

Med-Assist: An AI-Powered Medical Web Application with Chatbot

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To Cite this Article: Chet Ram Thakur¹, Priyanshu G. Bokde², Nachiket H. Jat³, Shailesh G. Mahatpure⁴, Arnav A. Aparajit⁵, Harshanand A. Walde⁶, Megha R. Supatkar⁷, "Med-Assist: An AI-Powered Medical Web Application with Chatbot", Indian Journal of Computer Science and Technology, Volume 04, Issue 03 (September-December 2025), PP: 189-194.



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Abstract: This paper is about an AI powered web application which consists of an AI chatbot that uses large Language Model (LLM) to answer the symptoms of a patient with possible ayurvedic and normal non-medicinal based remedies. It uses a powerful version of Google Gemini LLM – Flash 2.0 that has been fine tuned to provide the remedies for symptoms or diseases it has been asked for. Med-Assist chatbot provides recommendations of remedies based on any allergen conditions while keeping user medical history in memory to provide a safe healthcare for the patients. This research paper consists of methodologies and research done for bringing up this application.

Key Words: Large Language Model (LLM, Google Gemini Flash 2.0, Fast-API), AI-powered Chatbot, Agentic AI Model, Medical Consultant, Context-based interaction, Reliable Ayurvedic Information, Symptom, Artificial Intelligence in healthcare, Generative-AI, Body-Mass Index, Firebase Database, First-Aid, Symptom Checker, Personalised Healthcare, Emergency Contact, Web Application, Real-Time Learning.

I. INTRODUCTION

In today's world where everything is getting automated, health sector is not new to this technology either. AI is working around the corner of the professionalisms for making this automation better. In such a case, a web application that can keep your medical history in attention and will consist of a medical chatbot for replying to our concerns of disease or symptom with not just normal remedies but also with ayurvedic remedies is a plus to the industry itself.

Medical chatbots that works using LLM make it easier for patients to get the support they need, especially when they need quick answers. Because they can understand everyday language and respond based on what the user is asking, they create a more personal and helpful experience. This can also help doctors and nurses by taking care of non-prescription based questions, allowing healthcare professionals to focus on more serious cases and focus on prescription required questions and symptoms.

As technology continues to improve, research is being done to make these chatbots even more accurate and helpful. Developers are working on making them better at understanding context, providing more reliable responses, and creating conversations that feel more natural. New machine learning techniques and more powerful agentic AIs are helping chatbots learn from more real-world situations, making them smarter and more responsive over time.

Our research aims to contribute to this progress by exploring more advanced approaches to building medical chatbots. By using modern tools and improved methods, we created a chatbot that is more adaptable, trustworthy, and supportive for people seeking medical help online whether it is ayurvedic or normal remedies that do not require any doctor's prescription.

We also aimed to create a web application that can integrate this medical chatbot based on Gemini Flash 2.0. This web application consists of a symptom checker, a first aid dropdown and emergency contacts for cases of emergency in one single application.

II. LITERATURE REVIEW

Chatbots are AI-powered assistants used in banking, shopping, customer support, and healthcare. They save time, reduce costs, and provide 24/7 support. Examples: Amazon Alexa, Zocdoc, Babylon, WhatsApp bots. Healthcare needs quick, accessible, and affordable guidance. Patients can ask symptoms anytime for which chatbot provides triage, basic advice, or directs to a doctor. Provides user-friendly chat interface with medical records stored.

Consultation Systems for Physicians Proposed by Dr. Edward H. Shortliffe in Conference on Computation & Intelligence, January 1980. His Research was based on developing a consultation system for physicians using early systems that relied on statistical models such as Bayes' Theorem and decision analysis.

Methods Used by Dr. Shortliffe were a Conceptual development using the MYCIN system, which is one of the earliest AI-based Expert Systems developed in the 1970s. It was created to assist doctors in diagnosing bacterial infections (especially blood infections like bacteremia and meningitis) and recommending appropriate antibiotics. It poses various design issues like Mechanical (UI), Epistemological (logic, rules), Psychological (user trust).

Future Work Suggested by Dr. Shortliffe were to expand MYCIN to cover a wider range of diseases and to Integrate with natural language processing and hybrid AI/statistical systems.

