e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

MENTAL HEALTH TRACKER

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ABSTRACT

Our paper aims to propose a system design, which is based on the android app "Mental Health Tracker", which identifies the mental health of the user. Mental health can be tracked with such means as chatbot, physical device, and mobile application. According to our survey, the application must have an authentication system, so that the data will remain secure. An application should be easy to use and include options that allow the user to customize it, and goals and memories can be saved.

The system uses Neural Processing Language (Textblob), Machine Learning (algorithm random forest), and MySQL for sentiment analysis, questions must be shuffled. A graph will be generated will be generated based on the answers based on the answers, and you will see a graph of the weekly improvement. Using this application can help a person overcome their mental illness in order to live a happier life by suggesting some tasks or activities that they can do to accomplish their goals.

Keywords: Anxiety, Depression, Android Application, Prediction, Sentiment Analysis, NLP, Machine Learning, Classification, Mental Health.

I. INTRODUCTION

In our daily life, mental health is need of life. Mental health means a state of mind in which the person understands his/her own abilities and disabilities, but mental health will be metal illness, and it can affect our whole life. Because of mental person's relationship, theirs work environment and others also get influenced. We needed to express our emotions. Example of mental health issues like anxiety disorder, emotional disorder, bipolar affective disorder, depression, Eating disorder, etc.

During pandemics (from 2 years) because of strict lockdown we had to stay in home. We had a lot of time as we had nothing to do, we people keep thinking about various stuff and because of over thinking, frustration , less confidence we get annoyed/angry . Isolation, jobless , loss of money and many more thoughts revolves in our mind and that impacts our mental health. Many peoples became drug and alcoholic addicted. Peoples can't speak about their mental health openly. They have fear that anyone will judge them and tease them.

We applied a sentiment analysis strategy in this project's model. The sentiment analysis method aids in determining the user's sentiment. Sentiment analysis, as the name suggests, uses words or reviews to assess the user's sentiments and emotions. It focuses mostly on text data sentiment analysis. A producer known as NLP is required to understand human language by a machine. NLP enables humans to speak in their native tongue while simultaneously making computer comprehensible. Sentiment analysis is a branch of natural language processing that uses machine learning approaches to uncover precise insights. The random forest classifier will be utilised in this model, which is a machine learning method.

We also did some research with help of previous years IEEE papers and came to know that were some cons/disadvantages that were mentioned in IEEE papers that we came across.

According to "Mental Health Tracker" the Following key points in application:

1) Self-Monitoring
2) Notifications and Reminders
3) Dashboard
4) Recommends Activity and Videos
5) Privacy
6) Confidentiality

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II. BACKGROUND AND MOTIVATION

In many previous papers, we observed different systems and methods. We found some analysis based on that papers. We found some scope, advantages, and disadvantages. There are different kinds of systems that currently exist. Most of them use different methodologies to predict mental illness. Some current system include an online survey which predicts whether the user has mental illness or not. These surveys are illness specific, i.e., a different survey for depression, a different one for stress and so on.

A. Literature Review

In [1] this model aims to identify, analyze and characterize the current state of person by mood tracker, Chatbot, test were provided. Python and machine learning technology was used for this model.

In [2] this model develops various systems for mental health monitoring virtual counselling, precision therapy and diagnostic systems by reviewing of Chatbot and virtual counselling. The technology used was AI, Machine Learning and Neural Processing Language for text analysis.

In [3] smartphone will access and monitor sleep, depression and anxiety. Show early associations between behaviors and sleep parameters and agreement between clinic based assessments, active smartphone data capture and passively collected data. The technology used in this model was AI, Machine Learning and java.

In [4] user input was taken in the form of MCQ or speak. Then the text were passed to personality insights API which generates a JSON file. Then a chart were prepared according to the user input and a critical value was set by doctor and if the critical value falls below the range the doctor were notified via SMS. The OS used for this model was Linux/Windows. The programming language used was python 3.6. Framework was Flask0.12.2, Pygal2.4.0. The database used was sqllite3.8.2 and mangoDB3.6.0.

