DASM: Android based Application for Depression and Stress Management

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Abstract:

Around 43% of the population suffer from adverse health effects from stress. 75 to 90 % of all doctor visits are for stress- related ailments and complaints like headaches, change in diet, change in sleeping pattern, fatigue, etc. We propose an alternative to anti-depression medication with help of DASM: Android based Application for Depression and Stress Management. The application will help reduce stress and depression of users with help of user interaction, analysing user data and suggesting contact details for psychiatrists and relaxing music. Even suggestions for exercise and meditation routines are included in the application.

Keywords: DASM, depression and stress management, random forest.

1. Introduction:

In today's world, most of the adults are suffering from anxiety and depression. This happens because mind wandering involves thinking of events or experiences unrelated to task in hand. It has been estimated that mind wandering occupies up to 46% of our waking lives and been shown to negatively impact subjective well-being. Studies show that mindfulness training maybe effective for wandering mind.

There are two types of stress Acute stress and Chronic stress. Chronic stress is caused due to longer exposure to high pressure situations which leads to depression. Depression affects daily chores. It also worsens the condition of people already suffering from other diseases like asthma, cancer, cardiovascular disease, etc.

Depression is considered as a serious medical condition that can get worse without proper treatment. Antidepressants are available but after certain period of time body gets obsessed with medication and wants more. Addiction of medicine is not better than addiction to alcohol. In current scenario, corona, lockdown and less physical interaction with friends has introduced depression even in younger generation as well. It is not a good option for younger kids to be introduced to antidepressants. Relaxing with the help of DASM application will be a good and healthier alternative.

1.1 Random Forest:

Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks that operate by constructing a multitude of decision trees at training time. For classification tasks, the output of the random forest is the class selected by most trees. For regression tasks, the mean or average prediction of the individual trees is returned. Random decision forests correct for decision trees' habit of overfitting to their training set.

Even though random forests generally outperform decision trees, their accuracy is lower than gradient boosted trees. However, data characteristics can affect their performance.

Working of Random Forest:

Random forest is a supervised learning algorithm. The "forest" represents an ensemble of decision trees, usually trained with the "bagging" method. The general idea of the bagging method is that

a combination of learning models increases the overall result.

Simply put, a random forest builds multiple decision trees and merges them together to get a more accurate and stable prediction. One big advantage of random forest is that it can be used for both classification and regression problems, which form the majority of current machine learning systems. Let's look at random forest in classification, since classification is sometimes considered the building block of machine learning. Below you can see how a random forest would look like with two trees:
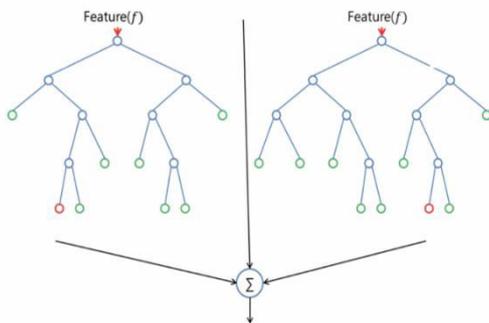
Random forest has nearly the same hyperparameters as a decision tree or a bagging classifier. Fortunately, there's no need to combine a decision tree with a bagging classifier because you can easily use the classifier-class of random forest. With random forest, you can also deal with regression tasks by using the algorithm's regressor.

Random forest adds additional randomness to the model, while growing the trees. Instead of searching for the most important feature while splitting a node, it searches for the best feature among a random subset of features. This results in a wide diversity that generally results in a better model.

