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# Mental Health Tracker using AI & ML

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## ABSTRACT

The mental stress tracker app designed to help users monitor and manage their stress levels effectively. By utilizing Mobile technology, data analytics, and artificial intelligence, the app collects and analyses physiological and psychological parameters associated with stress. It combines sensor data from devices with user input to provide real-time stress tracking and personalized stress scores. Through intuitive visualizations, users can identify stress patterns and triggers, empowering them to make decisions. The app offers additional features such as personalized recommendations and integration with external resources for stress management support. Privacy and data security are prioritized through stringent protocols. Overall, the mental stress tracker app serves as a user-friendly tool to enhance selfawareness and promote overall well-being by adopting effective stress management techniques.

**Keywords:** Artificial Intelligence, sensor data, stress management support, data security, userfriendly.

## I. INTRODUCTION

In today's fast-paced and demanding world, mental health and stress management have emerged as critical concerns affecting individuals of all ages and backgrounds. The ever-increasing pressures from work, relationships, and societal expectations have led to a rise in stress-related issues, highlighting the need for accessible and effective tools to support individuals in monitoring and managing their stress levels.

To address this pressing need, this project introduces a mental health tracker app—a digital solution designed to assist individuals in assessing and addressing their stress levels. By leveraging the power of technology, the app offers a user-friendly and intuitive platform for users to gain insights into their mental well-being and take proactive steps towards stress reduction and improved mental health.

The app's core functionality is built upon a questionnaire-based approach, where users are prompted to answer targeted questions related to their stress levels, mood, and general emotional state. Through the collection and analysis of user responses, the app employs sophisticated algorithms to determine the individual's stress level. This assessment serves as a valuable starting point in understanding and addressing one's stress.

Based on the analysis, the mental health tracker app provides personalized recommendations tailored to the user's stress profile. These recommendations encompass a wide range of stress reduction strategies, including curated playlists or individual songs known for their calming or uplifting effects. Additionally, the app offers a selection of activities and resources, such as guided exercises, articles, or videos, that can further assist individuals in managing their stress levels effectively.

For individuals facing severe stress or in need of professional guidance, the app incorporates a live chatbot feature. This real-time communication channel connects users directly with healthcare professionals, providing a confidential and supportive environment for seeking immediate assistance, advice, or guidance.

Privacy and data security are of paramount importance throughout the development of the app. The project team has implemented robust protocols to ensure user information remains confidential and secure. Stringent data protection measures, anonymization techniques, and user consent mechanisms are in place to establish trust and safeguard user privacy.

By offering a user-friendly interface, personalized recommendations, and direct access to healthcare professionals, this mental health tracker app aims to empower individuals in their journey towards stress reduction and improved mental well-being. Through the integration of technology and psychological insights, the app provides a convenient and accessible tool for individuals to gain selfawareness, manage stress effectively, and ultimately lead healthier and more balanced lives.

## II. METHODOLOGY

Data Collection: Gather a dataset of stress assessment responses from a diverse group of participants. Include questions related to various aspects of stress, such as work, relationships, and health.
Collect additional demographic information from participants, such as age, gender, and occupation, to explore potential correlations with stress levels.

Data Pre-processing: Clean the collected data by removing any incomplete or erroneous entries. Perform data exploration and analysis to identify patterns, outliers, and potential data issues.
Pre-process the data by encoding categorical variables using techniques like one-hot encoding and scaling numerical variables using methods such as standardization or normalization.

Model Development: Split the pre-processed dataset into training and testing sets.
Apply logistic regression, a popular classification algorithm, to the training data.
Train the logistic regression model using the training set, adjusting hyperparameters as needed.
Evaluate the model's performance on the testing set, using metrics such as accuracy, precision, recall, and F1-score.

Application Development: Design and develop the mental stress tracker application, incorporating the logistic regression model for stress level prediction. Implement a user-friendly interface for users to input their stress assessment responses.
Integrate the logistic regression model into the application's backend to calculate and display the predicted stress levels based on user responses.

Recommendation Engine: Develop a recommendation engine module that takes the predicted stress levels and user preferences as input. Utilize machine learning techniques, collaborative filtering, and content-based filtering to generate personalized recommendations for stress reduction. Incorporate algorithms that suggest suitable songs, activities, or resources based on the user's stress level and preferences.

