

A Study on Depression Analysis using Machine Learning Techniques among College Students

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Abstract:

Stress is a psychological condition that reduces the quality of sleep and affects every facet of life. Mental stress is a major issue nowadays, especially among youngsters. The age that was considered once most carefree is now under a large amount of stress. Recent days, Stress increase to leads to many problems like depression, suicide, heart attack, and stroke. In calculating the mental stress of students one week before the exam and during the usage of the internet. The main objective of this study to analyze the stress level in the college students at different points in his life. The main motive of this system was to use a machine learning approach in stress detection. Using information from the writings of a patient can potentially be a valuable source of information, especially now that more and more treatments involve computer-based exercises or electronic conversations between patient and therapist. In this predictive modelling using writings of patients under treatment for a social anxiety disorder or mental stress. Extract a wealth of information from the text written by patients including their usage of words, this work is discussed about, the sentiment of the messages, and the style of writing. The dataset originates from a clinical trial in which patients engaged in a self-help treatment program and wire supported by a secured email facility to interact with a therapist. The therapist pro-actively approached the patients on a weekly basis. The highest accuracy of the classifier is around 70% of LSTM and for SVM the highest accuracy is 81.79%. It trained the classifier on the datasets that are widely used in literature for the emotion mining tasks. The NLP technique gives an accuracy of 80% for detecting depression using features extracted from text data collected from online depression forums. Naive Bayes has provided the best accuracy of 85% in detecting depression after collecting data from 210 people.

Keywords —Depression, Machine Learning, Mental Stress, Naïve Bayes, Natural Language Processing, Support Vector Machine.

I. INTRODUCTION

Stress is a term frequently utilized synonymously with negative life experiences or life occasions. Logical research on pressure and uneasiness offers different points of view on the issue. The expanding pace of life hurried and focused ways of life imply that stress is an integral part of human life. A man in a condition of adjusting to pressure demonstrates conduct resistances. This prompts changes in one's

psychological procedures and enthusiastic scene. Stress can be a kind of mental disorder [1]. It additionally has a role in response to nature, and inspirations. A large damage may be there due to measures of pressure. Due to stress, there may be other health issues like obesity, heart attack, diabetes, asthma etc. Every hour, a student commits suicide in the different part of the country [2]. Our country has reported large suicide cases of the

youngsters aging between the age group of fifteen to twenty- nine, as per Lancet report 2012. This is an approach with the help of which it can analyse the stress at its very first step. It can find out the stress level in the students, in the short or long term it can help them in recovering. In the year 2015, the number of the suicide of students was 8,934. From 2010-2015, 39,775 students were dead due to suicide [5]. It used machine learning (ML) to identify the increasing stress level in the students and to predict the stress beforehand and be able to stop the major damage to their life before happening.

II. RELATED WORK

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it. The Health Information Text Extraction system (HIT Ex) are used to approaches for specific diseases such as enrich coded data with terms extracted from physician notes for mind depression. The patients are detect using NLP techniques it was used to classify True suicide notes are predefined who tire depressed at the time of writing, those who it not depressed and had never been depressed before, and those who had a history of depression but did not fulfil the criteria at the time of writing[7]. Clark and tills developed the self-help treatment program that provides support to patients by a secured email facility to interact with a therapist. The therapist proactively approached the patients on a tickly basis [4]. Depression is not just a temporary feeling of sadness, but a chronic condition that can significantly impact an individual's overall well-being, daily functioning, and quality of life. It is caused by a combination of biological, psychological, and social factors and can manifest in different ways in different individuals [6]. Identifying depression can be challenging due to its subjective nature and overlapping symptoms with other mental health conditions [10].

A. Issues in Related Work

- This system is used only for email conversation.
- Patient problem are not detected by parents, teachers and friends and not reported by the existing system.

- Patient wrote an email the therapists, if its ignored by a mistake to answer, it may cause patient life to be dangerous.

