# Mood Mechanic

**Srishti C Rai, Sheetal Vernekar, Ajay L Gowda, Nishith A, Prathima Anand**

***Abstract:*** ***Depression is a major problem being faced by a lot of people. It is the extremely low mood faced by an individual. Some cope up with this mood change very quickly but some drastically fall into it. Those who fall into it suffer from depression. Prediction of a person's mood plays a major role in treatment of depression. But predicting a person's mood from previously collected data is challenging. Mood of a person can depend on various factors such body language, facial expressions and current mind state .But mood prediction is not enough, instead the proposed system involves ways in which we can use the predicted data to provide assistance in case of any deviation from a healthy mental condition. Past approaches being used, predict mood considering only a few parameters .This can lead to results being less accurate making it less reliable. A lot of these issues can be handled by the 'Mood Mechanic' approach. This paper mainly emphasizes on the existing approaches related to mood prediction and their limitations so as to propose a system that would not only help in efficient prediction but also help in assisting the user of the system on the further actions to be taken based on the predicted results. This approach considers many parameters such as facial expressions, social media usage and self-evaluation results. On collecting all these data and performing analysis on them, the system will suggest the actions or solutions, which will help the person in deciding on tasks which are generally suggested and are necessary for getting better.***

***Keywords: Depression, Mood prediction, Mental wellbeing, Sentimental analysis***

## I. INTRODUCTION

Depression is a mental illness characterized primarily by mood disorder. It is a major medical condition for which proper medical attention is needed. However, depression and mental health have been ignored since ages. According to the World Health Organization (WHO) India, China & US are among the top 3 countries affected by this medical condition. Globally the number of people affected by depression was estimated to be more than 300 million as shown in Fig1.In India alone, WHO estimated that the mental health problems is of the tune of 2,443 DALYs(Disability Adjusted life year) per 100,000 population i.e. at least 6.5 percent of the total population. Even behind suicide deaths depression remains to be a major reason as more than 800,000 people die by suicide in a year.

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Mental illness cannot be linked only with certain age. It is totally dependent on the mental health of an individual, be it due to depression, anxiety or stress. It is easier to find any mental disorders in adults than in children as kids might not express the signs of major depressive disorder (MDD) as evident as adults could. A person suffering from this would display a range of behavioral and physiological changes. People associated with a long term undiagnosed condition may even end up in substance abuse also.

Thus, a major part in fighting against this prevailing condition is early detection. Though there have been remarkable changes in the way in which mental illness is being dealt with, the number of cases of mental illness are not decreasing, on the contrary it seems to be rising.

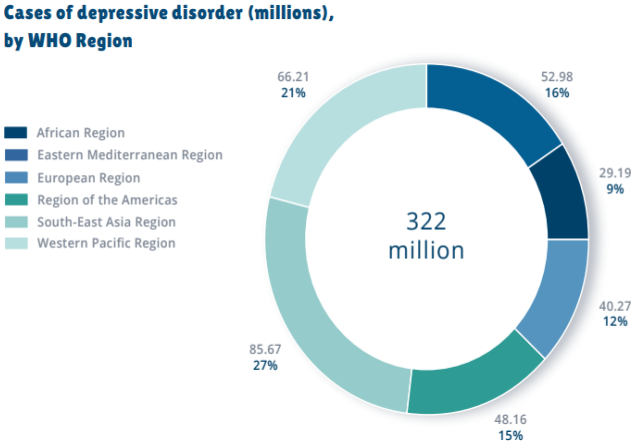


**Fig1: Illustration of depression rates based on WHO regions**

We are accustomed to physical and lab tests for our overall check up but when it comes to detection of depression, it usually involves a series of standard questionnaire dealing with daily mood and tracking of lifestyle habits which then can denote any variation from that of a healthy person. This helps to predict the mental condition of an individual by comparing the results of the test, to that of an individual with a healthy lifestyle. While this method has been helpful in coping up with the condition, self-diagnosis also plays a major role in the detection and treatment. The reason for this being that an individual may be hesitant about opening up about his struggles to others. Thus may want to try to handle his mind state on his own, but this will work only if the condition is not severe. But self-diagnosis cannot alone be considered sufficient as a lot of symptoms are not only associated with clinical depression. Thus, we will have to find better ways that will facilitate in proper detection. Technology is now advanced into almost every field.

This advancement can even be helpful in mental health support. People, be it a doctor or a layman can benefit from newer technologies as it provides a platform in managing data collection, monitoring progress and most importantly increasing understanding of mental wellbeing. It can further be used to keep measure of an individual's mental condition and thus can be used as a preventive mechanism.

## II. RELATED WORKS

**[1]. "**A Sentiment-and-Semantics-Based Approach for Emotion Detection in Textual Conversations "paper mainly focuses on Sentimental analysis used in detection of emotions like happiness, sadness or anger in textual conversations. It is based on an LSTM based Deep Learning model. This approach uses semi-automated method to gather text information and to exploit the advantages of semantic and sentiment based embedding and proposes a solution combining both.

