# Customer Churn Prediction Using Machine Learning Algorithm

## Introduction

The rise of subscription-based models in consumer-oriented companies has made customer retention a key factor for sustainable growth. predictive modeling offers companies the ability to foresee potential churn and take preventive measures, ensuring customer loyalty and reduced attrition.

## Problem Statement

Customer churn is one of the most significant challenges faced by companies. Losing customers not only reduces revenue but also increases the cost of acquiring new customers. Traditional methods of identifying churn are reactive and inefficient, leading to late interventions.

## Technology Used

Machine Learning Algorithms: Random Forest, Gradient Boosting (XGBoost, LightGBM).  
Data Processing Tools: Python, Pandas, NumPy.

Visualization: Matplotlib, Seaborn.  
Cloud Platforms: AWS, Azure, or GCP for scalable deployment.  
Database Management: SQL, NoSQL.

## Methodology

1. Data Collection: Collect customer data including subscription details, usage patterns, and support interactions from various sources.  
2. Data Preprocessing: Clean and preprocess the data by handling missing values, normalizing features, and encoding categorical variables.  
3. Feature Engineering: Create features that capture key customer behaviors such as login frequency, feature usage, and support requests.  
4. Model Training: Train machine learning models on historical data to identify patterns associated with churn.  
5. Model Evaluation: Use metrics such as accuracy, precision, recall, F1-score, and ROC-AUC to evaluate the model’s performance.  
6. Deployment: Deploy the model using APIs or integrate it into customer management systems to provide real-time churn predictions.