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Medibot: Automated Medical Chatbot

Prof. Vikas Gaikwad[1], Sneha Dhawale[2], Malhar Dhamale[3], Onkar Pathare[4], Pranjal Batule[5]
Professor, Department of Artificial Intelligence & Data Science [1]
Students, Department of Artificial Intelligence & Data Science [2,3,4,5]
Shree Ramchandra College of Engineering, Pune, Maharashtra, India

Abstract: *Medibot is a healthcare chatbot powered by AI that provides basic medical advice through a multilingual, interactive web interface. The system analyzes symptoms, predicts diseases, identifies emergencies, explains medical reports, retrieves medicine information, manages health profiles, maintains chat history, interacts with voice, and assists with doctor appointments. Medibot makes responses that are easy for patients to understand by using a structured symptom validation dataset, similarity-based reasoning, rule-based emergency detection, and external medicine knowledge sources. The system has a Next.js frontend and a Fast API backend, with separate services for analyzing symptoms, processing reports, translating, looking up medicines, and storing user profiles. Medibot is not meant to replace professional medical diagnosis or treatment. Instead, it helps users understand their symptoms, assess potential risks, and decide when to seek medical assistance. The goal of the system is to simplify access to healthcare information..*

Keywords: AI Healthcare Chatbot, Generative AI, Symptom Analysis, Disease Prediction, Medical Reasoning, Emergency Detection, Multilingual Healthcare Assistant, Medicine Knowledge Engine, Health Profile, TF-IDF, Medical Report Analyzer, Doctor Booking, Patient Support System.

I. INTRODUCTION

Medibot is a Generative AI healthcare chatbot that offers preliminary medical guidance through a multilingual and user-friendly digital interface. The system allows users to describe symptoms, upload medical reports, check information about medications, and receive helpful health suggestions in simple language. By using natural language processing, speech recognition, OCR, and medical reasoning, Medibot makes basic healthcare assistance more accessible. Generative AI generates context-aware responses, explains possible conditions, summarizes reports, and personalizes recommendations based on individual health profiles.

The system also includes features for emergency detection, severity analysis, support for booking doctors, and finding nearby healthcare services. Medibot does not replace professional medical diagnosis but serves as a supportive tool for early awareness and decision-making. This approach aims to improve healthcare access, especially for those who need quick, clear, and multilingual medical support. It also aids in preventive healthcare by storing user history, identifying recurring symptoms, and offering personalized lifestyle suggestions. Overall, Medibot shows how Generative AI can be used responsibly to boost patient awareness, enhance healthcare access, and provide digital health support.

II. PROBLEM STATEMENT

Many people put off getting medical help because they struggle to understand their symptoms, medical reports, medications, or emergency warning signs. Current healthcare tools can be hard to use, don't support multiple languages, and don't give personalized advice based on the user's health. Medibot solves this issue with an AI-powered healthcare assistant that helps with symptom checking, explains reports, provides medicine information, sends emergency alerts, and books doctor appointments. It offers straightforward and accessible health guidance while clearly stating that it is not a substitute for professional medical advice.

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III. OBJECTIVES

- To provide an AI-powered chatbot that helps users understand symptoms and receive basic health guidance.
- To support multilingual communication so users can interact with Medibot in their preferred language.
- To analyse medical reports using OCR and explain important findings in simple, patient-friendly language.
- To detect critical symptoms and show emergency alerts with options for nearby hospitals or ambulance calling.
- To store user health profiles, chat history, feedback, and booking details for a more personalized healthcare experience.

IV. SCOPE

The scope of Medibot includes symptom checking, disease prediction, emergency detection, medicine information, medical report analysis, multilingual chat, voice input and text-to-speech output, health profile management, doctor appointment booking, and nearby hospital/pharmacy/lab search. The system is designed for supportive and educational healthcare guidance only. It does not provide final diagnosis, medical prescription, or replacement for doctors. The future scope includes wearable device integration, doctor dashboard, advanced clinical validation, encrypted cloud storage, disease trend analytics, and integration with real hospital systems.

