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Mano Vaidya: Gateway to Relaxation Via Machine Learning

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Abstract - *Mental health is an essential issue in the world today. Nowadays, stress has increased a lot in the post-covid world. People are finding it hard to find ways to channel their stress or frustration. We come across many teenagers and youth succumbing to the mere stress faced in this competitive world. This is for several reasons. Chief among them is that people are not finding the right platforms and psychological guidance to overcome stress. In this project, we have planned to make an effort to reduce the stress level of people by utilizing technical advances in the field of computer science. We create an app that contains a closed set of questionnaires from SF-36, which have some weight associated with each question. Using clustering algorithms like k-means, we classify the new user into one of the three stress levels (positive, tolerable, and toxic). We modify the dataset, add the respective clusters in each row, and use the new data set to train classification algorithms like Naïve Bayes and Decision tree. We get the range limits from this and use that in our App to give results. Based on the obtained results, we recommend a few stress-relieving techniques and direct the user towards professional help, if necessary.*

Key Words: Mental health, Machine learning, Android application, Human Psychology, SF-36

1 INTRODUCTION

Mental well-being is the state of mind of that individual and gives an overview of his/her general nature. Assessing mental wellness is critical to understanding and suggesting treatments for patients with deviated cognitive behavior. This project aims to determine the mentally distressed individuals in the target population. The basic form of getting to know about individuals in a population is to get responses to benchmarked questions and rate them depending on their responses. The Short Form 36 Health Survey Questionnaire (SF-36) is employed to provide information about the state of a population's health, aid in planning services, and assess the effectiveness of clinical and social treatments. In addition, the SF-36 evaluates the individual patient's health status and monitors and compares the disease burden. Our App includes a user login page, user profile, notifications, and dashboard - which contains a set of questionnaires for the users and track the result of the user according to their answers. Activities like meditation and deep breathing exercises, some relaxing music, and some fun games for those who enjoy playing games are suggested based on the user's stress level. One resource where we can find de-stressing games is the 'Stress relief pig' website.

1.1 Overview

Our social, emotional, and mental health are all interconnected parts of our mental health. With a large population now, people are working from home and staying away from their loved ones; their mental health situation has deteriorated. It influences how we act, feel, and think. Moreover, it determines how we handle stress, relate to others, and make healthy choices. Mental health issues include thinking and emotional difficulties. Minor disruptions in various areas of life are typical, but when they cause the person great anguish, they are regarded as mental illnesses.

1.2 Problem Statement

About one in four persons suffer from mental health issues, from ordinary people, such as depression and anxiety, to rare problems, such as schizophrenia and bipolar disorders. Experiencing a mental health problem is often upsetting, confusing, and frightening. The fears are often reinforced by the negative way people experience mental health problems shown by the media. The covid patients also experience many mental health issues such as anxiety, stress, insecurity, suicidal thoughts, and hopelessness. Peoples are interested in improving their mental health, especially in stressful times. However, they struggle with being unsure where to begin when learning how to improve their mental health and that it is challenging to afford expert care. We aim to aid in making a safe space for people in need of a secure and understanding community and provide mental health guidance.

2. SYSTEM ANALYSIS AND DESIGN

2.1 Machine learning techniques: This section discusses various machine learning techniques used for classification and has been used for this system. The results of all these models have been compared to find the best model for the system.

K-Means Algorithm: The K-Means algorithm handles clustering issues in machine learning or data science. K-Means Clustering is an unsupervised learning approach. We shall discover in this article what the K-means clustering method is, how it functions, and how to apply it in Python to divide the unlabeled dataset into various clusters. Here, K specifies how many pre-defined clusters must be produced during the operation. Here, K=3, there will be three clusters because there are three levels of classification in our project: positive, tolerable, and toxic. It enables us to split up the data into various groups. It provides a practical method for automatically identifying the groups in the unlabeled dataset without training.

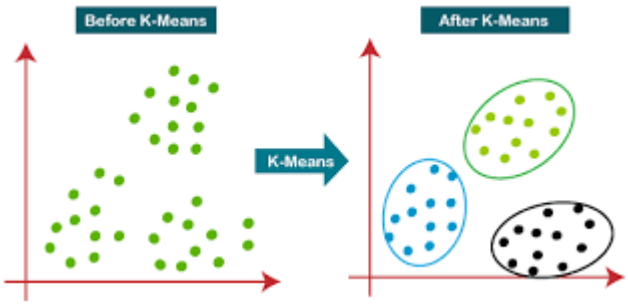

Fig - 1: K-Means Clustering

In our project, we received data on mental health from all over the world, which gives information on the mental health status given by the users and the feedback taken by them in the last few months. Using this knowledge, we must categorize the data into three clusters: positive, tolerable, and toxic. To ascertain K's value, another option is to apply the Elbow technique. The system will randomly assign a large number of centroids and measure the separation between each data point and these centroids after we have the K value. As a result, it designates the sites from where the distance is shortest as the appropriate centroid. Each data point will then be given its closest centroid as a result. As a result, there are K initial clusters. Next, it determines the new centroid position for newly generated clusters. Compared to the one chosen at random, the centroid's location changes. Finally, each point's distance from the new centroid location is once more calculated. If necessary, the data points are moved to the new centroids, and a new calculation of the mean position of the new centroid is made. Iteration continues if the centroid shifts, indicating that convergence has not occurred. However, the centroid will reflect the outcome after it stops moving (a sign that the clustering process has converged).

