Software Requirements Specification (SRS)

Project Name: ChatAll - Unified FAQ text and speech chatbot.

Version: 1.0

Date: 2023-08-12

Developer: Siddesh Mishra

1. Introduction

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to outline the functional and non-functional requirements for the development of a unified chatbot system, referred to as the "Cloud Counselage Chatbot." This chatbot aims to streamline communication between students, freshers, and the Cloud Counselage team through various social media platforms.

1.2 Scope

The scope of this project encompasses the development of a chatbot that can integrate with Facebook, Instagram, LinkedIn, WhatsApp, and SMS. It will provide users with instant responses to their queries by utilizing a database of frequently asked questions (FAQs) and offering both text and speech-based interactions.

1.3 Business Case

Implementing the Cloud Counselage Chatbot aligns with the organization's goal of improving efficiency and effectiveness within the Industry Academia Community (IAC) activities. By reducing customer support costs, enhancing response times, and increasing participant satisfaction, Cloud Counselage aims to elevate the success rates of its Internship Program (IP).

2. Objective

The objective of this project is to develop a unified chatbot that can be accessed through Facebook, Instagram, LinkedIn, WhatsApp, and SMS. The chatbot will be used to answer student queries about the Cloud Counselage Industry Academia Community (IAC) activities, including the online Internship Program (IP).

3. Problem Statement

1. **Unified Chatbot:** The project's primary objective is to create a unified chatbot capable of interacting with users across multiple social media platforms, ensuring seamless communication with Cloud Counselage.
2. **FAQ Integration:** The chatbot will incorporate frequently asked questions (FAQs) and their respective answers into its backend, allowing users to access relevant information instantly.
3. **Speech-Driven Chatbot:** While primarily text-based, the chatbot will also support speech-driven interactions, enhancing user experience and accessibility.

4. Business Case

A chatbot can help to save Cloud Counselage staff time and resources, and it can also improve the customer experience by providing students with a faster and more convenient way to get their questions answered.

5. Goals

The goal of this project is to develop a chatbot that can answer student queries about the Cloud Counselage IAC activities and the online IP almost instantly.

6. Deliverables

The deliverables for this project are:

An app demo in .mp4 format
The code for the chatbot
Project documentation

7. Scope

7.1 Within Scope

- The following features are within the scope of this project:

- The chatbot will be linked to all social media platforms: Facebook, Instagram, LinkedIn, WhatsApp, and SMS.

7.2 Outside Scope

- The following features are outside the scope of this project:

- Making the chatbot speech-driven

8. Risks

The following risks are associated with this project:

- Loss of FAQ data
- Poor response

9. Assumptions

- The project assumes that various types of questions and answers will be provided for the FAQ database.
- Users are expected to ask questions within the defined scope of the chatbot's knowledge.

10. Constraints

The chatbot is constrained by the limitation of covering a specific set of questions and answers, and it will not provide responses beyond this scope.

11. Dependencies

The successful completion of the Cloud Counselage Chatbot project relies on the following dependencies:

- Access to and integration with the specified social media platforms.
- Availability of a diverse and comprehensive set of FAQs and their respective answers.

12. Requirements

12.1. Software Requirements

12.1.1. Python 3.7+: The code for the chatbot is written in Python, and a compatible Python interpreter is required to run the application.

12.1.2. Python Libraries:

- `speech_recognition`: Used for speech recognition and audio processing.
- `transformers` (Hugging Face Transformers): Provides pre-trained models for text generation.
- `sentence_transformers` (Sentence Transformers): Used for semantic search and sentence embeddings.
- `Flask`: Required for creating a web-based interface for user interaction.
- `requests`: Necessary for sending HTTP requests to external messaging platforms.
- Other standard Python libraries.

12.1.3. Operating System Compatibility: The code is expected to run on multiple platforms, including Windows, Linux, and macOS.

12.2. Hardware Requirements

12.2.1. CPU: A standard CPU capable of running the required Python interpreter and libraries efficiently.

12.2.2. Memory (RAM): A minimum of 4GB RAM is recommended to ensure smooth execution, especially when dealing with complex natural language processing tasks.

12.2.3. Microphone (Optional): If voice input functionality is to be used, a microphone or audio input device is required for speech recognition.

12.3. Technology Used

- **Language Processing (NLP):** The chatbot leverages NLP technologies for understanding and generating text-based responses. It uses pre-trained models from Hugging Face Transformers for text generation and Sentence Transformers for semantic search.
- **Web Development (Flask):** The web-based interface for user interaction is created using Flask, a Python web framework.
- **Speech Recognition:** The chatbot supports voice input, utilizing the `speech_recognition` library for speech-to-text conversion.
- **API Integration:** External interfaces are established with Facebook Messenger and Instagram using the `requests` library, allowing communication between the chatbot and these messaging platforms.

12.4. External Interface Requirements

- **Facebook Messenger and Instagram:** The chatbot integrates with Facebook Messenger and Instagram to receive user queries and send responses. It requires access tokens and API keys to establish and maintain these connections.
- **Web Browser:** Users can interact with the chatbot through a web-based interface, which requires a modern web browser for a seamless experience.
- **Microphone:** Users can provide voice input to the chatbot if a microphone or audio input device is available.
- **Text Input Device:** Users can also interact with the chatbot through text input via a keyboard or touchscreen device.
- **Internet Connection:** An active internet connection is required for the chatbot to communicate with external messaging platforms and access pre-trained models and libraries.

12.5 Functional Requirements

12.5.1 Chatbot Integration

- The chatbot must integrate with Facebook, Instagram, LinkedIn, WhatsApp, and SMS as communication sources.
- Users should be able to initiate conversations on any of these platforms.

12.5.2 FAQ Database

- The chatbot must maintain a database of frequently asked questions (FAQs) and their corresponding answers.
- Users should be able to query this database for information.

12.5.3 Text and Speech Interaction

- The chatbot should support both text-based and speech-based interactions.
- Users can type or speak their queries, and the chatbot should respond accordingly.

12.6 Non-Functional Requirements

12.6.1 Risk Mitigation

- Measures must be in place to mitigate the risk of data loss, especially concerning the FAQ database.
- The chatbot should have backup mechanisms to ensure data integrity.

12.6.2 Response Quality

- The chatbot must provide high-quality responses to user queries.
- Responses should be accurate and contextually relevant.

12.6.3 Constraint

- The chatbot will cover a limited set of questions and answers based on the provided types.
- It is not intended to answer all possible questions.

13. Acceptance Criteria

The chatbot will be accepted when it meets the following criteria:

1. The chatbot is able to answer student queries about the Cloud Counselage IAC activities and the online IP almost instantly.
2. The chatbot is able to handle a variety of question types, including open-ended questions, factual questions, and follow-up questions.
3. The chatbot is able to provide accurate and helpful answers to student queries.
4. The chatbot is easy to use and navigate.
5. The chatbot is available 24/7.
6. The chatbot is secure and protects user data.

14. Success Metrics

The success of the chatbot will be measured by the following metrics:

1. The number of student queries that are answered by the chatbot.
2. The average time it takes for the chatbot to answer a student query.
3. The percentage of student queries that are answered correctly.
4. The satisfaction of students with the chatbot.

9. Conclusion

The Cloud Counselage Chatbot project addresses the need for a unified communication channel for students and freshers participating in the online Internship Program. By leveraging chatbot technology, Cloud Counselage aims to improve response times, reduce customer support costs, and ultimately enhance participant satisfaction within its programs. This Software Requirements Specification (SRS) document serves as a foundational guide for the project's development and ensures alignment with the organization's goals.