



# Codezilla - Project Report

Gradient Descent - Team 53

 Team Members

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# Problem Statement

## Multilingual Medical Translation Assistant

### Context:

Language barriers can significantly impede healthcare delivery. Translation tools can help providers and patients communicate. This challenge is to build a medical translation assistant for real-time healthcare conversations.

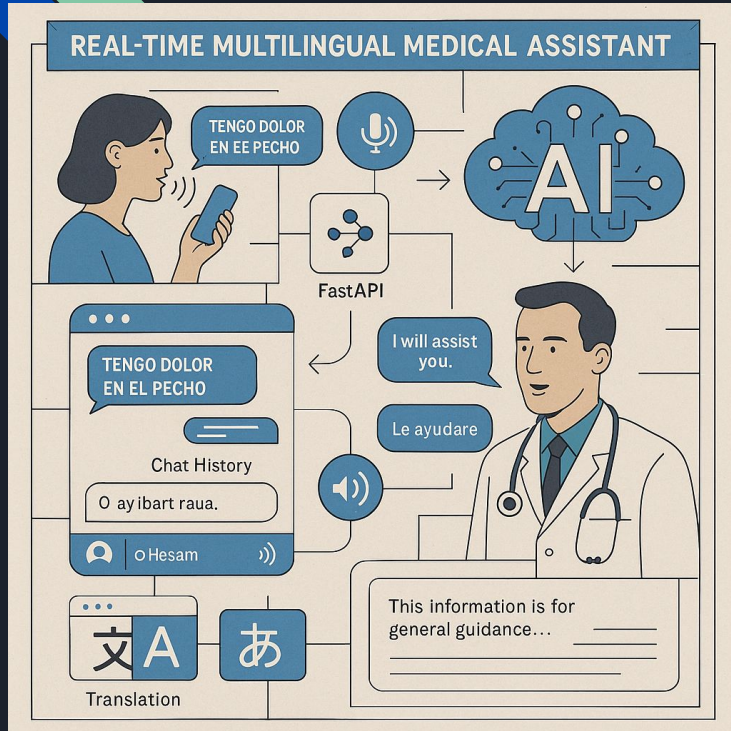
### Challenge:

Develop a real-time translation application for healthcare settings to facilitate communication between patients and providers speaking different languages.

### Bonus Features:

1. Include speech-to-text transcription and text-to-speech output.
2. Support sign language (text/voice to sign animation) for deaf patients.

# Why our Project is unique compared to others?

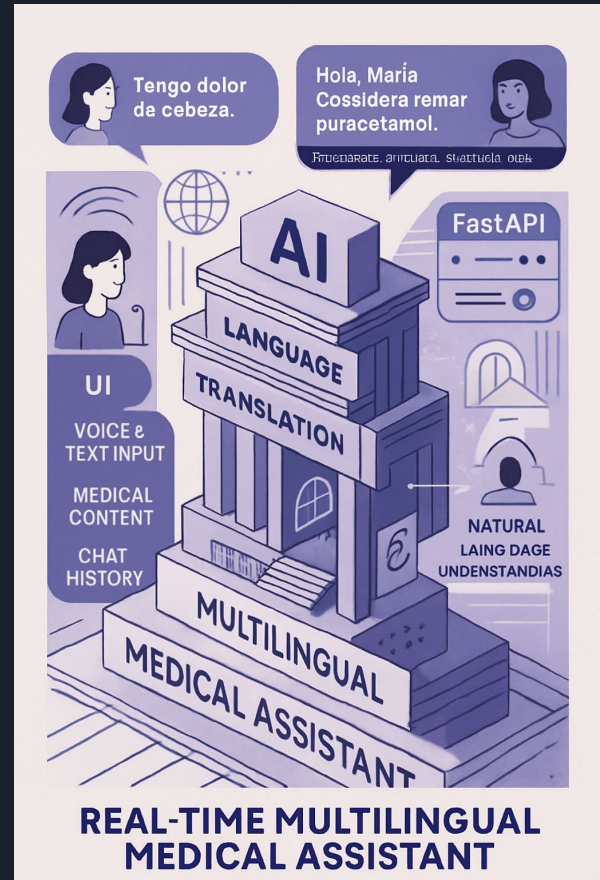


Our project is a real-time multilingual medical assistant designed to bridge communication gaps in healthcare by combining AI, voice technology, and live translation. The system allows patients to interact naturally using their preferred language and voice, making it especially useful in multilingual, multicultural, or underserved communities.

