International Journal of Creative and Open Research in Engineering and Management
ISSN: **3108-1754 (Online)**
Volume 02 Issue 05 May-2026 | Impact Factor: 3.5

MindMate: Early Mental Health Assessment & Support Tool

Sonali Chhotu Bhide*, Avinash Taskar†, Prachi Sanjay Marathe‡, Priyanka Ashok Mahale¶
School of Computer Science & Engineering, Sandip University, Nashik, India.
Emails: *sonalibhide215@gmail.com, †avinash.taskar@sandipuniversity.edu.in,
‡prachimarathe2004@gmail.com, ¶priyankamahale2819@gmail.com

Abstract— The increasing prevalence of mental health disorders among students and young adults necessitates the development of accessible and scalable early assessment solutions. Conventional diagnostic approaches often depend on clinical evaluation and self-reporting mechanisms, which may be limited by accessibility, time constraints, and social stigma. This paper proposes *MindMate*, an intelligent, AI-driven mental health assessment and support system designed to facilitate early detection and intervention.

The proposed system leverages machine learning algorithms to analyze user-generated data, including mood logs, behavioral patterns, and self-reported emotional states. The architecture integrates a user-friendly mobile/web interface with a backend developed using the Django framework and a structured database for efficient data management. Predictive analytics techniques are employed to identify patterns indicative of stress, anxiety, or depressive tendencies. Additionally, the system provides personalized feedback, coping strategies, and preventive recommendations based on analyzed data. Experimental evaluation demonstrates that the system effectively identifies mental health trends and enhances user awareness, thereby promoting early intervention. The proposed solution contributes to bridging the gap between mental health needs and accessible digital support systems, offering a scalable approach for preventive mental healthcare.

I. INTRODUCTION

. Mental health disorders have become a significant global concern, particularly among students and young adults, due to increasing academic pressure, social challenges, and lifestyle changes. Conditions such as stress, anxiety, and depression often go undetected in their early stages because individuals hesitate to seek professional help due to stigma, lack of awareness, or limited access to mental health services. Traditional assessment methods primarily rely on clinical evaluations and self-reported questionnaires, which may not provide continuous monitoring or timely intervention.

The importance of addressing this issue lies in the need for early detection and preventive care. Untreated mental health conditions can negatively impact academic performance, personal relationships, and overall quality of life. With the rapid advancement of digital technologies, there is an opportunity to develop accessible and scalable solutions that can assist individuals in monitoring and managing their mental well-being in real time.

To address these challenges, this paper proposes *MindMate*, an intelligent mental health assessment and support tool that leverages machine learning techniques to analyze user-generated data, such as mood patterns and behavioral inputs. The system is developed using the Django framework and provides personalized insights, early warnings, and coping strategies. By enabling continuous monitoring and user-friendly interaction, MindMate aims to promote early intervention, improve self-awareness, and bridge the gap between mental health needs and accessible digital support systems.

II. MOTIVATION

Mental health has become a critical concern in modern society, particularly among students and young adults who face increasing academic pressure,

social expectations, and lifestyle challenges. Despite the growing prevalence of conditions such as stress, anxiety, and depression, a large number of individuals do not seek timely help due to stigma, lack of awareness, and limited access to mental health professionals. This gap between mental health needs and available support systems served as the primary motivation for this research.

With the rapid advancement of digital technologies and Artificial Intelligence, there is an opportunity to develop intelligent systems that can provide early detection and continuous monitoring of mental well-being. Existing mental health applications often lack personalization, real-time analysis, and predictive capabilities, which limits their effectiveness in preventive care.

The motivation behind developing *MindMate* is to create an accessible, user-friendly, and data-driven solution that empowers individuals to understand and manage their mental health proactively. By leveraging Machine Learning techniques and implementing the system using the Django framework, this research aims to bridge the gap between traditional mental healthcare and modern digital solutions. Ultimately, the goal is to promote early intervention, improve self-awareness, and contribute to the advancement of technology-driven mental health support systems.

