

# An Empirical Analysis of Academic Stress on Student in Colleges with Machine Learning Algorithm

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**Abstract:** The major threat to student life in last few decades is psychological problem. Sharing their feelings in social media is commons in recent days. Parent and teachers feels difficult to handle the stress of adolescence age student in their institution and families. The emotional states are not in long lasting; their emotion will be in pleasant emotion such as joy or unpleasant emotion such as worry. The recent studies relieves that male students have lower academic stress than female student. Through psychological question students are tested to identify the stress factor that them .In this propose work the stress state of student is clustered using k-means clustering algorithm and it categories percentage of stress factor of student.

**Keywords-** psychological problem, stress factor, k-means clustering

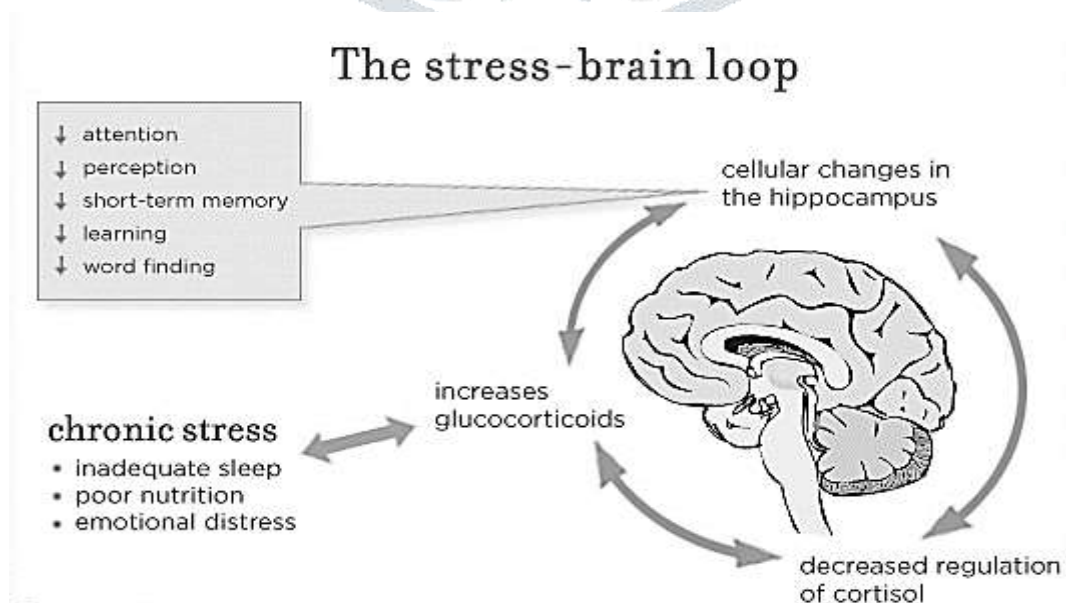
## 1.INTRODUCTION

Stress was first coined by Hans Selye (1930) is a biopsychosocial model that refers the failure of organism to respond. Stress is your body reacting for any kinds of demand. It may be positive or negative experience. If people is feel stressed by something around them when they stressed their body release the hypothalamus signals the adrenal gland to produce more hormone and that react with blood. If stress is positive that gives more energy, if stress is negative that leads people to response something emotional and their will not be any positive energy. Stress may affect both your body and your mind. The most crucial stage in life is Adolescence and their nearness of condition like stress, depression and anxiety at this phrase of life is matter of concern [1]. The majority of adolescent undergo stress. Their depression at this stage increases the risk of suicidal behaviour, tobacco use and other substance abuse into adulthood.

Some of the common problems faced by adolescence are:

- Breakup with boy or girl friends
- Arguing with parent
- Changes in financial status of parent
- Trouble with siblings
- Trouble with classmate

Understanding the adolescent girl behaviour in the content of brain reaction can help the behaviour management with calming strategies.



