

Gen AI Health Diagnosis Assistant: A Natural Language-Driven Approach for Intelligent Symptom Analysis.

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ABSTRACT

Artificial Intelligence has significantly transformed the healthcare domain by enabling intelligent systems capable of assisting users in early health assessment. This paper presents an AI-based Health Diagnosis Assistant that analyzes user-provided symptoms and generates possible disease conditions using the Gemini Generative AI API. The system accepts symptom input through a simple web interface and processes it using a pre-trained large language model without requiring custom dataset training.

The proposed system provides possible health conditions, general remedies, and guidance on when medical consultation is required. To improve usability, the application also supports secure user authentication and stores diagnosis history using MongoDB Atlas for future reference. The frontend is developed using ReactJS, while the backend is implemented with Node.js and TypeScript, ensuring scalable and maintainable communication with the AI service.

This system is especially useful in regions with limited access to healthcare professionals, enabling users to obtain preliminary health insights quickly. The developed solution serves as a decision-support tool for early symptom analysis and health awareness, while not replacing professional medical diagnosis. Experimental results demonstrate fast response generation, reliable history management, and a user-friendly healthcare assistance platform.

Keywords: Generative AI, Health Diagnosis, Gemini API, Symptom Analysis, Disease Prediction, Healthcare Assistant.

INTRODUCTION

The increasing demand for intelligent healthcare support systems has led to the development of AI-powered diagnostic assistants. Many individuals face difficulties in obtaining immediate medical guidance due to geographical, financial, or time constraints. This creates the need for a system capable of offering preliminary symptom-based health analysis.

The proposed Gen AI Health Diagnosis Assistant addresses this challenge by using the Gemini API, a pre-trained generative AI model capable of understanding natural language symptom descriptions. Users can enter symptoms in simple text form, and the system generates possible disease conditions, general remedies, and doctor consultation guidance.

Unlike traditional machine learning systems, the proposed approach eliminates the need for collecting medical datasets and training custom models. Instead, it leverages the pretrained knowledge of Gemini AI to provide intelligent symptom interpretation and health recommendations. Additionally, the system securely stores user diagnosis history for future access, improving long-term usability and health awareness.

I. LITERATURE REVIEW

Artificial Intelligence has played a major role in transforming the healthcare sector by enabling early disease prediction, symptom analysis, and virtual diagnosis support systems [1]. Machine learning-based medical diagnosis systems improved the reliability of disease prediction by learning symptom patterns from healthcare datasets, making preliminary diagnosis faster and more accurate [2].

Further advancements introduced AI-powered symptom analysis systems capable of understanding user-provided symptoms and generating possible disease conditions, which improved early-stage healthcare support [3]. Deep learning techniques also contributed significantly to medical imaging and health data analytics, increasing diagnosis precision and reducing manual intervention [4].

Recent intelligent virtual health assistants have improved user interaction by providing symptom-based suggestions and health guidance through natural language communication [5]. The implementation of such systems is further supported by powerful development tools and AI frameworks such as Python, TensorFlow, and OpenCV, which simplify model integration and deployment.

The rapid digital transformation in healthcare has further emphasized the importance of AI-driven diagnostic support systems for remote and accessible health services [6]. Existing AI-based healthcare systems demonstrate strong potential for future intelligent disease prediction platforms, but many still depend on structured datasets and predefined workflows [7].

The proposed Gen AI Health Diagnosis Assistant using Gemini API improves upon these systems by enabling natural language symptom understanding, real-time AI-generated disease suggestions, secure history storage, and scalable web-based deployment, making it highly suitable for practical healthcare assistance.

EXISTING SYSTEM

Most existing health diagnosis systems are based on rule-based methods, expert knowledge, and centralized data models. These systems compare user symptoms with predefined healthcare databases to generate possible disease suggestions. They mainly depend on structured symptom inputs such as fever, cough, or breathing difficulty and match them with stored medical records to provide diagnosis results. Such systems help in storing and retrieving healthcare information efficiently and act as the foundation for digital diagnostic support.

