Predicting Mental Health Issues Using Machine Learning Techniques

Kotapati Sai Prasanna, Yagala Suchitra, Talari Umadevi,
Gaddam Drakshayani and Kondakrindi Sucharitha
Department of CSE, Ravindra College of Engineering for Women, Kurnool, Andhra Pradesh, India

Abstract: MANAS stands as an advanced mental health chatbot which uses generative AI combined with prompt engineering together with natural language processing (NLP) to give custom care for people experiencing mental health problems. MANAS applies a broad personality assessment method to customize dialogues with users through a combination of their emotional profile and psychological traits made up of openness, conscientiousness, extraversion, agreeableness, and neuroticism. The system contains crisis detection mechanisms which can identify suicidal behavior and self-harm so it can activate emergency response protocols. Through its detailed report generation feature MANAS compiles a summary of patient interactions as well as emotional states and emerging concerns which healthcare providers can access to support assessment and treatment. The system resolves current mental health chatbot restrictions through its single interactive solution that features customized assistance along with distress handling capabilities and healthcare exchange capabilities. The implementation uses OpenAI API (GPT-3.5) together with NLTK and spaCy as the underlying library systems.

1 INTRODUCTION

The rising mental health problems which affect everyone from different backgrounds have become more widespread throughout the world. Personal needs of mental health support are higher than available professionals can manage because of which patients face extended periods of waiting before receiving assistance. Traditional therapy and counseling often require in-person interactions, which can be inconvenient, costly, and inaccessible for many. In recent years, digital mental health solutions have emerged to address these challenges, offering accessible, cost-effective, and anonymous avenues for support. However, existing mental health chatbots often lack the depth of personalization, crisis detection capabilities, and the ability to integrate with healthcare systems to provide holistic care. This gap presents a critical opportunity for innovation in the realm of mental health technology.

Objectives The MANAS Project (Mental Assistance Network for Alleviating Suffering) is a transformative mental health venture based on a contemporary model that integrates cutting edge artificial intelligence (AI) with patient-tailored support methods. The OpenAI GPT-3. 5) MANAS' simulated human interactions create enriched servicing for consumers of mental health through the use of 5 API. The proposed system MANAS has implemented a sophisticated personality assessment system, which adapts the response based on identifying the user's personality, for example, the behavior of openness and conscientiousness and introversion and agreeableness and neuroticism. With this capability the system provides patients with very specific support that adapts how it is presented to account for the emotional state of the user.

One aspect of MANAS that sets it apart is its ability to detect signs of crisis, like suicidal ideation or self-harm, by analyzing user input. Upon detecting these vital signals, the behavior-driven system promptly triggers a pre-designed crisis protocol to notify appropriate channels, such as mental health experts or emergency services, guaranteeing that when users are in critical condition, they receive prompt assistance. It is an important move in the direction of an emerging crisis management strategy which, when properly equipped-for in advance, stands to save lives through timely intervention in mental health emergencies.

With this level of sensitivity, MANAS can facilitate help not only for users dealing with everyday mental health and chronic problems but also those seeking mental health support during acute distress.

Additionally, MANAS extends beyond simple conversation assistance by creating comprehensive medical reports summarizing the interaction with the user, their emotional state, and the possible problems. These reports are a complete documentation that can be shared with the health providers leading to better-advised and quicker diagnosis. These reports allow users to continue to receive mental health support, even after they have engaged in the conversation with the chatbot. The unique paradigm of easy sharing of medical reports with professionals makes MANAS an important tool in a large mental health ecosystem and serves as a bridge between digital and traditional care.

The new system provides significant updates, compared to traditional mental health chatbots, because it can maintain full medical records, offer customized conversations and assist in crisis situations.

The MANAS system merges multiple services using composite personality assessment and crisis detection capabilities along with report generation functions to assist the individuals dealing with mental health challenges. This great system has also got some AI-powered dialog and gives you a personalized interaction at your fingertips that supports you throughout every interaction.

What makes the MANAS Project innovative is its integrative approach to mental health care, bringing together state-of-the-art AI technology with a rich understanding of human psychology. MANAS aspires to provide a safe and healthy space for users to seek help around mental health challenges by processing emotional cues and tracking responses accordingly in a direction that is gentle, caring and empathic. The primary goal of MANAS is not only to provide immediate support services but also to connect them to longer-term mental health care for sustained health and recovery.

