

Mental Health Journal and AI Chatbot

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Abstract—The aim of this paper is to develop a web based platform that integrates an AI powered mental health chatbot ,a secure digital journaling system , and a pulse sensor for real time stress monitoring .The chatbot uses natural language processing to provide supportive and context aware conversation , while the journaling feature encourages emotional self expression .

Keywords—Mental Health Monitoring , AI Chatbot , Nature Language Processing , Detection , Mental Health , Digital Journal , Pulse Sensor , Health Analytics , ESP32 .

INTRODUCTION

Mental health has become one of the most important aspects of human well-being in modern society. Rapid technological development, academic pressure, professional competition, and social challenges have increased the level of stress, anxiety, and depression among people. Many individuals hesitate to share their feelings openly from social stigma, lack of a awareness, or specific access to professional mental health services. As a result, there is a growing need for accessible and private tools that can support emotional well-being.

[1].Modern Technologies like Artificial Intelligence (AI) and Internet of Things (IOT) provide opportunities to develop digital platforms that support mental wellness in private , accessible and intelligent ways. [2]. Recent progress in Artificial Intelligence (AI) and digital communication technologies have enabled the development of intelligent systems capable of assisting users in managing their mental health. [3]. AI-based conversational agents, commonly known as chatbots, can simulate human-like conversations and provide supportive responses to users. [4]. These systems can offer emotional support, basic counselling guidance, and self-reflection opportunities through continuous interaction. [5]. The concept of a digital mental health journal allows users to record their daily thoughts, emotions, and experiences in a structured manner. [6]. Writing about feelings has been proven to improve emotional awareness and psychological clarity. [7].When combined with AI technologies such as Natural Language Processing (NLP) and sentiment analysis, these journals can analyze the emotional tone of user entries and identify patterns related to stress or mood changes. [8]. The

use of technology for mental health support has evolved significantly over the past few decades.

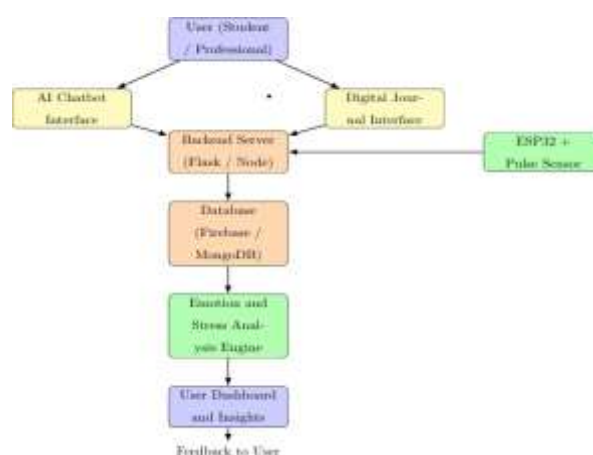


Fig. 1. Mental Health Journal and AI Chatbot

[9]. Early computer-based psychological support systems appeared in the 1960s with programs such as ELIZA, which simulated a therapist-like conversation using simple pattern-matching techniques. [10]. At the same time, wearable sensors and IoT devices have made it possible to monitor physiological signals such as heart rate, sleep patterns, and physical activity. [11]. These data sources provide valuable insights into a person's emotional and physical condition.

[12].The proposed system integrates a mental health journal with an AI-powered chatbot that interacts with users in a conversational manner.[13].Additionally, the system incorporates biometric monitoring using a pulse sensor connected to an ESP32 microcontroller to observe physiological indicators related to stress levels. [14].By combining emotional text analysis with real-time heart-rate monitoring, the system can provide more personalized feedback and insights regarding the user's mental state. [15].The goal of this system to create a supportive digital environment where users can their emotions freely, track their mental health patterns, and receive intelligent suggestions for stress management and emotional well-being.

II. ORIGIN OF PROBLEM STATEMENT AND MOTIVATION

A. Problem Statement:

In recent years, mental health issues and emotional imbalances such as stress, anxiety, and depression are increasing rapidly in modern society. Students, employees, and professionals often experience emotional pressure due to academic workload, career competition, financial concerns, and personal challenges. [16]. Students and professionals often struggle to manage their emotional well-being while balancing daily tasks and responsibilities. [17]. Although mental health awareness is improving, many people still avoid discussing their problems openly because of social stigma or fear of judgment. [18]. Traditional counselling services are helpful but are not always easily accessible. [19]. Many individuals face challenges such as high costs, limited availability of mental health professionals, and lack of privacy when seeking help. [20]. Because of these barriers, people often suppress their emotions instead of addressing them in a healthy way.

