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A Critical Analysis of Machine Algorithms to Perdict Depression

P.S Thakur,
Associate Professor, Government Degree College,
Billawar, Kathua, Jammu and Kashmir, India

Abstract - Due to competitiveness in the society workload make brain drain especially among the students. Prediction of mental health particularly anxiety and depression are incredibly challenging mission. The paper evaluates the machine learning algorithm to predict the mental health especially anxiety and depression.

Keywords - Anxiety, Machine learning algorithm, Depression.

I. Introduction

Recognizing the elements of psychological wellness issues among understudies has turned into a difficult errand. The elements can be impacted by natural, mental, and ecological issues. Finding can be interesting and intricate as side effects and factors are frequently comparable; this can lead the specialist to misdiagnose [1], and some unacceptable treatment being managed to the patient, subsequently risking the patient mental circumstances, both sincerely and typically. The World Wellbeing Association (WHO) characterizes psychological well-being issues or mental problems as the blend of unusual contemplations, feelings, conduct in everyday exercises, and associations with others [2]. The presence of AI would help in the extraction of information and may work on the nature of clinical practices [3].

II. Depression in Higher Education System in Jammu Division

The advanced education framework in Jammu is the full liability of and worked by the advanced education organizations (HEIs) under the power of the Service of Advanced education (MOHE) [4]. They cover public foundations subsidized by the public authority and confidential organizations, with both contribution declaration, confirmation, undergrad, and postgraduate software

engineers. The five degrees of advanced education capability are Declaration, Certificate, Four-year certification, Graduate degree and Specialist of Reasoning (PhD). These foundations for advanced education assist with human turn of events and up versatility out of destitution by delivering top notch graduates to function as top-level salary experts who add to the monetary area and the social climate [5].

The college is a spot to acquire information, in spite of the fact that life at college can be testing and loaded up with hindrances. Nonetheless, understudies can in any case succeed. These days, most of understudies protest about the elevated degree of stress they experience in their college lives, including sensations of nervousness and discouragement, particularly towards the finish of the semester [6]. The degree of stress increments as the growing experience advances because of the need to adjust evaluations, responsibility and assessments [7]. Different variables may likewise influence understudies' emotional wellness.

Understudies might confront a high gamble of creating emotional well-being issues because of family issues, vulnerabilities about their future vocations, monetary difficulties and troubles emerging out of residing away from home [8]. Adjusting between life at college and different requests or needs can likewise lead the understudies to confront the gamble of creating psychological well-being issues [7],[9].

III. Depression

Sorrow is portrayed by steady bitterness, loss of interest or energy, sensations of responsibility or low self-esteem, upset rest, loss of craving, weariness, and failure to think [15]. As indicated by the Public Establishment of Emotional wellness, misery or clinical despondency is a serious state of mind problem that causes extreme side effects that influence the way one feels, thinks, and handles everyday exercises [13]. Gloom can make torment the individual experiencing the illness and individuals around them. It tends to be a serious wellbeing worry as it might prompt self destruction [15]. The signs and side effects of gloom incorporate ceaselessly feeling miserable, vacant, irredeemable, indifference for side interests and exercises, and depleted [13],[15].

There are a few sorts of despondency, and a couple of them are tenacious burdensome problem, post birth anxiety, and insane misery [13]. Tireless burdensome problem, otherwise called dysthymia, is a condition of low mind-set that goes on for something like two years [15]. An individual who is determined to have diligent burdensome problem might have significant burdensome episodes alongside times of less serious side effects, however signs should endure over two years to be viewed as persevering burdensome issue [15]. Individuals with crazy sadness experience serious discouragement with some type of psychosis, for example, having stunningly deceptions, or hearing/seeing upsetting things that other output other/see. The side effects of insane sorrow commonly have a dismal "subject, for example, dreams of responsibility, neediness or sickness [15]. The advancement of another mind-set.

IV. Review of Literature (Related Studies using Machine Learning Algorithms)

Machine Learning is a logical discipline that spotlights on how PCs gain or gain information from information. AI is characterized as a field of study that gives PCs the capacity to learn without being unequivocally modified [3, 27]. AI can be separated into four classifications: regulated learning, solo learning, semi-managed learning, and support learning [23]. In light of Table 2, managed learning is the most chosen information mining methods to take care of the issues in characterizing psychological well-being issues.

