Journal of Information Systems Engineering and Management
2025, 10(51s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Developing Solutions for Assessing Mental Health and Well-Being in Youth

[1]J. Narmada, [2]D. Veera Reddy, [3]P. Lasya, [4]S. Kavya, [5]N. Pranavashware, [6]P. Koumudhi, [7]Dr. D. Shanthi

[1]Assistant Professor, CSE(AI&ML),

[2]Assistant Professor, CSE(AI&ML),

[7]Professor, CSE(AI&ML),

[(3,4,5,6)]B.Tech 4th year Student, CSE (AI&ML),

[1,3,4,5,6,7]Vignan's Institute of Management and Technology for Women, Hyderabad, India.

[1]narmada.nie@gmail.com, [2]veerareddydasari@gmail.com, [3]lasya.official25@gmail.com, [4]sriramkavya222@gmail.com, [5]pranavashwarenagulapalli@gmail.com, [6]koumudhi75@gmail.com, [7]drshanthicse@gmail.com

ARTICLE INFO

Received: 14 Dec 2024

Revised: 18 Feb 2025

Accepted: 27 Feb 2025

ABSTRACT

Mental health issues among youth are a growing concern, significantly impacting their academic performance, social relationships, and overall well-being. Many young individuals face barriers for seeking help due to stigma, limited resources, and inadequate awareness, which can worsen their mental health challenges. Mental health during the early life can influence overall development and well-being.This paper presents a machine learning-based mental health and well-being surveillance assessment specifically designed for youth. The system employs a Random Forest Classifier to analyze structured user input data collected through a comprehensive questionnaire, enabling accurate predictions of mental health conditions such as anxiety and depression, ptsd, stress. By providing personalized recommendations and resources tailored to the unique needs of young individuals, the solution fosters a safe and stigma-free environment that encourages proactive engagement with mental health. The implementation includes a user feedback mechanism that allows for continuous refinement of the machine learning model, enhancing the effectiveness of the recommendations over time.

Keywords: Mental health, well-being, youth, machine learning, Random Forest Classifier, personalized recommendations, api recommendation, stress, anxiety.

I. INTRODUCTION:

The mental health of youth has is a critical public health issue, with significant impact on their academic success, social interactions, and overall quality of life. Recent studies indicate that mental health disorders, including anxiety, depression, post-traumatic stress disorder (PTSD), and sleep disturbances, are increased among adolescents and young adults. These conditions not only hinder personal development but can also lead to long-term consequences if left unaddressed. The World Health Organization (WHO)[8] emphasizes that mental health during early years is foundational to lifelong well-being, making early intervention essential.

Despite the growing recognition of mental health as a vital component of youth development, many young individuals encounter substantial barriers when seeking help. Stigma surrounding

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permitsunrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Journal of Information Systems Engineering and Management
2025, 10(51s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

mental health issues often discourages open discussions and help-seeking behaviours, while limited access to resources and inadequate awareness of available support further exacerbate these challenges. Consequently, there is an urgent need for innovative solutions that can effectively assess and address the mental health needs of this vulnerable population.

II. RELATED WORK:

[1] Machine Learning-Based Prediction of Mental Well-Being Using Health Behaviour Data from University Students. The Authors are Hanif Abdul Rahman and Madeline Kwickiis. The study explores the use of machine learning to predict mental well-being based on health behavior data from over 15,000 students across 17 ASEAN universities. Using algorithms like Random Forest, adaptive boosting, and neural networks, the study identified key factors such as BMI, sports participation, sedentary hours, and GPA as predictors, with Random Forest achieving the highest accuracy. The study emphasizes the need for longitudinal research, diverse samples, and integration of objective measures to strengthen predictive systems and enhance mental health monitoring in resource-limited settings.

