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Mental Health Diagnosis and Cure System using ML Algorithms (Mental Health Prediction Mobile Application)

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ABSTRACT: Mental health disorders affect millions of people worldwide and can lead to significant social and economic costs. Accurate diagnosis and effective treatment of these disorders are critical to improving patient outcomes and reducing the burden on mental health care systems. The use of machine learning has the potential to improve the accuracy and efficiency of mental health diagnosis and treatment.

This project, aimed to develop a Mental Health Diagnosis and Cure System using Machine learning that can assist mental health professionals in accurately diagnosing and effectively treating mental health conditions. Collected a set of questions related to mental health do that we can frame a dataset according to our requirement.

Trained a machine learning model, of decision trees and random forest algorithm using stacking technique of ensemble learning, based on the data and identified features. Also evaluated the accuracy and effectiveness of the trained models in diagnosing and treating mental health conditions and compared the performance of the developed system to existing methods for mental health diagnosis and treatment. Also developed a user-friendly interface for mental health professionals to access and utilize the system.

Overall, the Mental Health Diagnosis and Cure System using Machine learning has the potential to assist mental health professionals in diagnosing and effectively treating mental health conditions, leading to improved patient outcomes and a more efficient use of mental health care resources.

KEYWORDS: Machine learning, Mental health detection, mental health diagnosis and treatment, tensorflow, Flutter.

I. INTRODUCTION

Many people experience unease and hopelessness from time to time, but when does it start to rule their lives completely? An individual may feel gloomy, melancholy, afraid, nervous, and restless as a result of losing a friend or family member, performing ineffectively in daily activities, being harassed and other challenges. Some people report having this experience frequently, occasionally even with no apparent cause at all. Those people may struggle with anxiety, pessimism, or both. It is practically a given that someone who struggles with anxiety will also struggle with discouragement, or vice versa. It is also established that half of people who are found to be unhappy also have anxiety problems. Discouragement doesn't result from a single event, but rather from a confluence of various events and variables, with a larger percentage of young people nowadays dealing with depression, anxiety, and various other psychological wellness difficulties.

II. GOALS & OBJECTIVES

Making a mobile application that will help the

Also provide a cure program to the user according to their mental state.



III. LITERATURE SURVEY

Early identification of mental health problems enhances patients' quality of life and enables professionals to treat them more successfully. When referring to one's psyche, social, emotional, and mental health. It has an impact on how one feels, thinks, and behaves. Every stage of life, from childhood and adolescence to adulthood, places a high value on mental promise of AI, a varied community of specialists involved in mental health research and care, including scientists, clinicians, patients, and regulators, must communicate and interact [2]. The detection of mental health concerns in online social networks (OSNs) is examined critically in this paper, along with the data sources, machine learning algorithms, and feature extraction approaches that were employed. A full investigation into the appropriateness of mental health detection is conducted, including a look at data analysis techniques, comparisons, difficulties, and constraints. Most researchers in the field utilized text analysis on newly extracted data sets from various OSN sources, employing statistical analysis or machine learning techniques. Some studies also employed multi-method approaches involving questionnaires and obtaining consent for accessing and extracting information from OSN accounts. The presented method offers an alternative approach to early detection of mental health problems compared to traditional strategies, but it requires comprehensive adoption, innovative algorithms, computational linguistics, and input from mental health specialists to effectively address limitations and challenges

IV. PROPOSED SYSTEM

4.1 Mental Health Detection

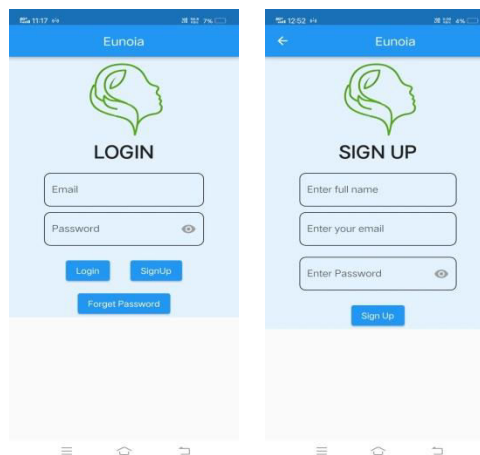
To develop a user-friendly interface for mental health professionals to access and utilize the system. To address ethical concerns around patient privacy, bias, and accountability in the development.

4.2 Mobile Application (Eunoia)

EUNOIA = A feeling of goodwill being friendly and wanting to help.

The system is created in the form mobile application as per convenience and need of any end user and to potentially integrate the developed system with existing mental health care infrastructure to improve patient outcomes.

When the end user interacts with the application, the user first need to login using required credentials, and if the user doesn't have an account, he needs to sign up using the email.

