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Smart Counseling: AI-Based Depression Management in university students

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***Abstract*—Abstract—This project introduces a conversational AI assistant designed to provide mental health support for university students. The system, accessible in both English and Malayalam, is built to function as a supportive listener, using a non-advisory, question-based approach to help students navigate their emotions and discover solutions on their own. Unlike a traditional chatbot, our system integrates mood and sentiment analysis to provide counselors with a data-driven dashboard, allowing them to monitor overall student well-being and identify individuals who may require a face-to-face session. By bridging the gap between students and professional counseling, this platform aims to reduce the stigma associated with seeking help and offer a confidential, accessible, and empathetic resource that complements existing mental health services, ultimately enhancing the well-being of the student community.**

***Index Terms*—Conversational AI, Mental Health Support, Natural Language Processing (NLP), Sentiment Analysis, Student Well-being, Counseling Technology, Machine Learning**

I. INTRODUCTION

The mental health of university students is a growing concern, as increasing levels of stress, anxiety, and depression adversely affect their academic performance and personal well-being. Although traditional counseling is essential, its use is often hindered by social stigma, challenges with accessibility, and the absence of immediate, on-demand help. This initiative presents a conversational AI assistant created to fill this void, offering students a confidential and immediate resource. The system is designed to hold empathetic, non-advisory discussions in both English and Malayalam, steering students toward self-discovery. It incorporates real-time mood analytics and a specialized dashboard for counselors, allowing professionals to monitor student well-being and identify those who might need in-person intervention. In an age of high digital reliance, such a secure and accessible platform is crucial for delivering scalable support and improving the student community's overall health.

A Importance of Accessible Counseling

The well-being of college students is a critical matter, with many facing high levels of stress, anxiety, and depression. While on-campus counseling is invaluable, its potential is often unrealized due to persistent social stigma, fear of judgment, and logistical hurdles such as inflexible scheduling and limited counselor availability. This results in a significant gap, leaving many students who require help without access to a prompt and confidential resource. Making mental health support read- ily accessible and non-intrusive is vital for fostering a support- ive academic environment. Timely intervention and ongoing support are key to promoting student success and preventing more severe mental health crises.

B Technological Advances

Recent progress in artificial intelligence and natural language processing (NLP) has generated new strategies for delivering mental health support. The evolution of advanced conversational AI, specifically models trained on therapeutic dialogues, enables the design of systems capable of empathetic and guided user engagement. This signifies a move away from basic rule-based chatbots toward intelligent agents that can comprehend linguistic and emotional nuances. Moreover, progress in sentiment and mood analysis provides these systems with the ability to interpret user inputs and deliver valuable, summarized insights to counseling professionals. These technologies together clear a path for adaptive, scalable, and personalized mental health tools that augment traditional counseling and reach a broader audience.

C Role of the Counselor Dashboard

Data visualization and analytics are central to this project, converting raw conversational data into practical insights for professional counselors. The dashboard for counselors gives a clear, high-level summary of the student body's mental state, identifying general mood trends, prevalent issues, and possible areas of concern. By visualizing this data in an easily digestible format, the dashboard helps counselors to pinpoint students who may be at greater risk and need face-to-face intervention. This feature facilitates a proactive, data-informed strategy for mental healthcare. It helps counselors optimize their time and allocate resources to students with the most urgent needs, shifting the paradigm from reactive waiting to proactive intervention.

D Real-Time Adaptability

At the core of our conversational AI is real-time adaptability, which allows the system to dynamically modify its responses

based on a student's changing emotional and conversational context. In contrast to a static, rule-based chatbot, our model's conversational flow is directed by a dynamic dialogue management system that processes user input instantly. This system employs advanced Natural Language Understanding (NLU) to perceive not just the message content but also its tone, sentiment, and emotional weight. As a student's feelings evolve during a conversation—perhaps shifting from anxiety to frustration, or from sadness to relief—the AI adjusts its questioning strategy to match. This immediate feedback loop fosters a more natural and empathetic interaction, building the trust needed for students to open up.

