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Understanding Mental Health Challenges Among Indian College Students Though Informal and Mixed-Language Text

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Abstract
Mental health challenges, including stress, anxiety, depression, and burnout, are increasingly prevalent among Indian college students. Factors such as academic pressure, social dynamics, and post-pandemic effects have intensified these challenges. Existing digital mental health tools, including conversational chatbots, are largely trained on Western, formal English datasets and often fail to interpret informal, code-mixed language (Hinglish) commonly used by Indian youth. This study proposes the development of an emotionally intelligent chatbot capable of understanding informal and Hinglish text expressions. To promote holistic well-being, the platform incorporates guided meditation content, stress-relief games, a digital doodle pad for creative expression, and a daily mood tracker.
The expected outcome is a culturally and linguistically adaptive digital tool that offers early emotional support, reduces mental health stigma, and enhances engagement among Indian college students. This research contributes to the design of context-aware, multilingual mental health interventions in the Indian higher education context.

Keywords: Mental Health, Indian College Students, Hinglish, Informal Text, Chatbot, Emotion Detection, Sentiment Analysis, Digital Well-being.

1. Introduction

This project proposes the development of an **emotionally intelligent chatbot** capable of understanding Hinglish and informal expressions. Using **Natural Language Processing (NLP)** and **sentiment analysis**, the chatbot will detect users' emotional states and respond empathetically with motivational, humorous, or resource-based messages. [2]
Mental health among Indian college students is a growing concern. Surveys suggest that nearly 50% of students experience symptoms of psychological distress, yet stigma, language barriers, and limited access to mental health professionals prevent many from seeking help. [5]
Students often express emotions in informal or code-mixed ways on social media and messaging platforms. Phrases like *"life's meh yaar"*, *"kaafi stress ho gaya"*, or *"I'm zoned out bro"* carry significant emotional meaning that standard English-trained systems cannot detect. There is a pressing need for **intelligent, culturally aware tools** that can understand such language, provide early emotional support, and encourage self-care.

1.1 Problem Statement

Existing AI-based mental health systems often fail to interpret informal or code-mixed (Hinglish) language commonly used by Indian college students. Emotional distress expressed through casual text frequently goes unnoticed, limiting the effectiveness of these tools. Additionally, current chatbots generally lack interactive modules that actively promote stress reduction, such as guided meditation exercises, doodle-based creative activities, or stress-relief games.

1.2 Significance

This study is significant as it develops a Hinglish-aware chatbot that understands informal, code-mixed expressions of Indian college students, addressing limitations of current AI-based mental health tools. By integrating interactive wellness modules like meditation, doodle activities, and stress-relief games, the system provides holistic emotional support. The research promotes culturally and linguistically sensitive digital interventions, encourages self-awareness, and helps reduce mental health stigma among students.[7]

1.3 Proposed Solution

The proposed solution is an emotionally intelligent chatbot designed to understand informal and Hinglish text used by Indian college students. Leveraging Natural Language Processing (NLP) and sentiment analysis, the chatbot detects users' emotional states and responds empathetically.[6][7]

To provide holistic mental health support, the platform integrates interactive modules such as guided meditation exercises, stress-relief games, a digital doodle pad for creative expression, and a daily mood tracker. These features encourage self-awareness, relaxation, and emotional regulation, making the system culturally and linguistically relevant for Indian students.[9]

2. Literature Review

The increasing prevalence of mental health challenges among college students has prompted significant research into digital interventions, particularly AI-driven chatbots. These tools aim to provide accessible emotional support, early detection of distress, and coping strategies. However, existing systems face limitations when applied to culturally diverse and linguistically mixed contexts, such as Indian college campuses.