However, these systems have several limitations. They heavily rely on fixed rules and structured datasets, making them less adaptable to new medical knowledge

and complex symptom descriptions. Most traditional systems lack natural language understanding, personalization, voice interaction, and intelligent reasoning capabilities. In addition, centralized architectures may cause scalability issues and performance bottlenecks when handling multiple users. These drawbacks reduce flexibility, user experience, and overall diagnosis accuracy, creating the need for a more advanced AI-driven health assistant.

II. PROPOSED SYSTEM

The proposed system introduces a Gen AI-based Health Diagnosis Assistant using Gemini API for intelligent symptom-based disease prediction. Unlike traditional rule-based systems, this model allows users to enter symptoms in natural language text, enabling more flexible and user-friendly interaction. The system analyzes the given symptoms using the Gemini Generative AI model and provides possible disease conditions, basic remedies, precautionary measures, and suggestions on whether medical consultation is required. The system is designed using a ReactJS frontend, Node.js with TypeScript backend, and MongoDB Atlas database for secure storage of user diagnosis history. By using Generative AI, the proposed solution eliminates the dependency on fixed medical rules and static datasets, thereby improving adaptability and response quality. It also supports history tracking, secure authentication, and scalable cloud-based deployment, making it more efficient, personalized, and suitable for real-time preliminary healthcare assistance compared to existing systems.

Advantages of Proposed System

1. Natural Language Input:

Users can enter symptoms in normal text, making interaction simple and flexible.

2. Real-Time Prediction:

The system quickly generates possible disease conditions and remedies using Gemini API.

3. Secure History Storage:

Previous diagnosis reports are safely stored in MongoDB Atlas for future reference.

4. Scalable System:

Cloud-based deployment allows the system to support multiple users efficiently.

5. Better Adaptability:

Unlike rule-based systems, it can understand different symptom descriptions dynamically.

6. Quick Recommendations:

Provides instant precautions, remedies, and doctor consultation suggestions.

7. Improved Accuracy:

Generative AI improves contextual understanding and response quality.

III. METHODOLOGY

The proposed Gen AI Health Diagnosis Assistant follows a systematic workflow for symptom-based disease prediction.

Initially, the user logs into the system using existing credentials or registers as a new user to access the platform securely. After authentication, the user provides symptoms manually through text input or uploads health-related data such as temperature, heart rate, or other medical parameters.

The entered data is then preprocessed to remove missing, noisy, or inconsistent values, ensuring better analysis quality. After preprocessing, important symptom patterns and relevant health features are extracted from the input for further intelligent processing. These extracted features are analyzed by the Gemini API-based Generative AI model, which predicts possible diseases or health conditions based on the symptom description and contextual understanding. Once the analysis is completed, the system generates diagnosis results along with possible confidence-based suggestions. Based on the predicted condition, the system further provides medical precautions, preventive tips, and recommendations on whether the user should consult a doctor. Finally, the diagnosis report is displayed through the web interface, and the user is given the option to download the health report in PDF format for future reference. This methodology ensures a secure, intelligent, and user-friendly healthcare assistance workflow suitable for real-time preliminary diagnosis.

