

Project Overview: Wine Chatbot

1. Overall Approach

The Wine Chatbot project aims to create an interactive platform where users can inquire about wines using natural language processing techniques. The core approach involves leveraging a corpus of wine-related documents for context and using machine learning models for question-answering tasks.

2. Frameworks/Libraries/Tools Used

Frameworks and Libraries:

- **Python:** Core programming language for development.
- **Streamlit:** Used to build the interactive chatbot interface.
- **PyPDF2:** Extracts text from PDF documents.
- **requests:** Handles HTTP requests for external APIs.
- **scikit-learn (sklearn):** Implements TF-IDF vectorization and cosine similarity calculations.
- **nlTK:** Provides natural language processing tools like tokenization.

Implementation Details:

- **Streamlit:** Main application framework for UI design and interaction.
- **PyPDF2:** Extracts text from the corpus PDF to generate responses.
- **scikit-learn (sklearn):** Computes cosine similarity to match user queries with corpus sentences.
- **Gemini Model API:** Used for advanced query responses beyond the corpus.

3. Challenges Faced and Solutions

Challenges:

- **Handling Out-of-Corpus Queries:** Some user questions didn't match well with the corpus, leading to inaccurate responses.
- **Integration of External APIs:** Setting up and authenticating with the Gemini model API posed initial integration challenges.

Solutions:

- **Threshold Adjustment:** Fine-tuned cosine similarity thresholds to improve response accuracy for in-corpus and out-of-corpus queries.
- **API Key Management:** Implemented secure handling of API keys and ensured proper error handling for API responses.

4. Future Scope

Potential Enhancements:

- **Multi-lingual Support:** Extend the chatbot to support multiple languages for a broader user base.
- **Enhanced User Interaction:** Implement sentiment analysis to gauge user satisfaction and tailor responses accordingly.
- **Dynamic Content Updates:** Periodically update the corpus with new wine-related information to keep responses relevant and up-to-date.
- **Personalization:** Introduce user profiles to customize recommendations based on past interactions.
- **Integration with E-commerce:** Direct users to purchase wines through integrated e-commerce platforms based on preferences discussed.

Expansion Opportunities:

- **Voice Interaction:** Introduce voice-based interaction using speech recognition APIs.
- **Data Analytics:** Incorporate analytics to track user queries and improve bot performance over time.
- **Social Media Integration:** Allow users to share recommendations or reviews on social media platforms directly from the chatbot interface.