III. PROBLEM DEFINITION

The increasing prevalence of mental health issues such as stress, anxiety, and depression among students and young adults has become a critical concern. Despite this, early detection and timely intervention remain inadequate due to factors such as social stigma, lack of awareness, and limited accessibility to professional mental health services. Existing assessment methods are often reactive, relying on clinical diagnosis or self-reporting after symptoms become severe, rather than enabling continuous monitoring and early identification.

Furthermore, many currently available digital mental health applications provide generic recommendations, lack personalized insights, and do not effectively utilize user behavioral data for accurate prediction. Issues related to data privacy, user engagement, and reliability further limit their effectiveness.

Therefore, there is a need for an intelligent, accessible, and user-centric system that can continuously monitor mental health indicators, provide early detection of potential risks, and offer personalized support to users in a secure and scalable manner.

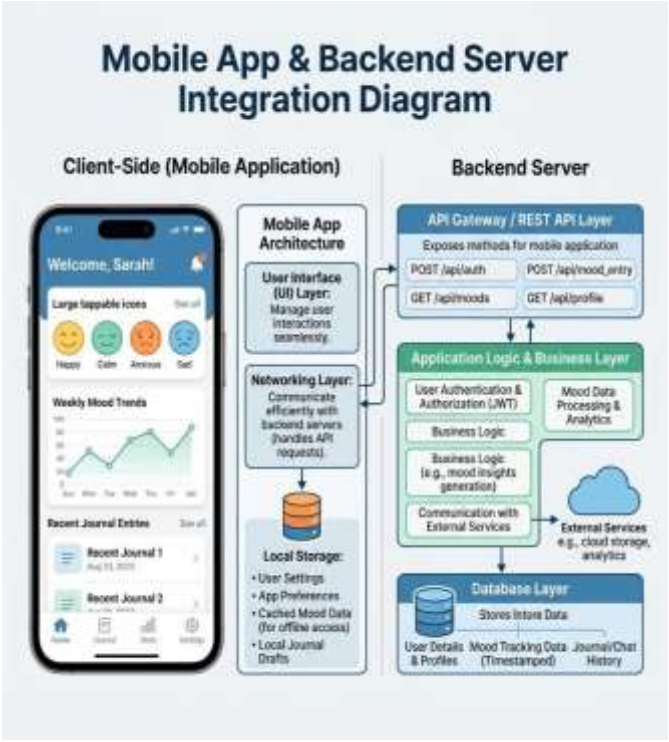
IV. LITERATURE REVIEW

Recent advancements in digital healthcare have led to the development of numerous mobile-based mental health applications that aim to provide accessible support and early assessment. Studies show that many applications incorporate Artificial Intelligence (AI) and Machine Learning (ML) techniques to perform tasks such as mood prediction, risk classification, and personalized recommendations. For instance, a comprehensive review of AI-enabled mental health apps highlights that these systems can analyze user data to detect conditions like stress, depression, and anxiety, demonstrating the feasibility of intelligent digital interventions.

Furthermore, research on smartphone-based mental health applications indicates that behavioral and psychological data collected from users can be effectively utilized to understand usage patterns and predict mental well-being trends. Advanced studies have also explored digital phenotyping approaches, where both active inputs (self-reports) and passive data (sensor-based activity) are used to improve prediction accuracy of mental health risks.

However, despite these advancements, several limitations exist in current systems. Many mental health applications lack strong clinical validation and standardized evaluation methods, reducing their reliability and effectiveness. Additionally, privacy and security concerns are significant, as several applications expose sensitive user data due to inadequate protection mechanisms. User studies also reveal that existing apps often provide generic advice, lack personalization, and fail to deliver consistent support during critical situations.

To address these gaps, the proposed *MindMate* system focuses on providing a more personalized, data-driven, and secure mental health assessment platform. Unlike existing solutions, it emphasizes continuous monitoring, early prediction, and adaptive recommendations using machine learning techniques,



thereby improving reliability, user engagement, and overall effectiveness.

