Women's Wellness Guide Using Machine Learning

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***Abstract*—** Women's mental health is a critical yet often overlooked aspect of well-being. In this project, Women's Wellness Guide, we have developed a comprehensive application designed to provide mental health support for women through innovative AI-driven features. Our system integrates machine learning models, utilizing logistic regression for sentiment analysis on journal entries, generating weekly mental health reports based on users' emotional patterns. Additionally, a personalized recommendation system employs decision tree models to provide tailored suggestions based on age group (15–19, 20–24, 25–30), mental state, daily routine, and severity of mental distress. The application incorporates real-time communication via Socket.IO, enabling seamless chat-based support. Furthermore, we offer professional consultation **services** and helpline support to assist users in distress. To enhance mental well-being, our platform provides curated content, including therapeutic music, informative articles, and guided exercises. This integrated approach leverages machine learning and real-time interaction technologies to offer personalized, accessible, and effective mental health support for women.

***Keywords*—** mental health, sentiment analysis, machine learning, logistic regression, decision tree, real-time communication, Socket.IO, consultation, helpline, personalized support, women's well-being.

I. INTRODUCTION

Mental health is an essential component of overall well-being, yet it is often overlooked, especially among women. Despite the increasing awareness of mental health issues, many women still face barriers in seeking help due to societal stigma, lack of awareness, and limited access to personalized mental health resources. Stress, anxiety, depression, and other mental health conditions can significantly impact daily life, relationships, and productivity, making it crucial to develop accessible and effective support systems. Addressing these concerns, we propose Women's Wellness Guide, an AI-driven application designed to provide personalized mental health support through machine learning, sentiment analysis, real-time communication, and recommendation systems.

Our platform aims to empower women by enabling them to track, analyze, and manage their mental well-being efficiently. One of the core functionalities of the system is sentiment analysis, which leverages logistic regression to analyze users' journal entries. By extracting insights from their writing, the system can detect emotional patterns, generating weekly mental health reports that help users monitor their mental state over time. These reports provide valuable feedback, allowing users to reflect on their emotional well-being and take proactive steps toward self-care.

To further enhance mental health management, Women's Wellness Guide incorporates a decision tree-based personalized recommendation system. This system considers key factors such as age group (15–19, 20–24, 25–30), mental state, daily routine, and distress severity to offer tailored recommendations. Whether a user is experiencing mild stress or severe emotional distress, the application suggests suitable interventions, including relaxation techniques, mindfulness exercises, lifestyle adjustments, and professional consultation when necessary.

Recognizing the importance of real-time support, our application integrates Socket.IO-powered chat spaces, allowing users to engage in instant communication with mental health professionals and peer support groups. This feature provides a safe and supportive environment where users can seek guidance, share experiences, and receive immediate emotional support. Additionally, we have incorporated consultation services and helpline support, ensuring that users have access to professional assistance whenever required.

Beyond emotional tracking and consultation, Women's Wellness Guide offers a comprehensive set of well-being resources, including therapeutic music, informative articles, and guided exercises. These resources are curated to promote relaxation, stress management, and self-improvement, fostering a holistic approach to mental health care. By integrating multiple support mechanisms, our platform ensures that users receive both proactive and reactive mental health assistance, bridging the gap between self-care and professional intervention.

II. LITERATURE REVIEW

Verónica Martínez-Borba et al. [1] studied the feasibility and user satisfaction of web-based and mobile platforms for perinatal depression screening via the HappyMom program. With 348 web users and 175 app users, assessments were conducted during pregnancy and postpartum. Web users had higher individual response rates, while app users showed better long-term retention. Both platforms had high satisfaction but faced dropout issues. The study emphasized choosing between web and app based on study goals and audience.

Martínez [2] examined mental health apps' role in improving women's well-being, especially during COVID-19. Analyzing Happify, Shine, Sanvello, and Talkspace, the study found these apps provide real-time monitoring and therapeutic support. While not replacing traditional therapy, they aid psychologists and serve as gateways to further care. The study highlighted their role in reducing stigma and improving mental health awareness.