With the advancement of artificial intelligence and digital technologies, it has become possible to develop intelligent systems that provide basic mental health assistance. A digital platform that allows users to record their feelings, interact with an AI chatbot, and monitor their stress levels can help individuals better understand their emotional state.

B. Motivation:

- (i). Encourage users to express their emotions through a secure digital journal.
- (ii). Provide AI-powered chatbot assistance for empathetic mental health conversations.
- (iii). Integrate a pulse sensor to detect and monitor stress level in real time.
- (iv). Make mental health support more accessible, private and available anytime.
- (v). Combine Artificial Intelligence (AI), Internet of Things (IoT) and data.
- (vi). Encourage self-reflection and emotional awareness.

III. LITERATURE REVIEW

In recent years, research in the field of digital mental health support systems has increased significantly due to the rising awareness of psychological well-being. With the advancement of Artificial Intelligence (AI) and Natural Language Processing (NLP), intelligent chatbot systems have been developed to assist individuals in managing stress, anxiety, and emotional

challenges. These technologies enable machines to understand human language and respond in a conversational manner, providing users with basic emotional support and guidance. The following literature review summarizes previous research work related to AI-based mental health chatbots, emotion detection techniques, digital journaling systems, and biometric monitoring technologies, highlighting their methodologies, key findings, and limitations.

[1] **"AI Powered. Chatbots for Mental Support."** – R. Kumar, A. R. Patel, JSRT, 2025.

This study focuses on the development of an AI-based chatbot system designed to provide emotional support and guidance to individuals facing mental health challenges and in student. The system uses Natural Language Processing (NLP) and machine learning techniques to understand user conversations and respond appropriately. The research highlights that AI chatbots can provide 24/7 accessible support, mood-improving suggestions, and confidential communication for users. The authors emphasize that such systems can help reduce the burden on traditional counseling services and provide immediate assistance for people experiencing stress or anxiety.

[2]. **"Sakhi: AI-Generated Mental Health Companion."**– Muskan Agarwal, Divyanshi Chauhan, Nidhi Yadav, Prof. Swasti Singhal, IEEE Conference, 2023.

This research introduces Sakhi, an AI-generated mental health companion designed to assist individuals experiencing stress, anxiety, and emotional challenges. The system focuses on providing technological assistance, social support, and psychological guidance through conversational AI. The chatbot helps users identify stress factors and offers motivational suggestions while maintaining privacy and anonymity. The research highlights that AI companions can act as supportive tools for mental well-being but require improvements in response accuracy and emotional understanding.

[3]. **"AI-Powered Mental Health Companion."**–Kushal Kumar B. N., Anusha A. S., K. Bhavana N., Bhavya P., Deekshitha S. A., IJARCCCE, 2025.

This study analyzes existing AI mental health companions that simulate conversations with users experiencing anxiety, depression, and stress. The system uses machine learning algorithms, NLP, and emotion recognition techniques to detect emotional states and provide appropriate responses. The research concludes that AI companions can significantly enhance mental health awareness and emotional support, although concerns such as data privacy, ethical issues, and response reliability must be addressed.

[4]. **“AI-Powered Emotional Wellness Companion for Mental Health Support.”**-Prof..Daniel Kumar,IJMLAI,2024.

This paper proposes an AI-based emotional wellness companion that identifies emotional cues from user conversations using affective computing and sentiment analysis. The system tracks emotional patterns over time and recommends coping strategies such as mindfulness exercises and relaxation techniques. The research demonstrates that AI-based emotional assistants can act as first-line mental health support tools and complement professional therapy services.

[5]. **“AI-Powered Mental Health Chatbot.”**-Prof. S. S. Dixit, Shruti Mahulkar, Manasi Pandrao, Gauri Rathor, Janhavi Thokane, IJRASET,2025.

This research presents a generative AI chatbot that offers confidential, 24/7 mental health support. The system uses NLP and AI models to understand user input and provide empathetic responses and self-care recommendations. The study emphasizes the importance of privacy, accessibility, and stigma-free communication in digital mental health platforms. The chatbot demonstrates improved contextual understanding and user engagement compared to traditional rule-based systems.

[6].**”AI for Mental Health Support”**-S. Anusha, N. Hiranmayee, P.T. Swetha Kamala, N. Sagarika, P. Roji Sushma, T. Alekhya Sai Lakshmi, M. Kavya Sri, International Journal of Innovative Science and Research Technology (IJSRT),2025.