V. LITERATURE SURVEY

Medical chatbot technology has quickly changed over the last decade. It has shifted from basic rule-based systems to smart healthcare assistants that use artificial intelligence, natural language processing, and Generative AI. Early medical chatbots relied mainly on predefined rules, expert systems, and manually coded medical protocols. Polignano et al. (2018) tested voice-enabled expert systems for basic disease diagnosis. However, these systems struggled with adaptability, scalability, and personalization.

With improvements in machine learning and NLP, researchers started using methods like TF-IDF, supervised learning, sentiment analysis, and multilingual text processing for healthcare chatbots. Bala et al. (2025) and Patil et al. (2022) demonstrated that AI-based chatbot systems can help with medical inquiries, patient interactions, and basic health guidance. Still, challenges such as small datasets, algorithmic bias, limited language support, and issues with medical accuracy have affected system reliability.

Recent advancements in healthcare AI have brought in electronic health records, deep learning models, large language models like BERT and GPT, and multimodal chatbot systems. Mishra and Bipul (2025) discussed how AI-driven bots can assist with mental health support and compliance management. They emphasized the importance of personalization, data security, and user feedback. These studies show that modern medical chatbots can make healthcare more accessible, but they must carefully manage safety, privacy, explainability, and emergency situations.

From the reviewed literature, it is clear that many existing systems focus on single features like symptom checking, text-based interaction, or disease prediction. Few systems combine multilingual support, report analysis, medication information, emergency detection, user health profiling, voice support, and Generative AI explanations on one platform. Therefore, Medibot is proposed as an integrated healthcare chatbot that offers clear, multilingual, and patient-friendly medical assistance while ensuring safety disclaimers and emergency readiness.

Comparison of Existing Systems vs. Medibot:

Feature	Existing Systems	Medibot Proposed
Symptom Checking	Basic symptom matching with limited context awareness	Context-aware symptom analysis using NLP and similarity-based prediction

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Feature	Existing Systems	Medibot Proposed
Patient Interaction	Mostly text-based or limited voice/text support	Multimodal interaction with text, voice, report upload, and multilingual support
Medical Explanation	Limited or rule-based responses	Generative AI based explanations in simple patient-friendly language
Data Privacy	Basic authentication and consent mechanisms	JWT authentication, consent handling, and privacy-aware user data storage
Medicine Information	Limited drug lookup or static information	Medicine information using structured sources such as openFDA, RxNorm, DailyMed, and MedlinePlus
Report Analysis	Rarely supported or limited OCR	OCR-based report reading with simplified medical explanation
Emergency Detection	Limited emergency handling	Critical symptom detection with emergency alert messages
Personalization	Minimal use of user history	Health profile, BMI, past symptoms, allergies, medicines, and chat memory support
Language Support	Limited multilingual capability	Supports multiple Indian languages with translated responses
System Integration	Usually focuses on a single function	Integrated dashboard with chat, reports, profile, history, booking, and nearby services

VI. METHODOLOGY

The development of the Medibot AI Health Companion follows a structured methodology combining Generative AI, medical reasoning, multilingual support, and database management to provide preliminary healthcare assistance to users.

The process involves:

A. Requirement Analysis

Identify the key needs of users, including symptom checking, medicine information, report analysis, doctor booking, emergency support, multilingual interaction, and health profile management.

B. System Design

Develop a modular architecture integrating a user interface, AI/NLP core, medical reasoning engine, database layer, and external healthcare services such as OCR, medicine APIs, and hospital location services.

C. Data Collection & Integration:

Collect structured symptom datasets, user health profile details, chat history, medical report inputs, and medicine-related information from reliable APIs such as openFDA, RxNorm, DailyMed, and OCR-based report extraction.

D. AI Model Integration:

Integrate Generative AI and natural language processing techniques to understand user symptoms, detect intent, generate patient-friendly responses, explain possible conditions, and provide multilingual medical guidance.

E. Implementation:

Develop the frontend using a responsive web interface and connect it with a FastAPI backend for authentication, chat processing, report upload, medicine lookup, health profile storage, appointment booking, and emergency alert handling.

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F. Testing & Validation:

Validate the system using structured medical test cases to measure disease prediction accuracy, emergency detection precision, recall, and response reliability, while ensuring that all outputs include medical safety disclaimers.