In [5] SituMan logic uses LTA (Location, Time, and Activity) logic. The location, time and activity were directly obtained from the device and a notification were sent by the mood Buster. This notification typically request patients to rate their levels of mood, anxiety, and sleep quality. From these situation aware notifications, the mood buster may be able to correlate the patient's status with their situations. The technology used for this model was Machine learning.

In [6] the application was created based on interaction between patient and the smart device to connect with psychologist. Heart rate were calculated by using camera sensor. By answering some question's user can measure their anxiety level. The technology used for this model was machine learning and signal processing.

In [7] the focus on the text entry pattern to track multiple emotions state. The model based to design, develop and implement an android based smartphone keyboard Emokey, which monitors user's typing pattern and determines four emotion states (Happy, Sad, Stressed, and relaxed) by developing an on device personalized machine learning model. The technology used for this model was machine learning and the programming language was python.

In [8] in this model, mental screening questionnaires were there for tracking mood and mental condition. This model helps rationalize negative thoughts, meditation guide and have activities and games for improving attention, memory etc. The technology used for this model was Machine Learning and AI. The programming language used was python.

In [9] this is a review based paper which is based on complaint that the apps are very complicated to use because of their design and have a lot of advertisement contents. Therefore, this paper tells that in order to enhance user experience and user adherence, these features should be carefully considered in the design phase during the development process of the apps.

In [10] this paper based on comparison of different machine learning algorithms. Machine learning were applied to determine different five different severity levels of anxiety, depression and stress. Data were collected using standard questionnaires measuring the common symptoms of anxiety, depression and stress. The accuracy of naïve Bayes was found to be the highest, although Random Forest was identified as the best model.

B. Commercial survey

In mood tracker mental health journal anti depression mobile application mental health journal with mood tracker and self-care diary were provided and helps them to cure of depression and anxiety.

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MindDoc Application is a leading monitoring and self management app for promoting emotional well-being and copying with such mental illnesses as depression, anxiety, insomnia and eating disorders.

Pixels-mood tracker is a leading app in which it practices mindfulness, log your mood, emotions and thoughts. This app helps to track your mood in simple, quick and easy manner and help you to get from the situation.

Inner Hour: anxiety, depression, Stress self-care is a mobile application in which it asks for current mood and after that it takes assessment like health, factor, global. Then it asks some question like activity level, relaxing questions. Then it calculates your mood and mental health according to your answers and based on your result it shows users personalized plans.

Daylio is an application in which firstly it ask for current mood. It shows daily mood chart according to the mood you have selected. It helps you to remind the activity you want to do every day like reading books, watching movie, etc. This app also allow saving your daily entry with text and photo.

Mental Health test is application in which it identifies your mental condition by giving different tests like depression test, eating disorder test, etc. Then according to your test it shows the result. It also suggests a therapist near your area.

Wysa is an AI friend that you can chat with free. It is therapy based technique and conversations make for a very cute and calming therapy chat app whether you're looking to cope better with mental disorders, to manage stress or to boost your mental health.

My stress diary app is a simple personalize tracker of mood, productivity, stress and habits. It is a self-care tool for improving your mental health. This app has a stress resistance test.

Mind journal: Diary, Mood tracker and Gratitude has a simple mood tracker diary allows keeping tracks of mood dynamically and self-care diary serves for learning new ways of thinking and overcoming depression.

III. PROPOSED SYSTEM

In this project, we are going to develop an android app that tracks the mental health of a person. This app will help to the patient to improve their mental condition and encourages them to enjoy life and helps them to stay always positive.

A. Workflow

In this app first we will give introduction guidelines that how to use this app after that login page will be there. If user don't have login then user can do signup. After that, some questions will be asked to the user. According to the answer given by the user, current mental state and current mood will be identified and result will be shown to the user. User can see their mental progress in terms of a graph. According to the report, some activities will be suggested to the user to improve their mental health condition. At the end, the app provides some psychologist contact details. If user need psychologist help then he or she can take psychologist help. This app is a user-friendly app. The user interface of this app is user-friendly and the functionality is understandable to the user. This app gives a complete picture of emotional state of user by using some questionnaires asked in the app and user need to answer that. In this way we can predict mental health of user and we can assign task to improve their mental health condition.