2 LITERATURE SURVEY

The advent of artificial intelligence (AI) has played a part in revolutionising mental health care worldwide. Olawade et al. (2024) examines the current trends and the future prospects of optimizing mental health with artificial intelligence, detailing its transformative potential in the diagnosis and treatment of mental health issues. AI-Powered Solutions for Mental Health CareAI-enabled solutions address the mental health gap with immediate, customized solutions. The Ajayi (Singh, L. (2024) study proposes the use of AI driven technology as an asset to manage complex mental health crisis and also towards addiction treatment programs and is a sign of AI's ability to provide targeted treatment strategies at scale.

AI applications for specific uses in mental health have received attention in several investigations in the last few years. Lee et al. analyze the clinical applications of AI in mental health care. (Koutsouleris et., al. 2022) that address both diagnostic aid and treatment capabilities, as well as challenges that concern ethics and clinical uptake. Koutsouleris et al. We discuss moving the promises of AI into a functional mental healthcare infrastructure (Thirupathi et., al. 2025) for real-world use within clinical practice. This research illustrates the potential opportunities and challenges that the introduction of AI systems poses for the delivery of mental health services.

Singh introduces the concept of AI-human synergy in mental health, emphasizing the potential for creating mental health applications that support mental health workers' well-being. This approach explores how AI can serve as a supportive tool for professionals, enhancing their ability to manage complex cases. On the other hand, Thirupathi et al. 2025 investigate the role of AI and the Internet of Things (IoT) in providing continuous, personalized mental health care, offering solutions for digital diagnostics and long-term support. Their research points to the evolution of mental health tools from crisis management to ongoing, individualized care.

AI through chatbots presents itself as a valuable solution for mental health support when built specifically for this purpose. The study by Yoon examines AI-based digital therapeutics that handle adolescent mental health care programs focusing on disaster response applications. The research by Manole et al. 2024 features chatbots which use AI for anxiety intervention through individualized mental health assistance Dutta, D., & Muni, A. D. (2024). The applications serve both urgent emotional requirements as well as establishing continuous programs for mental health maintenance.

Scientific research includes AI usage in mental health fields through its application to psychiatric and nursing care systems. Nashwan et al. examine how AI strategies enhance psychiatric patient care by explaining its value for mental health nursing practice to reach better outcomes. According to Dutta and Muni (2024), AI demonstrates its ability to detect depression early alongside managing this condition

within elderly populations.

The healthcare field is now tackling issues of security and morality that arise from AI implementation in mental health practices. De Freitas et al. (2024) present essential information about the security aspects of generative AI chatbots for mental health alongside necessary precautions for their appropriate utilization. Singh (2023) explains that AI tools such as ChatGPT will reshape mental health care but healthcare providers need to supervise their implementation to maintain ethical compliance. The evaluation by Denecke et al. (2021) examines the implementation risks and opportunities of AI-powered chatbots in mental health care while identifying the requirement for safe and effective methods of deployment.

Two research studies by Ahmad et al. (2022) and Sweeney et al. (2021) focus on personality-adaptive conversational agents designed for mental health care use. The research by Ahmad et al. discusses how agents responding through conversation should adjust to precisely match users' personalities to maximize their impact. This study by Sweeney et al. investigates how healthcare professionals perceive chatbots through their evaluation of potential advantages along with integration barriers for AI in mental health service delivery.

3 PROPOSED METHODOLOGY

The MANAS Project provides services to mental health patients by integrating artificial intelligence generative AI solutions with natural language processing and personality evaluations. By identifying crisis moments as well as delivering tailored ongoing patient care, the system delivers a full healthcare services package. The system provides empathetic and accurate answers because it recognize user emotional states along with personality features and environmental elements. The structure presented consists of essential portions that initially capture information and employ man made intelligence calculations. Figure 1 shows the system architecture.

3.1 Personality Assessment and Emotional Context Detection

MANAS begins the process with personality evaluation based on the Five-Factor Model (FFM) to analyze users traits of openness, conscientiousness extraversion, friendliness and neuroticism. Detecting emotional cues in user inputs, analyzing the emotional states, and creating a database of emotional

cues leads to an assessment of user emotions. The necessary knowledge to adjust conversation style is provided to the system by user feedback, as it allows the chatbot to offer suggestions that align with a person's traits. The personalized response system builds emotional resonance with users who face mental health challenges creating an emotionally nuanced tone for mental health care support. At the same time, MANAS also uses state-of-the-art NLP techniques to recognize the emotional context of the user's input and detect the signs of distress, sadness, anxiety or other emotional state. This information is essential to modify the chatbot response and tone depending on real-time user interaction. For instance, if the system senses that a user is feeling low or stressed, the chatbot might take a gentler, more encouraging approach. Detecting the emotional context is essential for improving user interaction, establishing trust and ensuring the chatbot responds ideal to different emotions.