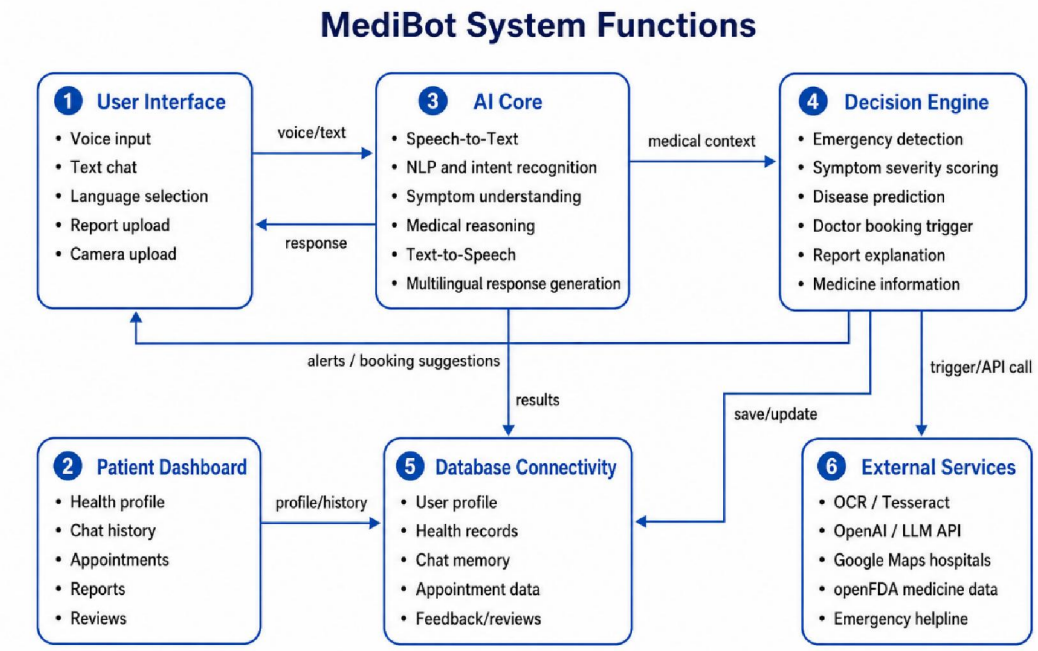

Figure 1: System Functions

VII. MODELING & ANALYSIS

The Medibot system incorporates several key modelling and analysis components to provide responsive, intelligent, and patient-friendly healthcare support.

A. Symptom Analysis and Disease Prediction:

1. ***Purpose***:

To understand the user's symptoms entered through text or voice and predict possible health conditions.

2. ***Technique***:

The system uses Natural Language Processing (NLP) to clean and normalize symptom text.

3. ***Similarity Matching:***

The extracted symptoms are compared with a structured medical validation dataset using:

• TF-IDF Cosine Similarity, Jaccard Similarity, Query Coverage

4. ***Output***:

The system returns the top possible diseases along with:

• Confidence scores, Severity level, Explanation, Medical disclaimer

B. Emergency and Severity Detection:

1. Purpose:

To identify critical symptoms that may require immediate medical attention.

2. Technique:

The system checks for emergency keywords such as chest pain, breathing difficulty, poisoning, unconsciousness,

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severe bleeding, and stroke-like symptoms.

3. Time-Based Severity:

The duration of symptoms is analyzed (e.g., fever for one day vs. seven days) to estimate risk more accurately.

4. Output:

The system displays a red emergency alert and suggests calling emergency services or visiting a nearby hospital.

C. Generative AI-Based Medical Reasoning :

1. Purpose:

To generate simple, explainable, and context-aware medical guidance for users.

2. Technique:

Generative AI converts medical reasoning into patient-friendly responses including possible causes, explanation, home care tips, and next steps.

3. Personalization:

The model considers user health profile data such as age, weight, BMI, allergies, medications, blood pressure, sugar level, oxygen level, and past symptoms.

4. Output:

Responses are generated in the selected language and include safety warnings wherever required.

D. Medicine Information Analysis:

1. Purpose:

To provide reliable and understandable information about medicines entered by the user.

2. Technique:

Medicine names are normalized and verified using public medical data sources such as openFDA, RxNorm, DailyMed, and MedlinePlus.

3. Analysis:

The system extracts uses, general dosage guidance, side effects, warnings, precautions, and when to consult a doctor.

