# Mental Health ChatBot

## 1. Project Overview:

MindfullChat is a user-friendly app designed to support mental health and well-being. It combines an easy-to-use frontend with a powerful FastAPI backend to provide a secure and supportive platform. The app helps users track their emotions, connect with a caring chatbot, review past conversations, and access immediate crisis support resources.

## 2. System Architecture:

The app is divided into a modular backend and a frontend, ensuring everything works together smoothly.

**Backend (**MentalHealthChatbot/backend/**)**:

- **Main Application (**main.py**)**: Initializes FastAPI, configures CORS for http://localhost:8080, and manages lifecycle events with the lifespan function to connect to MongoDB and initialize the chatbot.
- **Configs (**configs/**)**: Handles MongoDB connections using motor.motor_asyncio.
- **Routes (**routes/**)**: Defines API endpoints for authentication, chatbot, mood, and conversations.
- **Controllers (**controllers/**)**: Implements business logic for each feature.
- **Middlewares (**middlewares/**)**: Enforces JWT authentication.
- **Models (**models/**)**: Defines Pydantic data models for validation.
- **Chatbot (**chatbot/**)**: Manages LangChain and Chroma for query processing.

**Frontend**

- The frontend, built with React and TypeScript.With the help of AI tools.

## 3. Key Features:

- **User Authentication**: Secure registration and login with JWT tokens.
- **Chatbot Interaction**: A context-aware chatbot powered by LangChain and Chroma, using a PDF-based knowledge base.
- **Mood Tracking**: Logs mood scores and retrieves history for self-monitoring.
- **Conversation Management**: Stores and retrieves conversation history for continuity.
- **Crisis Detection**: Identifies crisis phrases and provides hotline numbers and emergency contacts.
- **Coping Tools**: Offers techniques like breathing exercises and affirmations.

## 4. Technologies:

**Backend:**

- **FastAPI**: Asynchronous web framework for high performance.
- **MongoDB (Motor)**: Asynchronous NoSQL database for flexible data storage.
- **LangChain & Chroma**: Powers the chatbot with context-aware responses.
- **HuggingFace Embeddings**: Creates vector representations for document retrieval.
- **JWT (JWT)**: Secures user authentication.
- **Pydantic**: Ensures data validation and serialization.