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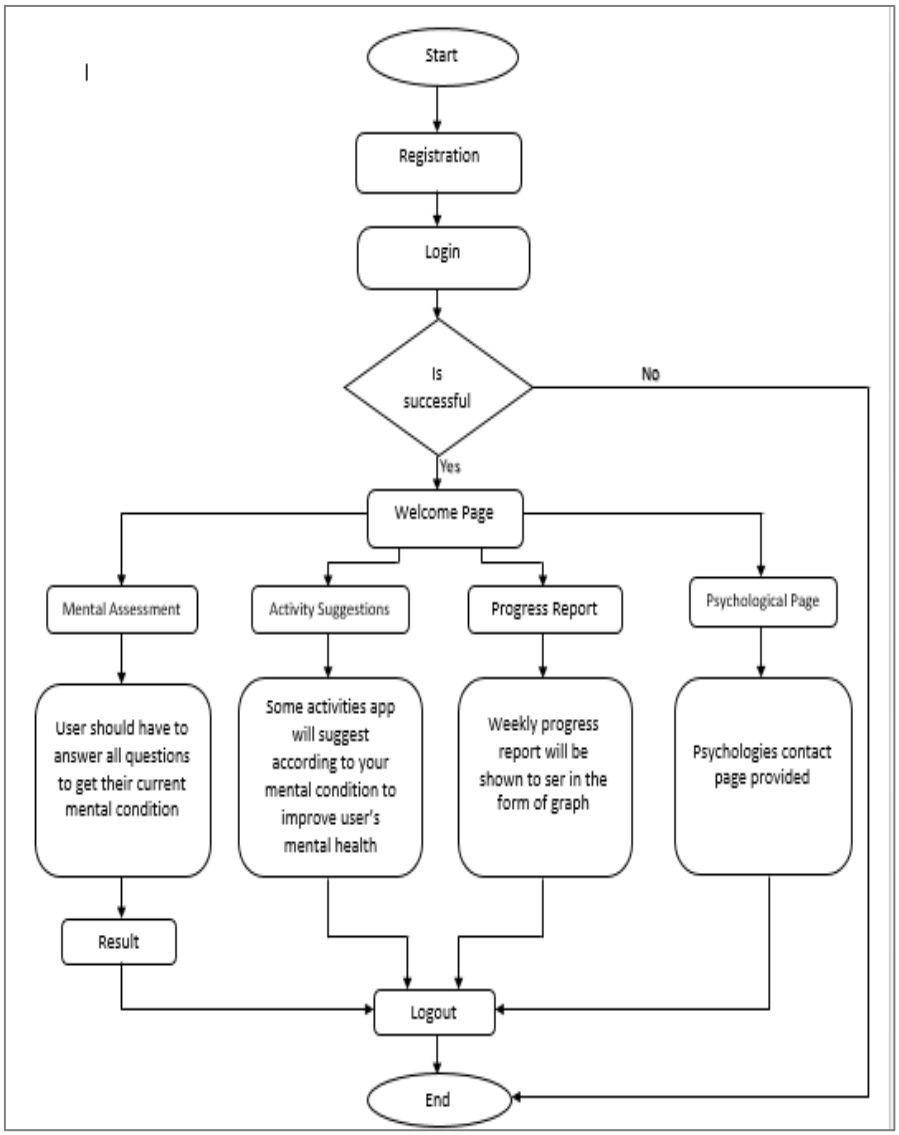

Figure 1: Flowchart of Application

B. Software Requirement

1) Android Studio

Android studio provides a unified environment where you can build apps for android phones, tablets, android TV, etc. In android studio you can design your app front end and as well as their backend functionalities using java language.

2) MySQL database

MySQL database is use for storage purpose. In our case, it stores the user data like user information or his/her predicted mental status.

3) Python

Python is an advanced programming language. Python makes the programming and development of the app easy. In our case, python is use to make API for our app.

