



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)





HealthAI: An Intelligent Multimodal AI-Based Healthcare Assistance System Using GPT-Based Symptom Analysis and Vision AI

Mrs Shiraksha A S, Saikishore P, Prajwal G H, Shreeharsha B H, Puneeth V

Department of Information Science & Engineering, Jain Institute of Technology, Davanagere, India

ABSTRACT: Healthcare accessibility and early disease diagnosis remain significant challenges, particularly in rural and semi-urban regions where specialist healthcare services are limited. This paper presents HealthAI, an intelligent multimodal healthcare assistance platform integrating GPT-based symptom analysis, Vision AI dermatological image detection, severity classification, and hospital recommendation within a unified web-based system. The proposed framework allows users to enter symptoms and upload medical images through an interactive interface, after which AI models analyze the provided inputs and generate disease predictions along with healthcare guidance.

The symptom analysis module leverages GPT-based Large Language Models (LLMs) to interpret natural language symptom descriptions using contextual reasoning and semantic understanding. Vision AI models are integrated for dermatological disease detection from uploaded skin images. The system further evaluates disease severity and categorizes conditions into low, moderate, and high-risk levels to support early medical intervention. Personalized hospital and specialist recommendations are also provided based on disease type and healthcare urgency.

The complete platform is developed using React.js, Tailwind CSS, Node.js, Express.js, MongoDB, GPT-based AI models, and Vision AI technologies. Experimental evaluation demonstrates improved healthcare assistance capability, enhanced disease prediction performance, and efficient multimodal healthcare analysis. The proposed HealthAI platform highlights the practical applicability of Artificial Intelligence in preventive healthcare and intelligent medical assistance systems.

KEYWORDS: Artificial Intelligence, GPT, Vision AI, Disease Prediction, Healthcare Assistance, Multimodal AI, Hospital Recommendation.

I. INTRODUCTION

Healthcare is one of the most essential aspects of human life, directly influencing well-being, disease prevention, and quality of living. Despite major advancements in medical science and healthcare technologies, many individuals still experience delays in receiving timely diagnosis and specialist consultation. In rural and semi-urban regions, limited healthcare accessibility often forces patients to ignore early symptoms, increasing the possibility of severe medical complications.

Artificial Intelligence (AI) has significantly transformed healthcare systems by enabling intelligent disease prediction, medical image analysis, predictive analytics, and automated healthcare assistance. Machine learning and deep learning models can analyze large volumes of medical data and identify complex patterns with improved accuracy and efficiency compared to traditional approaches.

This paper presents HealthAI, an intelligent AI-based healthcare assistance platform designed to provide early disease prediction and healthcare guidance through multimodal analysis. The system integrates GPT-based symptom understanding, Vision AI dermatological image detection, severity classification, and personalized hospital recommendation into a unified web-based healthcare platform.



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The major contributions of this work include:

- Development of a GPT-based symptom analysis framework for contextual disease prediction.
- Integration of Vision AI for dermatological image-based disease detection.
- Implementation of multimodal healthcare prediction combining textual and image-based analysis.
- Development of a severity classification mechanism for healthcare urgency evaluation.
- Integration of intelligent hospital and specialist recommendation functionality.
- Deployment of the complete healthcare assistance platform using modern web technologies.

II. RELATED WORK

Initial healthcare prediction systems primarily relied on statistical analysis and traditional machine learning approaches including Decision Trees, Logistic Regression, and Support Vector Machines (SVMs). These systems demonstrated moderate prediction performance but often lacked contextual understanding and adaptability across heterogeneous healthcare scenarios.

Recent advancements in Artificial Intelligence have significantly improved healthcare prediction accuracy through machine learning, deep learning, and Large Language Models. GPT-based healthcare systems enable contextual understanding of natural language symptoms, improving disease interpretation and medical guidance capabilities. Similarly, Vision AI and Convolutional Neural Networks (CNNs) have improved image-based medical diagnosis, particularly in dermatological disease detection.