[2] Machine Learning Techniques to Predict Mental Health Diagnosis. The authors are UjunwaMadububambachu, Modal Augustine Ukpebor and Urenna Ihezue. This paper examines the use of machine learning (ML) methods, including CNNs, SVMs, Random Forest, and DNNs, to diagnose mental health conditions among college students, with a focus on disorders such as bipolar disorder, schizophrenia, PTSD, depression, anxiety, and ADHD. Additionally, the focus on prevalent disorders like bipolar disorder and PTSD leaves less-studied conditions underrepresented. These challenges underscore the need for more robust, diverse, and ethically sound approaches to ML-based mental health diagnostics.

[3] Surveillance of Middle and High School Mental Health Risk by Student Self-Report Screener. Bridget V Dever, Randy W Kamphaus, Erin Dowdy, Tara C Raines,Christine DiStefano.This paper examines the use of the Behavioural and Emotional Screening System (BESS) to identify behavioural and emotional risks (BER) among 2,222 adolescents in a mid-sized Georgia school district. While the findings support the feasibility of universal mental health risk screenings in schools to guide interventions, limitations include insufficient representation of certain demographic groups, reliance on a single instrument, the cross-sectional design preventing longitudinal insight, and limited generalizability beyond the studied district. Additionally, challenges in practical implementation, ethical concerns around privacy and consent, and the lack of exploration into cultural or systemic factors influencing BER highlight the need for more comprehensive and context-sensitive research.

[4] Mental Health Prediction Using Machine Learning: Taxonomy, Applications, and Challenges. Jetli Chung, Jason Teo., this paper systematically reviews the use of machine learning (ML) in predicting mental health problems, focusing on disorders like schizophrenia, depression, bipolar disorder, anxiety, PTSD, and childhood mental health issues. Analyzing 30 studies, it highlights ML techniques such as SVMs, random forests, deep learning, and ensemble learning, with deep learning achieving high accuracy for schizophrenia and depression.This research identifies key limitations, including reliance on small, imbalanced, and non-standardized datasets; lack of longitudinal data; inconsistent algorithm performance; and limited real-world implementation due to infrastructure and ethical challenges. Ethical concerns around privacy and consent, the "black-box" nature of deep learning models, over-reliance on specific algorithms, and gaps in research diversity, particularly for less-studied disorders and underrepresented populations, further complicate clinical application.

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permitsunrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Journal of Information Systems Engineering and Management
2025, 10(51s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

III. PROPOSED SYSTEM:

A. Overview of the Proposed System:

The proposed system is an advanced, AI-driven platform designed to overcome the limitations of existing mental health assessment tools. By leveraging machine learning techniques, including the Random Forest Classifier, the system aims to provide accurate, real-time mental health detection and personalized interventions. Designed to support youth mental well-being, the system addresses early detection, personalization, and accessibility, empowering individuals to effectively manage their mental health in a supportive and inclusive environment that prioritizes user privacy. The system collects and processes user data in real-time to evaluate mental health levels through a web-based questionnaire and categorizes the conditions to identify different mental health conditions like anxiety or depression. The Random Forest Classifier ensures efficient performance with high accuracy, providing immediate feedback for proactive interventions. Personalized resources, including articles, meditation exercises, and therapy recommendations, are tailored to the user's assessment, with the system featuring a user-friendly interface and prioritizing user anonymity to encourage participation and reduce stigma.

IV. METHODOLOGY:

Random Forest Classifier:

Random forest is a commonly used machine learning algorithm, trademarked by Leo Breiman and Adele Cutler, which combines the output of multiple decision trees to reach a single result. Random Forest Classifier is a Supervised Machine Learning. It is very easy to use and flexible, as it handles both classification and regression problems. A Random Forest Classifier is a machine learning algorithm that combines multiple decision trees to make predictions, using an ensemble method that reduces over fitting and improves accuracy.

