

An Efficient Platform to Detect Mental Health Problems using Self-Assessment Tests and Provide Quick Guidance over it

Vedant Kulkarni¹, Sarthak Bhapkar², Sarthak Pawar³, Jayashree Bagade⁴ and Jayesh Waghela⁵

¹⁻⁵Information Technology, Vishwakarma Institute of Information Technology, Kondhwa, India

Email: vedantkulkarni22@gmail.com, sarthak.22220122@viit.ac.in, sarthakvp360@gmail.com, jayashree.bagade@viit.ac.in, jayesh.22110469@viit.ac.in

Abstract— Our project focuses on revolutionizing mental health analysis and support through an innovative platform. With user authentication, individuals access a diverse range of self-assessment tests upon login. These tests generate immediate scores, aiding in the evaluation of mental health status. Leveraging these scores, our system dynamically suggests tailored recommendations of qualified professionals. This streamlined process aims to bridge the gap between individuals seeking mental health support and timely expert guidance, fostering a proactive approach to mental wellness.

Index Terms— Technology, Self-help, Web, Mental health, Mental health analysis, User authentication, Self-assessment tests, Immediate scores, Tailored recommendations, Qualified professionals

I. INTRODUCTION

The burgeoning importance of mental health awareness and the increasing significance of technology in healthcare has led to the development of an innovative project aimed at revolutionizing mental health assessment and guidance. This endeavour seeks to address the pressing need for accessible and user-centric mental health support by creating a comprehensive platform that seamlessly integrates advanced technological tools.

In today's context, where mental health concerns are increasingly recognized, there's a critical need for solutions that empower individuals to actively manage their well-being. This project's core functionality revolves around a user-friendly login system, ensuring both security and confidentiality. Once users access the platform, they encounter an array of meticulously crafted self-assessment tests tailored to evaluate various facets of mental health, such as stress levels, mood patterns, anxiety, and more. The platform's innovative approach offers immediate scores upon test completion, providing users with instant insights into their mental health status. These scores form the foundation for the project's pivotal feature: personalized recommendations of qualified mental health professionals. Leveraging algorithmic matching, the platform dynamically pairs user scores with suitable healthcare experts, ensuring tailored and timely guidance. By seamlessly connecting individuals seeking mental health support with expert advice, this initiative aims to promote proactive mental wellness. Its ultimate goal is to empower individuals by providing easy-to-use self-assessment tools and prompt guidance from healthcare professionals based on their unique mental health scores.

This project underscores the indispensable role of technology in advancing mental health services while emphasizing the critical need for personalized and timely interventions in mental healthcare. Through this integrated platform, it aspires to contribute to a more supportive, accessible, and user-centric approach to mental health assessment and guidance.

II. LITERATURE REVIEW

A. Scientific Study

The following describes several related studies regarding mental health.

a) E. Garcia-Ceja et al (2018), a comprehensive overview of mental health disorders' prevalence and the rising necessity for continuous monitoring. It highlights the potential of Ecological Momentary Assessment (EMA), smartphone, and wearable technologies for real-time mental health tracking. Moreover, it synthesizes previous research, emphasizing the link between physiological/behavioural changes and mood states, advocating for sensor-based monitoring integrated with machine learning for improved mental health assessment.

b) Jetli Chung and Jason Teo et al (2022), critically evaluated existing methodologies, identified gaps, and proposed future research directions. Focusing on supervised and unsupervised learning, ensemble methods, and deep learning, the review analyzes the application of diverse algorithms in mental health prediction across schizophrenia, anxiety, depression, bipolar disorder, PTSD, and children's mental health, assessing their efficacy using metrics like accuracy and AUC. This comprehensive review targets practitioners in both machine learning and mental health communities, emphasizing the potential and limitations of machine learning techniques in this critical domain

c) Hernández-Torrano et al. (2020), It investigates the mental health challenges faced by university students during their transition, emphasizing the strains on mental well-being during this period. It highlights increasing concerns of a "mental health crisis" among higher education students globally, discussing the impact on academic performance and the lack of proportional support services. Employing bibliometric indicators, the study aims to comprehensively map the research trends, scientific collaborations, and thematic areas in mental health and well-being of university students to address the field's diversity and fragmentation, guiding future policy and practice

d) Guo et al. (2022), The research highlights the escalating concern about deteriorating youth mental health, particularly among university students, emphasizing the rise in depression and anxiety rates. It discusses the hesitancy of students to seek help despite mental health issues, underscoring the need for proactive detection systems. The paper proposes a novel framework, CASTLE, utilizing a multimodal approach to fuse diverse data types (such as social relationships, physical appearance, academic performance, and demographics) for accurate mental health detection. It addresses challenges related to data complexity, human bias, and imbalanced datasets while discussing the significance of representation learning and deep neural networks in enhancing detection accuracy.