4) Postman

Postman is an API (Application Programming Interface) testing tool. It tests, verify and validate the API.

C. Structure of Application

1) Splash screen

It shows the logo and loading screen of our app.

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2) Instruction pages

It shows the instruction and shows what features that the app have.

3) Login and signup page

You can login by providing login credentials. If you are a new user then you can sign up using the signup page.

4) Home page

Home page contains 4 pages

a) Prediction

Clicking this page, questionnaires page will open which contains different current condition based question. User need to answer all the questions to proceed further. After answering all the question's app will show the result according to user's answers.

b) Suggestions

This page contains some suggestion activities which will help user to come from depression and feel more motivated.

c) Graph page

This page shows the weekly report of user in the form of graph

d) Psychologist Contact Page

This page shows psychologist contact details that if user need urgent psychologist help then he or she can visit this page.

D. Sentiment analysis

In this project model, we have used sentiment analysis approach. Sentiment analysis approach helps to determine the sentiment behind the user's text. As its name suggest, sentiment analysis helps to analyze the user feelings, emotions by using some text or review. It mainly focuses on sentiment analysis of text data.

Sentiment analysis is contextual mining of textual content which identifies and extracts subjective data in supply material, and supporting an enterprise to recognize the social sentiment in their brand, services or products at the same time as monitoring on line conversations. Sentiment analysis is also called as subjective analysis, it classifies the text according to the priority and orientation of the opinion expressed into positive, neutral and negative.

E. NLP

To understand human language by the computer, we need a process called NLP. NLP means natural language processing. NLP helps to communicate with human in their own language and also it makes understandable to computer. In short, it is a center communicating medium between human and computer. Sentiment analysis is a subfield of NLP and with the help of machine learning techniques, it tries to identify the exact insights.

F. Random forest Algorithm

In this model we are going to use random forest classifier which a machine learning algorithm used for classifier. Random forest is a supervised machine learning algorithm. Random forest builds multiple decision trees and merge them together to get more accurate result and prediction.

1) Random Forest algorithm select the record from the dataset. Depending on the N record tree is constructed.

2) The decision tree is constructed based on the N records.

3) The number of trees was selected according to the available dataset.

4) In case of regression problem, each tree in the forest predicts the value of Y for a new record.

5) The average of all values were predicted by all the trees in the forest in order to calculate the final value.

6) In the case of classification problem, every tree inside the forest predicts the category to which the new record belongs.

7) Finally, a new record was assigned to the category.

G. Libraries

Python offers us various libraries for performing natural language task in the most convenient and efficient manner possible. For prediction, we have created an API which is coded in python language.

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One of the most prominent and easy to use library is textBolb. The txtBolb is a library provided by NLP. TextBolb actively used Natural Language Toolkit (NLTK) to achieve its tasks. NLTK is a library which gives an easy access to a lot of lexical resources and allows users to work with categorization, classification and many other tasks. TextBolb is a simple library which supports complex analysis and operations on textual data. TextBolb returns polarity and subjectivity of a sentence. Polarity lies between [-1,1], -1 defines a negative sentiment and 1 defines a positive sentiment.

Flask is a small and lightweight python web framework that provides useful tools and features that that make creating web application in python easier. It returns the data in the form of JSON. It converts the data in JSON format.

For calling API, volley is used in android project. Volley is used to manage the process and caching of network requests.

MySQL workbench is used to store the user details or predictions details.

By using prediction key, we can execute the content written in the function using get or post method.

We are going to request two things one is user ID and another one is input text provided by the user which will directly go into textBolb library so that it can analyze the level of depression the user have or the current mental state of a person.

IV. RESULTS AND ANALYSIS

A. Installation of mobile application needs to be done by the user and psychiatrist.

B. During answering the questions, the app will identify a user's mental state and verify whether it has any mental difficulties by gathering data from the user through communication.

C. After that, data obtained by the test and kept in the database will be examined, and if mental trouble is found, the user will receive an alert and some activity and task will be assigned, and a report will be generated.