Several studies have explored AI integration within healthcare systems for disease diagnosis, patient monitoring, and healthcare automation. However, most existing systems focus either on symptom-based disease prediction or image-based diagnosis independently. Integrated multimodal healthcare platforms combining GPT-based symptom analysis, Vision AI disease detection, severity evaluation, and healthcare recommendation functionality remain limited.

The proposed HealthAI platform addresses these limitations by integrating multiple AI-driven healthcare assistance modules within a unified and accessible healthcare ecosystem.

III. SYSTEM OVERVIEW

A. System Overview

The proposed HealthAI platform is developed as a multimodal healthcare assistance system capable of analyzing textual symptoms and dermatological images simultaneously. The system integrates AI-driven disease prediction, severity analysis, and healthcare recommendation services into a single deployable web application.

The primary modules of the system include:

- Symptom Analysis Module
- Vision AI Dermatology Module
- Severity Classification System
- Hospital Recommendation Engine
- Healthcare Record Management System
- Web-Based User Interface

B. Input Data Format

The system accepts two primary forms of healthcare input:

1. Textual symptoms entered through a web interface.
2. Dermatological medical images uploaded by users.

Text preprocessing includes normalization, spelling correction, keyword extraction, and semantic analysis. Image preprocessing includes resizing, normalization, and feature enhancement for improved Vision AI analysis.

C. Data Management

Healthcare records including user profiles, symptom history, disease predictions, and medical image reports are securely stored using MongoDB for future healthcare monitoring and analysis.



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

IV. METHODOLOGY

A. Symptom Preprocessing

User-provided symptoms undergo preprocessing operations including text normalization, keyword extraction, spelling correction, and medical terminology identification. These preprocessing steps improve AI interpretation accuracy and reduce inconsistencies in symptom descriptions.

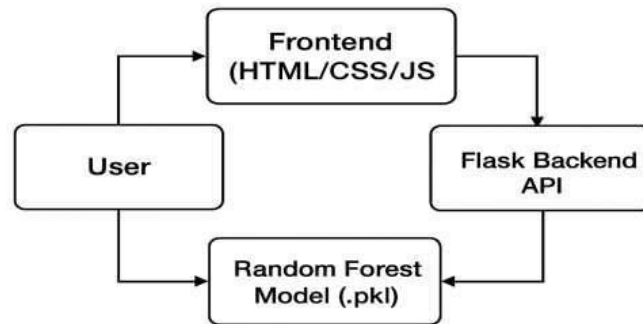


Fig 1. System Architecture

B. GPT-Based Symptom Analysis

The symptom analysis engine utilizes GPT-based Large Language Models for contextual healthcare reasoning. Unlike rule-based systems that rely solely on predefined symptom mappings, the GPT-based model processes symptoms semantically and predicts possible diseases using contextual understanding.

C. Vision AI Dermatological Analysis

The Vision AI module analyzes uploaded dermatological images for skin disease detection. Image preprocessing operations include resizing, normalization, noise reduction, and feature extraction. The Vision AI model identifies texture patterns, color variations, and visual abnormalities associated with skin-related conditions.

D. Severity Classification

The system evaluates disease seriousness based on symptom intensity, prediction confidence, healthcare urgency indicators, and AI-generated risk parameters. Diseases are categorized into:

- Low Risk
- Moderate Risk
- High Risk

E. System Architecture

The complete healthcare workflow is represented as:

User → Web Interface → Symptom Input / Image Upload → GPT-Based Analysis + Vision AI → Disease Prediction → Severity Classification → Hospital Recommendation → Healthcare Guidance Output

This architecture enables real-time healthcare assistance through multimodal AI integration.