This dynamic capability is also crucial for risk assessment and managing crisis interventions. The system actively mon- itors for specific high-risk keywords or phrases that might signal distress or suicidal ideation. When such signals are detected, the AI's logic instantly switches to a defined crisis protocol. This protocol is structured to offer urgent help, such as providing a hotline number, a link to emergency services, or an immediate suggestion to contact a counselor. This critical, real-time response function ensures that students in acute distress have a clear path to professional help, serving as an essential safety net.

Furthermore, the system's adaptability includes its bilingual operation. The AI capably switches between English and Malayalam, comprehending and replying to mixed-language input fluidly. This promotes a culturally relevant user experience, as language choice is often tied to emotional expression. Data gathered from these adaptive, real-time engagements—including emotional state changes and keyword frequency—is concurrently streamed to the counselor dashboard. This gives mental health professionals a live, data-rich view of student well-being, permitting proactive intervention before a situation worsens. Therefore, real-time adaptability is a foundational element of the entire system's capacity to deliver responsive, safe, and effective support.

II. LITERATURE REVIEW

Recent progress in AI, especially in NLP and conversational agents, has spurred new strategies for mental health support. This review of the literature focuses on significant contributions to the creation of empathetic and therapeutic chatbots, examining their methods, data, and evaluation techniques. The research highlighted here shows a distinct trend toward advanced, data-informed, and human-focused systems built to tackle the complex challenges of mental health counseling.

A Empathy in Conversational AI

Rashkin et al. [1] confronted the difficulty of embedding empathy—a key skill missing from many chatbots—into dialogue agents. They introduced EMPATHETIC DIALOGUES, a new dataset comprising 25,000 conversations based on emotional scenarios, offering a new benchmark for generating empathetic dialogue. Their trials demonstrated that models trained on this specialized dataset were judged as more empathetic by humans than models trained on vast, uncurated Internet data. This work underscores the necessity of domain-specific datasets for creating emotionally intelligent AI.

Ghandeharioun et al. [2] examined the effects of an emotionally-aware chatbot utilizing the Experience Sampling Method (ESM) to monitor user moods. They contrasted a neutral bot with an "Emotion-Aware" version that replied empathetically to user-reported feelings. A study lasting one week found that participants who engaged with the empathetic bot reported a greater frequency of positive moods. A significant finding was that while users appreciated the bot's empathetic quality, they were also frustrated by its lack of precision, as it could only address broad emotional states and often missed subtle feelings.

Devaram [3] offered a wide-ranging overview of empathic chatbots for mental health. The survey covered different methods, including text-based sentiment analysis, video-based facial recognition, and voice-based emotion detection. The review emphasized the advantages of such chatbots, including round-the-clock availability and decreased social stigma. It also addressed their limitations, such as the challenge of interpreting complex emotional expressions. The author observed that popular chatbots like Woebot and Wysa mainly use Cognitive Behavioural Therapy (CBT) principles for therapeutic guidance.

Majidi et al. [4] suggested a multi-modal method for improving therapy chatbots by combining Speech Emotion Recognition (SER) with a recommender system. Their frame- work applies a Convolutional Neural Network (CNN) to categorize negative emotions from voice data and subse- quently uses a Long Short-Term Memory (LSTM) model to produce personalized, audio-based recommendations via a custom bilingual dataset (English and Persian). The study showed strong performance, with the SER model hitting 88% accuracy and the recommender system 98%, indicating a potent technique for empathetic support that includes non- textual emotional signals.

Chen et al. [5] presented CauESC, a causal-aware model for Emotional Support Conversation (ESC). It surpasses basic sentiment recognition, instead concentrating on the "emotion causes" behind a user's distress and the "emotion effects" resulting from the conversation. The model employs a causal attention mechanism and an "independent-integrated strategy modeling" framework to formulate highly specific and supportive replies. Their tests revealed that CauESC surpassed several leading models, including ChatGPT, proving its causal reasoning framework's utility in creating more empathetic and meaningful, situation-specific responses.