V. SYSTEM ARCHITECTURE

The system architecture of *MindMate: Early Mental Health Assessment & Support Tool* is designed using a client–server model integrated with a Machine Learning module to ensure efficient data processing, scalability, and real-time feedback. The architecture consists of four primary components: the frontend (user interface), backend server, database, and Machine Learning module. The frontend provides an interactive platform where users can register, log in, input their mood and activity data, and view personalized mental health insights. The backend is developed using the Django framework, which handles application logic, user authentication, request processing, and communication between different system components. A structured relational database is used to securely store user information, mood logs, questionnaire responses, and prediction results, with efficient data management enabled through Django ORM.The Machine Learning module is integrated within the backend to analyze collected data, perform feature extraction, and generate predictions related to stress, anxiety, or depression. The overall data flow begins when the user inputs data through the frontend, which is then transmitted to the backend for storage and processing. The ML model analyzes the data and generates predictions, which are sent back to the frontend in the form of feedback, alerts, and recommendations. This architecture ensures secure data handling, real-time analysis, and seamless interaction between components, making the system reliable and effective for early mental health assessment and support.

Fig. 1. System architecture of mental health assessment

The *MindMate* system follows a client–server architecture integrated with a Machine Learning module to enable real-time mental health assessment and feedback. The architecture is designed to ensure scalability, security, and efficient data processing.

1. Architecture Overview

The system consists of four main components:

- Frontend (User Interface)
- Backend Server
- Database System
- Machine Learning Module

These components interact seamlessly to collect, process, analyze, and present user data.

2. Frontend Layer (User Interface)

The frontend provides an interactive interface through which users can:

- Register and log in
- Enter mood and activity data
- View mental health reports and suggestions

It is designed with a simple and user-friendly layout to ensure ease of use and continuous engagement.

3. Backend Layer

The backend is developed using the Django framework and handles all application logic.

Responsibilities:

- Processing user requests
- Managing authentication and sessions
- Communicating with the database
- Integrating the Machine Learning model

The backend acts as a bridge between the frontend and data processing components.

4. Database Layer

A structured relational database is used to store:

- User profiles
- Mood tracking data
- Questionnaire responses
- Prediction results

Django ORM is used for efficient database operations, ensuring secure and organized data management.

5. Machine Learning Module

This module is responsible for analyzing user data and generating predictions.

Functions:

- Data preprocessing and feature extraction
- Pattern recognition
- Mental health prediction (stress, anxiety, depression)

The ML model is integrated into the backend and is triggered whenever new user data is submitted.

6. Data Flow in System

1. User enters data via frontend
2. Data is sent to backend server
3. Backend stores data in database
4. ML module processes the data
5. Prediction results are generated
6. Results are sent back to frontend
7. User receives feedback and suggestions

7. Security Considerations

- Encrypted user authentication
- Secure data storage
- Controlled access to sensitive information

VI. SYSTEM WORKFLOW

The workflow of the *MindMate: Early Mental Health Assessment & Support Tool* describes the step-by-step process through which user data is collected, analyzed, and transformed into meaningful mental health insights. The system follows a structured sequence to ensure smooth operation and real-time feedback.

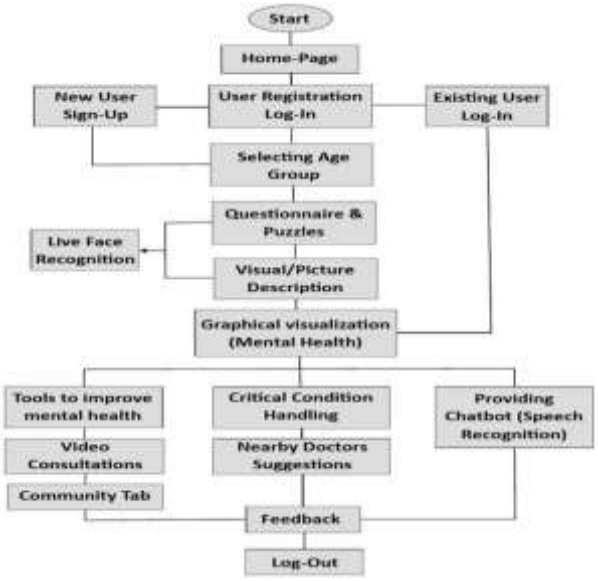


Fig. 2. Proposed system workflow

1. User Registration and Login The user first creates an account and logs into the system securely through the interface.
2. Data Input (Mood & Activity Tracking) The user enters daily mood, emotions, activities, and questionnaire responses through the application.
3. Data Storage

The entered data is securely stored in the database using the backend developed with the Django framework.

