA) was performed using various statistical and visual techniques to understand patterns and trends in the dataset. The following analyses were performed:

- **Descriptive Statistics**: Measures such as mean, median, and mode were calculated to understand the central tendency of variables like tenure and monthly charges.
- **Gender-wise Churn Analysis**: The churn rates were analyzed across different gender groups to check for any significant differences.

- **Contract Type Analysis**: Churn rates were compared across various contract types (e.g., month-to-month, one-year, two-year).
- **Internet Service and Payment Method Analysis**: The impact of internet service type (DSL, Fiber Optic) and payment methods on churn rates were explored.

4. SQL Analysis

SQL was used to query the dataset and extract key insights. Some of the important queries performed include:

- **Churn Rate by Contract Type**: Calculated the churn rate for each contract type to understand which contract types had higher churn.
- **Churn Comparison Across States**: Identified the churn rate in different regions and states to explore if churn is location-dependent.
- **Payment Method and Churn**: Analyzed the churn rate for customers using different payment methods.

5. Key Insights and Findings

From the analysis, the following insights were derived:

- Customers with **month-to-month contracts** exhibited a higher churn rate compared to those with one-year or two-year contracts.
- **Fiber Optic** internet service customers had a higher churn rate compared to customers using DSL.
- **Male** customers showed a slightly higher churn rate than female customers.
- **Credit Card payment method** users had a significantly higher churn rate than those using other payment methods.

6. Conclusion

This analysis highlights key factors that contribute to customer churn in the telecommunications industry. While a regression model was not implemented, the analysis conducted through EDA, SQL, and Power BI has provided valuable insights into churn patterns. By focusing on retention strategies for customers using month-to-month contracts or Fiber Optic internet service, the company can potentially reduce churn.

7. Future Work

In future work, a predictive model could be developed using machine learning techniques such as logistic regression, decision trees, or random forests to predict customer churn more accurately. Additionally, the analysis could be extended to include customer demographics and usage behavior to better understand the drivers of churn and retention.