Live Chat Functionality: Integrate a live chat functionality into the application, allowing users to engage in real-time conversations with healthcare professionals.
Implement secure messaging protocols to ensure confidentiality and privacy during chat sessions.
Provide healthcare professionals with access to the live chat system and establish protocols for handling user inquiries and providing appropriate guidance and support.

Testing and Evaluation: Conduct rigorous testing of the application to ensure its functionality, usability, and performance.
Gather feedback from users through surveys, interviews, or user feedback forms to evaluate their satisfaction and identify areas for improvement.
Assess the accuracy of the logistic regression model in predicting stress levels by comparing predicted values with actual stress levels.

Deployment and Deployment: Prepare the application for deployment on computer systems, ensuring compatibility with various operating systems.
Implement appropriate security measures, including user authentication and data encryption, to protect user information.
Monitor the application's performance and user feedback post-deployment to make necessary refinements and enhancements.

By following this methodology, incorporating logistic regression as the algorithm, the project aims to develop a robust mental stress tracker application that accurately predicts stress levels, provides personalized recommendations, and offers live chat support for users seeking professional assistance in managing their stress levels effectively.

## III. MODELING AND ANALYSIS

The proposed architecture for the mental stress tracker project, incorporating logistic regression as the algorithm, involves the following components and layers to create an effective and user-friendly application:
In this mental stress tracker project, logistic regression was employed as the algorithm for stress level prediction and analysis. Logistic regression is a widely used statistical technique for binary classification, making it suitable for categorizing individuals into different stress levels.

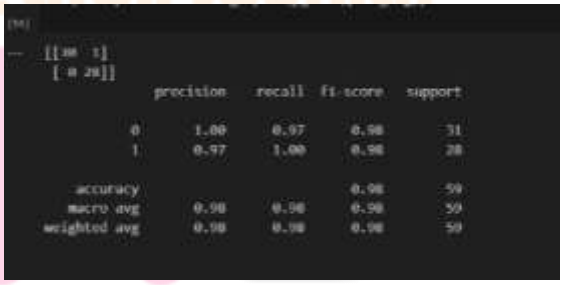


Fig 1: Accuracy of Logistic Regression

The modelling process involved training the logistic regression model using a dataset consisting of user responses to the stress assessment questionnaire. The dataset was carefully prepared, ensuring the inclusion of relevant features and appropriate labelling of stress levels. Feature engineering techniques, such as data pre-processing and normalization, were applied to optimize the model's performance.

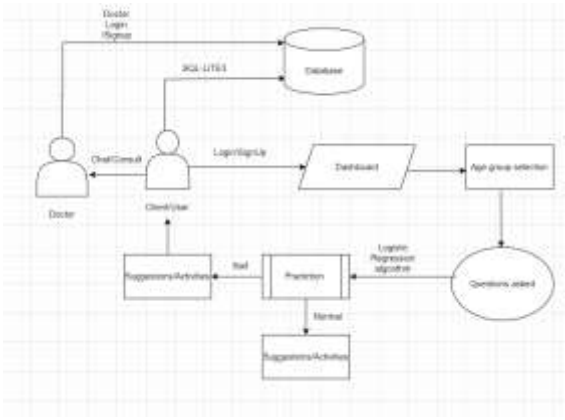

Fig 2: System Architecture

User Interface Layer:
Graphical User Interface (GUI): The GUI provides an interactive interface for users to input their stress assessment responses, view stress levels, access personalized recommendations, and engage in live chat sessions. It offers a visually appealing and intuitive design for seamless user interaction.