A Review based on AI based Medical Assistant Chatbot, reviewed by Prof. Chetan Bulla and his fellow acquaintances published at HBRP Publication in the Research and Application of Web development and Design Journal in 2020. This paper surveys AI-based medical assistance chatbots, emphasizing their roles in patient communication, diagnosis, and Mental Health Support.

Methods used in this Paper were the review of technologies like NLP, machine learning and examines various chatbot implementations and their development approaches. The future work suggested by Prof. Chetan Bulla and his acquaintance is to enhance AI Medical chatbots with Advance Symptom Recognition.

Evaluation of the performance of Google's Gemini 1.5 Flash and Gemini 2.0 Flash LLM's in Differential Diagnostics, conducted by Yaroslav Mykhalko, Andrii Mykhalko, Heorii Mykhalko in March 2020 at ResearchGate Publication, where the Effectiveness of Google's Gemini 1.5 Flash and Gemini 2.0 Flash models in Differential Diagnostics was investigated. Gemini 2.0 Flash showed higher Accuracy (84.34% vs 56.25%, $p < 0.05$). System limitations were identified in both the models particularly in the diagnosis of complex cases. The result confirms the potential of Gemini 2.0 Flash in Medical practice.

In our research, we taken insights from previous Research and Reviews and developed a Web-Application that have an integrated LLM based Chatbot for Medical Assistance with any given Symptom input questioned by user. This Web-Application stores past medical History as well as Allergen information of User to avoid providing harmful triage. This allows our chatbot to offer more personalized and accurate medical guidance, addressing the limitations observed in previous research regarding adaptability and real-time learning.

III.METHODOLOGY

A) Libraries and Frameworks

This web application along with Chatbot is built using the following key libraries and frameworks: -

1. Google Generative AI: Google Generative AI to be specific Gemini 2.0 Flash is used to generate intelligent responses based on user input. In our medical chatbot, it helps the system understand symptoms, answer health-related questions, and communicate naturally with users.

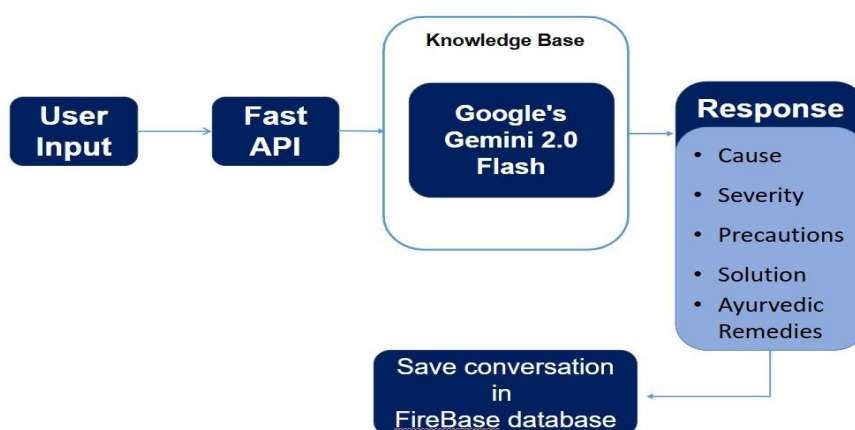
2. Firebase: Firebase is a cloud platform from Google that we use to store data and manage users. It stores data like: Chat history, User profiles, Symptoms or past interactions, etc.

3. Fast Api: Fast API is a backend framework used to create APIs that connect your chatbot app to the AI model and database. It:

- Receives the user's message from the app
- Sends it to Google Generative AI (Gemini 2.0 Flash) for processing
- Returns the AI response back to the user
- Interacts with Firebase for saving data

These are the major frameworks and libraries that we used to create the chatbot and integrated with our main web application.

B) Gemini Flash 2.0



Gemini 2.0 Flash is a high-speed, multimodal LLM (text, image, audio, video) supporting tool use and 1 million token contexts, designed for agent-style applications. It is a powerful, multimodal, agentic AI model able to generate images, audio, call tools, and carry out multi-step reasoning to support new “agentic” capabilities. We used this specific model of Gemini due to its high speed and high efficiency in providing responses to users which is a big advantage in use cases such as medical triaging where accurate and speedy response is required for the remedy suggestion. As such we needed to make it so that the LLM we're using should not just respond to user symptoms but also provide us with a structured response regarding the disease or symptoms and add an ayurvedic remedy too. To do so we needed prompt engineering to make the LLM provide the required response.

