Design And Development of Mental Health Checker Web Application Using Machine Learning Algorithms

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Abstract: Nowadays mental health is an issue of rising concern since people are facing many hardships and difficulties that affect them mentally. Mental health is equally important as physical health. It is very important to keep our mental health in check. Early-stage detection increases the rate of survival. The proposed methodology uses machine learning algorithms such as NLP to detect the type of mental illness one is suffering from, by analyzing the textual data obtained through various assessments provided in the web application. These inferences can then be used to create online pathways to direct people to health information and assistance and also to generate personalized interventions.

1. INTRODUCTION

Mental health is a level of psychological well-being or an absence of mental illness. Mental health means keeping our minds healthy. Mankind generally is more focused on keeping their physical body healthy. People tend to ignore the state of their minds. Human superiority over other animals lies in his superior mind. Man has been able to control life due to his highly developed brain. So, it becomes very important for a man to keep both his body and mind fit and healthy. Both physical and mental health is equally important for better performance and results. It’s the psychological state of someone who is functioning at a satisfactory level of emotional and behavioral adjustment. It includes subjective well-being, perceived self-efficacy, autonomy, competence, inter-generational dependence, and self-actualization of one’s intellectual and emotional potential, among others.

But in the world, we are living in today, it is difficult to connect to a loved one or share thoughts or any kind of problem we are facing. It is not an easy task to talk about your condition especially your mental condition because people are afraid of being judged. Hence there is a need for a companion for everyone with whom we can discuss our mental state, and our feelings. The web application is that companion.

The most important part of a mental disorder journey is the detection of the mental illness we are suffering from because there are similar symptoms to many mental illnesses. One way of doing so is by using technology. Mental Disorder Detection can be performed which can help in curing it. Tests can be performed based on various artificial intelligence and machine learning algorithms under different scenarios to detect emotional imbalances. With the rise in technology, various AI-based approaches are evolved to make machines emotionally intelligent to detect emotions in human beings.

Text-based emotion recognition is one of the most used techniques in such prediction models. Text analysis using the NLP technique is used to recognize emotions from the text. Various Machine learning algorithms like Naïve-Bayes, Support Vector machines (SVM) etc. can be used and results can be evaluated through a confusion matrix.

Once the mental disorder of a person is diagnosed the web application provides the person with professional help by offering a list of medical professionals that belong to the same locality as the user. The web application also provides various other facilities such as a task tracker, schedule, journaling, podcast recommendation etc. We try to build a web-application that stays with you as a companion throughout the journey of mental illness.

2. MOTIVATION

Mental health is an important issue in the world today. With a large population now working from home and staying away from loved ones, the mental health situation has deteriorated. Awareness about mental health is still happening at a slow pace. Hence people need friendly space to talk, discuss and analyze their mental health. It becomes important to track and remedy any problems before they get too serious.

With the rise in technology, various AI-based approaches are evolved to make machine learning intelligence detect emotions. We try achieving this using Natural Language Processing.

3. LITERATURE SURVEY

<table>
<thead>
<tr>
<th>Paper</th>
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<tr>
<td>Depression detection using emotional artificial intelligence and machine learning: A closer review</td>
<td>Manju Lata Joshi and N. Kanoongo</td>
<td>This study analyses how facial expressions, images, emotional chatbots, and texts on social media platforms can be effective in detecting one’s emotions and then depression. Method used: Naïve-Bayes. Year: 2020</td>
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### Support Vector Machines (SVM), Long Term Short Memory (LSTM) – Radial Neural Networks (RNN), Logistic Regression, Linear Support Vector, etc

| Year: 2020 | LIXIA LUAN, WENJING XIAO, KAI HWANG, M. SHAMIM HOSSAIN, GHULAM MUHAMMAD AND AHMED GHONEIM |
| MEMO Box: Health Assistant for Depression With Medicine Carrier and Exercise Adjustment Driven by Edge Computing | A health management assistant is proposed in this paper, called the MEMO box system, that focuses on emotion and takes a smart medicine box as a carrier. Specifically, the MEMO box system is composed of an electronic medicine box and smart applications of phones, and electronic medicine box can collect the multi-mode data of patients, including their medication behaviors, daily activities, physical exercise data, and so on, which provides a data basis for the health assistant |

| Year: 2020 | YAN DING, XUEMEI CHEN, QIMING FU AND SHAN ZHONG |
| A Depression Recognition Method for College Students Using Deep Integrated Support Vector Algorithm | In this paper, the current computer technology analyzes the user’s social network data to detect the user’s depression. This study uses text-level mining of Sina Weibo data from college students. First, collect text information of college student users on Sina Weibo, and construct the text information into input data that can be used for machine learning. |

### 4. PROBLEM STATEMENT AND PROPOSED SOLUTION

#### 4.1 PROBLEM STATEMENT

Everyone wants to be healthy in his life with low effort and great advantages. Similarly, we want to have everything at our fingertips. We recognized that there is a need for a web application that can be used to keep a check on our mental health as well as tell us what steps should we take to keep ourselves mentally fit and fine.

#### 4.2 PROPOSED SYSTEM

- The basic idea of the project is to collect user responses to various questionnaires in textual form and analyze the data using machine learning algorithms and tell whether the person is suffering from any mental disease or disorder. We try achieving this using Natural Language Processing.
- After the successful diagnosis of the problem user is having the web app will suggest the appropriate actions that are required to be taken.
- Also, the web app will help the user to reach professional help. A list will be given to the user of professionals that are in a similar locality and are experts.
➢ The web app will be a companion throughout the journey of the user. There are many little functionalities such as a journal, schedule, task planner, task tracker, meditation guide, workout guide, etc that will be included in this web app.