[2]. "Facial emotion detection using deep learning" states that a technique which uses facial images may provide a real time and practical approach for non-invasive mood detection. The purpose of the study was to develop a neural network based strategy which classifies facial expressions using thousands of images and videos.

[3]." Automated Mood-aware Engagement Prediction" proposes a mood-aware engagement predictor that uses total mood disturbance score, and the analysis compares both mood sub-scale predictors and an overall mood disturbance predictor.

[4]. **"**Facial Expression Emotion Detection for Real-Time Embedded Systems" paper mainly focuses on building a real time automatic facial expression system.

[5]. "Detection and treatment of depression in physically ill" discusses the causes and methodologies involved in efficient treatment of depression.

## III. EXISTING SYSTEMS

Several technologies have been developed in order to facilitate detection of mental illness, which prominently includes sophisticated mobile apps based on data collected from facial expressions, social media usage, lifestyle habits, body language etc. These apps have been helpful in predicting the overall mental health of an individual.

### *A. Depression & Anxiety testing applications*

There are numerous Smartphone applications related to mood prediction. They provide you with a mental health assessment that can help you deal with your current state of mental health. These apps ask you a set of questions similar to that in Fig2 over a period of 14 days. Based on the results obtained from this a person can decide on the further actions he/she needs to pursue. But the method undertaken here cannot be reliable at all times, mental health cannot be decided by just a frame of questions as the person taking up the assessment could have been through some major personal loss which might have affected his decision making. Though a person with clinical depression would display the same symptoms, there are chances that it might just be a phase of grievance and not an actual case of mental illness.

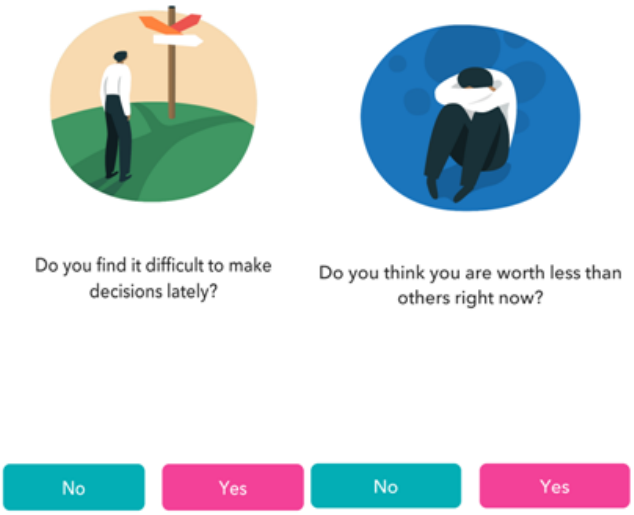


**Fig2: Experience sampling method**

### *B. Facial expression recognition system*

Several systems have been developed that use facial expressions in behavioral studies. This provides a quicker and more practical approach towards mood detection. Machine learning has been used in this approach to predict the mood of an individual, which can further be used for detection and prevention of mental illness. Here, facial expressions and data collected from hundreds of photos and videos are characterized into different parameters that will help us in the detection of different kinds of mood. Though it is possible to read the emotions on the basis of facial expressions, it cannot be of much help when it comes to internal mood of a person. Thus, it might be helpful to a certain extent but alone it cannot be used for describing the mental state of a person.

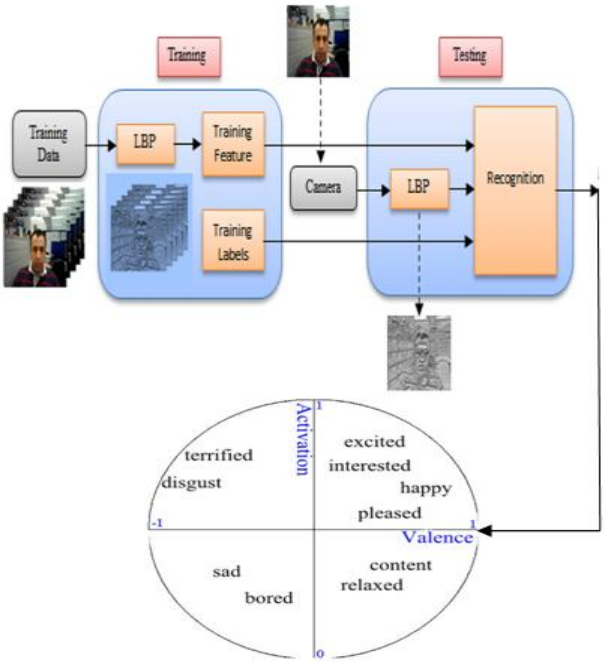


**Fig 3: Facial expression analysis**

### *C. Sentimental analysis on social media interaction*

We live in a modern day society where everyone is keen on sharing their whereabouts on social media. The posts on

social media can be used as an indication of their lifestyle habits & mind state. So, we can collect several behavioral patterns that will aid us in knowing the person's mood and social interactions. A lot of people suffering from even a mild case of depression tend to indicate feelings of sadness and emptiness. Thus using sentimental analysis we could be able to detect an individual's mind state. It uses AI in recognizing positive, negative and neutral feelings via texts such as survey responses, social media comments etc. We can even use data stored in several apps to display a pattern of behavioral changes. Like for instance the data collected from a music player. The tempo of the song and its danceability is considered. The different features of the song that a person regularly listens to can be used to predict the mood.