3.2 Crisis Detection and Emergency Protocol Activation

The second segment of the methodology uses intelligent algorithms to identify signs of a crisis through analytical of user-generated text contents for recognized warning signs. The model is extensively trained on diverse mental health datasets to learn the patterns of identification for speech content related to crisis and mental health keywords. Once a mental health crisis is detected by the system it employs a predetermined alert protocol to reach out to relevant stakeholders such as crisis hotlines along with mental health professionals and other emergency contacts. MANAS has a distinctive approach where a ready-made model of a conversation integrates users with instant help which is its competitive advantage against other mental health chatbots.

We also propose an escalation mechanism that adjusts intervention severity according to the type of crisis detected, thus further refining the crisis detection process. For instance, if a user is reported to be suicidal, the MANAS can prioritize responding quicker by calling emergency services or send a message to the user's primary emergency contact. The goal of the system is to respond based on urgency and not leave the user in a situation where they are dealing with a life-threatening situation alone.

3.3 Data Collection and Continuous Care through Medical Reporting

The third component of the methodology is the ongoing collection and analysis of user data for mental health monitoring. As users engage with the chatbot, their emotional state, responses, and behavioral patterns are tracked for analysis. These logs are not personally identifiable, but they give us valuable information about how the user interacts with us. The system analyzes the collected data and automatically generates detailed medical reports that summarize the user's emotional state, behavioral trends, and interactions. These reports provide medical professionals with context to evaluate the mental state of the user over time.

MANAS delivers ongoing treatment by providing users with a platform to monitor their mental health journey. A user can show these reports to healthcare providers, enabling continuous mental health support and better clinical assessments. It provides an objective perspective of the user's mental health trajectory, and supplements physical therapy approaches by documenting real-time indicators of a user's mental state and emotional excesses.

3.4 Integration and User Experience

Lastly, the methodology emphasizes on the inclusion of interface that allows the user to interact with system and access all other components in a unified way. Our chatbot is user-friendly with which to communicate so it offers intuitive options for to start conversations, track their feelings and ask for assistance. You are built on a modern tech stack using ReactJS for the front-end, providing an excellent user experience on all devices. It is pivotal that user interface shall go hand in hand with AI-driven algorithms for real-time personalized support, which makes the experience better for the user and motivates them for continuous interaction with the system.

In addition, MANAS acts to bridge a gap in the human web of healthcare professionals, tapping them into existing healthcare systems for easy transfers when users need it. This integration uses secure sharing features to let healthcare providers view user reports and evaluate their mental health alongside other clinical data. MANAS bridges the gap between digital health interventions and traditional healthcare systems by facilitating a holistic, continuous care process, where users can access professional help on demand when they need it most.
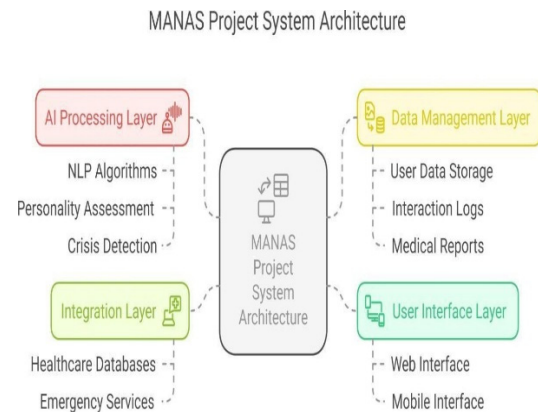

Figure 1: System architecture.

4 RESULTS AND DISCUSSION

The MANAS Project uses machine learning, natural language processing and computer graphics to create a highly personalized and empathetic mental health support system. These methods will yield anticipated results for both the user experience and mental health care: The system harnesses complex data pattern extraction to create profiles of users' emotional states, behavioral patterns, and contextual information, so as to effectively present tailored responses. One of the most important functions of the chatbot is its ability to adapt to different personalities, emotional signals, and changes in external circumstances, such as crisis detection, to allow the system to respond in dynamic and personalized ways to users.

We expect the model to adapt to a variety of user inputs, making it more intuitive and empathetic. For example, during periods of heightened emotional distress, the system is expected to change the tone and topic of its content to deliver more supportive, comforting and urgent responses. Moreover, if users display signs of a mental health crisis, such as suicidal thoughts, the system will trigger appropriate emergency responses, notifying healthcare professionals or crisis hotlines instantaneously - all throughout the process, personal information and concerns will never be stored., this adaptable model will learn to recognize and respond to different emotional states and provide a more effective, targeted solution than has historically been possible.