This paper proposes an AI chatbot system that integrates LLaMA models, Groq API, and ChromaDB to deliver context-aware emotional support. The chatbot analyzes user emotions using sentiment detection and provides personalized responses using retrieval-augmented generation (RAG). The research shows that AI-based mental health systems can offer scalable emotional support while maintaining user privacy and multilingual accessibility.

[7]. **“A Study on AI-Powered Chatbot for Mental Health Support”**-Kavitha Soppari, A.Krupa Vainala, Ajay Guniganti, Deekshitha Ratna,WJARR,2025.

This research focuses on building a chatbot using Python, Flask, and transformer-based NLP models. The chatbot detects user emotions, stores conversation history in a database, and provides empathetic responses. It supports both voice and text communication. The study concludes that AI chatbots can provide scalable and affordable mental health support, especially for people who hesitate to seek professional therapy.

[8]. **“Mental Health Companion Application.”**-Mohammad Ashfaquedheen, Abin K.C. Binoy, Adharsh M. M., Athul Unnikrishnan,IJERT,2023

This paper proposes a mental health companion application that allows users to communicate with an AI system to express

emotions and track mood changes. The application uses machine learning and chatbot technology to detect emotional patterns and recommend coping strategies. The research highlights that digital mental health companions can encourage users to openly discuss their feelings and improve self-awareness.

IV.METHODOLOGY

The design works on the idea of keeping the system affordable while still collecting accurate body signals in real time. In this section, we explain how the whole system works - starting from the overall design, the hardware we selected, how the signals from the user are captured, and how these signals are processed.

A. Proposed System Architecture

The following is the step by step flowchart of mental health journal and AI chatbot and the microcontroller and sensor used in this project the microcontroller used is ESP32 and the sensor used is pulse sensor .

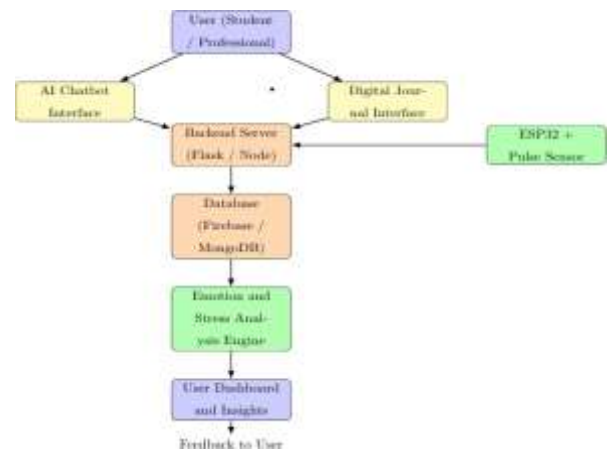


Fig. 2. Architecture of the system

1). User Interaction

The system begins with the user interacting with the application. The user Write daily journal entries about their feelings or experiences, Communicate with the AI chatbot for emotional support. And Place their finger on the pulse sensor to measure heart rate.This information helps the system understand the user’s emotional and physiological state.

2). Pulse Sensor

The pulse sensor measures the heart rate of the user.It works using photoplethysmography (PPG), which detects blood flow changes in the finger. When the heart beats, blood volume changes in the finger. The sensor detects these changes and

converts them into electrical signals. The output of pulse sensor is analog representing heartbeat.

3). Microcontroller-Esp32

The ESP32 reads the analog signal from pulse sensor its processes the signal to calculate BPM(Beats per Minute).

4). Database Storage

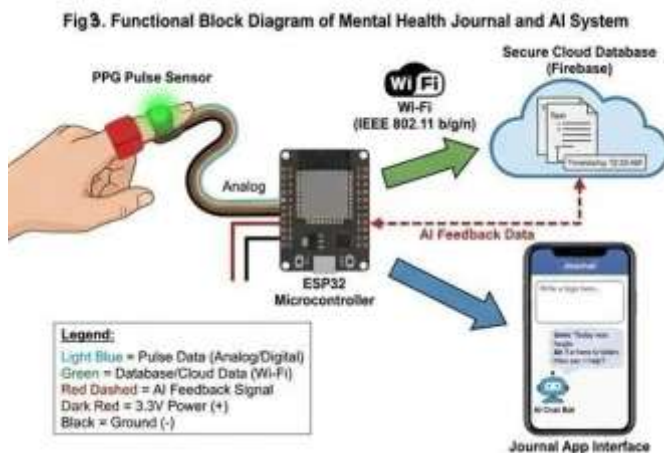
The database stores users journal entries ,heart rate date and the conversation between the chatbot and the user also it stores users mood history.