Namlı et al. [3] investigated the impact of bipolar disorder (BD) on spouses, focusing on sexual functions, alexithymia, marital satisfaction, and perceived burden. The study included 81 BD type 1 patients, their spouses, and 78 healthy controls, assessing them using various psychological scales. Results showed that BD patients and their spouses had lower marital satisfaction and higher sexual dysfunction compared to controls. Regression analysis indicated that alexithymia, depression, and sexual dysfunction influenced marital adjustment in BD patients, while burden and alexithymia affected their spouses' adjustment. The study emphasized the need for psychosocial interventions to support caregivers and improve relationship dynamics. Pinto-Foltz, Hines-Martin, and Logsdon [4] examined adolescent girls' perceptions of peers with depression and its impact on mental health treatment access. Analyzing focus groups, the study found that while girls understood mental health like adults, their emotional responses varied. They shared concerns seen in adults but also unique insights reflecting their development. The study highlighted the need for tailored mental health education to reduce stigma and encourage help-seeking.

M. Klose and F. Jacobi [5] explored gender differences in mental health, highlighting that women experience higher rates of mood and anxiety disorders, while men show higher rates of substance abuse and antisocial disorders. Using a diagnostic interview (CIDI), the research analyzed various sociodemographic factors affecting both genders. It found that factors like employment, social class, and parenthood had different effects on men and women. The study concluded that sociodemographic variables alone do not fully explain the higher prevalence of mental disorders in women, indicating that gender differences in mental health are still not fully understood.

De and Mishra [6] explored the evolution of sentiment analysis and its role in addressing mental health concerns. The study discussed emotion detection through facial expressions and compared existing sentiment analysis technologies. With the rise of social media, large-scale web data now reflects community mental health trends, especially post-COVID-19. The study highlighted sentiment analysis as a tool for understanding mental health issues but acknowledged accuracy challenges in existing algorithms while emphasizing future research opportunities.

Sohal et al. [7] reviewed the impact of journaling on mental health, analyzing 20 randomized controlled trials. The study found that journaling led to a small to moderate improvement in mental health outcomes, particularly for PTSD, anxiety, and depression. However, high data heterogeneity and methodological limitations prevent definitive conclusions. Given its low risk and resource requirement, journaling is suggested as a complementary therapy in primary care, though further research is needed to establish evidence-based guidelines..

McGranahan et al. [8] examined factors affecting the sexual and reproductive health rights (SRHR) of adolescent girls and young women in Ugandan slums. Through focus groups and interviews, the study found that limited access to information, stigma, and confidentiality breaches by duty-bearers hindered SRHR realization. Many relied on informal redress mechanisms due to fear of formal justice. The study highlights the need for targeted interventions, education, and training to improve awareness and support the protection of SRHR.

III. PROPOSED SYSTEM

The *Women's Wellness Guide* is an AI-driven wellness platform designed to provide personalized mental health support for women through sentiment analysis, AI-powered recommendations, real-time communication, and curated self-care content.

The system consists of three key modules:

Module 1: Sentiment Analysis & Mental Health Tracking This module analyzes user journal entries to classify emotions into positive or negative categories using a logistic regression model. Based on the detected sentiment, the system generates weekly emotional trend reports and provides insights into the user's mental well-being.

Key Components:

- Text Processing: Tokenization, stop word removal, and lemmatization for efficient sentiment detection.
- Sentiment Classification: A logistic regression model trained to categorize journal entries as either positive or negative based on linguistic patterns.
- Weekly Mood Reports: Summarizes emotional trends using visual graphs and insights, helping users track their mental state over time.
- Alert System: If consecutive negative entries are detected, the system suggests self-care activities or directs the user to real-time support.

Module 2: AI-Based Personalized Recommendation System This module provides tailored self-care suggestions using a decision tree model based on the user's age, emotional state, daily routine, and distress level.

Key Features:

- User Profiling: Factors like age group (15–19, 20–24, 25–30), sentiment trends, and activity levels influence recommendations.
- Decision Tree-Based Suggestions: Recommends guided breathing exercises, meditation, journaling prompts, relaxation techniques, and mental health resources.
- Adaptive Learning: Over time, the system refines recommendations based on user preferences and engagement.

Module 3: Real-Time Communication & Support System: To provide instant emotional support, the system integrates Socket.IO-powered chat spaces, enabling users to connect with registered users, including peer groups and mental health professionals. Unlike anonymous chats, registered users' names will be visible during conversations.