4. Output:

Information is presented in simple language with a disclaimer that it is not a prescription.

E. Report Analysis and OCR Processing :

1. Purpose:

To help users understand uploaded medical reports in simple language.

2. Technique:

OCR (Optical Character Recognition) extracts text from image or PDF reports, and AI explains important findings.

3. Abnormal Value Detection:

The system highlights abnormal values such as low hemoglobin, high blood sugar, and abnormal oxygen levels by comparing them with normal ranges.

4. Output:

The system provides a simplified summary, meaning of abnormal values, suggested next steps, and advice to consult a doctor.

F. Data Analysis and Visualization :

1. Purpose:

To monitor user health trends and improve personalized healthcare support.

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2. Technique:

The system stores and analyzes user profile data, chat history, symptoms, reports, BMI, blood pressure, sugar level, oxygen level, and appointment records securely.

3. Health Trends:

The dashboard identifies weight changes, symptom frequency, recurring health issues, and risk indicators such as obesity or diabetes risk.

4. Visualization:

Data is presented using charts, dashboard cards, health scores, BMI range, and preventive health suggestions.

VIII. SYSTEM DESIGN

The system is built on a modular architecture with the following components:

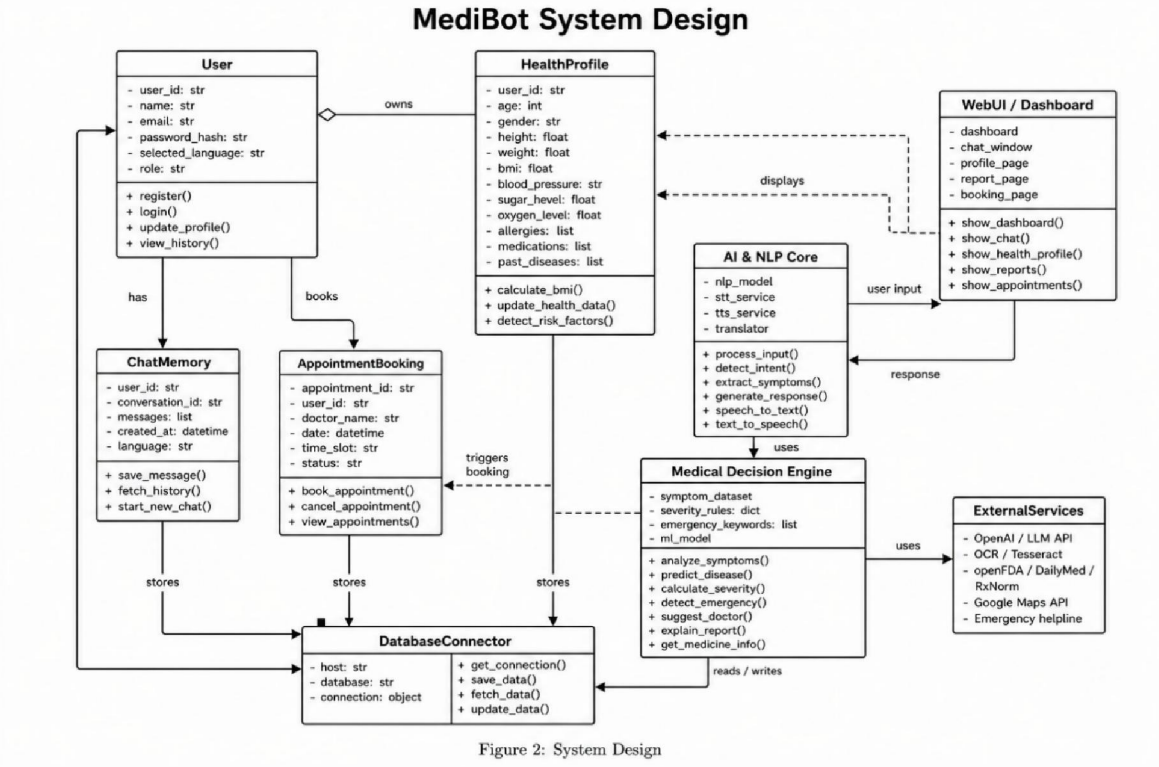

Figure 2: System Design

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IX. RESULTS & DISCUSSION

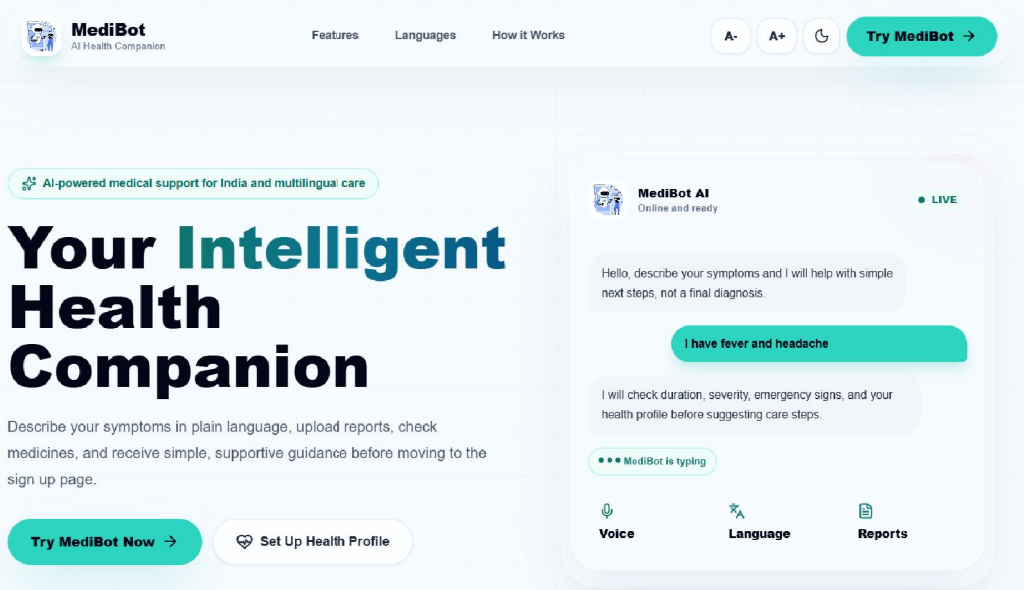

Fig 3: Medibot Landing Page

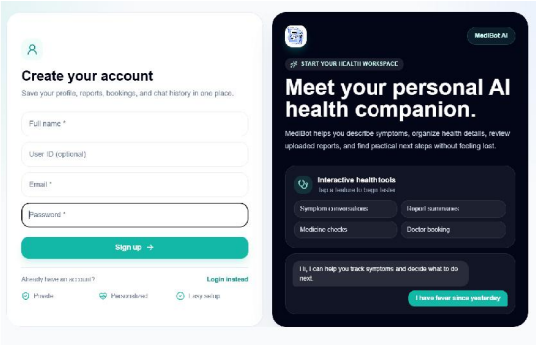

Fig 4: Sign Up Page

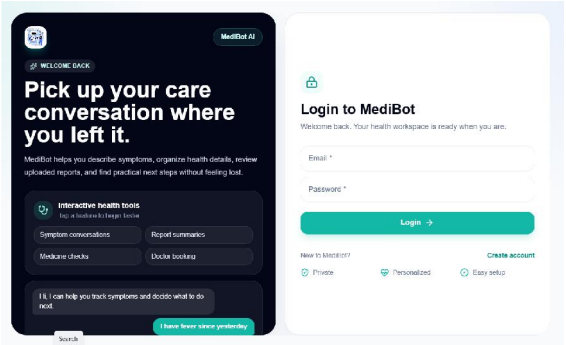

Fig5: Login Page

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Fig 6: Medibot Interface

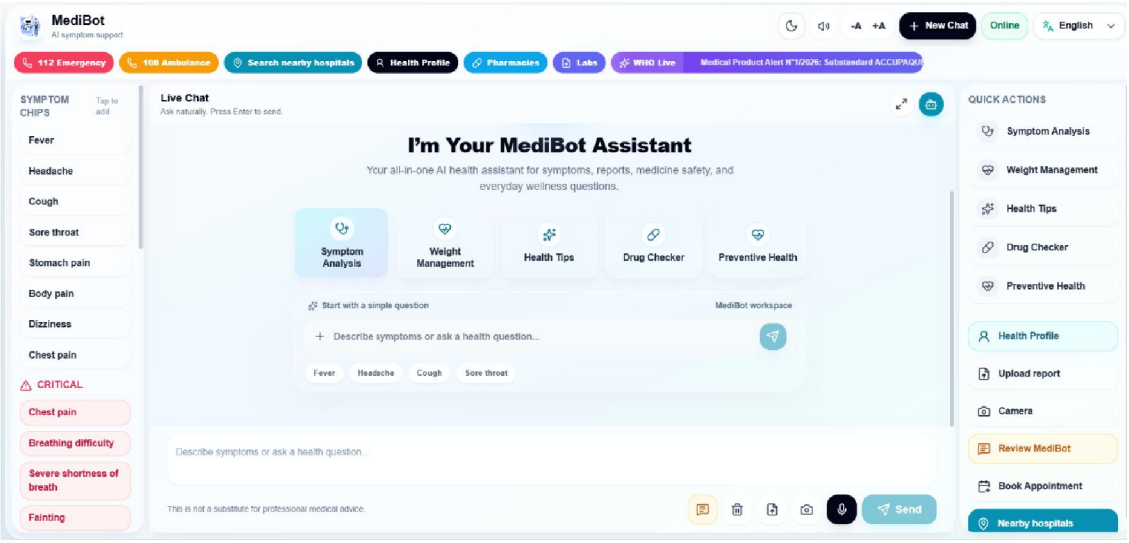

Fig 7: Symptom Analysis and Response

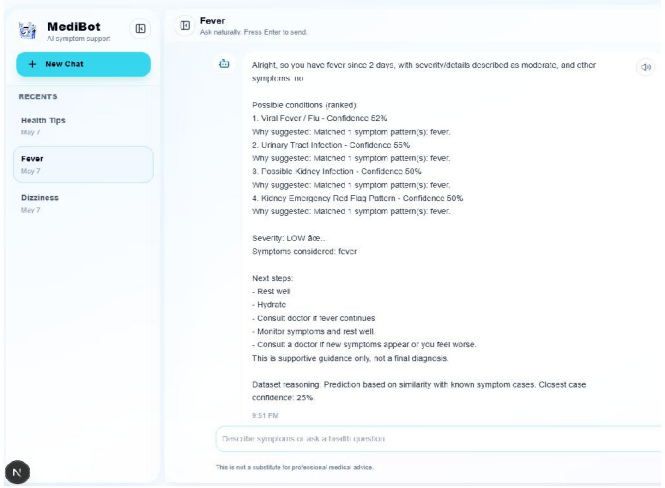

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Fig 7: Medibot Interface in Hindi Using Dark Theme (Multilingual Support Available)