**Frontend**:

- **React and TypeScript**

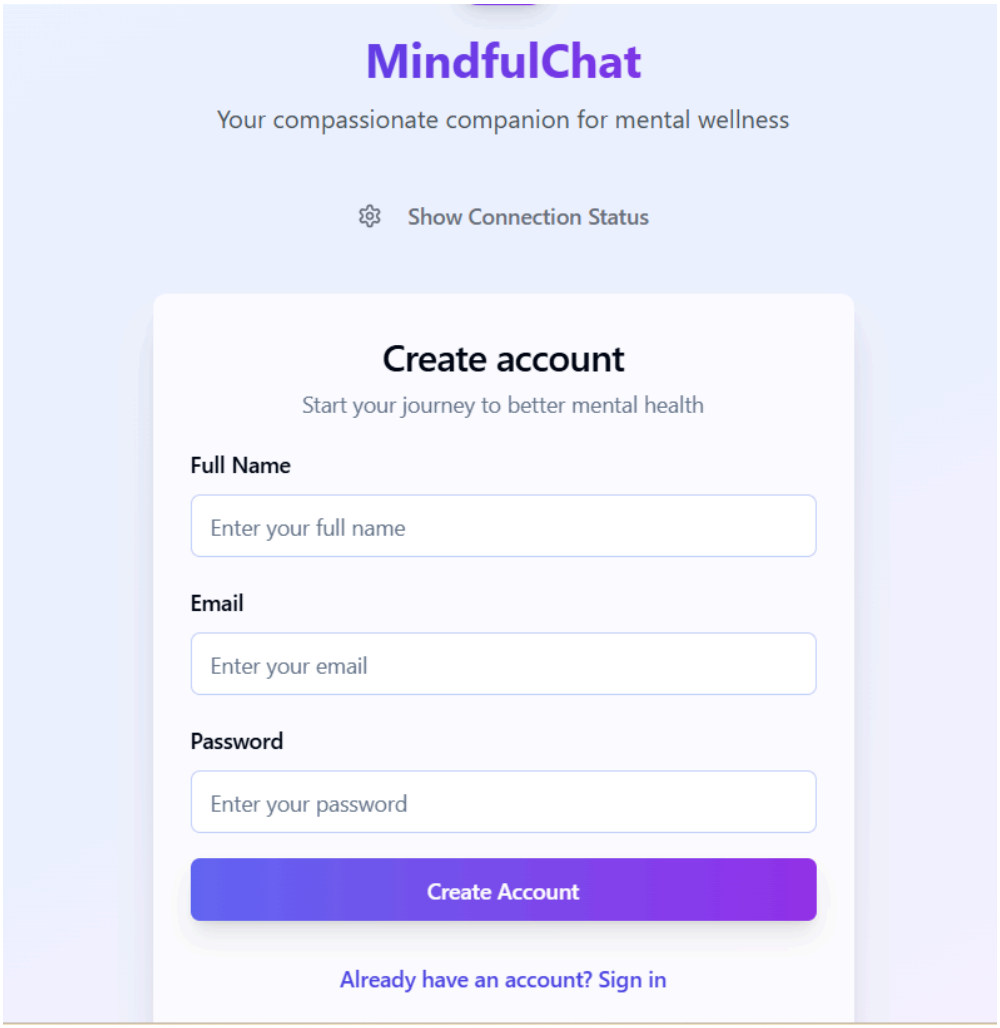
## 5. How It Works:

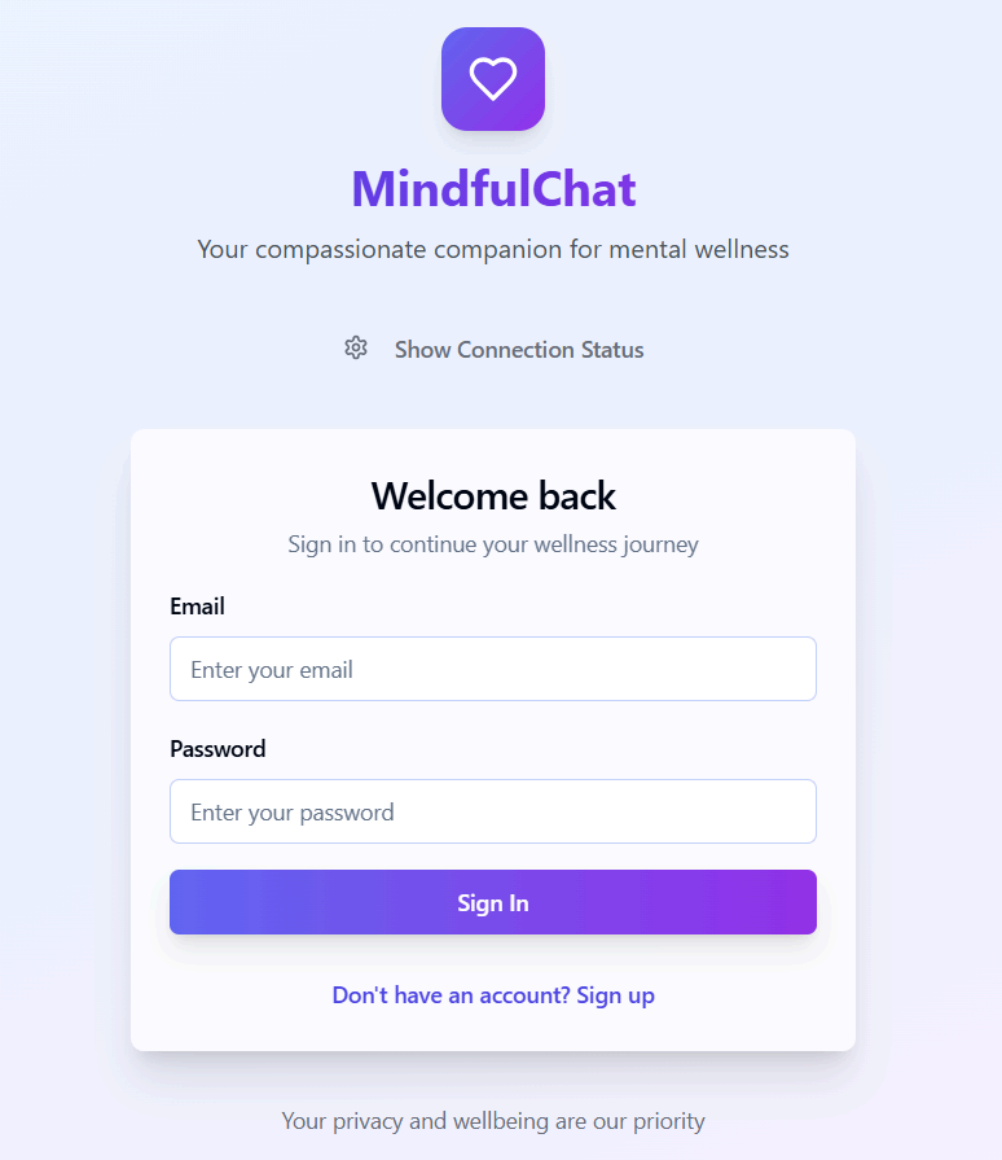
MindfullChat makes it easy for users to sign up, chat, track moods, and get help. The website is friendly and simple to use, while the system behind it works hard to keep everything safe and helpful.