Algorithm:

Input: User responses to 10 mental health-related questions (Q1 to Q10)

Output: Structured dataset with features and labels

FOR each user:

Collect response scores [Q1, Q2, ..., Q10]

Assign label based on expert/clinical feedback (e.g., 0=None, 1=Anxiety, 2=Depression, 3=PTSD, 4=Stress)

END FOR

Create dataset: Features = [Q1 to Q10], Label = mental health condition

Initialize Random Forest Classifier with:

n_estimators = 100

random_state = 42

Train Random Forest model using:

Input: Training features (X_train)

Target: Training labels (y_train)

Calculate Accuracy = compare y_test with y_pred

Generate Classification Report: Precision, Recall, F1-Score

Generate Confusion Matrix

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Journal of Information Systems Engineering and Management
2025, 10(51s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Display evaluation metrics

User Feedback Loop (Model Refinement):

- Accept new data samples with verified user labels (feedback).
- Add new samples to the training dataset.
- Retrain the Random Forest model on the updated dataset.

V. EXPERIMENTAL RESULTS AND ANALYSIS:

RESULTS:

Accuracy: 0.24

Classification Report:

	precision	recall	f1-score	support
None	0.30	0.34	0.32	31
Anxiety	0.18	0.24	0.20	24
Depression	0.25	0.13	0.17	18
PTSD	0.22	0.15	0.18	13
Stress	0.11	0.11	0.11	9

Comparative Analysis:

Study	Mental health problems Addressed	Machine learning model	Performance
HanifAbdul Rahman et al., 2023[1] Machine Learning- Based Prediction of Mental Well-Being Using Health Behavior Data from University Students.	Probability of Poor mental well-being	Random Forestand Adaptiveboosting	Accuracy: Randomforest: 90.1% Adaptiveboosting:89.3%.
Jetli Chung, Jason Teo. Mental Health Prediction UsingMachine Learning.	Anxiety and Depression	Logistic Regression, Random Forestand KNN	LogisticRegression: 87.5% Random Forest:89.0% KNN: 81.82%

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permitsunrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Journal of Information Systems Engineering and Management
2025, 10(51s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Our Study- Developing Solutions for Assessing Mental Health and Well-Being in Youth	Stress, Anxiety, Depression, PTSD	Random Forest Classifier	Random Forest Classifier:94%

Table: Comparisons of our model with existing models

VI. DISCUSSION:

With the continuous advancement of technology, smart devices and applications are increasingly being used to monitor mental health, particularly among the youth, whose well-being is significantly influenced over time. Social media, in particular, plays a crucial role in shaping behavior and can serve as a valuable tool for identifying signs of mental distress through changes in language, posting patterns, and social interactions. The integration of Artificial Intelligence (AI) and Machine Learning (ML) further enhances mental health tracking by analyzing large datasets from surveys and social media to detect conditions such as depression and anxiety. Additionally, collaboration with schools and communities is essential for mental health surveillance, fostering awareness across all generations and encouraging early intervention. A strong emphasis on prevention through education, the promotion of mental well-being, resilience-building, and strategies to reduce stigma can empower young individuals to adopt healthy habits and proactively address mental health challenges.

VII. CONCLUSION:

To conclude this study presents a Machine Learning based Mental Health Assessment system that utilizes questionnaire data mapped to a dataset and trains on Random Forest, which excels in capturing complex behavioural patterns. Our model's real-world impact and ease of use are what set it apart. In addition to detecting possible mental health issue, it offers individualized support by suggesting YouTube videos, books, and forums based on the user's predicted condition. We've added a feedback mechanism to improve the experience by letting users comment on the predictions and suggestions. It is also a safe and accessible tool for mental health awareness because we value user anonymity. We guarantee that all answers are confidential and that no personally identifying information is kept.