At the core of our application is an AI-driven backend powered by FastAPI that processes medical queries intelligently using natural language understanding. It recognizes common symptoms, provides general health guidance, and delivers personalized responses based on the patient's age and name. To ensure accessibility and inclusivity, the system detects the language of the user's input and automatically translates it into English for processing — then back into the user's language for response. This enables seamless communication regardless of the patient's spoken language.

Our UI that emphasizes simplicity, clarity, and trust. Users can speak or type their medical concerns and receive instant responses through both text and voice. Key features include multilingual support, medical context filtering, voice input/output, and chat history for continuity.

What makes this project unique is its end-to-end integration of voice, translation, and AI tailored specifically for medical dialogues. While many AI assistants exist, few are built with real-time healthcare interaction in mind — especially for non-English speakers. Our assistant not only understands and replies in multiple languages but also adds empathy, personalization, and responsible guidance through disclaimers, making it both powerful and safe.





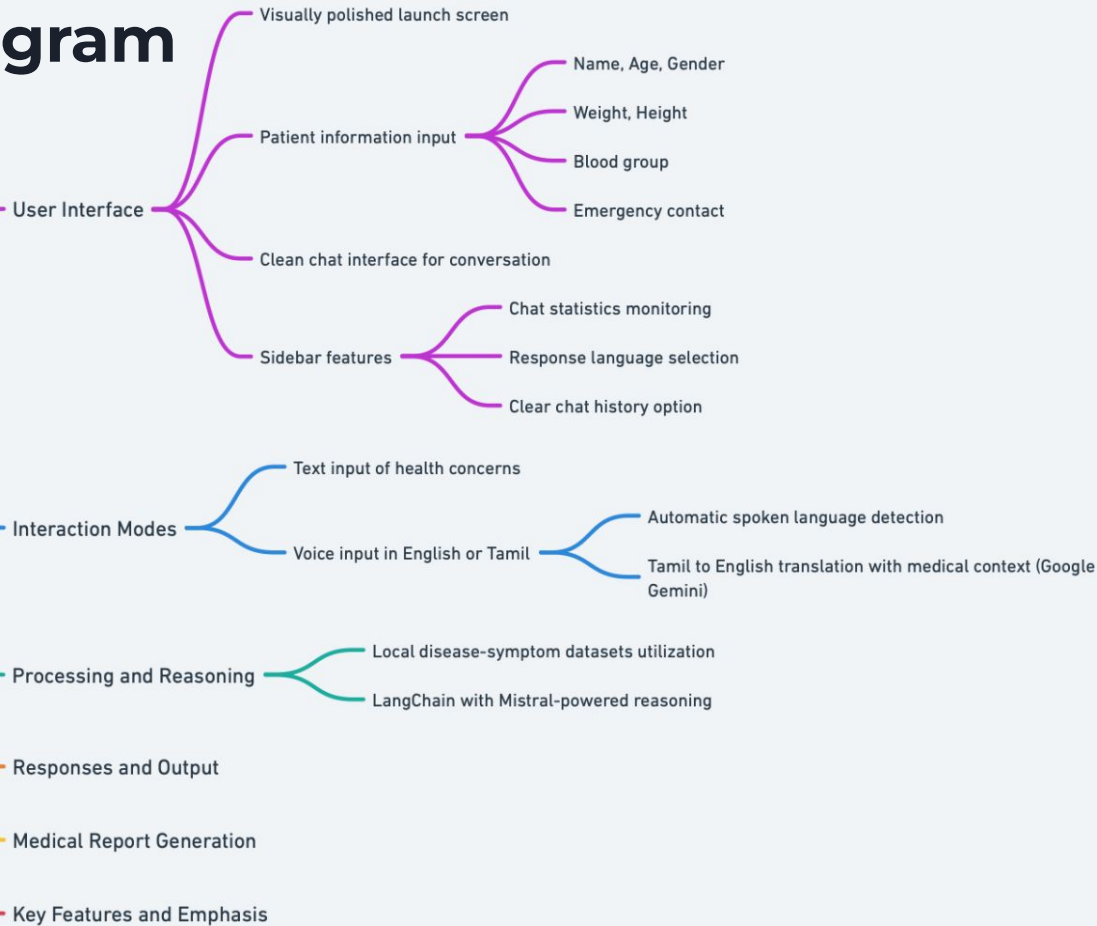
# Workflow of the Assistant

**Dr. AI is an AI-powered multilingual medical assistant designed to provide accurate, conversational healthcare support through text or voice.** Upon launching the app, users are greeted with a visually polished interface where they can first enter patient information such as name, age, gender, weight, height, blood group, and emergency contact. This data enables personalized responses and enhances the quality of the final medical report. Users can interact with Dr. AI by either typing their health concerns or speaking in English or Tamil. The system intelligently detects the spoken language, translates Tamil to English with medical context using Google Gemini, and processes queries using a combination of local disease-symptom datasets, LangChain's Mistral-powered reasoning, and semantic similarity via SentenceTransformers.

**In response, Dr. AI delivers medical advice in the user's chosen language (via translation), displays the message in a clean chat interface, and reads it aloud using text-to-speech.** The sidebar allows users to monitor chat statistics, choose a response language, and clear the chat history. Once a meaningful conversation has occurred, users can generate a comprehensive PDF medical report with one click. This report includes patient details, a consultation summary, AI insights, and personalized recommendations—all professionally formatted using ReportLab. Dr. AI ensures a seamless and supportive health consultation experience while emphasizing that its responses are educational and not a replacement for professional medical care.

# WorkFlow Diagram

## Dr. AI - Multilingual AI-Powered Medical Assistant



## Settings

Language