- **Starting the System**
  When the app starts, the system gets everything ready. It connects to a place to store information and sets up a smart chatbot that learns from a special

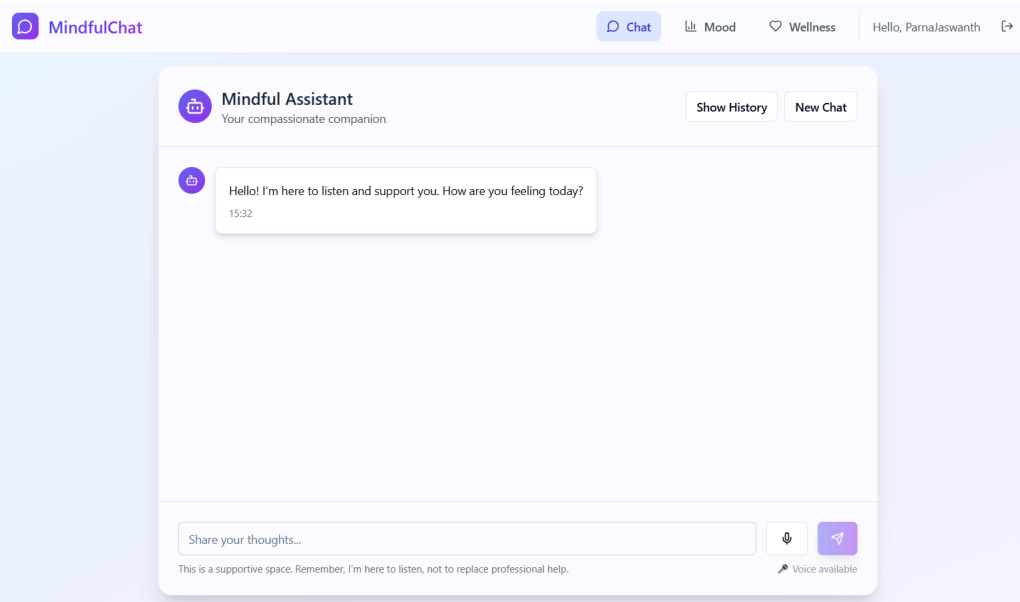
guide to answer questions. The website loads on a computer or phone, ready for users to visit.