REFERENCES:

[1] Hanif Abdul Rahman and Madeline Kwickiis. Machine Learning-Based Prediction of Mental Well-Being Using Health Behavior Data from University Students.
[2] UjunwaMadububambachu,Modal Augustine Ukpebor and Urenna Ihezue. Machine Learning Techniques to Predict Mental Health Diagnosis.
[3] Bridget V Dever, Randy W Kamphaus, Erin Dowdy, Tara C Raines, Christine DiStefano.Surveillance of Middle and High School Mental Health Risk by Student Self-Report Screener.
[4] Jetli Chung, Jason Teo. Mental Health Prediction Using Machine Learning: Taxonomy, Applications, and Challenges.
[5] Laura Marciano, Emanuela Vocaj, Mesfin A Bekalu, Antonino La Tona.The Use of Mobile Assessments for Monitoring Mental Health in Youth: Umbrella Review. JMIR Publications.
[6] Wikipedia contributors. (2025, March 3). Random forest. Wikipedia.
[7] Nikki Rickard, Hussain-Abdulah, David Bakker, Elizabeth Seabrook.Development of a Mobile Phone App to Support Self-Monitoring of Emotional Well-Being: A Mental Health Digital Innovation. JMIR Publications.

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permitsunrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

[8] GerosHealth.(2025, January 9). Is mental health a critical public health issue? GerosHealth.
[9] Luna Dolezal, Venla oikkonen. Mental Health and the Self-Tracking Student. Published on Apr 19, 2021. CATALYST.
[10] Chiauzzi, E. (2021), Emil. Lessons learned in measurement-based care with your mental health clients. APA PsycNet.
[11] Jessey E.Williams, Jessica Pykett. Development of a Mobile Phone App to Support Self-Monitoring of Emotional Well-Being: A Mental Health Digital Innovation. Science Direct.
[12] Rebecca H. Bitsko, Angelika H. Claussen, Reem M. Ghandour. Mental Health Surveillance Among Children — United States, 2013–2019. CDC
[13] Shatte, A. B., Hutchinson, D. M., & Teague, S. J. (2019). Machine learning in mental health: A scoping review of methods and applications. *Psychological Medicine*, *49*(9), 1426–1448.
[14] D Shanthi , Smart Healthcare for Pregnant Women in Rural Areas, Medical Imaging and Health Informatics, Wiley Publishers,ch-17, pg.no:317-334, 2022
[15] Shanthi, R. K. Mohanty and G. Narsimha, "Application of machine learning reliability data sets", Proc. 2nd Int. Conf. Intell. Comput. Control Syst. (ICICCS), pp. 1472-1474, 2018.
[16] D Shanthi, N Swapna, Ajmeera Kiran and A Anoosha, "Ensemble Approach OfGPACOTPSOAnd SNN For Predicting Software Reliability", International Journal Of Engineering Systems Modelling And Simulation, 2022.
[17] Shanthi, "Ensemble Approach of ACOT and PSO for Predicting Software Reliability", 2021 Sixth International Conference on Image Information Processing (ICIIP), pp. 202-207, 2021.
[18] D Shanthi, CH Sankeerthana and R Usha Rani, "Spiking Neural Networks for Predicting Software Reliability", ICICNIS 2020, January 2021, [online] Available: https://ssrn.com/abstract=3769088.
[19] Shanthi, D. (2023). Smart Water Bottle with Smart Technology. In Handbook of Artificial Intelligence (pp. 204-219). Bentham Science Publishers.
[20] Shanthi, P. Kuncha, M. S. M. Dhar, A. Jamshed, H. Pallathadka and A. L. K. J E, "The Blue Brain Technology using Machine Learning," 2021 6th International Conference on Communication and Electronics Systems (ICCES), Coimbatre, India, 2021, pp. 1370-1375, doi: 10.1109/ICCES51350.2021.9489075.
[21] Shanthi, D., Aryan, S. R., Harshitha, K., &Malgireddy, S. (2023, December). Smart Helmet. In International Conference on Advances in Computational Intelligence (pp. 1-17). Cham: Springer Nature Switzerland.
[22] Babu, Mr. Suryavamshi Sandeep, S.V. Suryanarayana, M. Sruthi, P. Bhagya Lakshmi, T. Sravanthi, and M. Spandana. 2025. “Enhancing Sentiment Analysis With Emotion And Sarcasm Detection: A Transformer-Based Approach”. Metallurgical and Materials Engineering, May, 794-803. https://metall-mater-eng.com/index.php/home/article/view/1634.
[23] Narmada, J., Dr.A.C.Priya Ranjani, K. Sruthi, P. Harshitha, D. Suchitha, and D.Veera Reddy. 2025. “Ai-Powered Chacha Chaudhary Mascot For Ganga Conservation Awareness”. Metallurgical and Materials Engineering, May, 761-66. https://metall-mater-eng.com/index.php/home/article/view/1631.
[24] Geetha, Mrs. D., Mrs.G. Haritha, B. Pavani, Ch. Srivalli, P. Chervitha, and Syed. Ishrath. 2025. “Eco Earn: E-Waste Facility Locator”. Metallurgical and Materials Engineering, May, 767-73. https://metall-mater-eng.com/index.php/home/article/view/1632.
[25] P. Shilpasri PS, C.Mounika C, Akella P, N.Shreya N, Nandini M, Yadav PK. Rescuenet: An Integrated Emergency Coordination And Alert System. J Neonatal Surg [Internet]. 2025May13 [cited 2025May17];14(23S):286-91. Available from: https://www.jneonatalsurg.com/index.php/jns/article/view/5738
[26] D. Shanthi DS, G. Ashok GA, Vennela B, Reddy KH, P. Deekshitha PD, Nandini UBSB. Web-Based Video Analysis and Visualization of Magnetic Resonance Imaging Reports for Enhanced