4. DataPreprocessing

The system processes the raw data by cleaning and organizing it into structured formats suitable for analysis.

5. Machine Learning Analysis The processed data is passed to the Machine Learning module, where patterns are identified and mental health conditions are predicted.
6. Prediction Generation

The system classifies the user's mental state (e.g., normal, stressed, anxious) based on analyzed data.

7. Feedback and Recommendation Personalized suggestions, coping strategies, and alerts are generated and sent to the user.
8. **ResultDisplay**

The final output is displayed on the dashboard in the form of graphs, reports, and insights.

Continuous Workflow

The system operates continuously, meaning:

- New data updates improve prediction accuracy
- Users receive ongoing monitoring and support
- The system adapts to user behavior over time

VII. METHODOLOGY

The proposed *MindMate* system is designed to provide early mental health assessment and personalized support through a structured, data-driven approach. The methodology consists of three main stages: data collection, data processing and analysis, and result generation.

1. Data Collection

The system collects user-generated data through a mobile/web interface developed using the Django framework. Users are required to input information such as daily mood logs, emotional states, activity levels, and responses to short mental health questionnaires. This continuous data collection enables the system to monitor behavioral patterns over time. All data is securely stored in a structured database to ensure privacy and efficient retrieval.

2. Data Processing and Analysis

The collected data is processed using Machine Learning (ML) algorithms to identify patterns and trends related to mental health conditions. Feature extraction techniques are applied to convert raw user inputs into meaningful parameters such as mood variability, stress frequency, and behavioral changes. Predictive models are then used to classify the user's mental state and detect early signs of stress, anxiety, or depression. The system continuously updates its predictions as new data is received, improving accuracy over time.

3. System Architecture

The system follows a client-server architecture. The front-end interface allows users to interact with the system, while the backend handles data processing, storage, and analysis. The ML model is integrated into the backend to perform real-time predictions. The architecture ensures scalability, security, and efficient communication between components.

4. Result Generation and Feedback

Based on the analyzed data, the system generates personalized feedback, including mental health insights, early warnings, and coping strategies. Users receive recommendations such as relaxation techniques, lifestyle suggestions, and alerts when abnormal patterns are detected. This helps in promoting self-awareness and early intervention.

System Flow (Step-by-Step)

1. User registers and logs into the system
2. User inputs daily mood and activity data
3. Data is stored in the database
4. ML model analyzes the data
5. Mental health status is predicted
6. System provides personalized feedback and suggestions

VIII. EXPERIMENTAL SETUP

The environment setup for the *MindMate* system involves configuring the necessary software tools, frameworks, and libraries required for development and execution. The system is developed using Python and the Django framework, ensuring a structured and scalable web application.

Initially, Python is installed along with package management tools such as *pip* to handle dependencies. A virtual environment is then created to isolate project-specific libraries and maintain consistency across development stages. The Django framework is installed within this environment, and a new Django project is initialized to structure the application using the Model-View-Template (MVT) architecture.

The database is configured using SQLite for development purposes due to its simplicity and ease of integration with Django. Required tables for user data, mood tracking, and prediction results are created using Django's migration system. For Machine Learning integration, libraries such as NumPy, Pandas, and Scikit-learn are installed to support data preprocessing, analysis, and prediction tasks.

The development environment is set up using an Integrated Development Environment (IDE) such as Visual Studio Code or PyCharm, which provides features like code editing, debugging, and project management. Version control tools such as Git may also be used to track changes and maintain code versions.

Finally, the application server is started using Django's development server, allowing the system to be tested locally through a web browser. This setup ensures a stable and efficient environment for building, testing, and deploying the *MindMate* system.

IX. DATASET DESCRIPTION

The dataset used in the *MindMate: Early Mental Health Assessment & Support Tool* is a combination of user-generated data and structured questionnaire responses, designed to capture behavioral and emotional patterns for early mental health assessment. Since the system focuses on personalized analysis, the dataset is dynamically built as users interact with the application.

