B-Tech Final Year
Project July-Dec 2024

Phase 2

Block Diagram Submission

"Enabling Automated Population of Patient-Clinician Dialogue into EHR systems utilizing Large Language Models"

Group No: AI_A3

SUBMITTED BY

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August 2024

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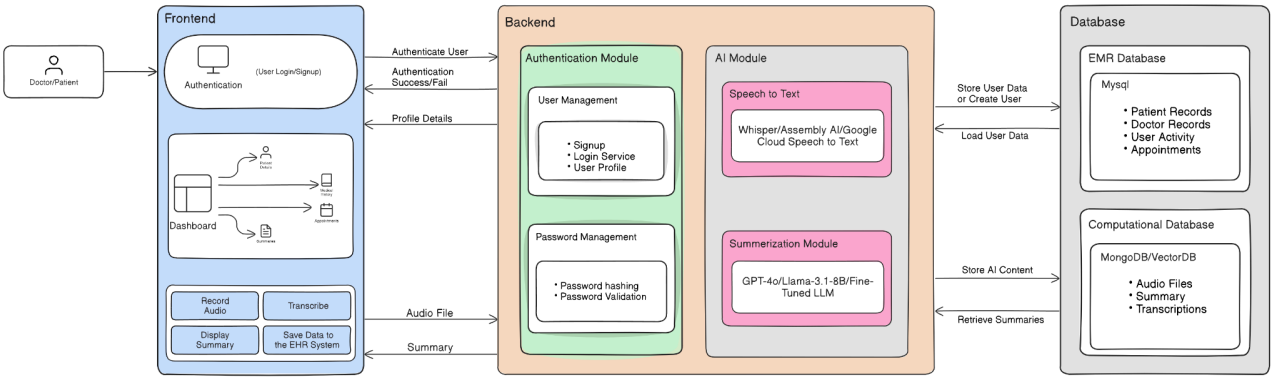
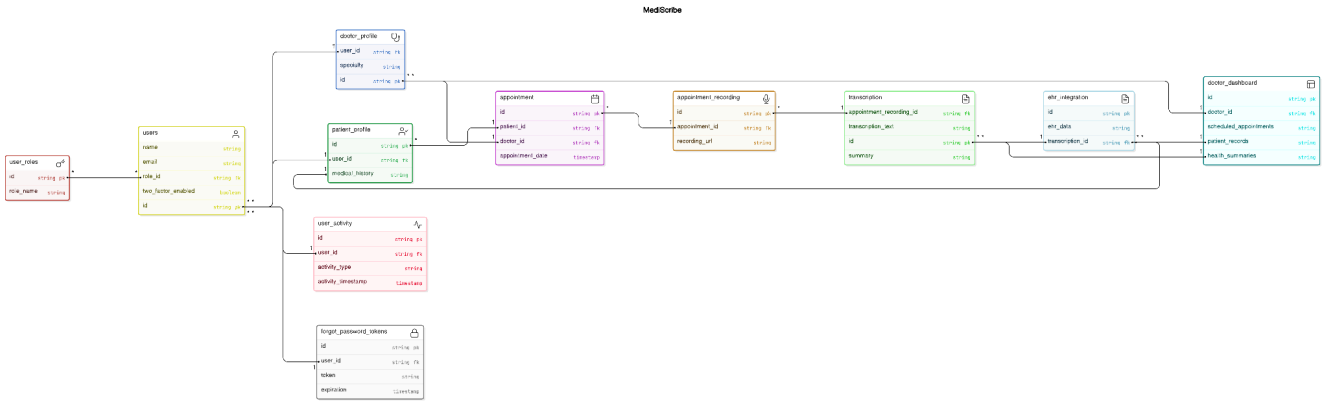
Block Diagram :



Class UML Diagram :



Description :

This project aims to streamline this process by recording, transcribing, and automatically summarizing patient-clinician interactions using AI. Integrating these transcriptions, summaries and audio files directly into the Electronic Health Record (EHR) system database. Also patients can schedule appointments.

Functional Requirements:

Authentication Module:

- **Sign-In and Sign-Up:** Secure sign-in and sign-up pages for both clients and doctors.
- **Two-Factor Authentication (2FA):** Added 2FA for password recovery, ensuring enhanced security.

- **Google Sign-in:** If the application is built using firebase and google cloud we sign in using google account.
- **Password Hashing:** Implementing password hashing for improved security.

User Roles and Permissions:

- **Doctor:** Ability to start/stop recordings, review automatically generated summaries and transcriptions, and update, export or save data to the EHR system. Respond for the patient's appointment requests.
- **Patient:** Access personal health records, including summaries of their consultations. Schedule appointments. Get Notifications from the Doctor regarding Scheduled appointments.

Voice Recording Module:

- Start/Stop/Pause recording functionality.
- Check the status of audio recording - .(failed/successful).
- Secure storage of recorded audio.

Transcription Module:

- Automatic transcription of recorded audio into text.
- We plan tocan use whisper/assembly AI / google cloud speech to text model for transcription.
- Display of real-time or near-real-time transcription.
- The transcription enters the patient EHR displays on the patient ID/visit ID/transcript ID.

Summarization Module:

- Automated generation of conversation summaries using a trained language model.
- For summarization we plan tocan use GTP-4o/ llama 3.1-8B-fine tuned/ medical LLM for summarization running on local machine or API calls.
- The generated summary will display on patient ID.
- The generated summary is utilized to fill in EMR fields that are structured in nature.
- Option for doctors to update, review and approve the summary before exporting.

Database:

- We are using MySQL for our EMR database to store/create user data - user records. doctor records, user activity, appointments.
- And MangoDB/VectorDB to store and retrieve audio files, transcription and summaries.

Data Export/Integration:

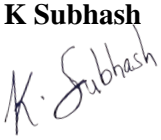
- Export summaries and transcriptions in formats compatible with EHR systems.
- Integration with existing EHR systems via APIs.
- The system will save patient records in a dedicated folder for each patient every time they visit the doctor.
- If the system requires API integration with external EHR systems, consider adding a block or connection in the architecture that explicitly shows "API Integration" for data export and import.

User Interface:

- Intuitive UI for easy navigation and operation.
- Doctor Dashboard: shows recent and upcoming appointments, recordings, summaries, and patient details with medical history.
- Patient Dashboard: shows recent and upcoming appointments,recordings,summaries and doctor details with specialization.

Students' Name and Signature:

K Subhash



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