C) Response Procedure

i) The LLM was first imported into the system by using API key from google.generativeai and model was selected and it was configured using following code snippet (API key will be developer's API key):

```
ii) GEMINI_API_KEY = os.getenv("GEMINI_API_KEY", "API_KEY")
iii) GEMINI_MODEL = os.getenv("GEMINI_MODEL", "gemini-2.0-flash")
iv) genai.configure(api_key=GEMINI_API_KEY)
v) model = genai.GenerativeModel(GEMINI_MODEL)
```

ii) A database was added and link with this API too so that LLM can answer while keeping the User's past medical conditions and allergens in mind while responding to their symptoms.

iii) Prompt Generation: Following code snippet demonstrate how the prompt will be generated:

```
"role": "You are an assistant aiding licensed Ayurvedic doctors.",
"guardrails": [
    "Provide evidence-informed Ayurvedic suggestions appropriate for general wellness.",
    "NEVER give emergency or diagnostic statements. Urge physician review for red flags.",
    "Avoid recommendations that include metals, toxic substances, or restricted drugs.",
    "Respect listed allergies: do not suggest any item that matches or contains them.",
    "Prefer lifestyle, diet, yoga, and gentle herbs. Provide dosages only when safe & common.",
    "Keep outputs concise and practical for India-friendly contexts."
],
"format": {
    "type": "json",
    "schema": {
        "answer_text": "string",
        "plan": [
            {
                "title": "string",
                "category": "herb|diet|lifestyle|yoga|breathing|other",
                "instructions": "string",
                "frequency": "string?",
                "duration": "string?",
                "rationale": "string?",
                "cautions": ["string"],
                "severity": ["string"]
            }
        ],
        "disclaimer": "string"
    }
},
"patient_context": {
    "user_profile": {
        "id": bundle["user"]["id"],
        "name": bundle["user"]["name"],
        "age": bundle["user"]["age"],
        "sex": bundle["user"]["sex"],

        "primary_complaint": bundle["user"]["primary_complaint"],
        "known_conditions": (bundle["user"]["known_conditions"] or "").split(",")
        if bundle["user"].get("known_conditions") else []
    },
    "allergies": bundle["allergies"],
```

```

    "past_conversations": bundle["past_conversations"]
  },
  "user_question": user_question or "",
  "task": (
    "Answer the user's question briefly in 'answer_text'. "
    "Then produce 4-7 tailored, safe suggestions as 'plan' in JSON, each with rationale and cautions. "
    "Respect allergies strictly; avoid any item that might contain them."
  )
}

```

iv) Retrieval and Response Generation: This is how the chatbot will reply for a given input symptom from user:

Ayurvedic LLM Assistant (Demo)

User ID:

Type your question:

I have a dry cough

Ask

Answer

Given your dry cough, along with your history of acidity, bloating, fever, anxiety, diabetes, cold, vomiting, feeling like you have arthritis, Herpes Zoster, rashes, itchy scalp, hairfall, pimples on your face and headaches, let's focus on gentle remedies to soothe your cough and reduce inflammation. Please consult a doctor to rule out any serious underlying cause for the cough. Here's a plan to help manage your symptoms.

Disclaimer: Educational use only; not medical advice. Outputs are intended for review by a licensed physician. Seek immediate care for alarming symptoms (severe pain, bleeding, breathing issues, fainting, chest pain, etc.).

Plan (JSON)

```

{
  [
    {
      "title": "Warm Water with Honey",
      "category": "diet",
      "instructions": "Mix 1 tablespoon of honey in a cup of warm water. Sip slowly.",
      "frequency": "2-3 times a day",
      "duration": null,
      "rationale": "Honey is a natural cough suppressant and soothes the throat. Warm water helps to loosen mucus.",
      "cautions": [],
      "severity": {}
    },
    {
      "title": "Steam Inhalation",
      "category": "lifestyle",
      "instructions": "Inhale steam from a bowl of hot water. You can add a few drops of eucalyptus oil if available (ensure no allergies).",
      "frequency": "1-2 times a day",
      "duration": "10-15 minutes",
      "rationale": "Steam helps to moisten the airways and loosen congestion.",
      "cautions": [
        "Be careful not to burn yourself with hot water."
      ],
      "severity": [
        "mild"
      ]
    },
    {
      "title": "Licorice (Yashtimadhu) Tea",
      "category": "herb",
      "instructions": "Boil 1 teaspoon of licorice root powder in a cup of water for 5-7 minutes. Strain and drink warm.",
      "frequency": "Once a day",
      "duration": null,
      "rationale": "Licorice has soothing and expectorant properties, which can help relieve dry cough and inflammation.",
      "cautions": [
        "Avoid if you have high blood pressure or kidney problems."
      ],
      "severity": [
        "moderate"
      ]
    }
  ]
}

