

Project Synopsis/Project Concept Document

Project number	Team 49
Project Title	Wave Diaries- AI based model concerning mental health
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Created By	Shivam Gupta, Aditya Gaur, Manit Roy, Raunak Seksaria
Client	Mr. Jazeel

Description

The problem on a conceptual basis deals with the usage of Artificial Intelligence and Generative AI, with context-aware conversations in tackling mental health problems and related disorders such as clinical depression, anxiety, stress etc.

The problem targets mental health disorders with the help of an AI model with an integrated speech to speech module capable of carrying out a voice sentiment analysis of the user culminating in therapeutic responses, acting as an alternative to treatment by professional psychologists where money, time and opportunity can all be constraints for patients. It can also act complementary to the treatment, and help the user tackle issues on-the-go in real-time, while the patient's personal therapist can review these conversations.

Profile of Users

Proposed users of the end product and their characteristics:

Since the project focuses on treating mental health problems and the younger generations comprising of students and the working population are more susceptible to such disorders, our project preferably targets people in the age group of 13-35 years. This age criteria encompasses following groups:

Students (aged 13 to 19): Teenagers or adolescents preparing for competitive examinations, often face significant stress and anxiety due to intense competition. This age group is particularly vulnerable to mental health challenges, both during and after puberty, as they navigate personal life complexities alongside academic pressures. As they mature, their ability to manage these challenges evolves. Given their technical literacy, the application can offer a flexible and user-friendly interface tailored to their needs.

Working Professionals: Working professionals are also prone to mental disorders where they can succumb to the pressures of hard deadlines and stringent or rigid working hours. The technical literacy of this user group represents a varied spectrum thus calling for a flexible and easy to use user interface.

Others: Those people suffering from faltering relationships can be socially and morally depressed and can end up using our application. The user interface and the responses of the finally developed product must cater to the needs of these users.

Notably, the responses of the final model must be very sensitive so that it strikes the right chord with the users mentioned above and there should undoubtedly be very low chances of error because of the extremely sensitive nature of the project.

Usage Model Diagram for AI-Based Therapy Web App

1. Users

- **New Users:** Sign up, set preferences (language, therapy style), and complete an initial mood assessment for personalized recommendations.
- **Returning Users:** Log in, interact with AI, track past moods, and receive tailored insights.

2. Inputs

- **Speech Input:** Users can speak, while the AI-based speech to speech module processes it.
- **Mood Selection:** Users must be allowed to manually select emotions or moods from a predefined list.
- **Feedback:** Users can rate AI responses to refine future interactions.

3. Processing (AI Backend)

- **Natural Language Processing (NLP):** Identifies user intent and emotional context.
- **Sentiment Analysis:** Extracts emotional tone from text/speech inputs.
- **Mood Tracking:** Logs and analyzes mood patterns over time.
- **Personalization:** Adapts responses based on user history and preferences.
- **Gamification:** Encourages engagement through rewards, streaks, or challenges.
- **Multilingual Vector-Based RAG (Retrieval-Augmented Generation):** Enhances AI responses by retrieving relevant multilingual therapeutic resources.

4. Outputs

- **Text Response:** AI-generated affirmations, reflections, or therapy suggestions.
- **Speech Response (TTS - Text-to-Speech):** AI provides spoken responses for accessibility. Tailor made sensitive responses that cater largely to the requirements of the user.

5. User Feedback Loop

- **User Ratings:** Users provide feedback via thumbs up/down or a like/dislike on the generated response calling for its critical assessment.
- **AI Adjustments:** AI refines responses based on cumulative feedback.
- **Secure Data Storage:** Mood trends and user interactions are securely stored for better personalization.

6. System Components & Interactions

- **Frontend (User Interface):** Intuitive chat-based interface, dashboard, and visual mood history.
- **Backend (AI & Data Processing):** AI engine, NLP models, APIs, and databases for seamless processing.

7. Security & Privacy

- **Data Encryption:** Ensures secure storage and transmission of user data.
- **User Anonymity Options and long-term memory:** Users can remain anonymous while interacting with AI. The long-term memory of the model does not require an already registered user to promptly enter the credentials thus ensuring seamless communication.
- **Regulatory Compliance:** Adheres to GDPR, HIPAA (if applicable), and other relevant data privacy laws.

