Table of Contents

[1. Overview of the project 2](#_Toc179145480)

[1.1. User input handling: 2](#_Toc179145481)

[1.2. Intent Classification: 2](#_Toc179145482)

[1.3. Submenu Options: 2](#_Toc179145483)

[1.4. Response Generation: 2](#_Toc179145484)

[1.5. Database Interaction: 2](#_Toc179145485)

[1.6. Fronted Interaction: 2](#_Toc179145486)

[2. Architecture Overview 3](#_Toc179145487)

[2.1. Components 3](#_Toc179145488)

[2.1.1. Frontend (Client-Side) 3](#_Toc179145489)

[2.1.2. Backend (Server-Side) 3](#_Toc179145490)

[2.1.3. Database 4](#_Toc179145491)

[2.2. Interaction Flow and data flow 4](#_Toc179145492)

[2.2.1. User Interaction: 4](#_Toc179145493)

[2.2.2. Message captured: 4](#_Toc179145494)

[2.2.3. Message Transmission: 4](#_Toc179145495)

[2.2.4. Intent Classification: 5](#_Toc179145496)

[2.2.5. Response Generation: 5](#_Toc179145497)

[2.2.6. Response Delivery: 5](#_Toc179145498)

# Overview of the project

This is project is a chatbot system that is concentrated on graduate handbook for computer science department at GSU.

This is basically how the system works:

## User input handling:

When the user enters a message, the chatbot processes the input by:

1. Classifying the input to detect specific keywords that map to predefined intents in the database.
2. Detecting if the input matches any submenu options associated with an intent.

## Intent Classification:

1. The chatbot uses keywords to identify the intent behind the user's input. It checks if the input contains keywords stored in the database using tokenization mechanism and prioritizes them.
2. If multiple keywords are detected with equal priority, the chatbot asks the user to choose from those keywords which one user prefers to know more about.

## Submenu Options:

1. The system displays a list of submenu options for the user to select from.
2. Once the user selects a submenu option, it retrieves and presents the relevant response.

## Response Generation:

1. The chatbot responds with predefined answers stored in the database based on the detected intent or submenu option.
2. If the intent has submenu options, the response includes both the submenu options and a prompt to choose from them.

## Database Interaction:

The SQLite database stores all the chatbot data, including intents, keywords, responses, and submenu options. When a user message is processed, the chatbot retrieves and matches relevant data from the database.

## Fronted Interaction:

1. The chatbot's frontend uses JavaScript to display messages, handle user interaction, and send/receive data from the backend.
2. It dynamically updates the conversation by adding messages to the chat window, including user messages, bot responses, and submenu buttons for user interaction.

# Architecture Overview

## Components

### Frontend (Client-Side)

**Technologies**: HTML, CSS, JavaScript

**Responsibilities**:

* Display the chat interface to the user.
* Capture user input and display bot responses.
* Handle user interactions such as selecting keywords or submenu options.

### Backend (Server-Side)

**Technologies**: Python (Flask framework)

**Responsibilities**:

* Receive and process user messages.
* Perform intent classification and submenu handling.
* Interact with the SQLite database to fetch intents, keywords, responses, and submenu options.
* Send appropriate responses back to the frontend.

### Database

A structured SQLite database is created to store information about **intents**, **keywords**, **responses**, and **submenu responses**. Provide a structured way to manage chatbot data.

A screenshot of a computer

Description automatically generated

The database contains the following key tables:

* **Intents Table**: Stores the various intent types, each with a unique ID and a flag to indicate if they have a submenu.
* **Keywords Table**: Stores keywords associated with each intent, used for classification.
* **Responses Table**: Contains predefined responses for each intent.
* **Submenu Responses Table**: Holds follow-up questions or submenu options for certain intents and their corresponding responses.

## Interaction Flow and data flow

### User Interaction:

* The user interacts with the chatbot via the frontend interface.
* User types a message in the input field and clicks “Send” or “Enter key”

### Message captured:

* User message captured by frontend and displays it in the chat window.

### Message Transmission:

* User messages are sent to the backend through HTTP POST requests.

### Intent Classification:

* The backend processes the message, classifies the intent, and determines if submenu options are required.

### Response Generation:

* Based on the classification, the backend fetches the appropriate response or submenu options from the database.
* The backend sends a JSON response containing either a direct reply, multiple intent options, or submenu options.

### Response Delivery:

* The backend sends the response back to the frontend, which then displays it to the user.