e) Ariel Soares Teles et al (2017), The research introduces "Situation Manager (SituMan)," a system leveraging sensors and user-defined contexts to address challenges in accurately assessing a patient's mental status and identifying situations impacting their psychological state. SituMan integrates with "MoodBuster," an ecological momentary assessment (EMA) mobile application designed for depression treatment, aiming to prompt self-assessments in contextually relevant situations. This approach facilitates timely responses and consultations with mental health professionals, potentially enhancing treatment effectiveness.

f) Vaishnavi N Jadhav et al. (2022), The provided excerpt in the research describes the significance of mental health in daily life, especially during the pandemic, emphasizing the impact of isolation, frustration, and overthinking on mental well-being. It introduces sentiment analysis as a strategy for understanding user sentiments and emotions, focusing on text data. The research outlines the "Mental Health Tracker" application's key features, including self-monitoring, notifications, recommendations, and privacy.

g) Saroj Sharma et al. (2023), The literature review summarizes the landscape of mental health applications on Android platforms, emphasizing the growing demand and usage of smartphone-based tools for psychological well-being. It highlights the global prevalence of mental health issues, their impact during the pandemic, and the potential of mobile apps in providing accessible mental health support. It discusses the increased interest in mental health applications, citing statistics indicating a rising preference for self-administration and monitoring of mental health using smartphone apps. The review acknowledges the current market trends, predicting sustained popularity for apps addressing anxiety and depression while recognizing the advantages of mobile applications in supplementing traditional therapy.

- h) Shreeya Mayekar et al. (2019), The research emphasizes the importance of technological solutions in the form of mobile apps for mood stabilization, self-assessment, and offering supportive activities like breathing exercises, jokes, and motivational quotes.
- i) K P Mayuri et al. (2017), Research in mental health care leverages SVM, CNN, and EEG signals to predict conditions and stress levels. It emphasizes tech's role in monitoring mental health and enhancing care access. Applications with Logistic Regression, KNN, Decision Trees, and SVM provide tailored interventions and track emotions, showcasing tech's potential in mental health management.
- j) Sunil Kumar et al. (2020), The literature survey explores mental health tracking through cognitive behaviour therapy, assessing emotions via natural language input, and preventing phishing attacks using data analysis. Studies emphasize data science's role in managing public mental health, proposing frameworks for comprehensive data analysis in healthcare. Additionally, research focuses on online mental status examination systems, emphasizing early detection and treatment of mental health issues through technology integration.
- k) Christina Kelley et al. (2017), The literature survey provided in the text highlights the growing field of personal informatics and self-tracking, emphasizing its effectiveness in promoting various health behaviours. It delves specifically into the context of self-tracking in mental health, showcasing prior studies on stress detection through technological means and the challenges unique to monitoring mental wellness.
- l) Cathrin Rohleder et al. (2020), The literature survey in the research paper emphasizes the burden of mental disorders, especially among young individuals, highlighting their early onset and the associated long-term disability. It underscores the necessity for comprehensive approaches that focus on early identification, personalized interventions, and enhanced long-term care strategies to mitigate these challenges
- m) Mark Matthews et al. (2023), The literature surveyed underscores the potential of continuous, unobtrusive sensing to detect changes in mental well-being, offering early warning indicators and personalized micro-interventions. It emphasizes the substantial impact of serious mental illnesses (SMIs) on individuals and society, highlighting the significant burden, costs, and shortened lifespan associated with these conditions.
- n) Nuno Gomes et al (2023), The literature survey includes evaluations of RPM technologies for mental health, indicating varying outcomes for wearables and smartphones in different studies. Smartphone sensing reviews emphasized mental health's prevalence, advocating for standardization and interdisciplinary collaborations for more effective applications.
- o) Ashley Polhemus et al. (2022), study systematically reviewed 26 depression self-management apps, analyzing 783 user reviews between 2018 and 2021, revealing themes related to mental health tracking's impact, app design preferences, and implementation considerations. Analyzing 783 user reviews from 26 depression self-management apps, the study identified themes centered on the impact of mental health tracking, user-driven design preferences, and considerations for app integration within the health ecosystem

B. WEB

The literature review of the aforementioned topic, which focuses on an efficient platform for detecting mental health problems through self-assessment tests and prompt guidance, involves an extensive exploration of existing studies and research in the field of mental health technology. It encompasses a comprehensive analysis of scholarly articles, research papers, and innovative technological solutions.

Existing literature emphasizes the increasing role of technology in addressing mental health challenges, highlighting the significance of user-friendly platforms that provide self-assessment tests. Studies indicate the effectiveness of such platforms in fostering mental health awareness and early detection of psychological issues. Additionally, research underscores the importance of timely guidance and expert recommendations based on test scores to bridge the gap between individuals seeking support and mental health professionals.