Table 2. Comparison Factor of Mental Health among Higher Education Students

Author	Techniques	Variables	Significances
[18]	Random forest, NB, SVM, KNN	Perceived Stress Scale (PSS) Questionnaire	The accuracy of randomforest83.33%, NB 71.42%, SVM 85.71%, KNN 55.55%
[24]	DT, SVM, ANN, BN	Outgoing activity, toileting activity, sleeping activity, disease, mental status (GDS)	DT 95.1%, SVM 75.6%, ANN96.7%, BN 92.7%
[25]	KNN,SVMBN	Depression level, sex, grade, major, technical, novel, amusing, psychological	Mild depression: DT 94.3%, SVM75.6%, ANN 96.2%, BN 91.3%
[26]	Random forest, rand om tree, MLP, SVM	Age, MMSE score, neurological condition, depression (GDS), MoCAtest	Severe depression: DT 99.4%, SVM99.5%, ANN & BN 100%

The most commonly applied algorithms are Support Vector Machine (SVM), followed by Decision Tree and Neural Network. These three models are highly accurate, above 70%, with good generalization capabilities that prevent over fitting [27]-[28].

V. Objectives

Based on their view of the relevant research studies, the main objectives of the

proposed work are summarized as follows:

1. To study and systematically review the classification and prediction data mining techniques in the context of depression problem in the different Universities of Jammu Division.

2. To prepare a data set while identifying the suitable age group for study.

3. To identify the parameters/symptoms significant for the prediction of depression.

4. To propose a suitable prediction technique based on availability of data and significant symptoms extracted for the prediction of depression.

5. To implement proposed technique for prediction of depression

6. To evaluate the proposed technique and cross validate the model.

VI. Research Questions

This systematic review will be conducted in an effort to answer the following key questions:

1. What is the documented prevalence of depression or anxiety among university students in Jammu Division?

2. Which socio demographic and curricular factors are associated with depression or anxiety among university students in Jammu Division?

VII. Research Hypothesis

H1: To evaluate short- and medium-term consequences of depression or anxiety among university students in Jammu Division.

H2: To compare the different machine learning algorithm for prediction of data taken for depression from the different universities of Jammu Division.

H3: To critically analyze the cause of depression among the students of the study area.

H4: To implement the optimize machine learning algorithm for prediction of data (depression) taken from the study area.

VIII. Research Methodology

1. Review the predictive data mining techniques in context of depression data by keeping track of the latest research. This would be done by studying related articles published in journals.

2. Prepare a data set and categorize based on age groups while identifying suitable age group

3. Normalization and preprocessing of data which includes exploring the different features and symptoms of depression and extraction of significant features using appropriate data extraction and reduction techniques to reduce the number of symptoms.

4. Proposing an appropriate predictive detaining technique based on data collected and features extracted to predict depression.

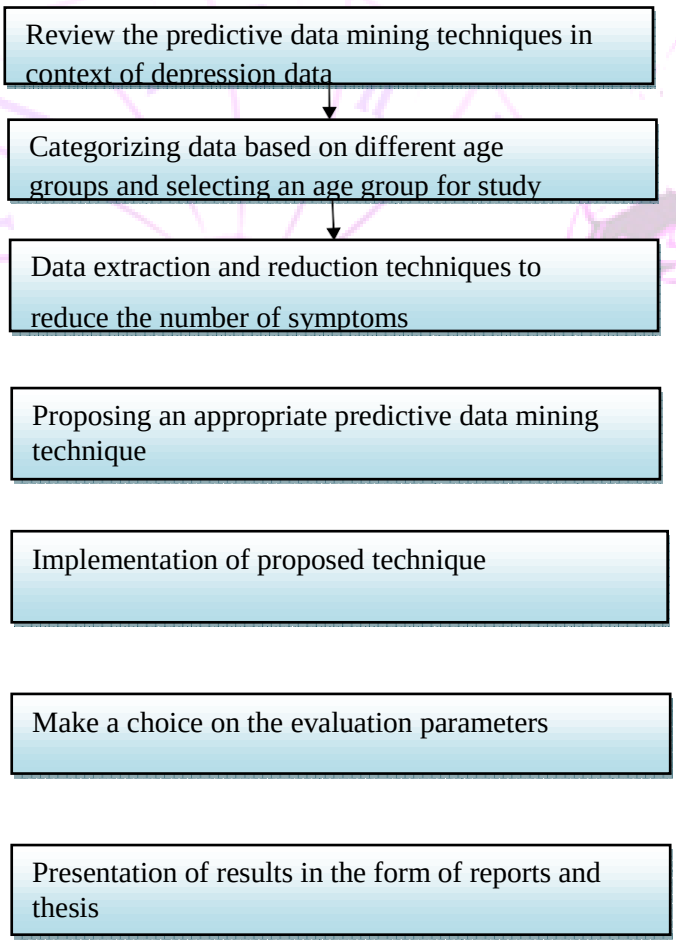
5. Implementation of proposed technique.

6. Making a choice of the evaluation parameters.

7. Evaluate the proposed technique to testify expected resultsaremet.

8. Presentation of results in the form of research papers and thesis report.

IX. Workflow



X. Conclusion

The paper explores the comparative analysis of machine learning algorithm which is suitable for the prediction of anxiety & depression among the students of the higher education. A detailed overflow and tabulated framework have been prepared for the said research analysis and evaluation. The paper outlays the research stand for the prediction using machine learning algorithm.

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