

AI-Driven Public Health Chatbot For Disease Awareness

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ABSTRACT-The *AI-Driven Public Health Chatbot for Disease Awareness* is an intelligent healthcare support system designed to provide accurate and instant health-related information to users. The chatbot uses Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques to interact with users in a simple and user-friendly manner. Its main objective is to spread awareness about common diseases, symptoms, preventive measures, and healthy practices. The system helps users understand basic health conditions by answering questions related to diseases such as fever, diabetes, dengue, COVID-19, malaria, and other public health concerns. It also provides guidance on hygiene, vaccination, nutrition, and emergency precautions. The chatbot is available 24/7 and can reduce misinformation by offering reliable and structured health awareness information. The proposed chatbot improves public access to healthcare knowledge, especially in rural and remote

areas where medical assistance may not always be easily available. The project demonstrates how AI can be effectively used to support public health education and community awareness.

KEYWORDS: Artificial Intelligence (AI), Application Programming Interface (API), Natural Language Processing (NLP), Image Processing, Machine Learning (ML), Public Health.

INTRODUCTION

The rapid growth of Artificial Intelligence (AI) has transformed many sectors, especially healthcare and public health services. In recent years, AI-powered systems have been widely used to improve communication, provide instant information, and support healthcare awareness among people. One of the most useful applications of AI in healthcare is the development of public health chatbots that can interact with users and provide disease-related information quickly and effectively. The AI-Driven Public Health Chatbot for

Disease Awareness is designed to create awareness about diseases, symptoms, preventive measures, and healthy practices through an intelligent conversational system. The chatbot helps users by answering health-related questions, providing basic guidance, and spreading awareness about common and dangerous diseases. It acts as a virtual assistant that is available anytime to support users with reliable health information. The main objective of this project is to improve public health awareness by using AI technologies such as Natural Language Processing (NLP) and Machine Learning (ML). These technologies enable the chatbot to understand user queries and provide accurate and meaningful responses in simple language. The system can help people gain knowledge about diseases like diabetes, dengue, malaria, COVID-19, blood pressure, and other health conditions.

RELATED WORK

Artificial Intelligence has become an important technology for developing intelligent healthcare applications. Researches have introduced numerous healthcare chatbots capable of answering medical questions, providing symptom-based guidance, and improving patient engagement. Early healthcare chatbots

replied primarily on rule-based systems with predefined responses, limiting their ability to understand natural language. The introduction of Machine Learning and Natural Language Processing significantly improved chatbot performance by enabling conversational interactions that closely resemble human communication. Several healthcare organizations have implemented AI-powered virtual assistants for appointment scheduling, medication reminders, symptom assessment, and disease awareness. Recent studies have also demonstrated that effectiveness of large language models in generating context-aware responses for health-care education. Image recognition technologies have further expanded chatbot capabilities by supporting analysis of skin conditions, medical reports, and other healthcare documents.

LITERATURE SURVEY

Artificial Intelligence has become an important research area in healthcare due to its ability to improve patient communication and healthcare accessibility. Russell and Norvig presented the foundations of intelligent systems capable of solving complex decision-making problems using machine learning techniques. Their work established the

theoretical basis for AI applications in healthcare. Jurafsky and Martin extensively discussed Natural Language Processing techniques that enable computers to understand and generate human language. Their research forms the foundation of conversational AI systems capable of processing user queries efficiently. Topol demonstrated how Artificial Intelligence can enhance healthcare delivery by supporting clinicians with intelligent decision-making while improving patient engagement through digital healthcare tools. His work emphasizes AI as an assistant rather than a replacement for medical professionals. Esteva and colleagues applied deep learning to medical image analysis, demonstrating dermatologist-level performance in skin disease classification. Their research highlights the potential of AI for image-assisted healthcare awareness and supports integrating image analysis into healthcare chatbots. These studies collectively support the development of the proposed AI-driven chatbot, which integrates conversational AI, image analysis, and healthcare education into a single platform designed to improve disease awareness among the general public.

EXISTING METHOD

Existing healthcare information systems primarily consist of websites, mobile applications, FAQs, and rule-based chatbots. These platforms provide general medical information but often require users to search manually through large volumes of content. Rule-based chatbots depend on predefined responses and cannot effectively understand complex or unexpected user questions. As a result, users frequently receive incomplete or irrelevant information. Many existing systems also lack advanced Natural Language Processing capabilities, making conversations less interactive and reducing user satisfaction.