- **Signing Up and Logging In**
  A user goes to the website and fills out a form with their name, email, and password to create an account. The system saves this information safely. When the user logs in, the system checks their details and gives the website a special key to let them use the app securely.

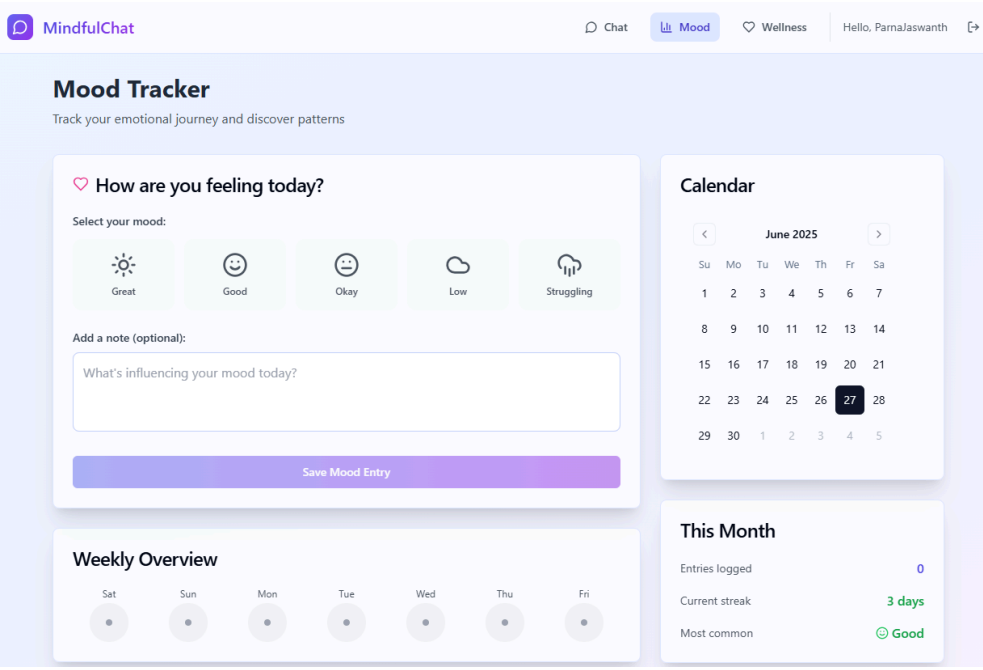




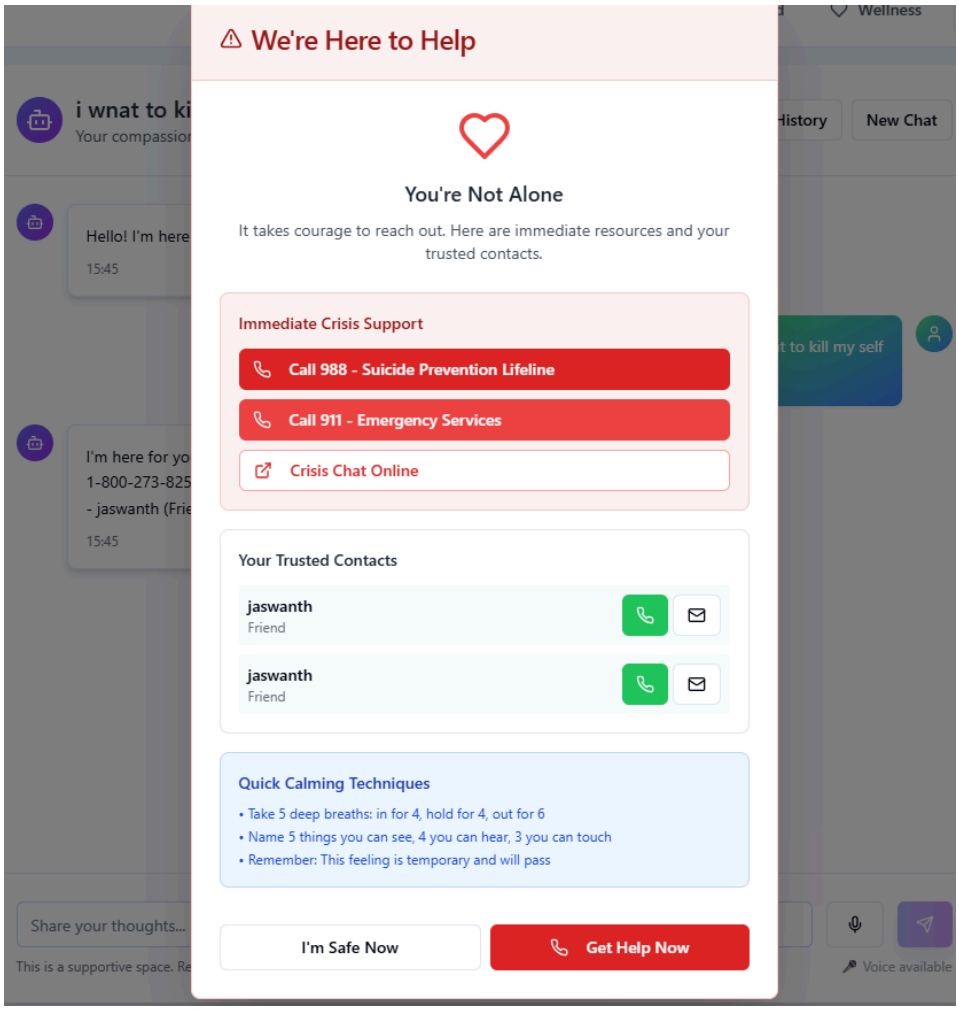

- **Chatting with the Bot**
  Users type questions or thoughts in a chatbox on the website, like talking to a friend. The system