![System Flow Diagram](image)

**The algorithms that are being used for text analysis of the data are as follow:**

A. Both supervised and unsupervised algorithms can be used for sentiment analysis. The most frequently controlled model for interpreting sentiments is Naive Bayes. The Naive Bayes algorithm is a supervised machine learning algorithm based on Bayes’ theorem. It is a probabilistic classifier that is often used in NLP tasks like sentiment analysis (identifying a text corpus’ emotional or sentimental tone or opinion). The most basic machine learning algorithm that can be implemented on this data is Naive Bayes. The Naive Bayes algorithm is a supervised machine learning algorithm based on Bayes’ theorem. It is a probabilistic classifier that is often used in NLP tasks like sentiment analysis (identifying a text corpus’ emotional or sentimental tone or opinion).

B. Support Vector Machine (SVM) has been chosen for the classification in the experiments. A support vector machine is a learning machine for two-group classification problems. It is used to classify the texts as positive or negative. SVM works well for text classification due to its advantages such as its potential to handle large features. “Support Vector Machine” (SVM) is a supervised machine learning algorithm which can be used for both classification or regression challenges. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well (look at the below snapshot).

Support Vectors are simply the coordinates of individual observation.

![SVM](image)

Support Vector Machine is a frontier that best segregates the two classes (hyper-plane/ line). You can look at support vector machines and a few examples of their working here.

5. **SYSTEM ARCHITECTURE**

- Once the user clicks on the link, the user is taken to the home page the home page will have two options Sing Up/Log In. After doing the registration the web app provides the user number of assessments such as a depression test, anxiety tests, Stress tests, Bipolar tests, addiction test, etc.
- The test consists of various brief answer questions. These questions take descriptive answers as a response, which will be used for analyzing whether the person is suffering from the illness he is taking the assessment of.
- Once the user has submitted the responses, the model will analyze and predict whether the person is suffering from that illness.
And if the person is suffering then the stage of illness will be diagnosed as mild, medium, or severe depending on the percentage of the symptoms shown by the user.

- After the diagnosis is done, the web app also provides professional help if opted for, by giving a list of consultants and professionals that belong to the same locality as the user.
- The user can take an appointment or schedule a meeting with the professional through the web app at the ease of their comfort.
- The web app has a built-in task tracker which is similar to the to-do list we have on our mobile phones, which will keep a track of tasks given by the opted consultant and done by the user.
- The scheduler will keep track of the appointments and meetings done with the consultant.
- The user can also write about their experiences in the journal which is also a part of this web app. People with mental illness often need someone to listen to them, where they can talk about their feelings and emotions. The journal will act the same for the user.
- The web app is a companion throughout the journey of the user.
- More elements like activity tracker, podcast recommendations, and exercise recommendations can be added to the web app.

6. FUTURE SCOPE

Technology has opened a new frontier in mental health support and data collection. Mobile devices like cell phones, smartphones, and tablets are giving the public, doctors, and researchers new ways to access help, monitor progress, and increase understanding of mental well-being.

Experts believe that technology has a lot of potential for clients and clinicians alike. With such web apps treatment can take place anytime and anywhere (e.g., at home in the middle of the night or on a bus on the way to work) and may be ideal for those who have trouble with in-person appointments.

Clients can seek treatment options without involving other people. Technology may be a good first step for those who have avoided mental health care in the past. Some apps are free or cost less than traditional care. Technology can help mental health providers offer treatment to people in remote areas or to many people in times of sudden need (e.g., following a natural disaster or terror attack).

Some technologies might be more appealing than traditional treatment methods, which may encourage clients to continue therapy. Technology can provide round-the-clock monitoring or intervention support. Technology can offer the same treatment program to all users. Technology can complement traditional therapy by extending an in-person session, reinforcing new skills, and providing support and monitoring. Technology can quantitatively collect information such as location, movement, phone use, and other information.

7. APPLICATION

- Using this web app any person can check his/her mental health without feeling judged and visit psychologists and Psychiatrists physically.
- As the web app provides the facility of consulting doctors and psychologists, one can begin her treatment without hesitation.
- Also, Users can keep track of their sessions with doctors/Psychologist and their activities and tasks.
- Also, Early detection of mental illness and solutions provided can help user survive their trauma and leads toward happy living!

- The app has various other applications than just being a mental health checker, such as
- This app can be used as Self – A management app. For example, the user might set up medication reminders, or use the app to develop tools for managing stress, anxiety, or sleep problems.
- Skill training can be done using this app. The user might watch an educational video about anxiety management or the importance of social support. Next, the user might pick some new strategies to try and then use the app to track how often those new skills are practiced.
8. CONCLUSION

• In an era of increasing competition, the number of people with mental illness is increasing. This project proposes a method that can effectively help people identify whether they are suffering from a mental illness.
• Mental illness is highly prevalent and causes considerable suffering and disease burden despite the existence of wide-ranging treatment options. Mobile phone apps offer the potential to help close this treatment gap by confronting key barriers to accessing support for depression.
• Further research will follow on how to more objectively screen out the most suitable data features to achieve the best recognition accuracy.

9. REFERENCES