AI-Based Chatbots for Mental Health - Conversational agents like Woebot (Fitzpatrick et al., 2017) and Wysa (Chaudhry et al., 2024) have demonstrated the potential of chatbots to deliver cognitive-behavioral interventions and emotional support. Woebot, for instance, engages users in real-time interactions, identifying negative thought patterns and providing coping strategies, while clinical studies report reductions in anxiety and depression symptoms during short-term use.[3] Wysa extends this functionality with guided meditation, mood tracking, and cognitive exercises. Despite their effectiveness, these systems are largely trained on formal English datasets, limiting their ability to interpret informal language, slang, or culturally specific expressions. Consequently, they are less effective for populations, such as Indian students, who frequently communicate in Hinglish or code-mixed text.[6][10]

Emotion Detection in Code-Mixed (Hinglish) Text - Recent research has emphasized the challenges of analyzing emotional content in mixed-language digital communication. Sasidhar et al. (2020) compiled a Hinglish dataset of over 12,000 social media and chat-like texts, annotated with emotional categories such as happiness, sadness, anger, stress, and anxiety. Their study demonstrated that standard English-trained NLP models performed poorly on Hinglish data, whereas fine-tuned multilingual transformer models effectively detected emotions in code-mixed contexts. Challenges identified include inconsistent spelling,

informal grammar, and frequent use of slang, all of which are common in Indian student communication.[1][2]

Holistic Interventions for Student Well-Being - Beyond chat-based interaction, holistic approaches that integrate interactive wellness modules have shown positive effects on stress reduction and emotional regulation. Meditation exercises, stress-relief games, creative expression tools such as doodle pads, and mood tracking encourage self-awareness and promote sustained mental well-being.[10] Combining these elements with a Hinglish-aware chatbot can create a comprehensive, culturally relevant support system tailored to the needs of Indian college students.[7]

3. Methodology (Development Process)

3.1 Design of Research

This research adopts a design-oriented and experimental approach to develop a Hinglish-aware digital mental health support system tailored for Indian college students. The methodology combines computational techniques, literature insights, and practical system design to ensure the solution is culturally and linguistically relevant, while also engaging through interactive wellness features.

The study is guided by a mixed-methods research design, integrating computational modeling with user-centered design principles. It emphasizes building a functional prototype that can detect emotions in informal, code-mixed (Hinglish) text and provide holistic support. The design process focuses on both the technical performance of the AI chatbot and the user experience, incorporating wellness modules such as meditation exercises, stress-relief games, and creative doodle tools.

3.2 Information Gathering

To capture authentic student communication, the research gathers informal Hinglish text from publicly accessible student forums, social media platforms, and online confession pages. The dataset focuses on expressions of stress, anxiety, depression, and happiness, reflecting real emotional states of college students. A portion of this data is manually annotated to create a labeled dataset for training emotion detection models, ensuring that the system can interpret subtle nuances in mixed-language text.[3][6][7]

- **Secondary Data**

The research draws upon existing studies and tools to identify gaps and guide system development. Literature on AI-based mental health chatbots, including Woebot and Wysa, highlights their effectiveness in providing support but also reveals limitations in handling informal and code-mixed language. Additionally, previous research on Hinglish emotion detection and holistic well-being interventions informs both the technical design and the choice of wellness modules integrated into the platform.[8]

- **Technical Research**

The technical research phase involves data preprocessing, model development, and system integration:

- Text data is cleaned, tokenized, and normalized using NLTK and Scikit-learn to handle inconsistent spelling and informal grammar.
- Transformer-based models such as Hinglish-BERT and mBERT are fine-tuned for accurate emotion classification.
- The chatbot backend is implemented in Python (Flask), connecting the NLP module to the frontend interface.
- The frontend, developed using HTML, CSS, and JavaScript, provides interactive modules for chat, meditation, doodle pad, and games.

3.3 Architecture of the System

The system architecture is designed to integrate multiple modules in a coordinated manner, ensuring a seamless and supportive experience for users.The frontend module offers a user-friendly interface where students can interact with the chatbot, access meditation exercises, play stress-relief games, use the doodle pad for creative expression, and track their mood. The backend module, implemented using Python Flask, manages all user requests, processes chat interactions, and communicates with the NLP and database modules.