Tamil

## Chat Statistics

Messages

0

Clear Chat History

## Medical Report

Start a conversation to generate a medical report

- Medical advice and guidance
- Medication questions
- Wellness and prevention tips

NEW: Speak in Tamil or English! Click the microphone button to start.

Or type your medical question below.

Ask Dr. AI about your health...

e.g., I have a headache, What should I do for better sleep?

Send

Click here to speak

Audio Recognition  
(Tamil/English)

Listening... Speak in Tamil or English!

Listening... Speak now! (Supports Tamil and English - Medical topics only)

Tamil detected: எனக்கு கொரோனா தொற்று உள்ளது நான் என்ன செய்ய வேண்டும்

Captured audio in Tamil  
and instant translation to  
english

English translation (medical): I have contracted a coronavirus infection. What should I do?

## Language Selector with 13 Languages

### ⚙ Settings

#### 🌐 Language

English

Hindi

Gujarati

Korean

Turkish

German

French

Arabic



Clear Chat History

### 📄 Medical Report



Generate Report



[Download Medical Report](#)



Hello Shebin, I'm sorry to hear that you have a fever. It is important to consult with a healthcare provider for proper diagnosis and treatment. In general, common medications used for treating fevers include Acetaminophen (Tylenol) or Ibuprofen (Advil, Motrin). However, these should be taken under the guidance of a doctor due to potential interactions with other medications or underlying health conditions. Please seek medical attention immediately if your fever persists for more than three days or if you experience any severe symptoms such as difficulty breathing, persistent headache, stiff neck, confusion, rash, or persistent vomiting. Stay hydrated and rest in the meantime.



Ask Dr. AI about your health...

e.g., I have a headache, What should I do for better sleep?



Send



## Medical Report Preview



Patient Concerns

2

Recent Patient Concerns:



AI Recommendations

2



## Settings

Language

Tamil

## Chat Statistics

Messages

6

Clear Chat History

## Medical Report

Generate Report

Download  
Medical Report

நீங்கள் உயர் இரத்த சர்க்கரை அளவை அனுபவிக்கிறீர்கள் என்பதைக் கேட்டு வருந்துகிறேன், ஷெபின். உங்கள் குறிப்பிட்ட சூழ்நிலையின் அடிப்படையில் தனிப்பயனாக்கப்பட்ட ஆலோசனைகளுக்கு உங்கள் சுகாதார வழங்குநருடன் கலந்தாலோசிப்பது முக்கியம். இருப்பினும், இரத்த சர்க்கரை அளவை நிர்வகிக்க உதவும் சில பொதுவான உதவிக்குறிப்புகள் இங்கே:

- ஒரு சீரான உணவைப் பின்பற்றுங்கள்: பழங்கள், காய்கறிகள், மெலிந்த புரதங்கள் மற்றும் முழு தானியங்கள் நிறைந்த உணவு உங்கள் இரத்த சர்க்கரை அளவை நிலையானதாக வைத்திருக்க உதவும். நிறைவுற்ற கொழுப்புகள், சேர்க்கப்பட்ட சர்க்கரைகள் மற்றும் பதப்படுத்தப்பட்ட கார்போஹைட்ரேட்டுகள் ஆகியவற்றில் அதிகமான உணவுகளை மட்டுப்படுத்த முயற்சிக்கவும்.
- வழக்கமான உடற்பயிற்சி: இன்சலின் உங்கள் உடலின் பதிலை மேம்படுத்தவும், உங்கள் இரத்த சர்க்கரை அளவைக் குறைக்கவும் உடல் செயல்பாடு உதவும். வாரத்தின் பெரும்பாலான நாட்களில் குறைந்தது 30 நிமிட மிதமான-தீவிரம் உடற்பயிற்சியை நோக்கமாகக் கொள்ளுங்கள்.
- உங்கள் இரத்த சர்க்கரையை தவறாமல் கண்காணிக்கவும்: நாள் முழுவதும் உங்கள் இரத்த சர்க்கரை அளவைக் கண்காணிப்பது சில நடவடிக்கைகள் அல்லது உணவுகள் உங்கள் இரத்த சர்க்கரை அளவை எவ்வாறு பாதிக்கின்றன என்பதைப் புரிந்துகொள்ள உதவும்.
- பரிந்துரைக்கப்பட்டபடி மருந்துகளை எடுத்துக் கொள்ளுங்கள்: நீரிழிவு நோய்க்கு நீங்கள் ஏதேனும் மருந்துகளை எடுத்துக் கொண்டால், அவற்றை உங்கள் சுகாதார வழங்குநரால் இயக்கியதைப் போலவே அவற்றை எடுத்துக்கொள்வது முக்கியம்.
- கட்டுப்பாட்டு அழுத்தத்தை: அதிக அளவு மன அழுத்தம் உங்கள் இரத்த சர்க்கரை அளவை பாதிக்கும். மன அழுத்தத்தை நிர்வகிக்க ஆழ்ந்த சுவாசம், தியானம் அல்லது யோகா போன்ற தளர்வு நுட்பங்களை முயற்சிக்கவும்.
- போதுமான தூக்கத்தைப் பெறுங்கள்: தூக்கமின்மை இரத்த சர்க்கரை அளவை அதிகரிக்க பங்களிக்கும். ஒரு இரவுக்கு 7-8 மணிநேர தூக்கத்தை நோக்கமாகக் கொள்ளுங்கள்.

உங்கள் நீரிழிவு மேலாண்மை திட்டம் குறித்து ஏதேனும் கேள்விகள் அல்லது கவலைகள் இருந்தால் தயவுசெய்து உங்கள் சுகாதார வழங்குநருடன் கலந்தாலோசிக்கவும்.

⚙ Settings

🌐 Language

Hindi

📊 Chat Statistics

Messages

8

🗑 Clear Chat History



I've been coughing for 3 days, sometimes with yellow mucus. Should I be worried?

🇮🇳 मुझे आपके लक्षण, शबिन के बारे में सुनकर खेद है। 3 दिनों के लिए पीले बलगम के साथ खांसी करना कई श्वसन स्थितियों का संकेत हो सकता है, जिनमें से कुछ को तत्काल ध्यान देने की आवश्यकता हो सकती है। यह देखते हुए कि आप युवा और आम तौर पर स्वस्थ हैं, यह संभव है कि यह एक वायरल ऊपरी श्वसन पथ के संक्रमण या एलर्जी के कारण हो सकता है, लेकिन मैं निश्चित रूप से आगे की परीक्षा के बिना नहीं कह सकता। हालांकि, आपके लक्षणों की दृढ़ता और पीले बलगम के उत्पादन को देखते हुए, एक स्वास्थ्य पेशेवर से चिकित्सा सलाह लेना बुद्धिमानी होगी। वे एक उचित मूल्यांकन कर सकते हैं और यह निर्धारित कर सकते हैं कि क्या आगे परीक्षण आवश्यक है। इस बीच, हाइड्रेटेड रहना सुनिश्चित करें, बहुत आराम करें, और जितना संभव हो उतना एलर्जी या चिड़चिड़ाहट के संपर्क में आने से बचें।

कृपया ध्यान दें कि जब मैं सटीक और उपयोगी सलाह प्रदान करने का प्रयास करता हूं, तो इस जानकारी का उपयोग पेशेवर परामर्श के स्थान पर नहीं किया जाना चाहिए। यदि आपके लक्षण बिगड़ते हैं या बने रहते हैं, तो तत्काल चिकित्सा ध्यान देने में संकोच न करें।



Ask Dr. AI about your health...