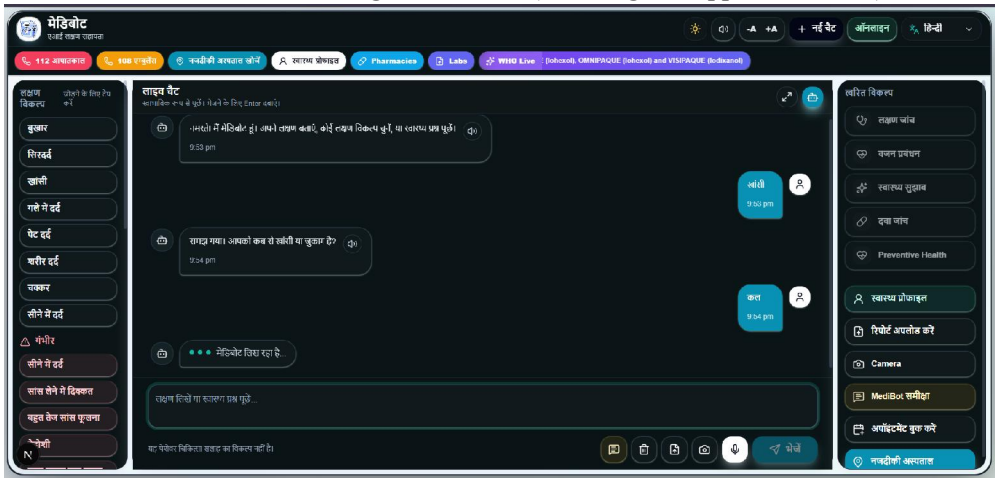


Fig 8: Emergency Alert Detection

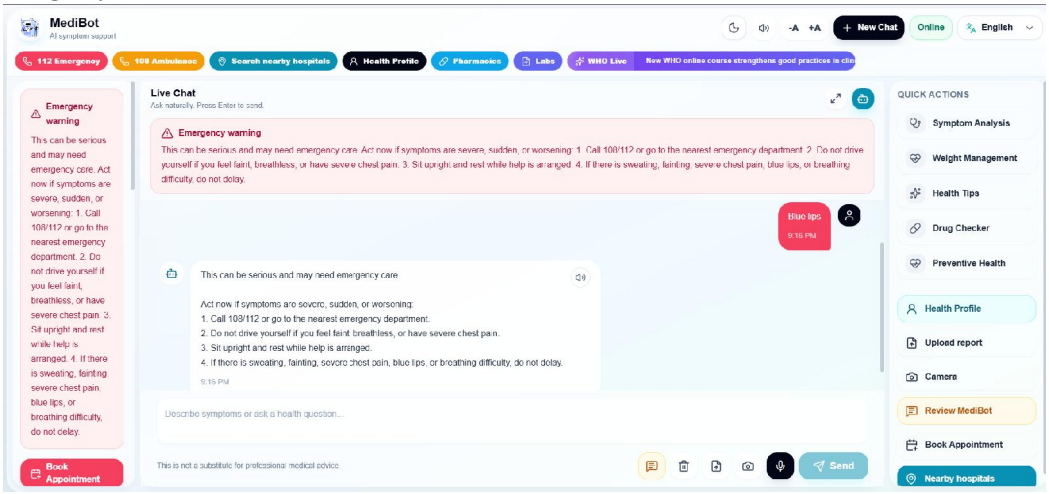
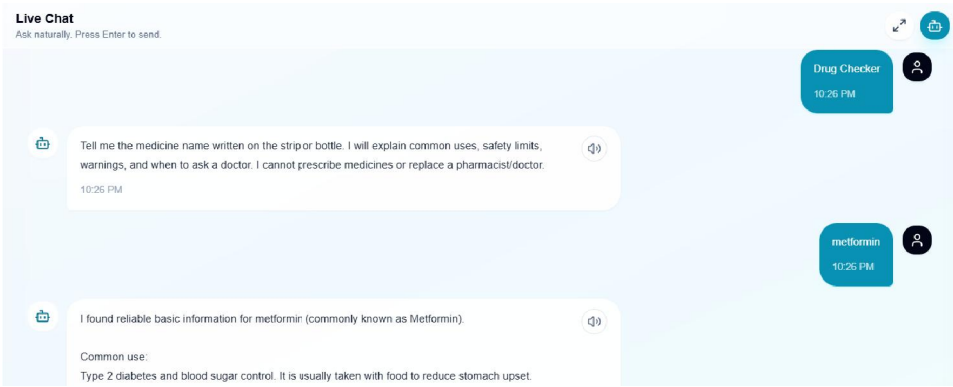