4. Design and Implementation

4.1 System Architecture

The system architecture integrates multiple modules to provide a seamless and supportive user experience:

- **Frontend:** A responsive dashboard enabling access to the chatbot and wellness features.
- **Backend:** Python Flask APIs manage chatbot communication, emotion detection, and data storage.
- **Database:** MySQL stores user profiles, chat logs, and mood-tracking data.
- **AI/NLP Module:** Hinglish-aware transformer models perform emotion recognition and sentiment analysis.

System Workflow

The system workflow illustrates the step-by-step interaction between users and the Hinglish-aware mental health support platform, highlighting how the various modules work together to deliver holistic emotional support.

1. **User Interaction:** The workflow begins with the user accessing the platform through the frontend dashboard. Students can input text into the chat module, select meditation exercises, play stress-relief games, use the doodle pad for creative expression, or log their daily mood.
2. **Data Transmission to Backend:** User inputs are sent to the backend server (Flask API), which manages all requests and ensures secure communication with the AI/NLP and database modules.
3. **Emotion Detection and NLP Analysis:** Text inputs from the user are preprocessed and sent to the AI/NLP module. Here, fine-tuned transformer models (Hinglish-BERT, mBERT) detect emotional states such as happiness, sadness, stress, or anxiety.
4. **Response Generation:** Based on the emotion detected, the chatbot formulates a context-aware response. This may include motivational text, suggestions for relaxation, or guidance to access wellness modules.
5. **Wellness Module Interaction:** Users can engage with guided meditation videos, stress-relief games, or the doodle pad to manage stress and express emotions creatively. All activities are tracked for usage and effectiveness.
6. **Feedback and Iteration:** The system collects user engagement metrics and feedback to continuously refine chatbot responses, module effectiveness, and overall usability. This ensures that the platform evolves to meet the dynamic emotional needs of Indian college students.

