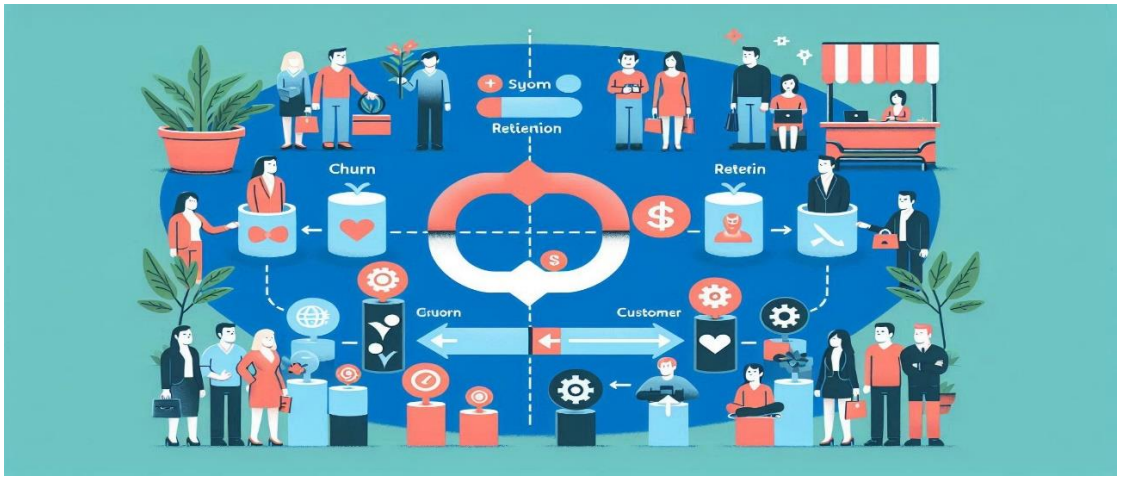
Developing a Comprehensive Churn Prediction and Retention System at XYZ Bank



Problem Statement: As an AI/ML engineer, you are tasked with developing a comprehensive churn prediction and retention system for our company. Your objective is to design and implement a solution that addresses the following components:

- **Predictive Models for Churn Analysis:** Analysing customer data to predict which customers are at risk of leaving and identifying factors contributing to churn.
- **NLP for Customer Feedback Analysis:** Understanding reasons for dissatisfaction by analysing textual feedback from surveys, complaints, and social media.
- **Generative AI for Retention Strategies make use of Chat bot:** Developing and testing personalized retention strategies and communication plans to reduce churn rates based on user feedback.

Solution:

- Develop a well-structured solution architecture utilizing the proposed techniques.
- Showcase the functionality of solution and its potential impact.

Dataset: For this assignment, you will work with the following datasets: Attached.

Task Requirements:

a) Data Understanding and Preprocessing:

- Examine the provided datasets and describe their structure.
- Identify relevant features for churn prediction.
- Propose and implement necessary data cleaning and preprocessing steps.
- Handle missing values and outliers appropriately.
- Perform exploratory data analysis to gain insights.

b) Predictive Models for Churn Analysis:

- Select and justify appropriate machine learning algorithms for churn prediction.
- Implement feature engineering techniques to improve model performance.
- Develop at least two different models.

- Evaluate and compare model performance using relevant metrics.
- Identify the most important features contributing to churn.

c) NLP for Customer Feedback Analysis:

- Preprocess textual data from customer feedback.
- Implement sentiment analysis to gauge overall customer satisfaction.
- Develop a method to extract key insights and reasons for dissatisfaction.

d) Generative AI for Retention Strategies:

- Propose an approach for using generative AI to create personalized retention strategies. Use the models as per your convenience.
- Develop a system to generate tailored communication plans based on customer profiles and churn risk.
- Implement a method to evaluate and refine generated strategies.
- Describe how you would integrate this component with the predictive model and NLP analysis.
- Build a Chat model for response based on user query.

  Example : My Debit Card often gets blocked without reason.

  Response from Chat bot: Thank you for facing issue with Debit Cards we will route to Debit Cards team.

  Or Routed to Debit Cards Team

- Develop a method for the chatbot to ask clarifying questions when needed

e) System Integration and Deployment:

- Outline an architecture for integrating all components into a cohesive system.
- Propose a deployment strategy (e.g., cloud-based, on-premises)
- Describe how you would handle real-time data processing and model updates.
- Discuss potential scalability challenges and how to address them.

f)) Ethical Considerations and Privacy:

- Discuss potential ethical implications of the churn prediction system.
- Propose measures to ensure customer privacy and data protection.
- Address any potential biases in the model and how to mitigate them.

Deliverables:

- Jupyter notebook(s) with complete solution that provide entire workflow, from data loading, EDA, FE to Model building and deployment code with clear comments and explanations.
- Python scripts for your final implementation.

- A presentation (maximum 10 slides) summarizing your approach, key findings, and recommendations for stakeholders.
- Requirements.txt file listing all necessary libraries and their versions.