Customer Churn Prediction and Analysis

1. Requirements Gathering

1.1 Stakeholder Analysis

Identifying key stakeholders and their needs ensures that the system aligns with business objectives and user expectations. The key stakeholders include:

Stakeholder	Role & Interest	Needs
Business Executives (CEO, CFO, CMO)	Need insights to reduce churn and maximize revenue.	Actionable reports, predictive insights, customer segmentation.
Marketing Team	Wants to understand why customers leave.	Churn risk scores, customer behavior analysis, personalized retention strategies.
Customer Support Team	Needs insights into customer complaints and dissatisfaction.	Identifying at-risk customers and improving service interactions.
Data Science Team	Develops predictive models.	High-quality data, access to machine learning infrastructure, performance metrics.
IT & Security Team	Ensures system reliability and security.	Data security compliance, infrastructure management.
Customers	End users who interact with the service.	Better service, personalized experience, reduced friction.

1.2 User Stories & Use Cases

User stories help define how different users will interact with the system.

User Stories

1. **As a marketing manager**, I want to receive a **list of high-risk customers**, so that I can offer them targeted retention campaigns.
2. **As a customer service agent**, I want to **see a customer's churn risk score**, so that I can proactively address their issues.
3. **As a data scientist**, I want to **access structured customer data**, so that I can build accurate predictive models.
4. **As a business executive**, I want to **view a dashboard with churn trends**, so that I can make strategic decisions.

Use Case Example: Predicting Customer Churn

Actors: Marketing Manager, Data Science Team, CRM System
Preconditions: Data is collected, cleaned, and available in the system.
Steps:

1. The system collects customer transaction, behavior, and feedback data.
2. A machine learning model analyzes data and assigns churn probability scores.
3. The system sends churn reports to the marketing team.
4. Marketing executes targeted campaigns for high-risk customers.
   Postconditions: Improved customer retention and reduced churn.

1.3 Functional Requirements

The system should have the following features and functionalities:

1. **Data Collection & Storage**
   - Collect customer demographics, transactions, interactions, and support tickets.
   - Store data in a structured format (e.g., database, data warehouse).
2. **Data Processing & Feature Engineering**
   - Handle missing values, outliers, and inconsistencies.
   - Create relevant features such as frequency of purchases, time since last interaction, and sentiment analysis of feedback.
3. **Machine Learning Model for Churn Prediction**
   - Train classification models (e.g., Random Forest, XGBoost, Neural Networks).
   - Provide probability scores for customer churn risk.
4. **Dashboard & Visualization**
   - Show churn trends, high-risk customers, and retention strategies.
   - Allow filtering based on demographics, purchase behavior, etc.

5. **Automated Alerts & Notifications**
    - Send automated alerts to the marketing team about high-risk customers.
    - Recommend personalized offers based on customer profiles.
6. **Model Performance Monitoring**
    - Evaluate accuracy, precision, recall, and F1-score.
    - Retrain models periodically to maintain accuracy.

1.4 Non-Functional Requirements

Category	Requirement
Performance	The model should predict churn within **2 seconds per request**.
Security	Ensure customer data is encrypted and follows **GDPR compliance**.
Usability	The dashboard should have an **intuitive UI** with **clear visualizations**.
Scalability	The system should handle **millions of customer records** efficiently.
Reliability	Ensure **99.9% uptime** and provide **regular backups**.