5). AI chatbot

The chatbot analyses the users journal text .It perform sentiment analysis to understand such as stress, anxiety, happiness or sadness it also note the heart rate. Also the chatbot will give the feedback to users as per the data.

B. Implementation

The implementation of system is given in fig .3.



C. Formula

Formula used is of BPM (Beats Per Minute)

$$\text{BPM} = \frac{60}{\text{Time per beat (seconds)}}$$

V. MERITS AND DEMERITS

A. Merits

1. Real Time Stress Monitoring .
2. Easy Accessibility.
3. Early Detection of Emotional Issues.
4. Data Storage and Tracking.
5. Low cost implementation.

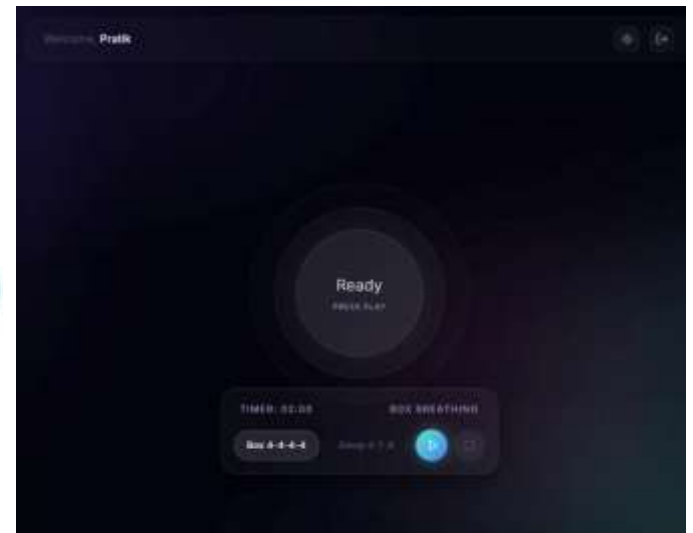
B. Demerits

1. Not a replacement for professional therapy.
2. Dependence of Internet Connectivity.
3. Limited Emotion Understanding .

VI. Result

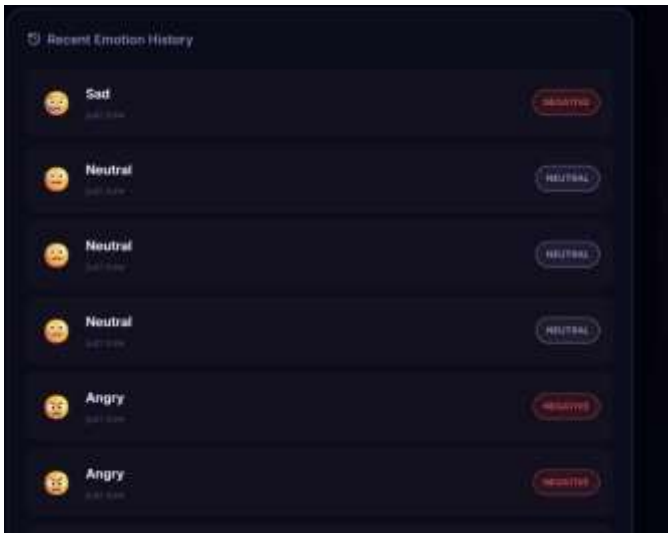
The Calm Bridge Mental Wellness Application was successfully designed and implemented with a modern and user-friendly interface. The project achieved the intended objectives of helping users monitor their emotional wellness through daily check-ins, mood tracking, breathing exercises, journaling, and AI-based emotional support features.

1).Welcome Interface



2).Recent Emotion History

The user can checked its recent interaction with calm bridge using recent history tab .At this tab user can see that its behavior is neutral , positive or negative . If its shows negative then calm bridge will guide the user to become neutral .



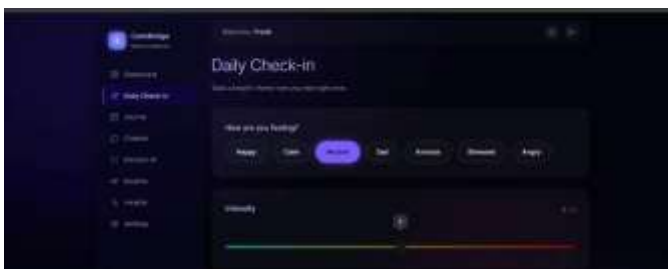
3).Dashboard

At dashboard there is gentle focus section where there are some steps from which user can choose one of them .