**Fig1. Stressed adolescent girl's brain**

This part of brain act as a CEO and controls all higher brain function such as judgment, decision making, emotional regulation and problem solving. When the survival brain is in charge a may react aggressively, fight refuse, throw a temper tantrum. The brain integration is break down due to stress and depression. The two side of brain need to work common for balance emotion. If communication between the left and right side of brain is not worked properly then it is the feeling of helplessness, despair and anxiety run. This deficiency impairs communication with other dendrites, reducing the brain ability to process information effectively. Girls and boys experience distinctly different patterns of stress during adolescence that may leave girl to more depression. The similar level of stress was experienced by both adolescence male and female. Perhaps adolescence girl experience more stress in their relationship with their parent and friends. Where adolescence boy face stress in troubling with friends or other factors outside their relationship with others.

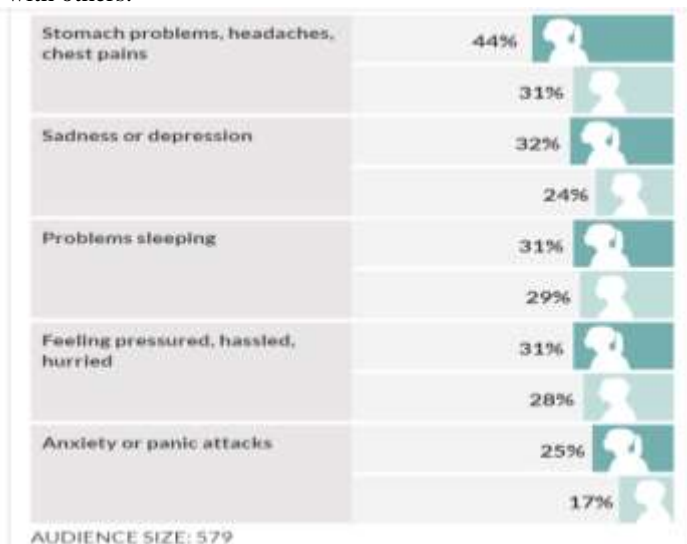


Fig 2. Teen Girls more Stressed than boys

Overall symptoms of depression are associated with stress levels in girls than in boys. Parent says that their teen daughter has more stress then their teen sons. Home and schools are the major factor for these problems. The majority of suicides (37.8%) are in India below the age of 30 years their deaths are due to mental disorder [2]. The present studies are carried with the objective to predict the stress in girl on their adolescence period; she bound to all the social and educational responsibilities in her life. This paper organized as follows section II gives table of review, section III is proposed work, section IV is Methodology, section V is Experimental verification, Section VI is Result and Discussion and section VII is Future work.

II. TABLE OF REVIEW

S.No	Paper	No.of Student	Name of Stress	Description
[1]	Depression , Anxiety and Stress among Adolescent Students Belonging to Affluent Families : A School-based Study	242 students	Academic stress	Through this study female student have more stress (rank 132.5) then male student(113.2)
[2]	Suicide and its prevention: The urgent need in India	Nil	Mental disorder	The majority of suicides (37.8%) are in India below the age of 30 years their deaths are due to mental disorder
[3]	A Study On The Effectiveness Of A Stress Management Programme For College Students	136 undergraduate student	Academic stress	The stress management for undergraduate student was conducted with two stages, through this they identified lower levels of stress, anger, helplessness and salivary control in students

[4]	Academic Distress, Perceived Stress And Coping Strategies Among Dental Student In Saudi Arabia	556 dental student	Dental environment stress	The study was start with first year academic student of dental college. Through this study the female and married student have high stress than male and junior student. The student with high stress scored low mark in exam.
[5]	Perceived Stress , Reasons For And Sources Of Stress Among Medical Students At Rabigh Medical College , King Abdulaziz University , Jeddah , Saudi Arabia	176 medical student	Academic stress	Due to their daily life and academic burden medical student having the more stress. Student with low stress will scored more marks in exam.
[6]	Activity based Mental Stress Detection and Analysis	19500 samples from different participants	mental stress	The physical and mental maturity was growth rapidly in the stage of Adolescent. The disease that identified in stress is heart disease, sleep difficulties, headaches and performance leads to behaviour disorder.
[7]	An Analysis of students ' performance using classification algorithms	Nil	Nil	Here they analysis and evaluate the student performance by data mining algorithms and finally concluded that Random forest is better than the other algorithm.
[8]	Prevalence of and Risk Factors for Depressive Symptoms Among Young Adolescents	9863 students in grade 6,8 and 10	Academic stress	Depression is the unrecognized problem in an adolescence age.
[9]	survey on stress types using data mining algorithms	Nil	Nil	The higher secondary school students are having the stress to score more marks in examination. to play their role effectively, they must have good physical and psychological functioning.