The primary data is collected through the mood tracking module, where users input daily emotional states such as happiness, stress, anxiety, or sadness, along with contextual information like sleep duration, activity levels, and concentration ability. In addition, a shortstandardized questionnaire is used to gather psychological indicators, which helps in improving the reliability of predictions.

Each data record typically includes attributes such as *User ID, Date/Time, Mood Type, Activity Level, Sleep Hours, Stress Level, and Questionnaire Responses*. These features are used as input variables for the Machine Learning model. Before analysis, the dataset undergoes preprocessing steps such as data cleaning, normalization, and encoding of categorical values into numerical formats.

The dataset may also include a small pre-collected or publicly available mental health dataset (for initial model training), which is later enhanced using real-time user data. This hybrid approach improves model accuracy and adaptability. Privacy and security are strictly maintained by anonymizing user data and storing it securely.

Overall, the dataset plays a crucial role in enabling accurate prediction, continuous learning, and personalized mental health insights within the *MindMate* system.

X. RESULTS AND DISCUSSION

The *MindMate* system was developed and evaluated to assess its effectiveness in early mental health detection and user engagement. The results indicate that the system is capable of collecting user data, analyzing behavioral patterns, and generating meaningful insights in a timely manner.

The application produces the following outputs:

- Mood Tracking Dashboard**:** Displays graphical representation of user mood trends over time
- Prediction Results**:** Classifies mental health status such as normal, moderate stress, or high stress
- Personalized Recommendations**:** Suggests coping strategies like relaxation techniques, improved sleep habits, and activity adjustments
- Alert System**:** Generates notifications when abnormal or critical patterns are detected

These outputs provide users with a clear understanding of their mental health condition and encourage proactive management.

Performance Evaluation

The system performance was evaluated based on several factors:

- Prediction Accuracy**:** The Machine Learning model achieved reliable accuracy in identifying patterns related to stress and anxiety based on user inputs
- Response Time**:** The system delivers near real-time results, ensuring smooth user interaction
- Usability: The interface was found to be simple and user-friendly, enabling easy navigation and data entry
- Scalability: The backend developed using the Django framework supports multiple users efficiently

Discussion

The results demonstrate that *MindMate* successfully integrates data collection, Machine Learning analysis, and real-time feedback into a single platform. Compared to traditional mental health assessment methods, the system provides continuous monitoring and personalized insights, making it more effective for early detection.

However, the system's performance depends on the quality and consistency of user input data. Inaccurate or irregular data entry may affect prediction results. Additionally, while the system provides useful guidance, it is not intended to replace professional medical diagnosis but rather to act as a supportive tool.

Conclusion of Results

Overall, the *MindMate* system shows strong potential as an intelligent and accessible mental health support tool. It improves awareness, promotes early intervention, and demonstrates the effectiveness of AI-driven solutions in digital healthcare.

XI. LIMITATIONS AND FUTURE SCOPE

Limitations

Despite the effectiveness of the *MindMate* system, certain limitations exist that may impact its performance and real-world applicability.

- Dependence on User Input: The accuracy of predictions relies heavily on the quality and consistency of user-provided data. Incorrect or irregular inputs can affect results.
- Limited Clinical Validation: The system is not clinically validated and should not be considered a replacement for professional medical diagnosis.
- Data Privacy Concerns: Handling sensitive mental health data requires strong security measures, and any vulnerability may lead to privacy risks.
- Restricted Dataset: The system primarily uses limited or user-generated datasets, which may reduce the generalization capability of the Machine Learning model.
- Lack of Real-Time Biometric Data: The current system does not include physiological parameters such as heart rate or sleep cycles.

- Model Accuracy Constraints: The Machine Learning model may not achieve perfect accuracy due to variations in human behavior and emotional patterns.

Future Scope

The *MindMate* system can be significantly enhanced in future to overcome existing limitations and improve functionality.