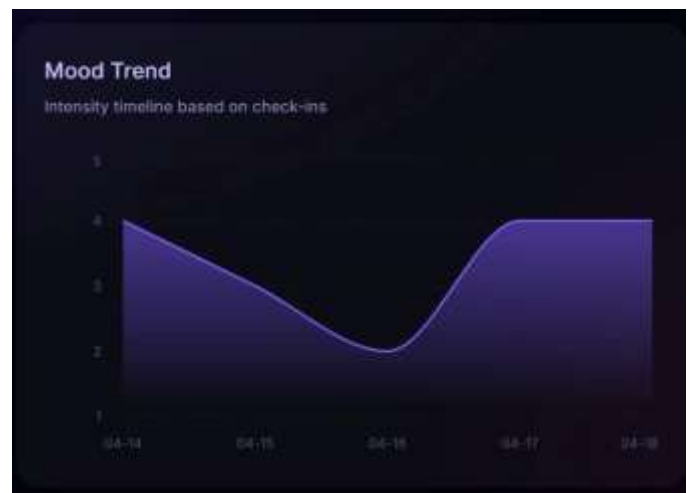


4).Daily Updates/Daily Check in

There are daily check in to users to see its progress and updates.

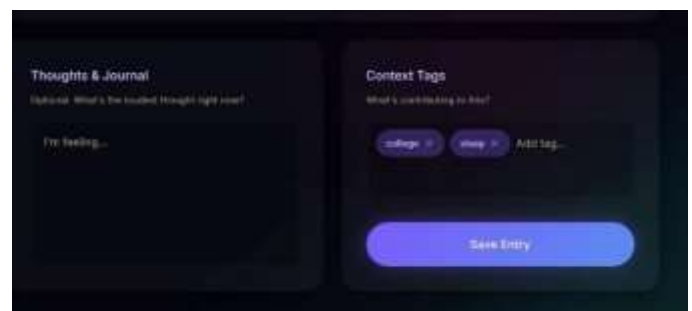


There is Mood Trend chart following the timeline from users check ins.



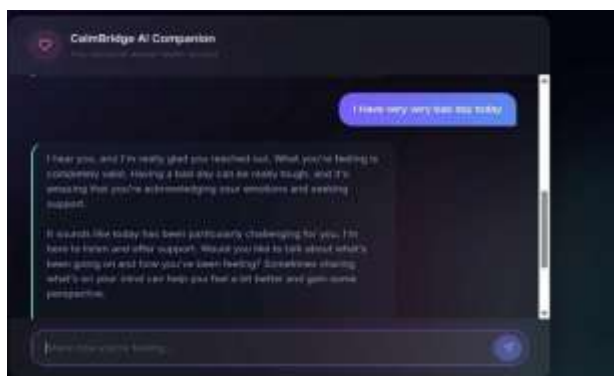
5).Journal and Journaling

User can journal its daily emotion behaviour because of journaling the user can get its timeline of emotion feeling at which moment user is neutral ,depressed etc.



6).Chatbot (CalmBridge)

CalmBridge is AI chatbot which implemented in the users interface where users can freely talk and express its emotion or day routine to chatbot and feel free and the chatbot will guide you to be neutral and happy like suggesting to listen some music ,to dance or to take some rest etc .



VI. CONCLUSION

The proposed Mental Health Journal and AI Chatbot system demonstrates how modern technologies can be integrated to support mental well-being in an accessible and user-friendly manner. By combining an AI-powered conversational chatbot with a digital journaling platform and real-time physiological monitoring through a pulse sensor, the system provides a holistic approach to mental health support. The chatbot enables users to express emotions and receive contextual responses, while the journaling feature encourages self-reflection and emotional tracking. Additionally, the integration of sensor-based health monitoring enhances the system's capability to observe stress-related indicators in real time.

The proposed platform highlights the potential of Artificial Intelligence and IoT technologies in creating supportive environments for the individuals who may hesitate to seek traditional mental health services due to stigma, lack of awareness, or limited accessibility. By offering a private, interactive, and continuous support tool, the system aims to promote early awareness of mental health conditions and encourage healthier coping mechanisms.

Future work may focus on improving the chatbot's emotional intelligence, incorporating advanced machine learning models for more accurate sentiment analysis, expanding physiological monitoring features, and enhancing data privacy and security. Overall, the system presents a promising step toward leveraging intelligent technology for proactive mental health care and digital well-being support.

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