reads the message, checks its guide for helpful information, and sends back a kind, thoughtful reply. The website shows this reply in the chatbox, making it feel like a real conversation.



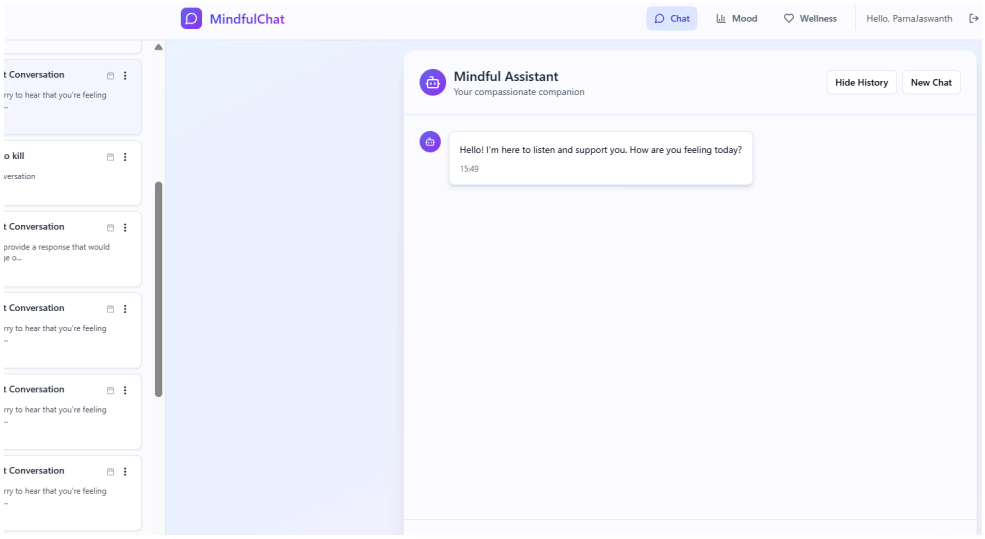

- **Tracking Moods**
  Users can pick how they're feeling, like happy or sad, using a form on the website. The system saves their mood and the time they picked it. Later, users can see a list or chart of their past moods on the website to understand how they've been feeling over time.