Some applications provide symptom checking but cannot analyse uploaded images or generate context-aware explanations. Additionally, many healthcare platforms are available only in specific languages and offer limited accessibility for users with varying educational backgrounds. Another limitation is the inability of traditional systems to provide real-time educational guidance during public health emergencies or disease outbreaks. Since many systems are not continuously updated, they may contain outdated information. Furthermore, several platforms fail to emphasize that

online information should not replace professional medical consultation.

These limitations highlight the need for an intelligent, AI-powered healthcare assistant capable of understanding natural language, analysing health-related images, delivering updated educational content, and promoting responsible healthcare practices while encouraging users to consult qualified medical professionals.

PROPOSED METHOD

The proposed system, AI-Driven Public Health Chatbot For Disease Awareness, is designed to provide reliable accessible, and real-time public health information using Artificial Intelligence. The Chatbot is using the Flask web Framework With HTML, CSS, and JavaScript for the user interface, While google Gemini AI is integrated to enable intelligent conversational capabilities through Natural Language Processing(NLP). The system allows users to ask questions about diseases, symptoms, causes, preventive measures, vaccination, nutrition, and healthy lifestyle practices in natural language. In addition through text-based interaction, the chatbot supports image upload functionality, enabling users to submit health related images such as skin conditions, food labels, or medical reports. The AI model analyses the uploaded

content and provides educational explanations and awarenesses information. The system is designed strictly for diseases awareness and health education; it does not diagnosis diseases, prescribe medicines, or replace health care professionals. Instead, it encourages users to consult qualified medical practices for diagnosis and treatment. The chatbot offers a simple, responsive, and user-friendly interface that ensures easy accessibility across different devices. By delivering instant, evidence based health information, the proposed system helps reduce misinformation, promotes preventive healthcare practices, and improves public understanding of common diseases.

SYSTEM ARCHITECTURE

The proposed system begins when the user enters a health-related question through a web or mobile chatbot interface. The query is processed by the Natural Language Processing(NLP) module, which identifies the user's intent and extracts important medical keywords. The processed information is forwarded to the AI Response Engine, where the chatbot analyses the request.

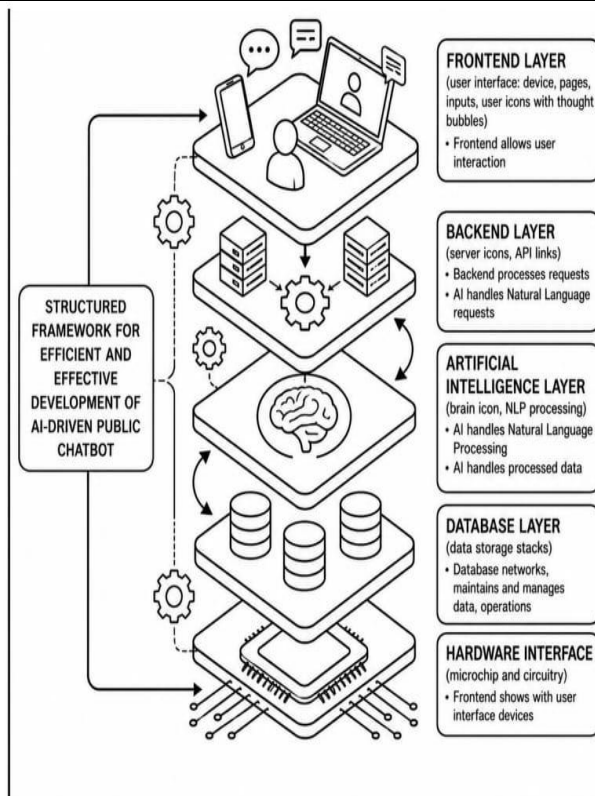


Fig 1: System Architecture

METHODOLOGY DESCRIPTION

1.User Query Submission

The user interacts with the chatbot through a web or mobile application by entering a disease relate question in natural language. The system accepts the query and forwards it for future processing.

2.Natural Language Processing (NLP)

The NLP module analyses the user's input to identify the intent and extract important medical terms such as disease names, symptoms, or preventive measures. This

helps chatbot understand the user's request accurately.

3.Query Analysis

The processed query is analysed by the AI engine to determine the most relevant health information required to answer the user's questions. The system selects appropriate response strategies based on the identified intent.

4.Knowledge Base Retrieval

The chatbot searches the disease knowledge database, which contains information about diseases, symptoms, causes, prevention methods, treatments, and frequently asked questions.