III. PRE-PROCESSING

The predictive modelling of social anxiety symptoms, the dataset originates from a clinical trial in which patients engaged in a self-help treatment program and were supported by a secured email facility to interact with a therapist. The therapist pro-actively approached the patients on a weekly basis. The treatment covered a period of twelve weeks in total and the dataset covers 69 patients, all diagnosed with a social anxiety disorder. It try to predict successful therapeutic outcome (according to a significant improvement in the Social Phobia Measure from the start to the end of therapy) at three points in time: [1] at the start of the therapy by means of socio- demographic data; [2] halfway through the therapy (6 items) by using the sociodemographic data and the emails sent by the patient up to that time point, and [3] at the end of the therapy by using the socio-demographic data and all email data originating from the patient. To extract useful predictors from the emails, it deploys range of techniques, including basic emailing behaviour (e.g. Response time, length of emails), word usage, writing style, sentiment, and topic modelling. It not only looks at the average score for these predictors, but also study their trends over time.

- Predicting therapeutic outcome in the mental health domain is of utmost importance to enable therapists to provide the most effective treatment to a patient
- One solution to the many challenges faced by mental health care is the use of new technology such as the Questioner System using Naïve Bayes Classifier.
- This microblogging-based system extracts a wealth of information from the text written by patients including their usage of words, this works in discuss about, the sentiment of the messages, and the style of writing.
- This method is used to alert to parents, friends and family about the depression, and give suggestions and helps to interact with a therapist.

IV. PROPOSED METHODOLOGY

Predicting therapeutic outcome in the mental health domain is of utmost importance to enable therapists to provide the most effective treatment to a patient. One solution to the many challenges faced by mental health care is the use of new technology such as the Questioner System using Naïve Bayes Classifier[13]. This micro blogging-based system extracts a wealth of information from the text written by patients including their usage of words, this work of discuss about they talk about, the sentiment of the messages, and the style of writing. This method is used to alert to parents, friends and family about the depression, and give suggestions and helps to interact with a therapist.

- The Proposed System is Questioner System, which provides treatment suggestions for depressed persons through social media. Naïve Bayes Classifier is used in this proposed method to classify the depressed from the social conversations. Patients are detected by way of texting in micro blogging facility to interact with a therapist, friends and family.
- Take user’s recent individual emotion as well as emotion difference between user and microblog as metrics to further analyse user’s retweeting sentiment tendency.
- Improve traditional Salton metrics according to directivity of link for being applied to directed network better.
- Blend temporal information in user’s retweeting sentiment features on the basis of time series of user’s contents and network topological information so as to capture dynamic evolution process of information and network structure.
- Build a multilayer Naive Bayes model[13] on account of Naive Bayes models from different dimensions to complete user’s sentiment tendency analysis in a more fine-grained perspective.

A. Advantages of Proposed Methodology

- Easy and fast to detecting the Negative thoughts from patient using Micro blogging.
- This Micro blogging facility to interact with a therapist friends and family which are faster and more efficient.
- The ability to predict patient’s outcomes early and therapy can be valuable because it can

allow therapists to adjust therapy as soon as possible.

B. Predicted ML Model

The system development involves predictive modelling of social anxiety symptoms using data from a clinical trial. The dataset covers 210 patients and aims to predict therapeutic outcomes using socio-demographic data and email data from patients.

Various techniques are used to extract useful predictors from the emails, including response time, length, word usage, sentiment, and topic modelling. Predicting therapeutic outcomes in the mental health domain is crucial, and new technology such as the Questioner System using Naive Bayes Classifier [13] can be helpful. This microblogging-based system extracts information from patient text, including their usage of words, sentiment, and writing style, and can alert family and friends about depression and suggest interacting with a therapist. The proposed predicted ML Model shown in Fig. 1.

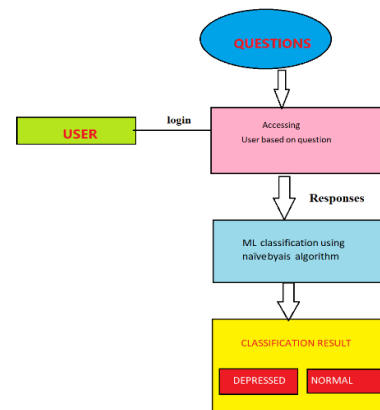


Fig. 1Proposed Prediction ML Model

V. RESULTS & DISCUSSION

Through this analysis, to explored various aspects of depression, including its definition, causes, risk factors, symptoms, diagnosis, and treatment options [8]. In Fig. 2 shows that various level of depression.

