

# Telecom Customer Churn Analysis

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## Problems and Background

In today's highly competitive telecom industry, retaining customers is a major challenge due to the increasing number of service providers and growing customer expectations. Companies face significant losses when customers churn, often without a clear understanding of the reasons behind their departure. This project focuses on analyzing customer churn behavior using real-world data from a telecom company. By identifying key factors that influence churn — such as contract types, payment methods, internet services, and tenure — the goal is to equip the business with actionable insights to reduce churn, improve customer satisfaction, and increase overall profitability. This analysis is crucial for customer-centric decision-making and long-term growth strategies.

## Solution

To address the problem of customer churn, a structured data analysis approach was applied. The process began with cleaning and transforming the data using **SQL**, followed by exploratory analysis in **Python** to uncover patterns and relationships within customer behavior. This was further enriched through an interactive one-page **Power BI** dashboard.

## Data Analysis

The dataset was analyzed to understand key variables such as customer tenure, contract type, monthly charges, payment method, and customer demographics. Visualizations like bar charts, pie charts, and combined line-column graphs were used to identify trends in churn behavior. DAX measures were created to calculate churn rate, active/inactive customers, and churn by tenure.

## Data-Driven Insights

Several meaningful insights were derived from the analysis. For example, customers on month-to-month contracts exhibited the highest churn rate, while long-tenured customers

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were more likely to stay. Additionally, churn was higher among those using mailed check payment methods and fiber optic internet. These insights help pinpoint at-risk customer groups and highlight areas where retention strategies can be implemented effectively.

## Project Goal

The primary goal of this project was to identify the key factors contributing to customer churn in a telecom company and provide data-driven recommendations to minimize it. By leveraging SQL, Python, and Power BI, the aim was to build an end-to-end analytics solution that not only uncovers churn patterns but also presents them in an intuitive and interactive dashboard. The ultimate objective was to empower business stakeholders with actionable insights that support strategic decisions, improve customer retention, and enhance overall service quality.

## Recommended Analysis

### Python-Based Data Analysis

- **Data Cleaning** – Used pandas to remove duplicates, handle missing values, and standardize column formats.
- **Feature Engineering** – Derived new columns such as Age Group, and created a simplified churn label.
- **Exploratory Data Analysis (EDA)** – Visualized distributions, outliers, and correlations using matplotlib and seaborn.
- **Pre-Summarization** – Grouped and aggregated data (e.g., churn by contract type, average monthly charges by tenure) for meaningful patterns.

### SQL-Based Data Preparation

- **Joins and Merges** – Combined customer, service, and location data from multiple tables using INNER JOIN and LEFT JOIN.
- **Data Transformation** – Used CASE WHEN to derive churn labels.

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- **Filtering and Cleaning** – Removed noisy, null, and irrelevant data at the database level for efficient querying.

### Power BI Visual Dashboard

- **KPI Cards** – Display total customers, active customers, churned customers, churn rate, and average monthly charges.
- **Top 10 Churn Reasons** – Horizontal bar chart showing key factors contributing to churn.
- **Churn by Contract Type** – Clustered column chart comparing churn across month-to-month, one-year, and two-year contracts.
- **Customer Status Distribution** – Donut chart showing active vs churned customer split.
- **Churn Rate vs Tenure** – Combination chart showing churn rate trend with tenure and a line for average monthly charges.
- **Churn by Payment Method** – Highlights which payment options correlate with higher churn.
- **Interactive Slicers** – Gender, age group, internet type, and city filters for segmented insights

### Project Owner

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- **Date:** 24 Jul,2025