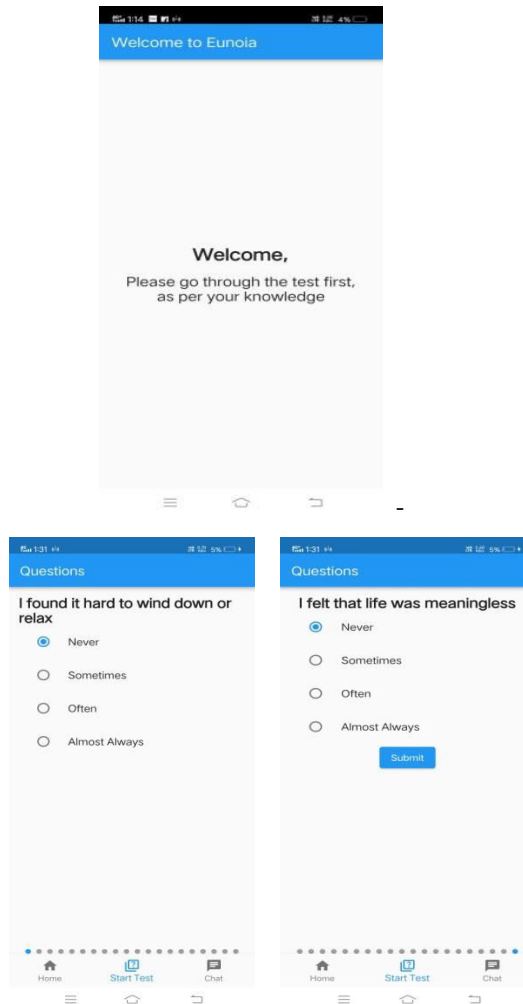


If a user is doing sign up, by registering himself to the portal, and after that when user login for first time he will see a welcome screen and then redirected directly to the start test screen, such as follows.

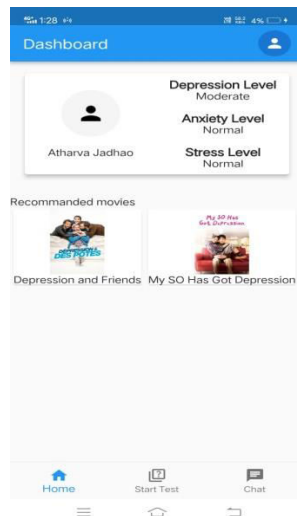


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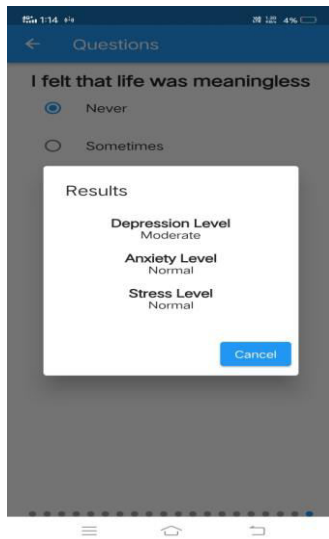
| DOI:10.15680/IJIRSET.2023.1206057 |



And if the end user is doing normal login, then the user will see a dashboard where he/she will be able to see his diagnosis test results and movie recommendation and other things too.



On Successful submission of a test user will be able to see the output in following format



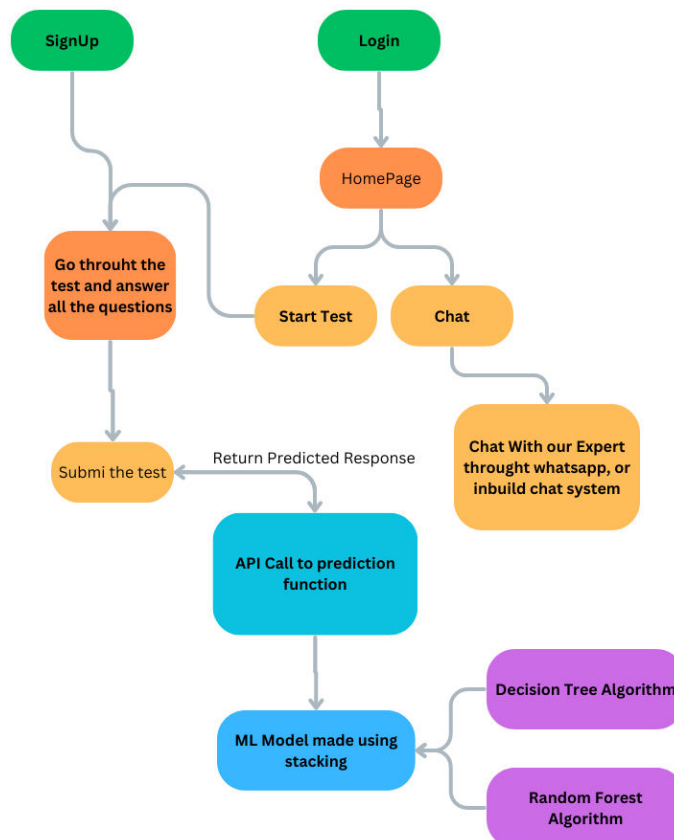
He can also give the test once again by clicking the ‘Start Test’ Option in bottom navigation bar.