4.1 Expected Trends in User Interactions

The user will most likely have different behavior and

data than other users, which the model should pick up on. For instance, users with high rates of neuroticism might show more frequent signs of emotional distress and may warrant more immediate crisis detection and intervention. On the other hand, users who tend to show more agreeableness or extraversion are likely to have more casual and positive conversations, making space for long-term mental health interventions for the chatbot rather than immediate intervention. Therefore, the system's flexibility is needed to cope with these dynamics in real-time, providing personalized and relevant responses grounded on the user's individual emotional and psychological features.
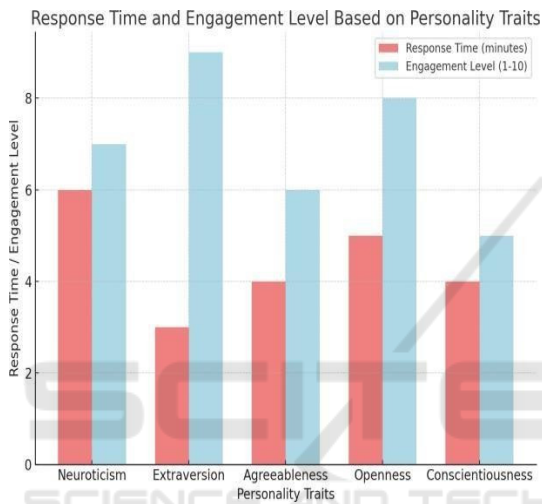

Figure 2: Response time and engagement level based on personality traits.

Figure 3: - This Graph Shows What Predicts Different Personality Traits (Neuroticism, Extraversion, Etc) As Well As the Time It Takes The Chatbot to Respond (In Minutes) and How Engaged the User Was (Score of 1-10). Figure 2 Shows the Response Time Is Depicted Through the Red Bar, and Engagement Levels Through The Blue.

Other anticipated developments are the system's capacity to observe trends in people's responses throughout time, allowing it to monitor mental health progress and adjust support accordingly. For example, if a user shows improved mood and emotional well-being, the system may provide suggestions for their continued mental health journey, whereas a user who returns with a decline in their emotional well-being may be offered an immediate intervention or referred to professional care. Table 1 shows impacts on user behaviour.

4.2 Comparative Analysis: MANAS vs. Traditional Methods

Comparative to traditional therapy which is time consuming, expensive and requires physical attendance, MANAS gearing up better advantages by providing standard mental health service provision. MANAS provides users constant availability as well as personalized representation support which also captures and stores user progress independently over time. Instant therapeutic solutions for users via AI-based operational models housing these that extract mental health support through emotional input and identify crises at this very moment.

Traditional approaches may often return profuse examples of querying and information which do not offer the same level of relevance depending on the information received from the user; the MANAS system works to differentise itself in this aspect. High user engagement and user satisfaction compared with standard mental health chatbots without personalization is likely to be an outcome of this. Additionally, the incorporation of crisis detection and medical report generation offers a holistic, end-to-end solution that is unparalleled by traditional systems.
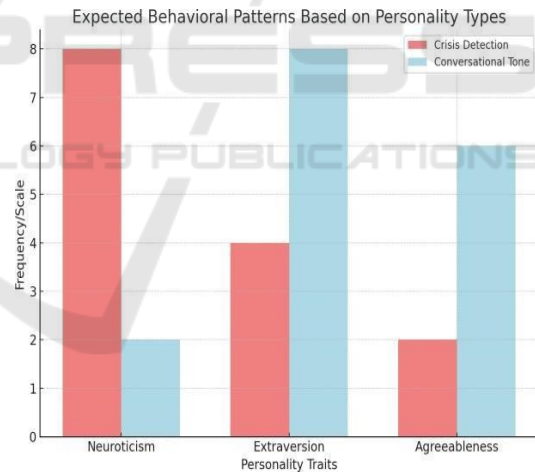

Figure 3: Expected behaviour patterns based on personality types.

Table 1: Expected impact of external data (weather, economic variables) on user behavior.

External Factor	Expected Impact on User Behavior	Notes
Weather (Seasonal)	Increased depressive symptoms in colder months.	Emotional cues might indicate a need for more support during winter.

Economic Conditions	Higher stress levels due to economic downturns.	System may detect increased anxiety and offer targeted interventions.
Social Events	Positive mood during holidays, higher engagement.	The system may shift its tone to reflect a more positive environment.
Media Exposure	Increased exposure to negative news could cause distress.	Adjustments in response tone, with crisis detection if needed.