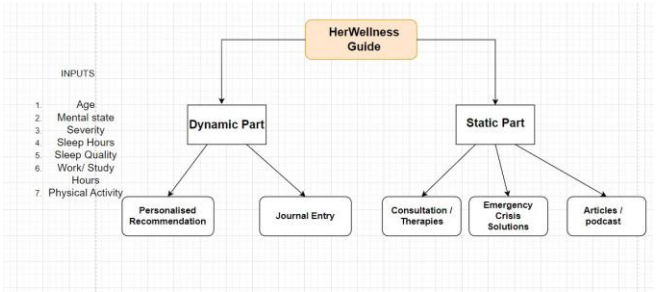
Core Functionalities:

- User-Based Chat System: Enables registered users to engage in discussions with their names displayed, fostering a sense of community and accountability.
- Peer Support Groups: Users can join topic-based discussions and share their experiences.
- Professional Consultation: Direct access to mental health professionals for one-on-one guidance.
- Emergency Help & Crisis Support: The system suggests contacting a helpline if a user exhibits prolonged distress.

Additional Features:

- Curated Self-Care Content: Includes therapeutic music, guided relaxation, informative articles, and breathing exercises.
- User Dashboard: Displays emotional trends, recommendations, and upcoming consultations.

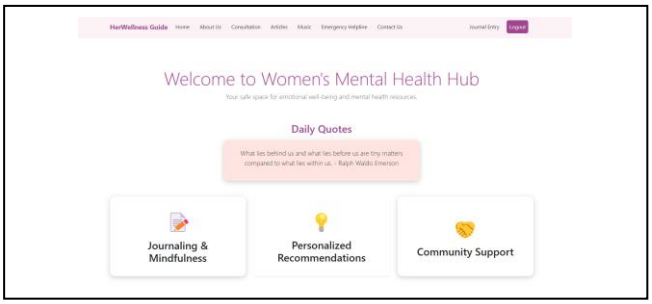
System Workflow:

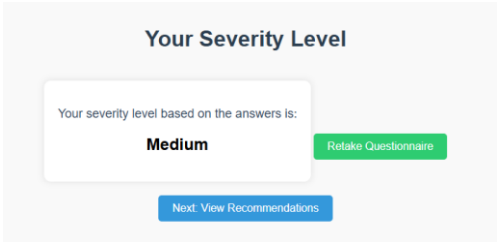


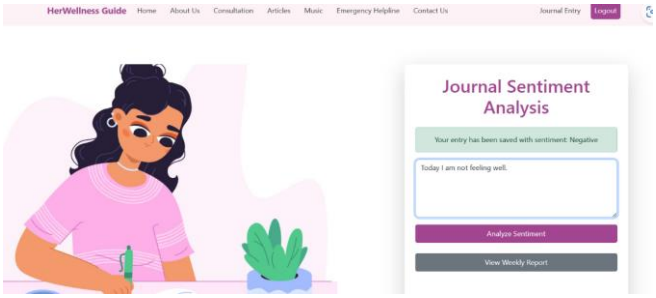
1. User Writes Journal Entry → Sentiment analysis classifies it as positive or negative.
2. Emotional Trends Analyzed → Generates weekly reports based on mood patterns.
3. Decision Tree Matches User Profile & Sentiment → Suggests personalized self-care activities.
4. Registered Users Engage in Real-Time Chat → Connects users with peer support or professionals for guided discussions.
5. Crisis Detection & Alert System → Prompts self-care tips or emergency support in case of prolonged negative sentiment.

By combining machine learning, real-time support, and personalized recommendations, the *Women's Wellness Guide* aims to create a safe, accessible, and stigma-free environment for women to track and enhance their mental well-being.

IV. EXPERIMENTAL RESULTS







Conclusion

This project addresses the critical need for a deeper understanding of women's mental health across various age groups, recognizing that the challenges and needs of women evolve throughout their lives. By utilizing a multifaceted approach that combines data analysis, personalized recommendations, peer support, and technology integration, we aim to provide comprehensive and effective mental health resources tailored to individual experiences. Through sentiment analysis of journal entries, we will uncover emotional patterns that inform our understanding of age-specific mental health issues outcomes but also to contribute to broader societal change regarding women's mental health.

ACKNOWLEDGMENTS

The authors would like to thank their family members and the SIES Management for their support towards the development of the project.

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