And he can Chat with our expert using the ‘Chat’ Option beside the ‘Start Test’ option.

V. METHODOLOGY

Designing a mental health diagnosis and cure system using machine learning algorithms would involve several steps. Here is a general methodology that we followed:

5.1 System Architecture





5.2 Dataset: To train machine learning algorithms, there is a need of a large dataset of mental health. Generated data using python, with the reference from DASS-21 questioner.

5.4 Algorithms: There are various machine learning algorithms that we can use for mental health diagnosis and treatment.

The algorithms used here in making the model include decision trees and random forests. We implemented these algorithms using stacking technique of ensemble learning.

5.5 Train models: Now there is a need to train our ML models using the generated dataset. This step may involve splitting your data into training and testing sets, here we used `train_test_split` module of `sklearn` library. We trained our model using **Stacking** technique of **ensemble learning** of ML, we used **Decision Tree** and **Random Forest Algorithm** for stacking of the model.

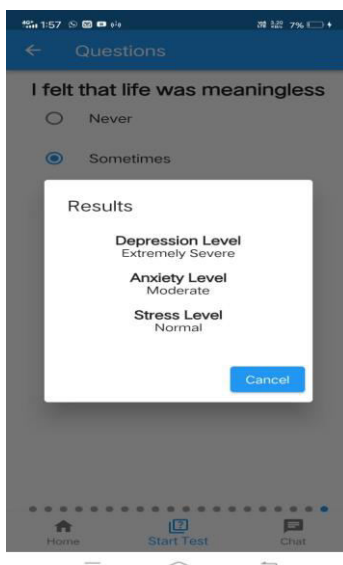
5.6 Test the accuracy of models: After training the model with the defined dataset, there is a need to evaluate their performance to determine how well they are working. This step may involve calculating metrics such as accuracy and precision. We used the `accuracy_score` module of `sklearn` library for this purpose.

1.7 Deploy models: Once the models give satisfactory results, then the ML model can be deploy in a production environment. Here the deployment is done using REST API, and used flask for making REST API, so that whenever an API is hit for a GET request using proper parameters, it will return the prediction. In summary, designing a mental health diagnosis and cure system using machine learning algorithms involves defining the problem, generating and preprocessing data, engineering features, selecting and training algorithms, evaluating models, deploying models.

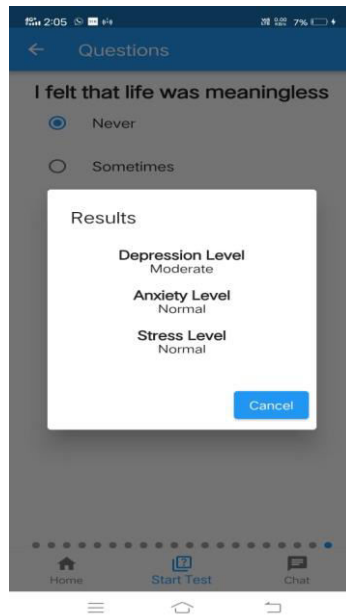
VI. RESULT AND DISCUSSION:

When a user give the answer of all the questions in the questioner, and when user clicks on the ‘Submit’ button, a request will be send using API with the selected answers of the given questions, where the input will be evaluated using the ML model and the output will be send back as a response, then the response will be used to show the result, and user will see the following popup box which includes, his depression level, anxiety level, stress level.

The following output is shown when the user gives the answer of the question as “Often, Sometimes, Sometimes, Almost Always, Sometimes, Sometimes, Often, Sometimes, Often, Often, Sometimes, Often, Often, Sometimes, Sometimes, Often, Sometimes, Sometimes, Often, Sometimes”.



And if the user gives the answer as “Never, Never, Sometimes, Never, Never, Never, Sometimes, Never, Never, Sometimes, Never, Never, Never, Never, Sometimes, Never, Never, Never, Never, Never”, then the output will look like



Also the application will recommend them exercises, movie recommendations, some friendly activities and introducing them with doctors and other features that will help them to reduce the mental health issue.

VII. CONCLUSION AND FUTURE SCOPE

A machine learning-based Mental Health Diagnosis and Cure System can be integrated with telemedicine platforms to allow remote diagnosis and treatment. The system can also use predictive analytics to identify potential mental health disorders early and monitor patient progress in real-time. Additionally, multilingual support and ethical considerations are crucial aspects that need to be addressed, and the system can be integrated with wearable technology to provide more data for diagnosis and treatment the use of ML algorithms for mental health diagnosis and treatment has shown great promise in recent years. With the ability to analyze large amounts of data and recognize patterns that may not be immediately apparent to human clinicians, ML algorithms can provide more accurate and efficient diagnoses and treatment plans for individuals with mental health conditions However, there are still several challenges that need to be addressed in this field. One of the primary challenges is the lack of high-quality, standardized data that can be used to train ML models. Another challenge is the need for greater transparency and interpretability in ML algorithms to ensure that they are not biased or unfair.

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