Moreover, the literature review reveals the evolving landscape of mental health technologies, incorporating frameworks using React, Node.js, and SQL for creating interactive and efficient platforms. It also delves into the importance of privacy measures, technological integration, and the impact of user-centered design principles in ensuring the confidentiality, usability, and trustworthiness of these platforms.

III. RESEARCH METHODS

A. Self-assessment tests

The website has integrated health assessments to create a self-evaluation platform. It is designed for individuals, with computer skills and internet access. Once users agree to participate they will be presented with a series of

validated tests covering aspects of health such as depression, anxiety, stress and other related factors. The wide range of assessments aims to provide users with an understanding of their well-being.

To ensure consistency and objectivity in scoring established algorithms are applied to each assessment. This enables a quantification of user responses across dimensions of mental health. Users receive feedback that provides a breakdown of their performance on each assessment. If the assessment scores indicate severe levels discreet recommendations are provided on the website for users to consider seeking medical assistance.

The platform also offers access to health resources and support services as part of an all-encompassing approach, to promoting mental well-being. Maintaining security and privacy is of importance, during the implementation process. We have implemented measures in line with data protection regulations to protect user privacy and ensure the confidentiality of assessment results. Ethical considerations are an aspect. We obtained informed consent from all participants. We prioritize anonymity and confidentiality ensuring that participants are well informed about the purpose and implications of their involvement. To ensure accuracy and relevance we have established a quality assurance process for our mental health assessments. Regular reviews and updates are carried out to align with the research findings and all of the better practices of health assessment.

The core of this implementation involves test like DASS and KGV, into the website's framework. These tests are chosen due their proven results and accuracy.

The result conditions for ANXIETY (see Annexure I for the full set of questions for ANXIETY test) test include: ANXIETY-RATING SCALE :-

0 = The individual does not mention experiencing any anxiety during the month.

1= The person reports anxiety within the range of normal fluctuations in mood that most people experience in their daily lives. It is a temporary response to minor life stresses.

2 = The individual mentions anxiety. They can exert some control over their anxiety by redirecting their attention to things although it requires a noticeable and sustained effort. If there are signs of motor tension or brief autonomic hyperactivity they accompany the anxiety.

3 = Marked anxiety is reported by the person. When this occurs they have no control, over their attention. Cannot shift it to other matters even with a distinct and sustained effort. The presence of at least one persistent sign of notable motor tension or autonomic hyperactivity accompanies the anxiety. This form of anxiety has been experienced on a few days in the past month.

4 = Severe anxiety is reported by the individual. When anxiety strikes individuals often find themselves unable to regain control or redirect their attention no matter how hard they try.

The result conditions for DEPRESSION (see Annexure II for the full set of questions for the DEPRESSION test) test include: The rating scale for depression is as follows;

0 = The person does not report any depression in the month.

1 = The person reports depression, which falls within the normal range of mood fluctuations experienced by most individuals in their daily lives. It is a temporary reaction to minor life stresses.

2 = The person reports depression. They still have some ability to manage their feelings and can alleviate or reduce them by redirecting their attention although it requires a noticeable and sustained effort. If there are any symptoms present they are very mild or infrequent.

3 = The person reports depression. When this level of depression occurs they have no control over it. They cannot shift their focus to other things even when making a distinct and continuous effort.

4 = The person reports depression. When this level of depression occurs they have no control, over it. They cannot shift their focus to other things even when making a distinct and continuous effort. There should be the presence of at least one biological symptom of depression and, at least one indication of severe depression.

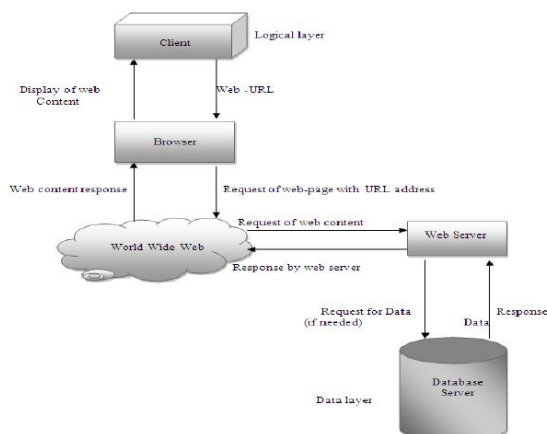
B. Architecture

The following Picture 1 is a diagram of the system architecture.