5 CONCLUSIONS

MANAS Project is an important developmental step in digitalmental health support due to its integration of generative AI technologywith a personality assessment and crisis detection in a single interface. Through analysis of thought and act in emotional state and personality traits, MANAS can generate real-time responses allowing MANAS to provide mental healthcare with a higher degree of empathy compared to the traditional approach. The system is capable of detecting crises and issuing complete medical records for continuous health care needs, thus enabling patients to achieve complete mental wellness from the entire system. Mental health support systems face a paradigm shift for the future as it will provide better support methods that suit the individual needs as well as support operational outputs to improve therapeutic outcomes on the mental health of a patient.

6 FUTURE SCOPE

Capabilities that support the mental health component of the MANAS Project will have the highest leverage impact. Recommended Future Work Further improvement of MANAS Project could user multi patient data as Vocal tone, biological sensor data for complete emotional state analysis. In addition, the model can be expanded in its applications by integrating multiple health conditions along with assessing them continuously through wearable sensors so as to enhance its usability in pre-crisis and crisis realms of treatment. Improving Multilingual Support Features The system should be able to address a broader range of language populations that it can serve. Incorporation with Electronic Health Records (EHRs) and telemedicine

systems enabling seamless communication between traditional and digital mental health services will make MANAS further integrated with healthcare.

REFERENCES

Ahmad, R., Siemon, D., Gnewuch, U., & Robra-Bissantz, S. (2022). Designing personality-adaptive conversational agents for mental health care. Information Systems Frontiers, 24(3), 923-943

De Freitas, J., Uğuralp, A. K., Oğuz- Uğuralp, Z., & Puntoni, S. (2024). Chatbots and mental health: Insights into the safety of generative AI. Journal of Consumer Psychology, 34(3), 481-491.

Denecke, K., Abd-Alrazaq, A., & Househ, M. (2021). Artificial intelligence for chatbots in mental health: Opportunities and challenges. In Multiple Perspectives on Artificial Intelligence in Healthcare: Opportunities and Challenges (pp. 115-128).

Depression in Elderly Citizens. Library of Progress-Library Science, Information Technology & Computer, 44(3).

Dutta, D., & Muni, A. D. (2024). Artificial Intelligence for Mental Health: A Review Based Analysis of Early Detection and Management of

Koutsouleris, N., Hauser, T. U., Skvortsova, V., & De Choudhury, M. (2022). From promise to practice: towards the realisation of AI-informed mental health care. The Lancet Digital Health, 4(11), e829-e840.

Manole, A., Cârciumaru, R., Brînzaş, R., & Manole, F. (2024). Harnessing AI in Anxiety Management: A Chatbot-Based Intervention for Personalized Mental Health Support. Information, 15(12), 768.

Nashwan, A. J., Gharib, S., Alhadidi, M., El-Ashry, A. M., Alamgir, A., Al-Hassan, M., ... & Abufarsakh, B. (2023). Harnessing artificial intelligence: strategies for mental health nurses in optimizing psychiatric patient care. Issues in Mental Health Nursing, 44(10), 1020-1034.

Olawade, D. B., Wada, O. Z., Odetayo, A., David-Olawade, A. C., Asaolu, F., & Eberhardt, J. (2024). Enhancing mental health with Artificial (AI) Graham, S. A., Kim, H. C., ... & Jeste, D. V. (2021). Artificial intelligence for mental health care: clinical applications, barriers, facilitators, and artificial wisdom. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 6(9), 856-864..

Singh, L. (2024). Revolutionizing Care: Developing an AI-Human Synergy Mental Health Application for Mental Health Worker's Well-Being (Doctoral dissertation, Capella University).

Singh, O. P. (2023). Artificial intelligence in the era of ChatGPT: Opportunities and challenges in mental health care. Indian Journal of Psychiatry, 65(3), 297-298.

Sweeney, C., Potts, C., Ennis, E., Bond, R., Mulvenna, M. D., O'Neill, S., ... & McTear, M. F. (2021). Can chatbots help support a person's mental health? Perceptions and views from mental healthcare

professionals and experts. ACM Transactions on Computing for Healthcare, 2(3), 1-15.

Thirupathi, L., Kaashipaka, V., Dhanaraju, M., & Katakam,V. (2025). AI and IoT in Mental Health Care: From Digital Diagnostics to Personalized, Continuous Support. In Intelligent Systems and IoT Applications in Clinical Health (pp. 271-294). IGI Global.

Yoon, S. (2024). AI-Based Digital Therapeutics for Adolescent Mental Health Management and Disaster Response. Information, 15(10), 620.