3. IMPLEMENTATION

3.1 Start building screens: First, we will create the App's skeleton. Use your imagination to create an intuitive app with elements that appeal to people of all backgrounds. Make sure the workflow is simple to understand and follow. Avoid any design choice that requires the user to take a complicated path to achieve a goal that can be accomplished more straightforwardly.

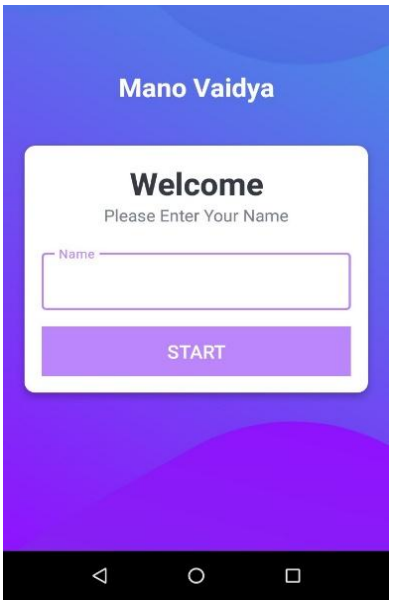

Fig - 2: Home Page

3.2 Questions Screen and UI refinement: Give the Questions UI a full-screen experience. In order to keep the user's attention only on the question displayed on the screen, all distractions are eliminated. Then we find out what widgets can be used to get answers from the user in a fun way. Using the K-means algorithm, we have used a data set and successfully clustered them into three clusters, i.e., positive, tolerable, and toxic. After clustering, we used a classification algorithm to classify a user into one of these classes. We have also implemented various algorithms for classifications and compared their accuracy.

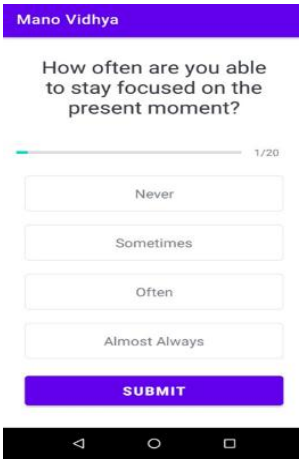

Fig - 3: Question displayed

3.3 By machine Learning Algorithms, the App was predicting the future results: Out of Logistic Regression, Naive Bayes, SVM (Support Vector Machine), and k-Means have the highest accuracy in our case. It includes a sequence of inquiries commonly used to predict a person's mental health. A user-friendly interface is created where the user can answer a series of questions. Each correct answer is worth some points. After the user enters answers to all questions, the average points are calculated, and his mental health is predicted. A suggestion will be made to the user based on their responses.

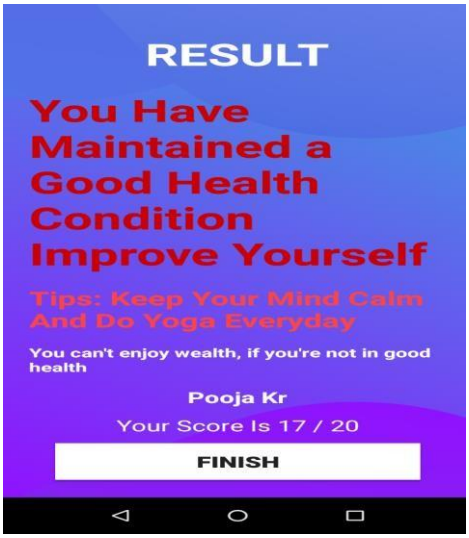

Fig - 4: Result page

4. CONCLUSIONS

With the help of the Android platform's self-analyzing treatment, the concept of inevitable improvements in mental health for human services is seen as one possible treatment option. A promising innovation stage through which to make it a reality is recognized as cell phones. Furthermore, when self-evaluation surveys are distributed through completely designed mobile phone interfaces instead of the best-in-class paper-based versions, the quantity, consistency, and character of the information are improved. A particular application is crucial to choosing the best strategy. Focusing on differentiating mental health difficulties like discouragement or bipolar disorder, we present the positives and cons of the most inspiring technological breakthroughs. Business social insurance providers are becoming increasingly interested in modifying research into products and bringing them to market because of the positive results cell phones can provide for treating mental illness. Finally, we look at the advantages that patients, parents, doctors, and providers of medical services protection can receive from using the application.

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