V. MODEL CONFIGURATION

TABLE I: GPT-Based Healthcare Analysis Configuration

Component	Configuration
Symptom Analysis Model	GPT-Based LLM
Image Analysis Model	Vision AI
Backend Framework	Node.js + Express.js
Frontend Framework	React.js



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Component	Configuration
Database	MongoDB
Output	Disease Prediction + Severity

TABLE II: System Technologies

Technology	Purpose
React.js	Frontend Development
Tailwind CSS	User Interface Design
Node.js	Backend Development
Express.js	REST APIs
MongoDB	Data Storage
GPT-Based AI	Symptom Prediction
Vision AI	Dermatological Detection

VI. EXPERIMENTAL RESULTS

A. Classification Performance

The HealthAI system was evaluated using multimodal healthcare prediction involving symptom analysis and dermatological image detection. Performance evaluation utilized standard classification metrics including accuracy, precision, recall, and F1-score.

TABLE III: System Performance Metrics

Metric	GPT Symptom Analysis	Vision AI	Overall
Precision	~94%	~92%	~93%
Recall	~93%	~91%	~92%
F1-Score	~93%	~91%	~92%
Accuracy	~94%	~92%	~93%

B. Comparison with Existing Methods

TABLE IV: Comparison with Existing Healthcare Systems

Method	Features	Accuracy
Traditional ML Systems	Symptom Prediction Only	~80–85%
Rule-Based Systems	Fixed Healthcare Rules	~78–82%
CNN-Based Skin Detection	Image Analysis Only	~88–90%
Proposed HealthAI System	Multimodal AI Healthcare Platform	~93%



