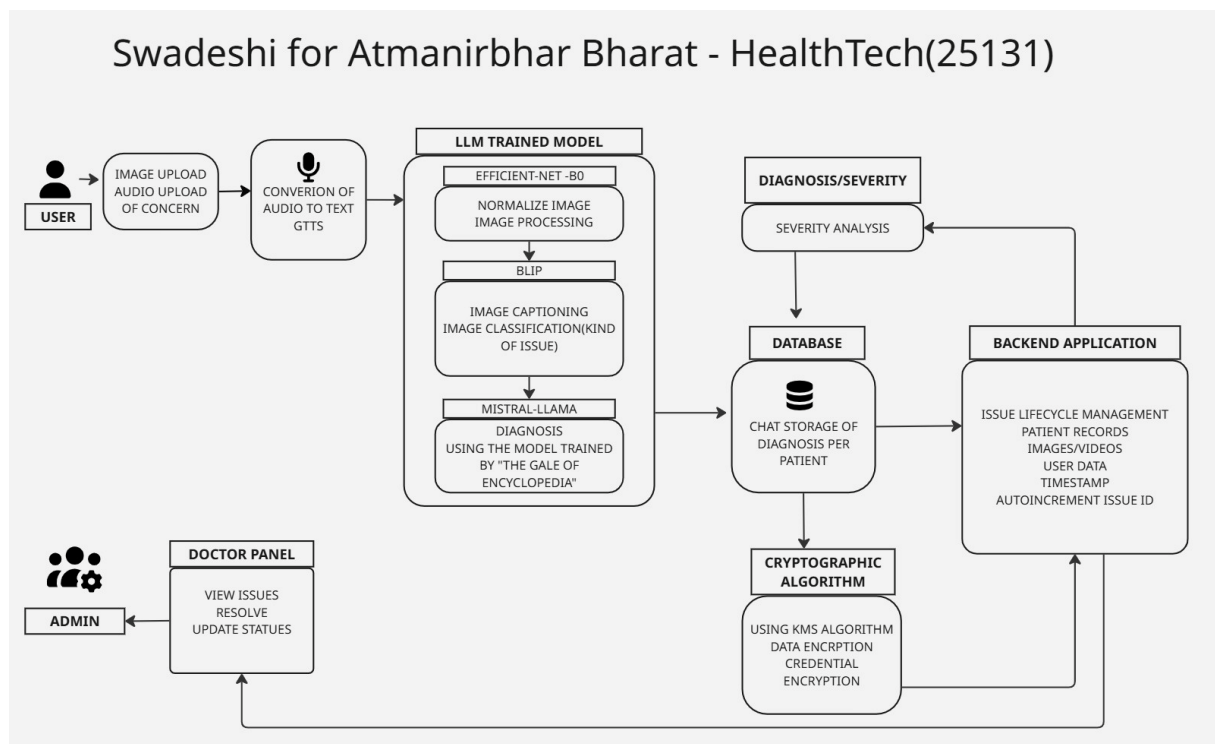


SOFTWARE ENGINEERING BCSE301P

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ARCHITECTURE DIAGRAM



FUNCTIONAL REQUIREMENTS

1. User Management

- The system shall allow users to register and log in securely.
- The system shall store user profile details and medical history.
- The system shall generate a unique issue ID for every new medical query.

2. Medical Query Input

- The system shall allow users to upload images related to medical issues.
- The system shall allow users to upload audio describing symptoms.
- The system shall convert uploaded audio to text using a speech-to-text module (GTTS).

3. Image Processing & Analysis

- The system shall preprocess uploaded images using normalization techniques.
- The system shall classify medical images using the EfficientNet-B0 model.

- The system shall generate image captions using the BLIP model.

4. AI-Based Diagnosis

- The system shall analyze text and image inputs using an LLM (Mistral-LLaMA).
- The system shall provide a preliminary diagnosis based on trained medical knowledge.
- The system shall classify the type of medical issue (skin, wound, infection, etc.).

5. Severity Analysis

- The system shall evaluate the severity level of the detected medical issue.
- The system shall categorize cases as normal, moderate, or severe.
- The system shall automatically forward severe cases to the doctor panel.

6. Doctor Panel

- The system shall allow doctors to view assigned severe cases.
- The system shall allow doctors to review diagnosis, images, and patient history.
- The system shall allow doctors to update case status (reviewed, under treatment, resolved).
- The system shall allow doctors to provide medical recommendations.

7. Backend & Data Management

- The system shall store all diagnosis chats per patient in the database.
- The system shall manage issue lifecycle including timestamps and status updates.
- The system shall support storage of images, videos, and text records.

8. Admin Panel

- The system shall allow admin users to manage doctors and users.
- The system shall allow admins to monitor system activity and case flow.

9. Security & Encryption

- The system shall encrypt sensitive medical data using cryptographic algorithms.
- The system shall use a KMS-based encryption mechanism for credentials and records.

NON-FUNCTIONAL REQUIREMENTS

1. Performance

- The system shall respond to user queries within an acceptable time limit.
- Image and audio processing shall be optimized for faster diagnosis.

2. Scalability

- The system shall support multiple users simultaneously.
- The system shall scale to handle increasing medical queries and data storage.

3. Reliability

- The system shall ensure consistent availability of medical records.
- The system shall prevent data loss during system failures.

4. Security

- The system shall ensure confidentiality of patient data.
- The system shall restrict access to medical records based on user roles (user, doctor, admin).
- The system shall comply with basic healthcare data protection standards.

5. Usability

- The system shall provide a simple and intuitive user interface.
- The doctor panel shall be easy to navigate for quick decision-making.
- The system shall support both text and voice-based interaction.

6. Maintainability

- The system shall be modular to allow easy updates of AI models.
- The system shall allow easy bug fixing and feature enhancements.

7. Portability

- The system shall be accessible via web and mobile platforms.
- The system shall run on standard cloud or local server environments.

8. Accuracy

- The system shall provide reliable AI-based diagnosis with minimal false results.
- Severity classification shall prioritize patient safety.