5.AI Response Generation

The AI engine combines, the retrieved medical information with natural language generation techniques to produce a clear, accurate, and user-friendly response. The response is structured in simple language for better understanding.

6.Disease Awareness and Prevention

The generated response includes disease awareness information, preventive measures, healthy lifestyle recommendations, and general precautions.

This helps users improve their understanding of common health conditions and disease prevention.

7. Response Delivery

The final response is displayed through the chatbot interface. Users can continue asking follow-up questions, enabling interactive and continuous health awareness support.

8. Data Logging and System Improvement

The chatbot stores anonymous user queries and interaction logs for system monitoring and performance evaluation. These records help improve response accuracy, expand the knowledge base, and enhance future chatbot performance while maintaining user privacy.

RESULTS AND DISCUSSIONS

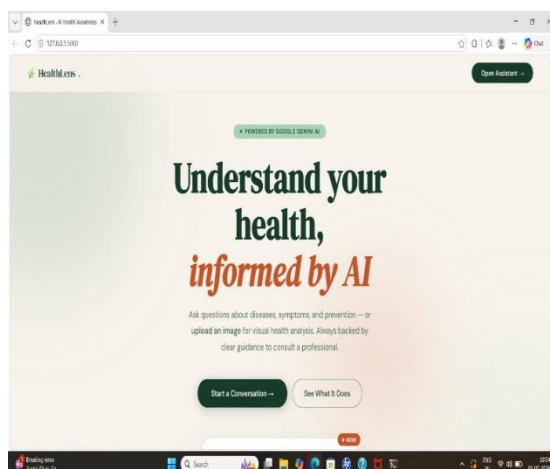


Fig 2: Home Page

The above figure shows the Home Page of the AI-Driven Public Health Chatbot for Disease Awareness. It serves as the maintain interface where users can access the chatbot and explore its healthcare assistance features.

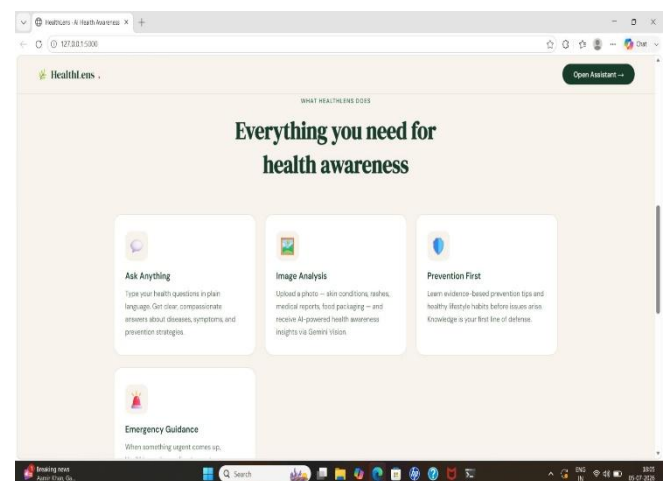


Fig 3: Types of modules

The above figure shows the Health Awareness Features page of the AI-Driven Public Health Chatbot for Disease Awareness. This section Highlights the major services provided by the chatbot to improve public health awareness and support users with reliable healthcare information.

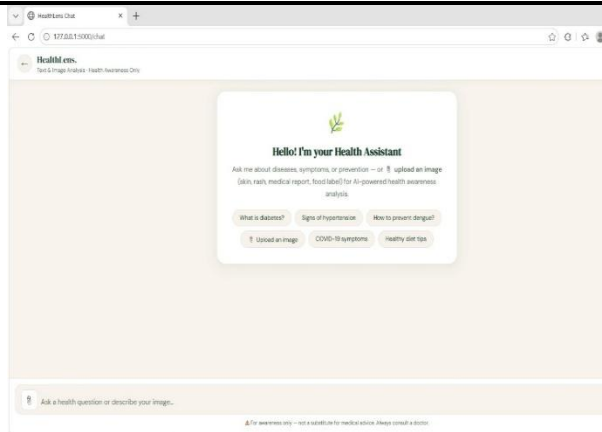


Fig 4 : Select module

The above figure shows the Chatbot Interface of the AI-Driven Public Health Chatbot for Disease Awareness. This is the primary interaction page where users can communicate directly with the AI-Powered health assistant and receive healthcare-related guidance.