I've been coughing for 3 days, sometimes with yellow mucus. Should I be worried?



Send

## Settings

Language

English

## Chat Statistics

Messages

4

Clear Chat History

## Medical Report

Generate Report

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## Generating AI Report

hello, i have a fever. which medicine should i take?

Hello Shebin, I'm sorry to hear that you have a fever. It is important to consult with a healthcare provider for proper diagnosis and treatment. In general, common medications used for treating fevers include Acetaminophen (Tylenol) or Ibuprofen (Advil, Motrin). However, these should be taken under the guidance of a doctor due to potential interactions with other medications or underlying health conditions. Please seek medical attention immediately if your fever persists for more than three days or if you experience any severe symptoms such as difficulty breathing, persistent headache, stiff neck, confusion, rash, or persistent vomiting. Stay hydrated and rest in the meantime.

Ask Dr. AI about your health...

e.g., I have a headache, What should I do for better sleep?

Send

## Medical Report Preview

Patient Concerns

2

AI Recommendations

2

Total Messages

4

Recent Patient Concerns:

1. have contracted a coronavirus infection. what should i do?
2. ello, i have a fever. which medicine should i take?

# ■ Dr. AI Medical Consultation Report

## ■ Patient Information

Name	Shebin
Age	20
Gender	Male
Weight	70.0 kg
Height	170.0 cm
Blood Group	A+
Emergency Contact	987654321

Report Generated: August 08, 2025 at 10:04 AM

Total Messages: 4

## ■ Consultation Summary

Number of Health Concerns Discussed: 2

Number of AI Recommendations Provided: 1

## ■ Patient Concerns & Symptoms

1. [10:00 AM] have contracted a coronavirus infection. what should i do?
2. [10:03 AM] ello, i have a fever. which medicine should i take?

## ■ Dr. AI Recommendations

1. [10:03 AM] Hello Shebin, I'm sorry to hear that you have a fever. It is important to consult with a healthcare provider for proper diagnosis and treatment. In general, common medications used for treating fevers include Acetaminophen (Tylenol) or Ibuprofen (Advil, Motrin). However, these should be taken under the guidance of a doctor due to potential interactions with other medications or underlying health conditions. Please seek medical attention immediately if your fever persists for more than three days or if you experience any severe symptoms such as difficulty breathing, persistent headache, stiff neck, confusion, rash, or persistent vomiting. Stay hydrated and rest in the meantime.

## ■ Key Medical Insights

- Shebin, the main health concern is a fever, which may be symptomatic of an underlying illness or infection.
- Recurring symptoms mentioned by the patient include a possible coronavirus infection and a fever.
- Key recommendations provided include seeking immediate medical attention for proper diagnosis and treatment, staying hydrated, resting, and taking over-the-counter medications such as Acetaminophen (Tylenol) or Ibuprofen (Advil, Motrin), but only under the guidance of a doctor due to potential interactions with other medications or underlying health conditions.
- Important medical themes discussed are fever management and seeking prompt medical care for possible infections.
- Lifestyle advice given is to rest and stay hydrated while waiting for medical attention.
- Age-specific considerations were not relevant in this conversation, but it's essential for all individuals with a fever to consult healthcare providers as soon as possible due to potential complications from infections in young adults like Shebin.

## ■ Personalized Recommendations

- Shebin, it is essential to consult with a healthcare provider as soon as possible for proper diagnosis and treatment of your fever. In the meantime, stay hydrated by drinking plenty of fluids such as water, clear broths, or electrolyte-rich beverages like sports drinks.
- Rest at home, avoid physical exertion, and try to maintain a cool environment to help bring down your body temperature.
- Monitor your symptoms closely and seek medical attention immediately if your fever persists for more than three days, you experience severe symptoms such as difficulty breathing, persistent headache, stiff neck, confusion, rash, or persistent vomiting.