Fig 9: Medicine Information Interface



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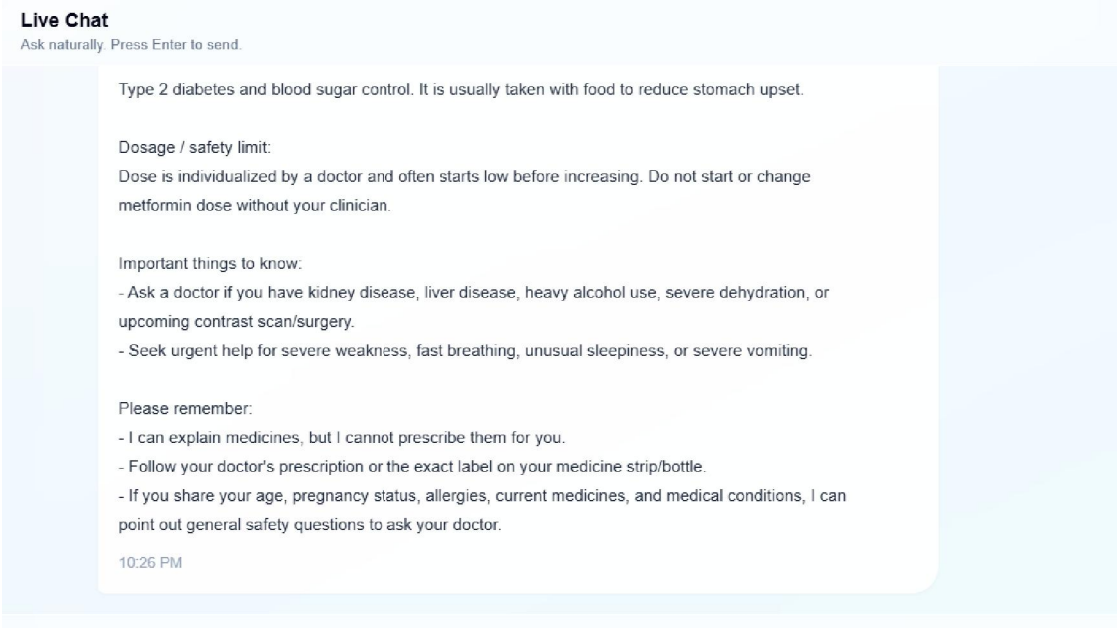
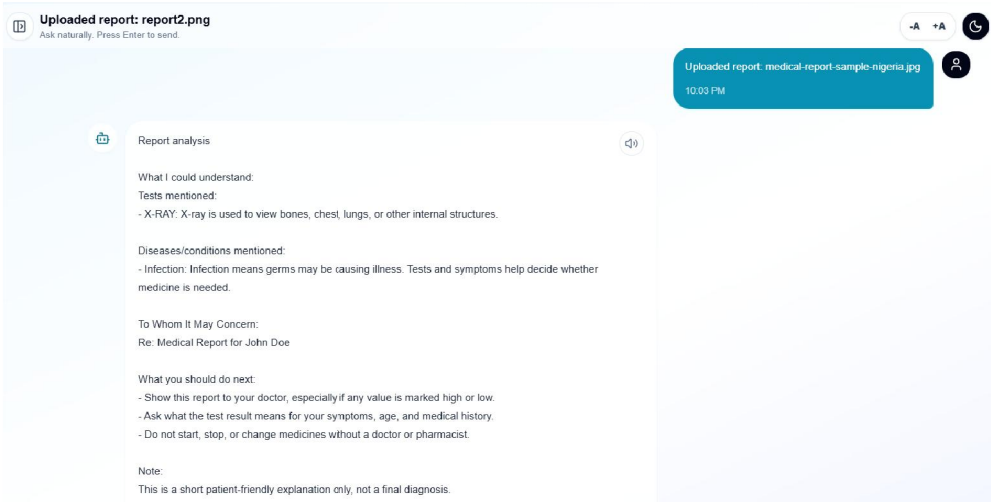
Medicine Information Interface:



Report Upload and Medical Summary:



The results show that Medibot successfully provides preliminary healthcare support through symptom analysis, emergency detection, medicine information, report explanation, and multilingual interaction. The high emergency recall indicates that the system is effective in identifying critical cases. However, Medibot is not a replacement for doctors, and its accuracy depends on symptom clarity, dataset quality, OCR performance, and API availability.

X. CONCLUSION

Medibot, Generative AI, is the latest in healthcare chatbots with the capability of generating a healthcare plan for you (the patient) based on your preliminary medical needs, including symptom assessment, information about medications, explanation of medical tests and procedures, and detection of emergency alert situations. Medibot's design includes

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features that utilize the latest technology, such as natural language processing (NLP), optical character recognition (OCR), speech processing, similarity-based disease prediction, and user health profile management; therefore, Medibot provides simple and individualized instructions. Furthermore, Medibot offers several features that improve your access to basic healthcare assistance, such as scheduling doctor visits and finding a local hospital to assist you with your needs, connecting you with your chat history, and providing a report analysis. Although Medibot is not intended to replace an actual medical diagnosis, it serves as an online healthcare companion that will assist you in understanding your symptoms, diagnosing potential problems, and taking appropriate action at that time. Medibot clearly demonstrates the promise of using generative AI and intelligent healthcare systems to help improve patient education, preventative healthcare, and access to digital forms of healthcare.

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