Client-server architecture is the backbone of today's web applications, enabling seamless interaction between users and remote servers. In this setup, users (clients) access services through web browsers, while servers handle requests, process data, and deliver information

This architecture operates on a request-response model: users request information via their browsers, servers process these requests and then send back the necessary data. Communication occurs through standardized protocols like HTTP, allowing browsers to fetch web pages or submit forms, while servers process these requests and deliver the right content. This system maintains state across interactions, ensuring a smoother user experience, even though each interaction is independent.

Essentially, client-server architecture streamlines how we access and interact with web-based services. It's what allows us to browse the internet, access databases, and use online applications seamlessly. Plus, it's scalable, letting multiple users connect to a single server or a network of servers, making it adaptable to varying levels of demand and user traffic on the web.



Picture 1 System Architecture

IV. RESULTS AND DISCUSSION

The platform was tested with 20 people from a wide range of age [17-50], gender, and socioeconomic backgrounds. The platform was easy to use and 100% of participants found it easy to use. The various accessibility options made it easier for people to use the platform across different demographics.

The self-assessment tools used within the platform received positive feedback, 95% of users acknowledged the tool's effectiveness in evaluating different aspects of their mental health. The results showed an 80% percentage of people with increased awareness of their mental health or identification of common mental health issues.

The majority of participants provided helpful recommendations, such as interface improvements or additional features that could improve the usability and effectiveness of the platform. The majority of people who received recommendations were satisfied with the guidance they received.

Below are the results of the ANXIETY test we performed on 20 people:

Candidate	Age	Gender	Result
1	20	M	Severe
2	20	F	Normal
3	19	M	High
4	18	M	High
5	21	M	Severe
6	17	M	Mild
7	35	M	Normal
8	32	F	Normal
9	18	M	High
10	45	F	Mild
11	32	F	Normal
12	19	F	High
13	20	M	Severe
14	23	F	High
15	20	M	Severe
16	20	F	High
17	23	M	Mild
18	30	F	Normal
19	35	F	High
20	40	M	Normal

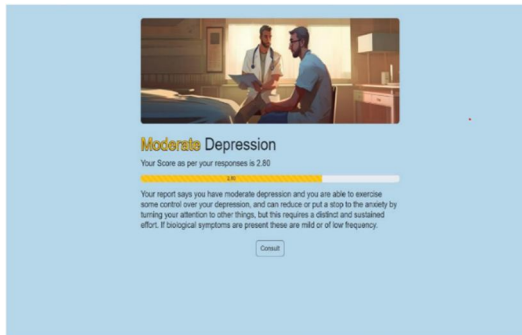
The screenshot shows a web-based questionnaire titled "Anxiety Test". It includes instructions: "Use options as a scale from 0 to 4" and "The extra details you write in the text area below each question regarding that question will not directly affect your score but the information can be taken into consideration by the doctor which you consult if needed." The first question is "Q1: Have you worried a lot in the last month?" with radio button options 0, 1, 2, 3, and 4. Option 1 is selected. Below the question is a text area for additional details. Further down, there are more questions and text areas, including "What do you worry about?", "What is it like when you worry?", "Do unpleasant thoughts constantly go round and round in your mind?", "Can you stop them by turning your attention to something else?", and "How often have you worried like this in the last month?".

Picture 2 Questionnaire

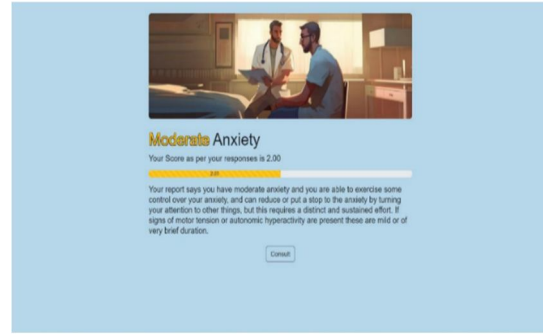
The following Picture 2 is the questionnaire for the tests

The following Picture 3 is the result screen of the depression test

The following Picture 4 is the result screen of the anxiety test



Picture 3 Depression test result screen



Picture 4 Anxiety test result screen

V. CONCLUSION

In conclusion, the development and implementation of this Mental Self-Assessment Platform offer significant potential to foster mental health awareness and early intervention. The platform provides accessible and user-friendly mental health assessments, enabling individuals to self-assess their mental well-being conveniently. Additionally, the platform's capability to suggest professional assistance for severe mental health concerns enhances its value as an aid in timely intervention. The data collected from the platform's usage presents an opportunity for further analysis to understand prevalent mental health trends and improve mental health services. The continuous evolution and refinement of this platform are crucial, emphasizing user privacy, data security, and ongoing collaboration with mental health professionals. As the platform continues to grow, its contributions to mental health awareness and early intervention are anticipated to make a substantial impact on individual well-being and societal mental health as a whole.

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