- If prescribed by your doctor, take Acetaminophen (Tylenol) or Ibuprofen (Advil, Motrin) to help reduce your fever and alleviate discomfort. However, these medications should be taken under the guidance of a doctor due to potential interactions with other medications or underlying health conditions.
- Shebin, as you are a 20-year-old male, it is crucial to practice good hygiene measures like washing hands frequently and covering your mouth when sneezing or coughing. Maintain social distancing whenever possible, especially in public settings. Also, ensure proper sanitization of frequently touched surfaces at home.
- Consider maintaining a balanced diet rich in vitamins, minerals, and nutrients to support your immune system during recovery. Foods such as fruits, vegetables, lean proteins, and whole grains can help boost your immunity.

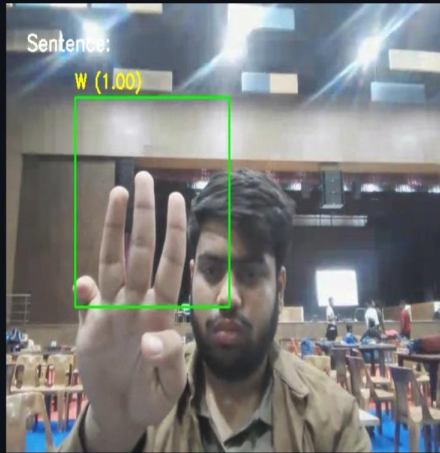
## ■ Important Medical Disclaimer

This report is generated by Dr. AI, an artificial intelligence medical assistant. The information provided is for educational and informational purposes only and should not be considered as medical advice, diagnosis, or treatment. Always consult with qualified healthcare professionals for proper medical diagnosis, treatment, and care. This report is not a substitute for professional medical consultation. If you are experiencing a medical emergency, please contact emergency services immediately.

# BONUS Feature-1 Real Time Sign Language Detection and Sentence Conversion (Beta Model and Future Enhancement)

## ASL Real-Time Recognition

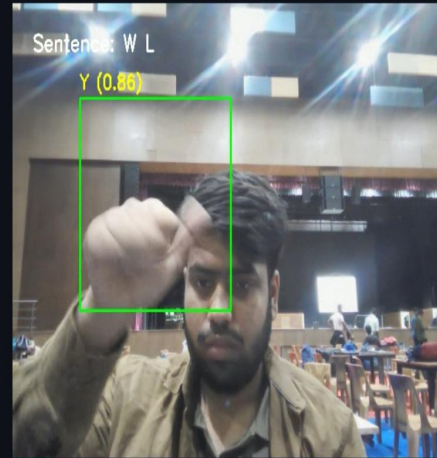
This app uses your webcam to recognize ASL letters and construct sentences in real-time.



STOP

## ASL Real-Time Recognition

This app uses your webcam to recognize ASL letters and construct sentences in real-time.



STOP



# Bonus Feature-2 Real Time Chatbot Fine-Tuned For Medical Analysis.

Language Selector

us English

Chat Statistics

Messages: 2

Session: Active

Clear Chat History

Features

- ✓ Medical keyword detection
- ✓ Health tips personalization
- ✓ Multilingual support
- ✓ Symptom similarity search

## Dr. AI - Your Medical Assistant

Your specialized AI medical doctor • Focused on health and medical concerns

Hello im Suffering from fever  
10:33

Dr. AI

I understand your concern. While I can provide general health information, it's important to consult with a qualified healthcare professional for proper diagnosis and treatment. They can provide personalized medical advice based on your specific situation.

10:33

e.g., I have a headache, What should I do for better sleep?

Send

# Bonus Feature-2 Real Time Chatbot Fine-Tuned For Medical Analysis.

Language Selector

us English

Chat Statistics

Messages: 4

Session: Active

Clear Chat History

Features

- ✓ Medical keyword detection
- ✓ Health tips personalization
- ✓ Multilingual support
- ✓ Symptom similarity search



## Dr. AI - Your Medical Assistant

Your specialized AI medical doctor • Focused on health and medical concerns

information, it's important to consult with a qualified healthcare professional for proper diagnosis and treatment. They can provide personalized medical advice based on your specific situation.

10:33

Suggest Me some tablets for cure

10:35

Dr. AI

I understand your concern. While I can provide general health information, it's important to consult with a qualified healthcare professional for proper diagnosis and treatment. They can provide personalized medical advice based on your specific situation.

10:35

Bonus Feature  
Text to Speech  
Transition

e.g., I have a headache, What should I do for better sleep?



Speaking in English...