

Technical and Business Report

A-Technical Motivations:

1. Seamless Integration of Components:

- The backend system is built with FastAPI, providing a lightweight, asynchronous web server capable of handling complex data interactions efficiently.
- The frontend system leverages Streamlit for an interactive user interface, ensuring end-users ease of use.

2. AI Integration:

- The use of Hugging Face's LLMs (meta-llama/Llama-2-7b-chat-hf) enables sophisticated text generation and comprehension capabilities. This is vital for tasks such as feature extraction and predictive insights.
- The FAISS (Facebook AI Similarity Search) indexing ensures efficient retrieval of relevant information from vectorized data.

3. Data Processing and Predictive Modeling:

- Incorporates robust preprocessing modules (ChurnPreProcessing) to clean and split datasets effectively.
- The machine learning pipeline supports various classification algorithms (e.g., XGBoost, CatBoost, Random Forest) with hyperparameter tuning, allowing for customized predictions.

4. Scalability and Flexibility:

- Modular architecture ensures that components can be updated or replaced without disrupting the overall system.
- Dynamic handling of models and parameters facilitates testing and deployment across multiple use cases.

B-Business Motivations:

1. Customer Retention:

- The predictive churn analysis directly supports decision-making for customer retention strategies by identifying at-risk users.

2. User Empowerment:

- A user-friendly interface provides businesses with actionable insights without requiring in-depth technical expertise.

3. Data-Driven Decision Making:

- Leveraging LLMs for feature extraction transforms raw data into actionable metrics, enabling strategic decision-making.

C- Alignment with Client Requirements:

1. Requirement: Predictive Modeling for Churn Analysis

- Alignment: The solution integrates a robust machine-learning pipeline with advanced classification algorithms to predict churn with 80% accuracy.

2. Requirement: Interactive and Intuitive User Interface

- Alignment: The Streamlit-based front-end provides an accessible and visually engaging interface for interacting with the model.

3. Requirement: Real-Time Insights and Query Responses

- Alignment: The backend supports real-time data queries, conversational AI, and predictive modeling, offering instantaneous responses.

4. Requirement: Scalability and Modularity

- Alignment: The architecture separates data handling, model training, and user interaction, allowing easy integration of new datasets, models, or features.

5. Requirement: Technical Excellence

- Alignment: Leveraging state-of-the-art tools like Hugging Face, FAISS, and advanced ML algorithms ensures high performance, accuracy, and reliability.