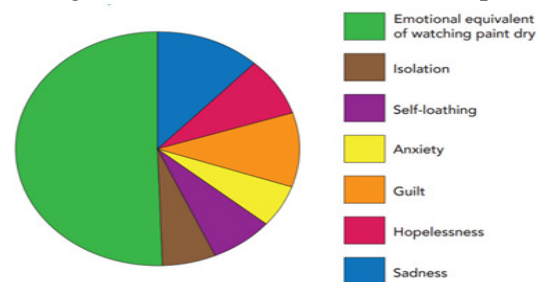


Fig. 2Depression Level Chart

However, various screening tools and diagnostic criteria are available to assist healthcare professionals in making an accurate diagnosis. Treatment options for depression typically include a combination of pharmacotherapy, psychotherapy, and lifestyle changes.

However, the effectiveness of treatment may vary depending on the severity of depression and the individual's response to different interventions. It is essential to consider a personalized and holistic approach to managing depression, addressing not only the symptoms but also the underlying causes and contributing factors. The highest accuracy of the classifier is around 70% of LSTM and for SVM [14] the highest accuracy is 81.79%. It trained the classifier on the datasets that are widely used in literature for the emotion mining tasks. The NLP [13] technique gives an accuracy of 80% for detecting depression using features extracted from text data collected from online depression forums. Naive Bayes has provided the best accuracy of 85% in detecting depression after collecting data from 210 people. Depression prevention level identified in our system shown in Fig. 3.

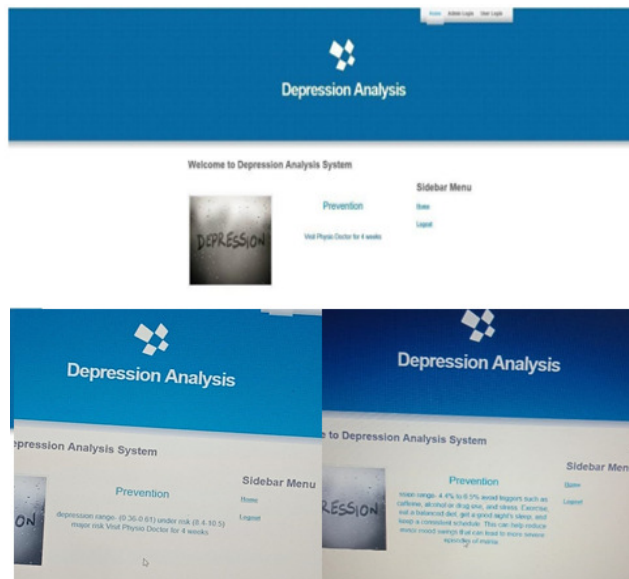


Fig. 3 Depression Prevention Level in our System

VI. CONCLUSION

In conclusion, depression is a complex mental health condition that affects millions of people worldwide. Through this analysis, we explored various aspects of depression, including its definition, causes, risk factors, symptoms, diagnosis,

and treatment options. It is caused by a combination of biological, psychological, and social factors and can manifest in different ways in different individuals. Identifying depression can be challenging due to its subjective nature and overlapping symptoms with other mental health conditions. However, various screening tools and diagnostic criteria are available to assist healthcare professionals in making an accurate diagnosis. Treatment options for depression typically include a combination of pharmacotherapy, psychotherapy, and lifestyle changes. However, the effectiveness of treatment may vary depending on the severity of depression and the individual's response to different interventions. It is essential to consider a personalized and holistic approach to managing depression, addressing not only the symptoms but also the underlying causes and contributing factors. In future, this work may be extended in Advanced Machine Learning Techniques, Personalized Assessment and Treatment Planning, Integration with Telehealth and Remote Monitoring.

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