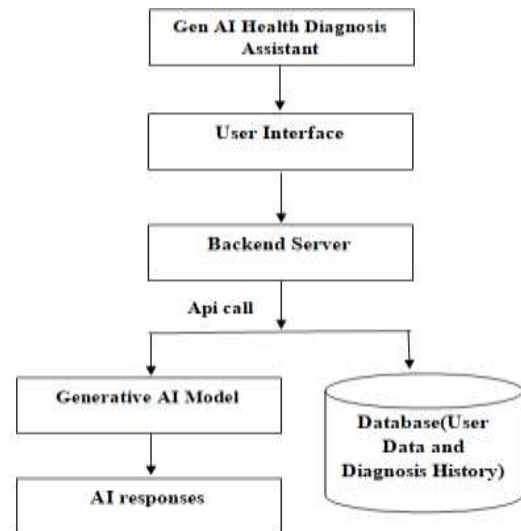


Figure: System Architecture

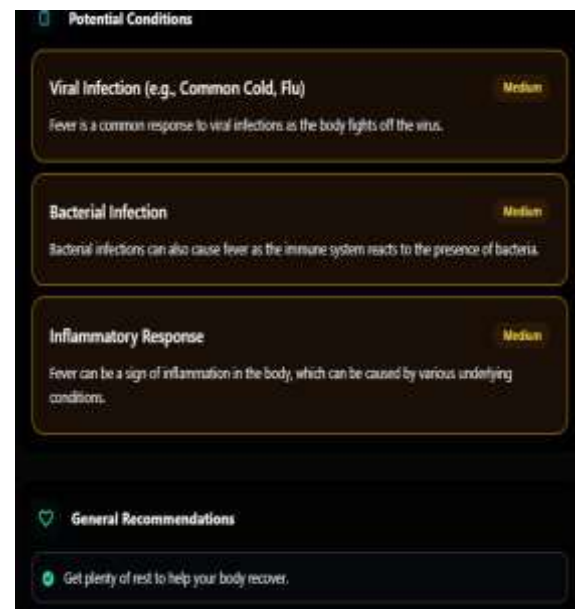


Figure: Shows that Architecture Diagram

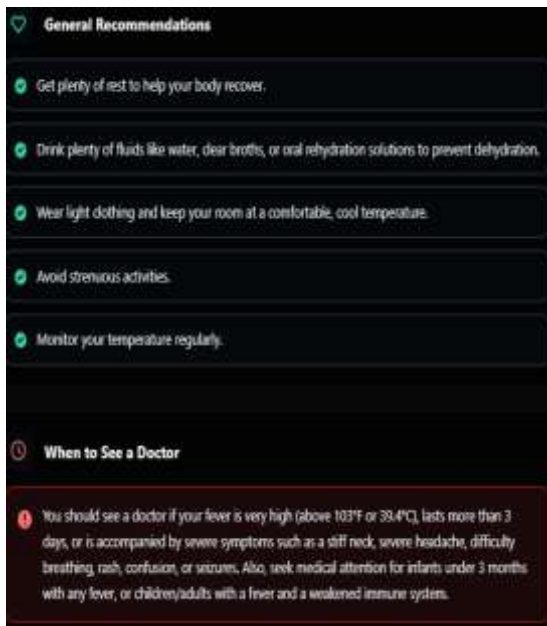
IV. EXPERIMENTAL RESULTS

This project has a very simple work process. The user will then be able to log in to the system. The log in will enable the user to enter the symptoms that he or she has or enter the type of medical-related questions that the user has.

The input is passed on to a Generative AI model via an API. The AI reads the symptoms understands what question the user is asking and finally crafts a response based on the training it has received within the field of medicine. It will usually return the potential problem

that might exist within the person along with its definition.

This assists in allowing the user to view their searches in case he or she needs them at any point in time. Further it also provides some form of general advice in respect of resting having water or consulting a doctor depending on whether it is a serious symptom or not.



The developed system successfully performs symptom-based disease analysis using Generative AI. Users can securely log in, submit symptoms, receive possible disease conditions, view remedies, and download health reports. The history module stores previous symptom analyses, improving usability.

V. CONCLUSION

The proposed Gen AI Health Diagnosis Assistant using Gemini API successfully provides an intelligent and user-friendly platform for preliminary symptom-based disease prediction. By integrating Generative AI, the system can understand symptoms entered in natural language and generate possible disease conditions, preventive measures, and recommendations for medical consultation in real time.

Compared with traditional rule-based healthcare systems, the proposed solution offers better flexibility, faster response generation, secure history storage, and improved user interaction through a modern web interface.

The experimental results confirm that the system effectively supports early health awareness and assists users in obtaining quick preliminary medical guidance. This makes the proposed model highly suitable for real-world healthcare assistance, especially in situations where immediate doctor consultation is not available.

Future enhancements can include voice-based symptom input, multilingual support, wearable sensor integration, and telemedicine connectivity, making the system more intelligent, accessible, and practical for next-generation digital healthcare services.

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