Language Learning Chatbot: System Report

1. Introduction

This report describes the design and architecture of a **Language Learning Chatbot**, which assists users in practicing a new language by engaging in contextual conversations. The chatbot detects mistakes, provides real-time corrections, and stores errors for later review.

2. System Overview

The chatbot is an interactive system that asks users about the language they wish to learn, their proficiency level, and their known language. It then initiates a conversation tailored to their level, detects common mistakes, logs them into a database, and provides real-time corrections.

Key Features:

- **Personalised Conversations**: Adjusts scenarios based on user proficiency.
- **Mistake Detection**: Identifies grammatical and vocabulary errors.
- **Error Logging**: Uses an SQLite database to store user mistakes.
- **Review Mechanism**: Summarises mistakes and suggests areas for improvement.

3. System Architecture

The architecture consists of four primary components:

3.1 User Interface (Frontend)

- Developed using **React (or HTML/JS)** to provide an intuitive chat interface.
- Sends user responses to the backend for processing.

3.2 Backend (Chatbot Logic & Processing)

- Built in **Python (Flask or FastAPI)** to handle user input.
- Processes user messages, detects mistakes, and interacts with the database.

3.3 Mistake Detection Module

- Analyses user responses to detect language mistakes.
- Uses predefined rules (hardcoded examples) but can be expanded with AI-based detection.

3.4 Data Storage (SQLite Database)

- Stores user mistakes along with corrections and timestamps.
- Allows retrieval of mistakes for review at the end of a session.

4. System Architecture Diagram

Diagram:

(Start) —> User Interface (React/HTML+JS) —> Chatbot Backend(Flask / FastAPI) —> Mistake Detection Module (Rule-based & AI) —> SQLite Database (Logs Errors) —> Mistake Review(Feedback to User) —> (End)

Explanation of Data Flow:

1. **User enters responses** in the frontend chat interface.
2. **Chatbot backend processes** the message and detects errors.
3. **Mistake Detection Module** checks for grammar and vocabulary mistakes.
4. **Errors are logged** in the SQLite database.
5. **At the end of the session**, mistakes are retrieved and reviewed with the user.

5. Implementation Considerations

- 🔷 **Expand mistake detection** beyond hardcoded examples using AI (like GPT).
- 🔷 **Improve user tracking** by generating unique `user_id` dynamically.
- 🔷 **Add more languages** (e.g., Spanish, German).

6. Conclusion

The Language Learning Chatbot is an effective tool for interactive language practice. With its ability to detect and log mistakes, it provides users with a structured approach to language learning, helping them improve over time. Future enhancements, such as AI-driven mistake detection and multi-language support, can further enhance its capabilities.

Link : https://colab.research.google.com/drive/1mp4QrUi5MjvR2Zga4YyNij3MzZr7IpbS?authuser=0#scrollTo=eVLsuOc_13Wz