B LLMs and Therapeutic Models

Brocki et al. [6] created ”Serena,” a deep learning dialogue system intended to function as a virtual mental health counselor, addressing barriers like cost and stigma. This system employs a large-scale generative Transformer model that was fine-tuned on transcripts from person-centered therapy (PCT) sessions. A primary characteristic of Serena is its post-processing framework, which improves output quality by removing contradictory, toxic, or repetitive replies. The authors pointed out that while Serena delivers empathetic and engaging dialogue, it sometimes suffers from hallucinations and incoherence, highlighting the persistent difficulties of using generative models in sensitive fields.

Liu et al. [7] introduced ”ChatCounselor,” a large language model fine-tuned specifically for mental health support, us- ing real conversations from licensed psychologists. This re- search confronts a typical shortcoming of current LLMs: their common lack of specialized knowledge and skills necessary for psychological counseling. By leveraging a high-quality, professionally sourced dataset (Psych8k), ChatCounselor managed to exceed other open-source models and rival ChatGPT’s performance on a specialized test called Counseling Bench. This work emphasizes how crucial domain-specific, high-quality data is for attaining a professional and therapeutic conversational tone.

C User Perspectives and Human-AI Collaboration

Sharma et al. [8] investigated a distinct human-AI collaboration model named ”HAILEY” aimed at enhancing the quality of peer-to-peer mental health support. The system operates as an AI-in-the-loop, delivering real-time feedback to human peer supporters and providing specific suggestions to improve the empathy of their replies. A randomized controlled trial showed that the system produced a 19.60% rise in response empathy and was especially beneficial for participants who found it difficult to provide support. This method presents a safer, more effective use of AI as an assistive tool that enhances human skills rather than replacing them in a critical setting.

Zhang et al. [9] used a pilot study to gauge college students’ views on LLM-assisted mental health services. The study examined student attitudes across five different scenarios, from general information requests to initial screening and long-term care. Results showed that students were most receptive to AI in high-efficiency, low-risk situations, such as initial screening or follow-up procedures. However, they expressed worries about the AI’s ability to offer genuine emotional support and handle complex, chronic issues. The study’s key contribution is its focus on designing AI to augment human care, stressing transparency about limitations and a user-centered, empathetic design.

Yoo et al. [10] led a study to grasp the values and potential dangers of AI mental health chatbots, drawing from the perspectives of individuals with depression. They employed a technology probe named ”Zenny,” a GPT-40-based chatbot, in scenario-based interviews with 17 people. This study identified five key user values: emotional support, informational support, personalization, crisis management, and privacy. It also highlighted the intricate relationship between these values, especially the ”personalization-privacy dilemma.” While participants were optimistic about the AI’s potential, they also had serious concerns about misinformation and the bot’s capacity to manage crises, reinforcing the need for careful, value-sensitive design to reduce risks.

III. CONCLUSION

Conversational AI and mental health support are crucial for the accessibility, confidentiality, and effectiveness of contemporary mental healthcare. The literature reviewed indicates a distinct transition from static, rule-based systems to more dynamic, intelligent, and generative solutions. These approaches combine real-time emotion analysis, hybrid dialogue mod- els, non-advisory questioning, interactive dashboards, and AI-powered empathy to deliver precise, responsive, and actionable help. These advancements collectively show that future effective systems will integrate real-time adaptive frameworks with scalable support, empathetic visualization, and smart automation to provide personalized and trustworthy insights.

Notwithstanding these advancements, significant challenges persist. These include guaranteeing response safety during crises, interpreting subtle emotional cues, accommodating diverse linguistic and cultural contexts, and ensuring the trustworthiness of collected data. Overcoming these hurdles involves consolidating the strengths of current methods into secure, robust, and adaptive platforms. The goal is to equip counselors and students with a predictive, resilient, and autonomous support system suitable for future mental health infrastructures.

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