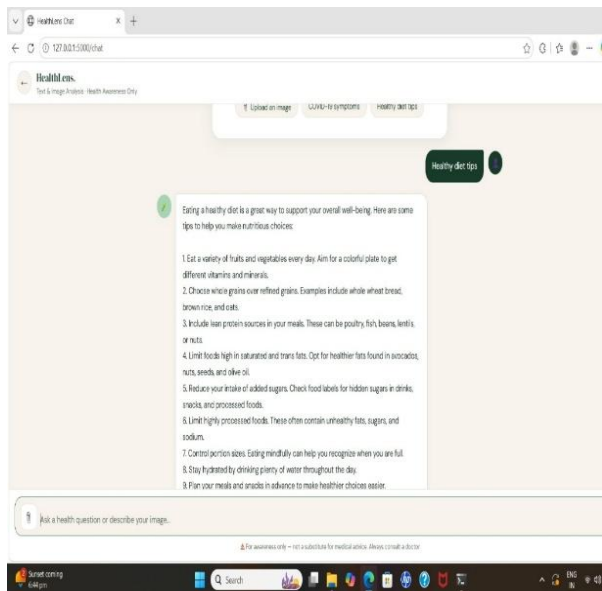


Fig 5: About Module

The above figure shows the AI-Driven Public Health Chatbot responding query

about Healthy Diet Tips. After the user selects or enters the topic, the chatbot generates a detailed response containing practical dietary recommendations to promote a healthy lifestyle.

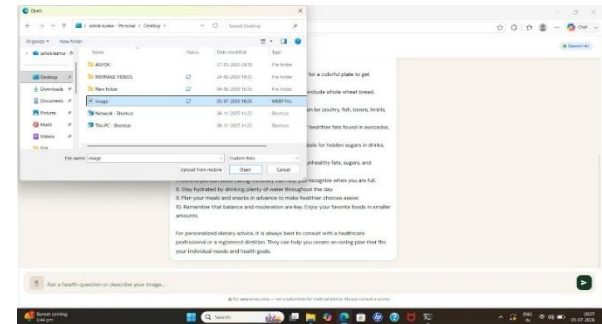


Fig 6 : Register

The above figure shows the Image Uploaded Functionality of the AI-Driven Public Health Chatbot for Disease Awareness. This feature allows users to select and upload health-related images from their local computer for AI-based analysis.

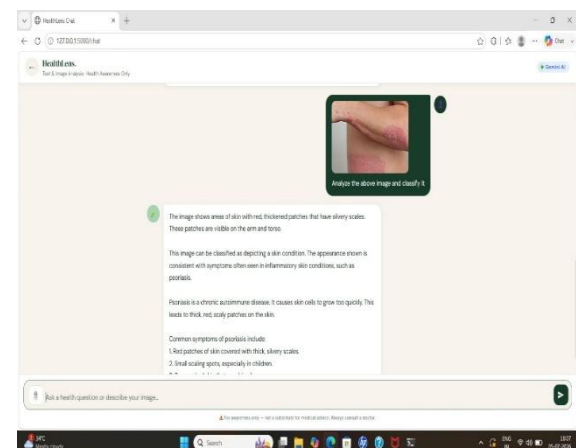


Fig 7: Photo Detection

The above figure shows the Image Analysis feature of the AI-Driven Public Health Chatbot for Disease Awareness. In this module, the user uploads an image of a skin condition and requests the chatbot to analyse it. The uploaded image is processed using Google Gemini AI and Artificial Intelligence (AI) techniques to identify visible symptoms and provide health awareness information.

CONCLUSION

The “AI-Driven Public Chatbot for Disease Awareness” project was successfully developed to provide healthcare awareness and disease-related information through an intelligent chatbot system. The system uses Artificial Intelligence, Machine Learning, and Natural Language Processing techniques to understand user queries and generate real-time responses.

The chatbot helps users access information about diseases, symptoms, prevention methods, and healthcare guidance through a simple and user-friendly interface. The proposed system improves public health awareness, reduces misinformation, and supports efficient digital healthcare communication.

FUTURE SCOPE

The future scope of the “AI-Driven Public Health Chatbot for Disease Awareness” project is to enhance the system with more advanced Artificial Intelligence and Healthcare technologies. The chatbot can be improved by adding multilingual support so that users can interact with the system in different languages easily.

Future enhancements may include voice-based interactions, advanced disease prediction, and integration with real-time healthcare databases and hospital management systems. The system can also be connected with mobile applications and cloud platforms to improve accessibility and performance.

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