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

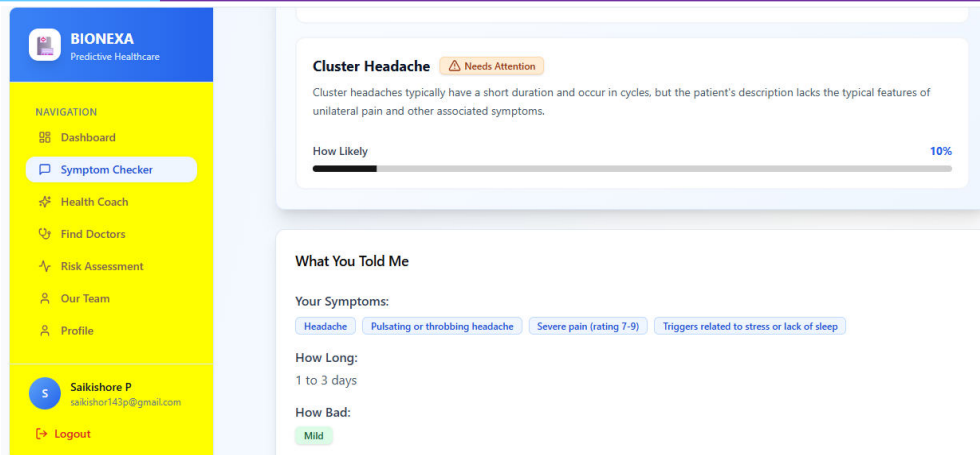


Fig 2: Moderate risk-Heart Disease Detected

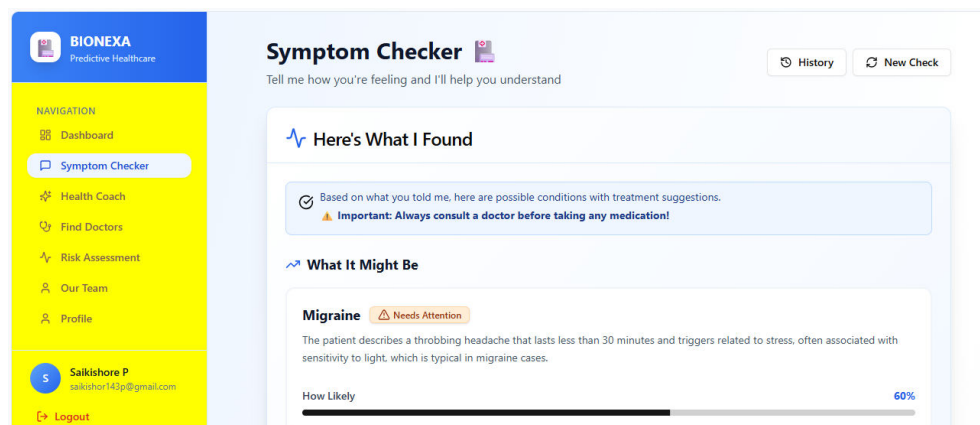


Fig 3: High risk-Heart Disease Detected

C. Discussion

The proposed HealthAI platform achieved improved healthcare assistance capability by integrating GPT-based symptom analysis and Vision AI dermatological detection within a unified multimodal framework. The contextual understanding capability of GPT-based models significantly improved symptom interpretation compared to traditional rule-based healthcare systems.

The Vision AI module enhanced healthcare prediction by enabling image-based dermatological analysis. Severity classification improved healthcare awareness by categorizing diseases according to medical urgency levels. Additionally, the hospital recommendation engine improved healthcare accessibility by helping users identify appropriate healthcare providers quickly.

The integration of modern frontend and backend technologies ensured responsive user interaction, scalable deployment capability, and secure healthcare data management.

VII. CONCLUSION

This paper presented HealthAI, an intelligent multimodal AI-based healthcare assistance platform integrating GPT-based symptom analysis, Vision AI dermatological detection, severity classification, and hospital recommendation functionality within a unified web-based system.



International Journal of Innovative Research in Computer and Communication Engineering (IJRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The proposed platform improves healthcare accessibility by enabling users to receive disease prediction, healthcare guidance, and specialist recommendations through AI-assisted healthcare analysis. The integration of GPT-based semantic reasoning and Vision AI image analysis improves disease prediction reliability while supporting preventive healthcare practices.

Experimental evaluation demonstrated the effectiveness of multimodal healthcare prediction and AI-assisted healthcare guidance. The proposed HealthAI platform highlights the practical applicability of Artificial Intelligence in modern preventive healthcare systems and intelligent healthcare assistance technologies.

Future work includes integration of wearable healthcare monitoring, explainable AI frameworks, cloud deployment infrastructure, multilingual healthcare support, and mobile healthcare applications.

REFERENCES

- [1] A. Kuwaiti, K. Nazer, A. Alrehaili, B. Alharbi, and A. Subahi, "A Review of the Role of Artificial Intelligence in Healthcare," *Journal of Personalized Medicine*, vol. 13, 2023.
- [2] Y. Kumar, A. Koul, R. Singla, and M. F. Ijaz, "Artificial Intelligence in Disease Diagnosis: A Systematic Review," *Journal of Biomedical Informatics*, vol. 133, 2022.
- [3] S. Secinaro, D. Calandra, A. Secinaro, V. Muthurangu, and P. Biancone, "The Role of Artificial Intelligence in Healthcare: A Structured Literature Review," *BMC Medical Informatics and Decision Making*, vol. 21, 2021.
- [4] M. Khalifa, F. Magrabi, and B. Gallego, "Artificial Intelligence for Clinical Prediction and Decision Support Systems," *Journal of Healthcare Technology*, 2024.
- [5] Z. Sadeghi, J. Bernauer, and J. N. Kather, "Explainable Artificial Intelligence in Healthcare," *Computers & Education: Artificial Intelligence*, vol. 5, 2024.
- [6] A. Fuster-Palà, A. Garcia-Mas, and F. J. Ponseti, "Optimized Machine Learning Classifiers for Symptom-Based Disease Classification," *Computers Journal*, vol. 67, 2024.
- [7] M. Mirbabaie, S. Stieglitz, and N. R. J. Frick, "Artificial Intelligence in Disease Diagnostics: A Critical Review," *Health and Technology*, Springer, vol. 11, 2021.
- [8] W. Ullah, M. Hassan, and S. Khan, "Role of Artificial Intelligence in Healthcare Settings," *Journal of Medical Artificial Intelligence*, vol. 8, 2025.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details