- **Helping in a Crisis**
  If a user types something serious, like feeling really sad or unsafe, the system notices right away. It sends back a message with phone numbers for help, like a hotline, and any trusted contacts the user added, like family or friends. The website shows this information clearly so the user knows where to get help fast.




- **Saving Conversations**
  Every time a user chats with the bot, the system saves the messages. The website lets users look at their past chats or start a new one, so they can easily pick up where they left off. All this information is kept safe and organized.




## 6. Security:

- **JWT Authentication**: The ensure_authenticated middleware verifies tokens for protected endpoints.
- **Password Hashing**: Uses passlib to securely store passwords.
- **CORS**: Restricts frontend access to trusted origins (e.g., http://localhost:3001).

## 7. Database Design:

MongoDB stores data in collections:

- **Users**: Stores user credentials and metadata.
- **Conversations**: Stores conversation history with user_id, conversation_id, and messages.
- **Mood Logs**: Stores mood scores and timestamps.
- **Emergency Contacts**: Stores user-defined contacts for crisis support. Asynchronous operations via motor.motor_asyncio ensure efficient data handling.

## 8. Chatbot Implementation:

The chatbot uses LangChain and Chroma to process queries:

- **Initialization**: Loads data.pdf, splits it into chunks, and creates a vector database with HuggingFace embeddings.
- **Query Processing**: The process_query function retrieves relevant documents and generates responses using the LLaMA3 model via Groq API.
- **Persistence**: The vector database is stored in ./vector_db/chroma_db for reuse.

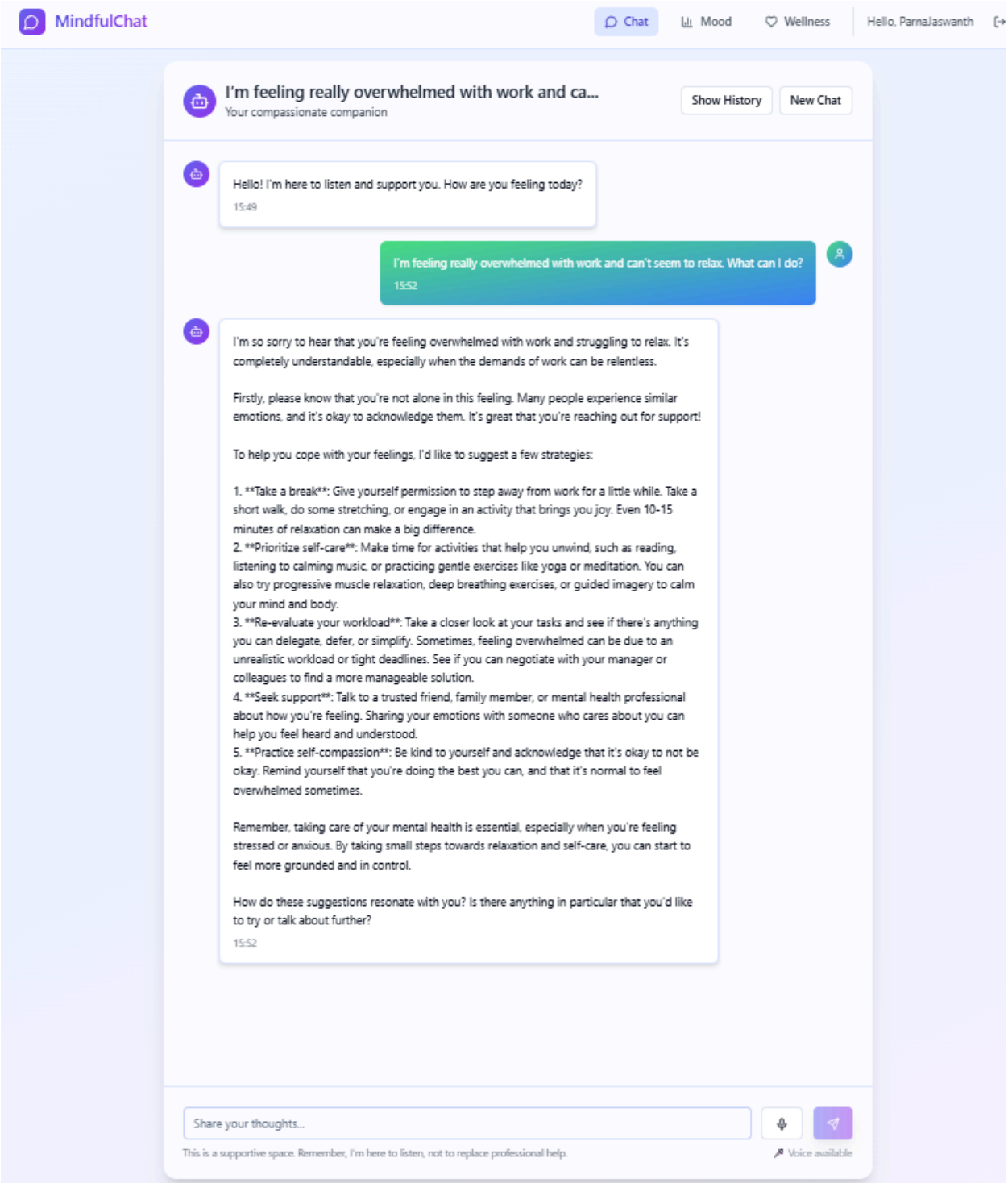
## 9. Crisis Detection:

The system detects crisis phrases (e.g., “die”, “suicide”) in user queries and responds with hotline numbers (e.g., 1-800-273-8255) and emergency contacts. This feature ensures user safety by providing immediate support and logging crisis events for follow-up.

## 10. Conclusion

MindfullChat is a full-stack mental health app with a secure FastAPI backend and a friendly React and TypeScript frontend. It helps users chat, track moods, and get crisis support, making care easy and accessible.

# 11. Results:


MindfulChat
Chat
Mood
Wellness
Hello, ParnaJaswanth
I'm feeling really overwhelmed with work and ca...
Your compassionate companion
Show History
New Chat
Hello! I'm here to listen and support you. How are you feeling today?
15:49
I'm feeling really overwhelmed with work and can't seem to relax. What can I do?
15:52
I'm so sorry to hear that you're feeling overwhelmed with work and struggling to relax. It's completely understandable, especially when the demands of work can be relentless.
Firstly, please know that you're not alone in this feeling. Many people experience similar emotions, and it's okay to acknowledge them. It's great that you're reaching out for support!
To help you cope with your feelings, I'd like to suggest a few strategies:
1. **Take a break**: Give yourself permission to step away from work for a little while. Take a short walk, do some stretching, or engage in an activity that brings you joy. Even 10-15 minutes of relaxation can make a big difference.
2. **Prioritize self-care**: Make time for activities that help you unwind, such as reading, listening to calming music, or practicing gentle exercises like yoga or meditation. You can also try progressive muscle relaxation, deep breathing exercises, or guided imagery to calm your mind and body.
3. **Re-evaluate your workload**: Take a closer look at your tasks and see if there's anything you can delegate, defer, or simplify. Sometimes, feeling overwhelmed can be due to an unrealistic workload or tight deadlines. See if you can negotiate with your manager or colleagues to find a more manageable solution.
4. **Seek support**: Talk to a trusted friend, family member, or mental health professional about how you're feeling. Sharing your emotions with someone who cares about you can help you feel heard and understood.
5. **Practice self-compassion**: Be kind to yourself and acknowledge that it's okay to not be okay. Remind yourself that you're doing the best you can, and that it's normal to feel overwhelmed sometimes.
Remember, taking care of your mental health is essential, especially when you're feeling stressed or anxious. By taking small steps towards relaxation and self-care, you can start to feel more grounded and in control.
How do these suggestions resonate with you? Is there anything in particular that you'd like to try or talk about further?
15:52
Share your thoughts...
This is a supportive space. Remember, I'm here to listen, not to replace professional help.
Voice available