## IV.PROPOSED SYSTEM

Technology related to mental health has advanced a lot. But most of the existing systems focus on a single factor; this will not be able to give the most accurate result. This paper suggests a way in which multiple factors can be considered side by side in building a system. So as to combine all the determining factors in obtaining the best possible result. As social media & Smartphone have become a major part of our daily life, we could obtain a lot of relevant information from them. This information can then be processed to obtain the relevant information required to know the mental state of a person.

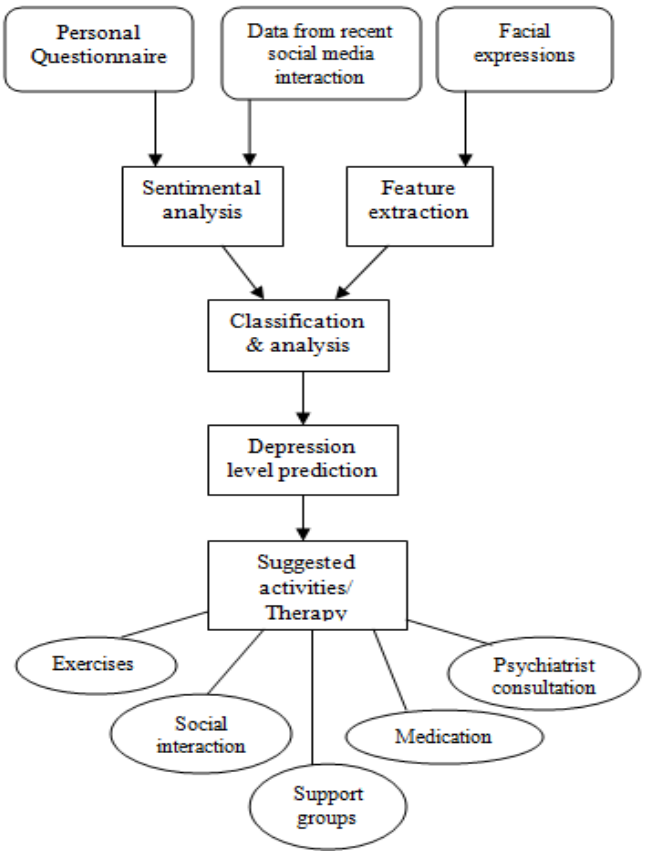


**Fig 4: Flow chart illustrating the proposed system**

**Mood Mechanic** mainly emphasizes that detection alone is not enough in fighting against mental illness but further it depends on how the results of prediction system can be used to overcome the problem being addressed. Depression can be divided into several stages and the treatment for it also depends on the severity of the issue. This proposed system as shown in fig 4 not only targets on prediction but also guides the recipient of the predictive result, on what further action he/she must undergo. This involves developing a system which shows an individual's mood & a prediction of the severity of the depression if it exists. Depending on the depression rate the individual can be classified into which band of mental health does he belongs to and decide what medication or treatment is required as shown in Table 1.

Table 1: Different stages of depression and possible treatment involved

Reference [5]

| **Stage of depression** | **Possible treatment** |
|---|---|
| Minor, and mild to moderate depression | Self-help,exercise,psychological intervention |
| Moderate to severe depression | Medication, social support, psychological intervention |
| Patients with depression and physical illness. | Supervision from mental health professional |
| Suicidal individuals,resistant to treatment | Medication,combined treatments,electroconvulsive therapy |

The major advantage of this system is that it would not only predict but also focus on treatment of the individual who has now been predicted to have that particular condition. To facilitate this, once an individual has been diagnosed with a particular stage of depression he/she will receive suggestions of what the treatment involved should be. For this several therapy guides have to be thoroughly examined so as to come up with exact plan of action.

Like for instance if the patient suffers from minor or mild depression; than the system shows various self-help methods and exercises an individual could perform. But in case severe diagnosis of severe depression then psychiatric help is needed. Then the system searches for the nearest top psychiatrists and suggests it the user. It also displays nearby events so that social interaction and the lifestyle of that particular person may be influenced in order to facilitate faster recovery.

The system would be trained in such a way that if the depression is at certain

extreme level it would immediately suggest professional help and try to convince the individual that the condition would get worse if treatment is not administered soon.

## V. CONCLUSION

Thus Mood Mechanic would be very useful for patients suffering from depression and mental illness. This would give an excellent solution of how to detect and deal with depression. This approach being self-interactive would equally focus on prediction as well as treatment of an individual with a certain mental condition. It would be very effective as users are the ones who are directly administering their problem as this will enable an individual to keep check on the progress he/she is making with regards to the treatment being undertaken. All of these features can be summed up to build a mobile application for easier access. This approach if implemented in real time it would reduce depression rate and would be a helping aid in fighting against mental illness.

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