Therefore, in random forest, only a random subset of the features is taken into consideration by the algorithm for splitting a node. You can even make trees more random by additionally using random thresholds for each feature rather than searching for the best possible thresholds (like a normal decision tree does).
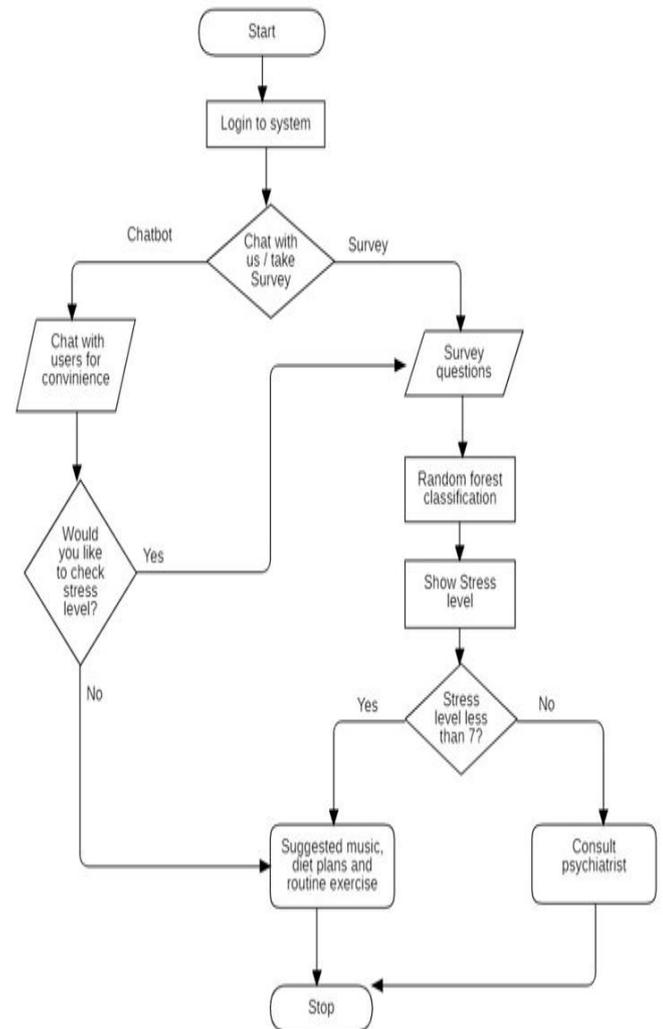
2.   System architecture:

Fig 1: Flowchart of DASM

Start: When the user runs the application the first activity will be the splash screen which will then direct the user to login system after few seconds.

Login: Now the user will either login or sign up to our system by entering appropriate username and password.

Chat bot: Chat bot will convince the user to take a survey to check their stress level.

Survey questions: Chat bot will then ask the user a series of questions to determine the stress level of the user.

Random forest: After the questions are answered, a random forest classification algorithm will be used to determine the stress level of the user and thus the user will then be classified into one of the categories.

Suggestions: The user will be suggested to follow a certain routine, particular diet, exercise, etc.

Consult psychiatrist: User can talk with therapist via our application.

3.   Literature Survey:

The paper states that people spend almost half their waking hours lost in stimulus-independent thought, or mind wandering, which in turn has been shown to negatively impact well-being. This has sparked a rise in the number of cognitive training platforms that aim to boost executive functioning, yet it is unclear whether mind wandering can be reduced through online training. This study is focused on investigating whether behavioural markers of mind wandering can be reduced through two short-term online-based interventions: mindfulness meditation and brain training. This paper shows significant results in meditation and has a methodological limitation for brain training, since reports were filled by people themselves and so were biased.[1]

This paper states that Compulsive Internet use (CIU) refers to those individuals who experience a loss of control regarding their online use. Even if a small number of people have suffered, a much larger proportion of adults were reported to be experiencing early signs of CIU, which became more problematic since sustained over time, especially when used as a coping mechanism for stress. Since compulsive behaviours are characterized by executing behaviours on "automatic pilot," mindfulness techniques help individuals relate more consciously with their environment, and helps to develop a more adaptive relationship with technology. However, mindfulness interventions are often lengthy hence not ideal for busy individuals with early signs of CIU. The methods that were used were equally effective and showed promising results for larger RCT samples. [2]

This paper states that even if authentic leadership has been shown to inform a host of positive outcomes at work, the literature has dedicated little attention to identifying its personal antecedents and effective means to enhance it. Building on strong theoretical links and initial evidence, they've proposed mindfulness as a predictor of authentic leadership. Their results of both studies confirmed that mindfulness training represents a valuable tool for improving a leader's leadership behaviour and for sustainable changes longer meditation practice is required.[3]

This paper states that medical students have higher rates of depression and psychologic distress than the general population, which may negatively impact academic performance and professional conduct. Their study assessed whether 10–20 min of daily mindfulness meditation for 30 days, using a mobile phone application, could decrease perceived stress and improve well-being for medical students. This paper states that mobile app proved effective to decrease perceived stress given longer duration of intervention and can also be used for patient care but the intervention period was shorter.[4]

4.   Conclusion:

The research highlights that a mobile audio-guided mindfulness meditation program is an effective means to decrease perceived stress. Integrating mindfulness training has implications for a broad group of therapists and healthcare providers, ultimately improving quality of healing and patient care.

We recognized that in today's world, individuals are suffering because of stress and depression. We propose DASM as the way to tackle this issue. This application will help users with their mindfulness training, connect them with therapist's if they need them, keep track of their stress or depression level with the help of a quiz, good music, etc. and will hence improve their mental health.

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