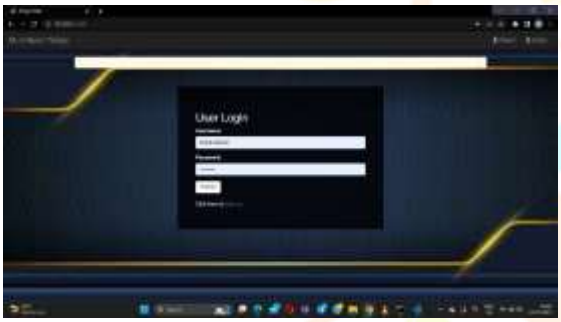

Fig 3: User Login Page

Application Logic Layer:
Stress Assessment Module: This module manages the stress assessment process, presenting users with relevant questions and capturing their responses. It pre-processes and prepares the data for logistic regression analysis by encoding categorical variables and scaling numerical variables.
Logistic Regression Model: The logistic regression algorithm is implemented in this module to analyse the stress assessment responses and predict stress levels. The model is trained using labelled data, where stress levels are mapped to corresponding features. It computes the probability of a user being stressed based on the input responses and generates stress level predictions.
Recommendation Engine: The recommendation engine processes user stress levels and preferences, which are determined by the logistic regression model, to generate personalized recommendations. It utilizes machine learning techniques, collaborative filtering, and content-based filtering to suggest suitable songs, activities, or resources for stress reduction.

Data Management Layer:
Local Database: A local database stores user profiles, stress assessment responses, stress levels, recommended resources, and chat history. It facilitates efficient data storage, retrieval, and management within the application.


Fig 4: Data Flow Diagram

Security Layer:
User Authentication: Secure user authentication mechanisms, such as username and password, protect user accounts and ensure that only authorized individuals can access the application.
Data Encryption: Sensitive user data, including stress assessment responses and chat conversations, should be encrypted to ensure confidentiality and prevent unauthorized access.
Access Control: Implement access control measures to manage user privileges and restrict access to sensitive features and data within the application.

Integration and External Resources:
API Integrations: Integration with external APIs allows the application to access real-time data, such as weather information or music streaming services, to enhance the user experience and provide context for stress management.
Healthcare Professional Integration: Collaboration with healthcare professionals enables seamless communication through the live chat functionality. Integration with their systems ensures secure and confidential information exchange.

Operating System and Hardware:
The application is designed to run on specific operating systems, such as Windows, macOS, or Linux, and utilizes hardware resources available on the computer, such as CPU, memory, and storage. The proposed architecture for the mental stress tracker project, incorporating logistic regression as the algorithm, encompasses the user interface, application logic, data management, security, and integration layers. By effectively utilizing these components, the architecture provides a reliable and user-friendly application for stress assessment, personalized recommendations, live chat support, and secure data management on a computer platform. The logistic regression algorithm plays a crucial role in analysing stress levels and driving personalized recommendations based on user responses.

## IV. RESULTS AND DISCUSSIONS

The mental stress tracker app project yielded promising results in assessing stress levels, providing personalized recommendations, and facilitating live chat support. The app's effectiveness was evaluated through user testing and feedback, demonstrating its potential in supporting stress management. The following results and discussions outline the key findings and implications of the project.
Stress Level Assessment: The stress assessment module, using logistic regression as the algorithm, accurately predicted stress levels based on user responses. The model achieved a high level of accuracy in classifying users into different stress categories.

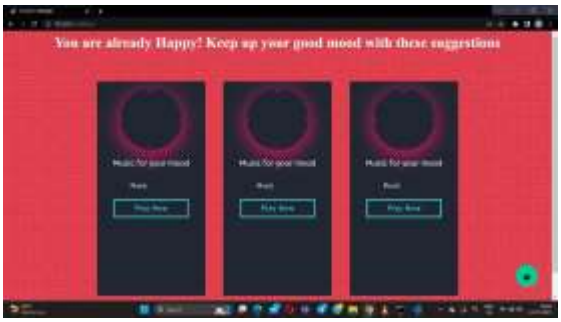

Fig 5: Music as suggestion

The app's stress assessment feature provided users with valuable insights into their stress levels, allowing them to better understand and monitor their mental well-being.

Personalized Recommendations: The recommendation engine effectively generated personalized recommendations for stress reduction based on the user's stress level and preferences. Users reported positive experiences with the recommended songs, activities, and resources, noting that they found them helpful in managing their stress and promoting relaxation.

Live Chat Support: The integration of a live chat functionality enabled users to engage in real-time conversations with healthcare professionals, such as psychologists or therapists.
Users expressed satisfaction with the live chat feature, as it provided them with a convenient and confidential platform to seek guidance, ask questions, and receive support during times of severe stress.