```

IV.LIMITATIONS

Despite the successful development of Med-assist Web-Application, there are several limitations that warrant further research. The Main limitation of our Research is that the users have to login before they could access the Chatbot to keep their medical history stored. The chatbot is currently available only in English, restricting its accessibility to non-English speaking users.

V.CONCLUSION

This research paper presents the development of Med-Assist, an AI-powered assistant designed to provide accurate and reliable medical information in response to user's queries, concerns and conditions. Med-Assist integrates Agentic AI based Models in our case Gemini 2.0 Flash into chatbot and Web-Application solely focused on medical purposes providing quick and efficient symptom checking and triaging along with medical assistance and First-AID in case of Emergency whenever required by user.

This research proves the potential of Agentic AI based Healthcare oriented Web applications such as Med-Assist which offers precise solution to complex medical queries and concerns, thereby enhancing the accessibility and quality of healthcare information and Remedies. The chatbot's ability to understand user's queries and past medical history allows it to provide responses that are not only accurate but also contextually relevant and personalised. It also doesn't forget the roots of Indian Medicinal practices such as Ayurvedic remedies.

The development of Med-Assist initiates the integration of more LLM's focusing particularly medicinal sector to improve its capabilities further. Potential applications include expanding the chatbot's knowledge base focusing different treatment practices such as Ayurveda, enhancing its ability to provide various types of treatment suggestions, and integrating multilingual support to serve a broader user base.

In summary, Med-Assist is an AI-powered medical assistant built using Agentic AI (Gemini 2.0 Flash) to provide accurate health information, symptom checking, triaging, and first-aid guidance. It provides personalized responses by understanding user queries and medical history, while also including traditional Indian Ayurvedic remedies. This research demonstrates the potential of AI-based healthcare applications to improve accessibility and quality of medical support. Future development will focus on expanding treatment knowledge, enhancing suggestion accuracy, and adding multilingual support to reach a broader audience.

VI. RESULTS

Here we can see that the AI model took the user's symptom, sent through its knowledge database, checked for any previous records of patient's conversation with the chatbot or any in-app allergen mentioned and provided remedies for the same symptom. It made the bullet points for its response for users to understand the remedy clearly. This provides quick way for user to check the remedy for their symptom.

VII.FUTURE SCOPE

The potential future development of the Med-Assist project is complex including both technical enhancements and practical implementations that can significantly advance AI-based healthcare support. Here are some future enhancements:

A) Multi-Lingual Support

It is important to have a multi-lingual i.e. access to multiple languages in multi-lingual countries like India where English is not primary language to majority of users accessing the application and chatbot. As such people with old age may not even grasp the meaning of many complex english words. This makes it necessity to have a multi-lingual support for triaging where determining severity of patient's symptom is necessary. It can be done by optimizing the input and output parameters of the chatbots.

B) Voice Assistance as well as Input

Introducing voice assistance for both query insertion and Response will provide easier accessibility to users with disabilities such as Dyslexia. Sometimes users may experience situations where they are unable to type in their queries in such cases Voice Assistance will be Helpful. By implementing voice Assistance, it will improve the User Experience.

C) Integration of Image Recognition

Many symptoms such as skin infections, skin burns and irritations are something that can't be explained with words. This means image recognition can help the bot to understand the patient's actual condition and severity. This can prove useful in creating an analyser for conditions on human skin and provide effective remedy consultation for user. It can provide a much better outcome compared to just typing the symptoms.

D) Expanding Web Application Use Cases

Improving storage and maintenance of user's health records such that the health records can be used by the doctors and medical personals such as paramedics for triaging and symptom checking along with determining any unknown allergen can help to improve healthcare service's individual experience by a lot.

E) Integrating Nearby Clinic and Hospital Information

A patient or user might need to determine a clinic or hospital suitable for their needs. As such having a one stop web application that can provide these information' for the user such that they can even contact the medical institution or book an appointment on one click can help a user a lot of times. Thus, adding such feature can improve functionality of the application too.

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