D. In general, the app will be available to all users and will include many feature in addition to mental health analysis, such as daily blogs, motivational boosts, expert advice, exercises, and so on, all of which will assist the user in resolving mental difficulties while also enjoying fun activities and even talking with expert advice. E. When the alert is delivered to the psychiatrists, they will review the report and contact that specific user to give therapy that they require.

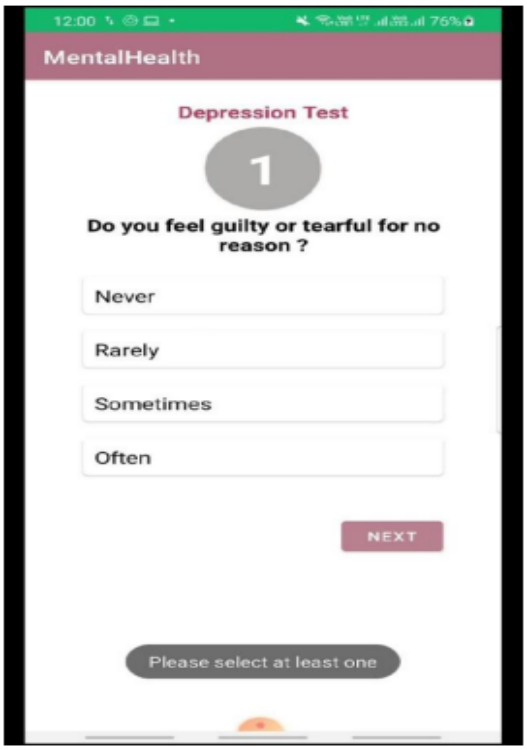

Figure 2: Question 1 Image.

Figure 3: Question 2 Images.

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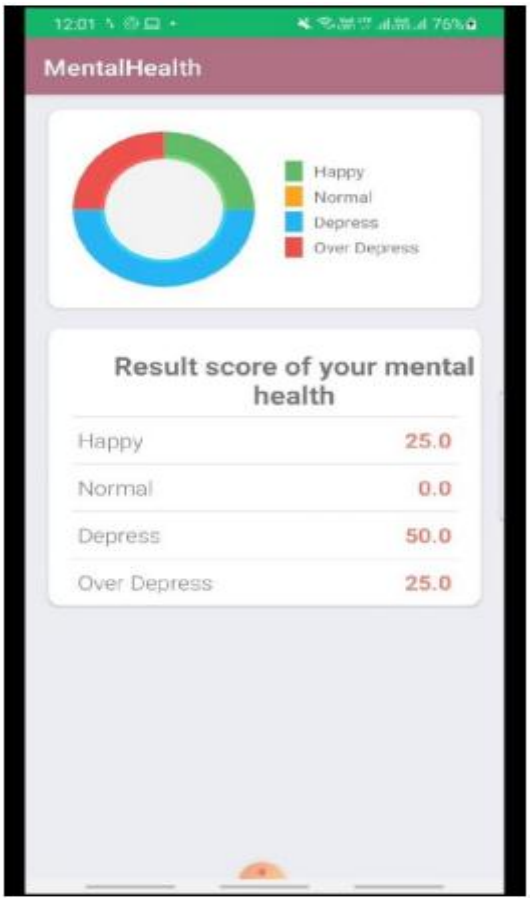

Figure 4: Result Image.

V. CONCLUSION

Mental health is an issue that is both delicate and vital at the moment. It is necessary for a healthy and balanced lifestyle. Mental health has an influence on one's thoughts, actions, and feelings. It can have an impact on a person's productivity and effectiveness. According to a WHO researches, depression will be a major cause of mental disease throughout the world, and individuals must pay more attention to their mental health in order to live a healthy social and professional life. Online predictors for outcomes can be used by those who are afraid to contact humans for diagnosis,

"Mental Health Tracker" is a utility that lets in monitoring of mental fitness of user's. By accessing the inputs furnished with the aid of the affected person over a time duration with the aid of some questions. According to the answer given with the aid of a person, a task and activity will be generated. As per the user's temper, a task is assigned. A weekly graph will also be generated so that we can see our mental health growth through the use of this application.

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