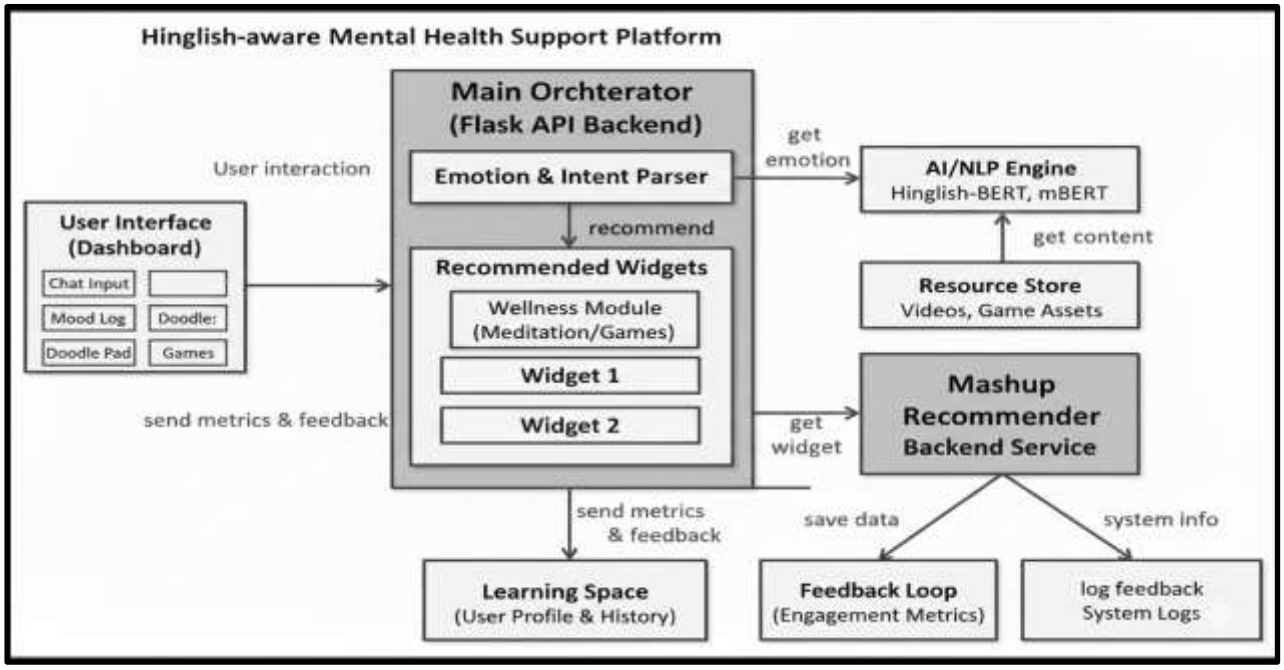

Figure 1 System Architecture of Mental Health chatbot

4.2 Technologies Used

The development of the Hinglish-aware mental health support system leverages a combination of modern programming languages, frameworks, AI models, and tools to ensure robust, scalable, and user-friendly functionality. The technologies used are as follows.

Table 1 Technology Stack of Mental Health Chatbot

Components	Technology Used
Frontend	HTML, CSS, JavaScript, React
Backend	Python 3.10+, Flask – handles system logic, API requests, and module integration
Database	MySQL, stores user profiles, chat logs,
Authentication	Secure login and registration, password hashing/encryption

4.3 User Interface (UI) and Screenshots

The user interface (UI) of the Hinglish-aware mental health support system is designed to be intuitive, engaging, and accessible, enabling seamless interaction with the chatbot and wellness modules. The dashboard integrates multiple sections that support emotional well-being.

4.3.1 User Interface Overview

There are a number of role based interfaces in the system:

- **First Page (Landing Page):** Provides an introduction to the platform, highlighting its features like mental health support, interactive modules, and wellness tools. Includes buttons for **Login** and **Registration**.

- **Registration Page:**Allows new users to create an account using their email, username, and secure password.
- **Login Page:**Enables returning users to securely access their accounts.
- **Home Page (Dashboard):** Serves as the main navigation hub for the system. Displays modules including Chat, Meditation, Games, Doodle Pad, and Mood Tracker.
- **Admin Dashboard:** Designed for administrators to monitor user engagement, chatbot performance, and module usage.
- **Quiz Page:** Provides mental health quizzes or self-assessment tests for users.
- **Game Page:**Hosts stress-relief and cognitive games to support relaxation and emotional regulation.

4.3.2 UI screenshots

The following figures illustrates the key UI screens of mental health chatbot application:

Figure No.	Description
Figure 2	First page Introduces the platform with features overview and Login/Registration buttons.
Figure 3	Home Page (Dashboard) Main navigation hub showing Chat, Meditation, Games, Doodle Pad, Mood Tracker, and profile overview.
Figure 4	Admin Dashboard Monitors user engagement, chatbot performance, and provides analytics/visualizations.
Figure 5	Game Page Hosts lightweight stress-relief and cognitive games for relaxation and emotional regulation.
Figure 6	Chatbot conversation page the interactive chatbot page where interaction between user and machine

Figure 2: First Page of mental Health chatbot

First page:

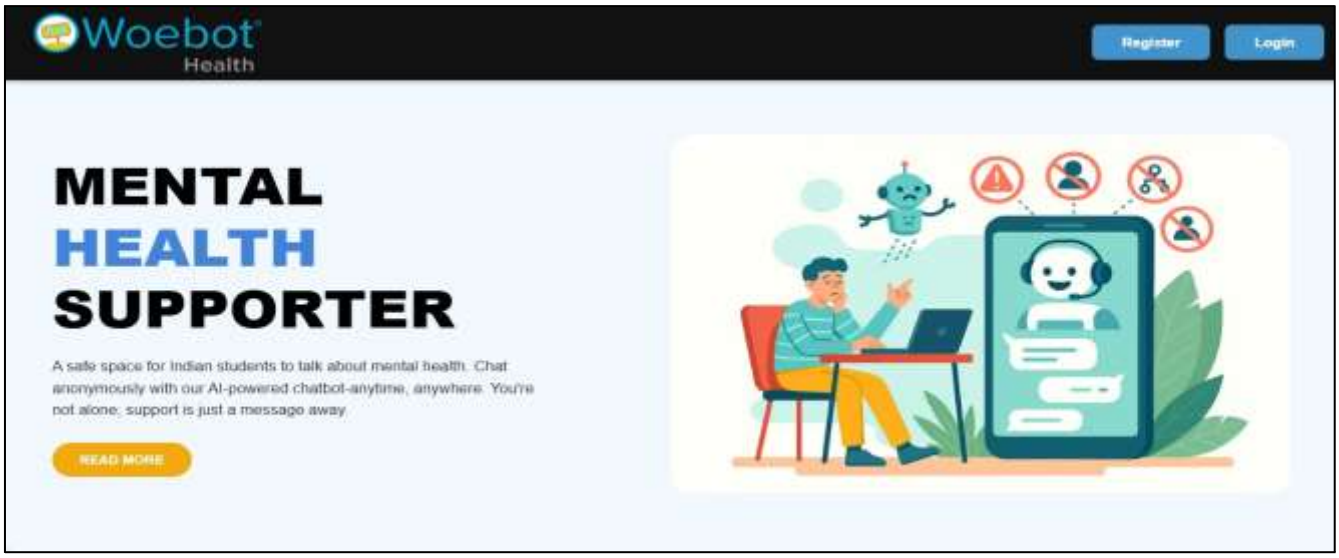

Figure 3: Homepage

Figure 4: Admin Dashboard

Admin dashboard:

Figure 5: Game page

Games page:

Figure 6: Chatbot

6. Discussion

6.1 Strengths of the System

- **Cultural and Linguistic Relevance:** Handles Hinglish and informal expressions commonly used by Indian students.
- **Holistic Support:** Integrates multiple wellness modules (meditation, games, doodle pad, mood tracker) beyond standard chatbot responses.
- **User-Centered Design:** Intuitive interface and interactive dashboard improve engagement and accessibility.
- **Data-Driven Personalization:** Stores user mood logs and interaction history to provide tailored suggestions and feedback.
- **Real-Time Emotion Detection:** NLP and sentiment analysis provide immediate and empathetic responses.

6.2 Challenges and Limitations

- **Data Scarcity:** Limited availability of large, high-quality Hinglish datasets can affect emotion detection accuracy.
- **Model Limitations:** Transformer models may misinterpret highly informal slang or inconsistent spelling.
- **User Dependency:** Effectiveness depends on consistent user engagement with wellness modules.
- **Technical Constraints:** Real-time performance may be limited on low-end devices or slow internet connections.
- **Scope of Evaluation:** System evaluation is primarily qualitative; larger-scale studies are needed to validate effectiveness.

6.3 Future Scope

- **Expanded Language Support:** Include regional languages and other code-mixed combinations for broader accessibility.
- **Mobile Application Development:** Build Android/iOS apps to increase reach and convenience.

- **Advanced AI Models:** Incorporate multimodal emotion detection using voice, facial expressions, and text.
- **Integration with Academic Support:** Connect mental health support with college counseling services or peer networks.

7 Conclusion

The Hinglish-aware mental health support system represents a significant advancement in the development of culturally sensitive digital mental health tools for Indian college students. By combining AI-driven chatbot technology with interactive wellness modules including guided meditation, stress-relief games, a doodle pad for creative expression, and a mood tracker. The platform addresses multiple dimensions of mental well-being. Unlike conventional digital tools that rely solely on formal English and structured communication, this system recognizes and interprets informal and code-mixed Hinglish text, enabling it to respond empathetically and meaningfully to students' emotional expressions.

The system not only provides immediate emotional support but also fosters self-awareness, relaxation, and engagement through holistic interventions. The modular design ensures scalability and maintainability, allowing additional features to be integrated in the future, such as mobile applications, regional language support, and multimodal emotion detection. By storing mood trends and interaction histories, the system enables personalized recommendations, which can help students monitor their emotional patterns and take proactive steps toward mental well-being.

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