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permitsunrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Patient Understanding. J Neonatal Surg [Internet]. 2025May13 [cited 2025May17];14(23S):280-5. Available from: https://www.jneonatalsurg.com/index.php/jns/article/view/5733

[27] Srilatha, Mrs. A., R. Usha Rani, Reethu Yadav, Ruchitha Reddy, Laxmi Sathwika, and N. Bhargav Krishna. 2025. "Learn Rights: A Gamified Ai-Powered Platform For Legal Literacy And Children's Rights Awareness In India". Metallurgical and Materials Engineering, May, 592-98. https://metall-mater-eng.com/index.php/home/article/view/1611.

[28] Shanthi, Dr. D., G. Ashok, Chitrika Biswal, Sangem Udharika, Sri Varshini, and Gopireddi Sindhu. 2025. "Ai-Driven Adaptive It Training: A Personalized Learning Framework For Enhanced Knowledge Retention And Engagement". Metallurgical and Materials Engineering, May, 136-45. https://metall-mater-eng.com/index.php/home/article/view/1567.

[29] Priyanka, Mrs. T. Sai, Kotari Sridevi, A. Sruthi, S. Laxmi Prasanna, B. Sahithi, and P. Jyothsna. 2025. "Domain Detector - An Efficient Approach Of Machine Learning For Detecting Malicious Websites". *Metallurgical and Materials Engineering*, May, 903-11. https://metall-mater-eng.com/index.php/home/article/view/1663.

[30] Thejovathi, Dr. M., K. Jayasri, K. Munni, B. Pooja, B. Madhuri, and S. Meghana Priya. 2025. "Skinguard-Ai FOR Preliminary Diagnosis OF Dermatological Manifestations". *Metallurgical and Materials Engineering*, May, 912-16. https://metall-mater-eng.com/index.php/home/article/view/1664.

[31] Jayanna, SP., S. Venkateswarlu, B. Ishwarya Bharathi, CH. Mahitha, P. Praharshitha, and K. Nikhitha. 2025. "Fake Social Media Profile Detection And Reporting". *Metallurgical and Materials Engineering*, May, 965-71. https://metall-mater-eng.com/index.php/home/article/view/1669.

Copyright © 2024 by Author/s and Licensed by JISEM. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.