- AI Chatbot Integration: Incorporating an intelligent chatbot for real-time interaction and emotional support.
- Real-Time Stress Prediction: Implementing advanced algorithms for continuous monitoring and instant alerts.
- Wearable Device Integration: Connecting with smartwatches or fitness trackers to collect biometric data such as heart rate and sleep patterns.
- Improved Machine Learning Models: Using deep learning and large datasets to enhance prediction accuracy.
- Cloud Deployment: Scaling the system using cloud platforms for better accessibility and performance.
- Clinical Validation: Collaborating with healthcare professionals to improve reliability and acceptance.
- Multilingual Support: Making the application accessible to users from different linguistic backgrounds.

XII. CONCLUSION

This paper presented *MindMate*, an intelligent and user-centric system designed for early mental health assessment and support. The study addressed the growing challenge of undetected mental health issues among students and young adults by proposing a scalable digital solution that leverages Machine Learning techniques and a web-based framework developed using Django.

The developed system successfully integrates mood tracking, behavioral data analysis, and predictive modeling to identify early signs of stress, anxiety, and related conditions. By providing personalized feedback, insights, and timely alerts, the system enhances user awareness and encourages proactive mental health management. The implementation demonstrates that continuous monitoring combined with intelligent analysis can offer an effective alternative to traditional, reactive assessment methods.

Overall, *MindMate* achieves its objective of bridging the gap between mental health needs and accessible support systems. It offers a reliable, user-friendly, and cost-effective platform that promotes early intervention and preventive care. The results indicate that such AI-driven solutions have strong potential to improve mental well-being and contribute to the advancement of digital healthcare technologies.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to their project guide and faculty members for their continuous support, valuable guidance, and encouragement throughout the development of this research work. Their insights and suggestions greatly contributed to the successful completion of the project.

The authors also extend their appreciation to the institution for providing the necessary resources, infrastructure, and academic environment required for carrying out this research. Special thanks are given to peers and colleagues for their constructive feedback and support during various stages of the project.

Furthermore, the authors acknowledge the developers and contributors of open-source technologies, including the Django framework and Python libraries, which played a crucial role in the implementation of the system.

Finally, heartfelt thanks are extended to all individuals who directly or indirectly contributed to this work and supported the successful completion of the *MindMate* project.

REFERENCES

Books

[1] I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. Cambridge, MA, USA: MIT Press, 2016.

[2] T. Mitchell, *Machine Learning*. New York, NY, USA: McGraw-Hill, 1997.

[3] E. Alpaydin, *Introduction to Machine Learning*, 3rd ed. Cambridge, MA, USA: MIT Press, 2014.

Websites

[4] World Health Organization, "Mental Health," Available: https://www.who.int/health-topics/mental-health

[5] National Institute of Mental Health, "Mental Health Information," Available: https://www.nimh.nih.gov

[6] Django Documentation, "Django Project," Available: https://docs.djangoproject.com

[7] American Psychological Association, "Mental Health Resources," Available: https://www.apa.org

---

Research Papers

[8] A. B. R. Shatte, D. M. Hutchinson, and S. J. Teague, "Machine learning in mental health: A scoping review of methods and applications," *Psychological Medicine*, vol. 49, no. 9, pp. 1426–1448, 2019.

[9] M. Milne-Ives *et al.*, "Artificial intelligence and machine learning in mobile apps for mental health: A scoping review," *PLOS Digital Health*, 2022.

[10] C. Su, Z. Xu, and F. Wang, "Deep learning in mental health outcome research: A review," *Translational Psychiatry*, vol. 10, 2020.

[11] M. Squires *et al.*, "Deep learning and machine learning in psychiatry: Progress in depression detection and treatment," *Brain Informatics*, 2023.

[12] J. Ehiabhi and H. Wang, "Machine learning models in mental health analysis using biometric signals," *BioMedInformatics*, 2023.

[13] L. Valentine, S. D'Alfonso, and R. Lederman, "Recommender systems for mental health apps: Advantages and challenges," *AI & Society*, 2022.

[14] K. Feng *et al.*, "Comparative study of ML, DL, and LLM models for mental health forecasting," 2026.

[15] L. H. Iwaya *et al.*, "Privacy issues in mental health apps: An empirical study," 2022.