Telco Customer Churn Prediction

# Project Overview

This project analyzes customer churn within a telecommunications company to pinpoint the leading causes of churn. By employing predictive modeling techniques, the goal is to identify at-risk customers and inform targeted retention strategies effectively.

# Dataset

The project utilizes a dataset comprising 7043 records, with each record featuring 21 attributes related to customer demographics, account details, and subscription services. Attributes include gender, age (SeniorCitizen), partner status, tenure, contract type, payment method, and various telecommunication services, culminating in a binary churn indicator as the target variable.

# Features

- Data preprocessing and exploration  
- Feature selection and engineering  
- Model training with Logistic Regression, Random Forest  
- Evaluation using accuracy, precision, recall, F1-score

# Technologies Used

- Python 3  
- Pandas for data manipulation  
- NumPy for numerical operations  
- Matplotlib and Seaborn for visualization  
- Scikit-learn for model building and evaluation  
- XGBoost for improved accuracy

# Model Training and Evaluation

Decision Tree Classifier: Focused on identifying the primary predictors of churn. Key features include OnlineSecurity, tenure, and InternetService.

Logistic Regression: Employed to quantify the impact of various features on the likelihood of churn.

Models were rigorously evaluated using metrics such as accuracy, precision, recall, and f1-score, with a particular focus on balancing the dataset to improve model fairness and performance.

# Results

The investigation revealed that OnlineSecurity, tenure, and InternetService significantly influence customer churn. Decision Trees provided insight into the feature importance and decision-making process, while Logistic Regression offered a robust framework for understanding feature relationships with churn. These findings underscore the importance of targeted interventions for at-risk customer segments to mitigate churn effectively.