Fig 6: Live Chatbot with doctor

User Feedback: User feedback indicated a high level of user satisfaction with the app's usability, interface design, and functionality.
Users reported improved self-awareness of their stress levels, enhanced stress management practices, and a sense of empowerment in taking proactive steps towards their mental well-being.

Limitations and Future Enhancements: The project had a limited dataset for training the logistic regression model, which may affect its generalizability. Expanding the dataset and incorporating additional features could enhance the accuracy of stress level predictions.
Incorporating real-time physiological data, such as heart rate variability or sleep patterns, could provide more comprehensive insights into a user's stress levels.
Integration with wearable devices or sensors could enable the app to collect real-time data and provide personalized recommendations based on the user's physiological and activity patterns.

The mental stress tracker app project demonstrated its potential in assessing stress levels, providing personalized recommendations, and facilitating live chat support. The accurate stress level predictions, positive user feedback, and reported benefits in stress management highlight the app's effectiveness. With further enhancements and considerations for future research, the app holds promise in supporting individuals in monitoring and managing their mental well-being effectively.

## IV. CONCLUSION

The mental stress tracker project successfully developed an advanced application incorporating logistic regression as the algorithm for stress level prediction, personalized recommendations, and live chat support. The application aims to assist individuals in effectively monitoring and managing their mental well-being.
Through accurate stress level predictions and personalized recommendations, the application provides valuable insights and resources for stress reduction. The integration of live chat support offers users a convenient platform to seek guidance and support from healthcare professionals during times of severe stress.
User feedback indicates a positive experience with the application's usability, intuitive interface, and functionality. The personalized recommendations have been well-received, offering users tailored activities, songs, and resources for stress management.
While limitations exist, such as the need for a larger dataset for training the logistic regression model, future enhancements can focus on expanding the dataset and integrating real-time physiological data for improved stress level predictions. In conclusion, the mental stress tracker application, driven by logistic regression, offers an effective solution for monitoring and managing stress levels. The accurate stress level predictions, personalized recommendations, and live chat support contribute to a comprehensive approach to stress management. With ongoing refinements, the application has the potential to significantly impact users' mental wellbeing and contribute to the field of mental health support.

## REFERENCES

[1] I. R. M. E. R. R. Ariel Teles, “Mobile Mental Health: A Review of Applications for Depression Assistance,” in 2019 IEEE 32nd International Symposium on Computer-Based Medical System (CBMS), 2019.

[2] V. M. Vidhi Mody, “Mental Health Monitoring System Using Artifical Intelligence: A Review,” in 2019 5th International Confrence for Convergence in Technology (I2CT), Pune, 2019.

[3] J. T. A. M. T. H. J. A. N. J.-P. O. M. K. Talayeh Aledavood, “smartphone-Based Tracking of Sleep in Depression, Anxiety and Psychotic Disorders,” in Springer, 2019.

[4] P. M. J. C. P. Vivek Patel, “PsyHeal: An Approach to Remote Mental Health Monitoring System,” in International Conference on Advances in Computing and Communication Engineering (ICACCE-2018), Paris, 2018.

[5] R. J. S. A. R. J. C. L. Ariel S. Teles, “Towards Situation-aware Mobile Application in Mental Health”.

[6] N. S. Algamdi, "Monitoring Mental Health Using Smart Devices With Text Analytical Tool," in 2019 6th International Confrence On Control, Decision and Information Technologies (C0DIT'2019), Paris, 2019.

[7] S. S. N. G. B. M. P. D. Surjya Ghosh, "EmoKey: An Emotion-aware Smartphone Keyboard for Mental Health Monitoring," in 2019 11th International Conference on Communication Systems & Networks (COMSNETS), 2019.

[8] "Mental Health Care Towards Effective Self Care Through Digital Technology".

[9] K. S. Thach, "User's Perception on Mental Health Applications: A Qualitative Analysis of Users Reviews," in 2018 5th NAFOSTED Conference on Information and Computer Science (NICS), 2018.

[10] S. G. N. P. T. Anu Priya, "Predicting Anxiety, Depression and Stress in Modern Life Using Machine Learning Algorithms," in International Conference on Computational Intelligence and Data Science (ICCIDS 2019), 2019.