### III.PROPOSED WORK

The Proposed work shows a maximum conversion of student stress in their adolescence age the data's are trained and tested with an algorithm with the output whether they are stressed student or non-stressed student.

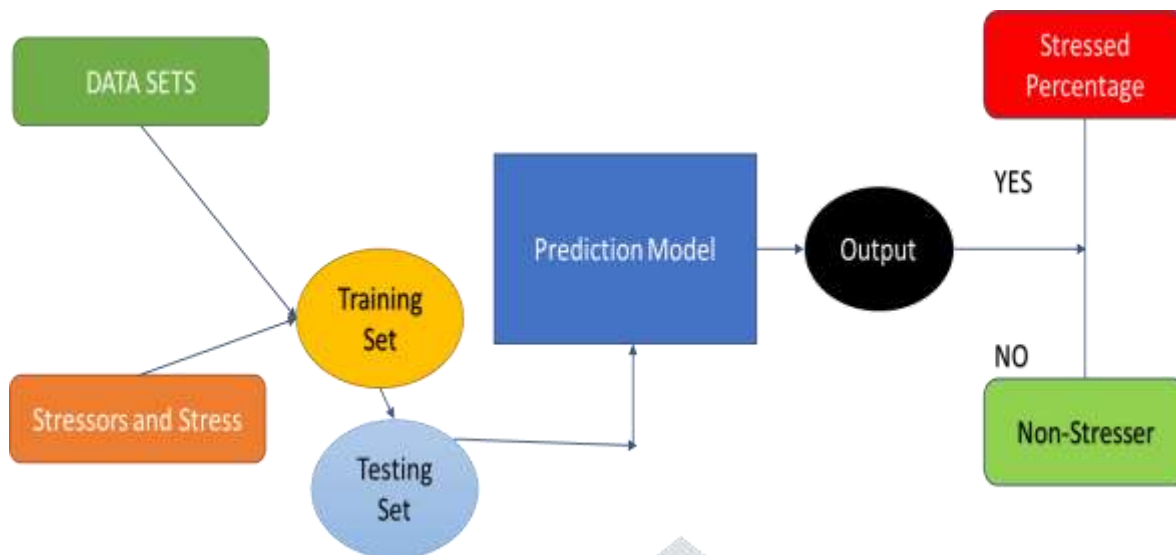


Fig 3 – Proposed model for predicting stress in adolescent girls

**IV.METHODOLOGY**

Clustering is concerned with grouping objects together that are similar to each other and dissimilar to the objects belonging to other clusters. Analytics is carried out with the help of clustering algorithm that will classify the clusters for better analytics. Clustering algorithm must be able to deal with different types of attributes [6][9]

**a) K-medoids Algorithm**

The k-medoids algorithm is a clustering algorithm related to the k-means algorithm which attempts to minimize the error. The k-medoids algorithms are partition the dataset into groups and attempt to minimize the distance between points [6].

**a) Random Clustering**

The operation on dataset performs randomly in random clustering. This process will randomly select the examples for clustering. Thus the K- medoids and Random clustering is used in an analyzing process.

**b) Questioner**

A Questionnaire is about the degree of stress that faced by Adolescence girl was up. This consist of Q1 to Q50 questions Q1-Q10 is about the Academic factor, Q11-Q20 is about the Social Factor, Q21-Q30 is about the personal Factor, Q31-Q40 is about the Personal Factor and Q41-Q50 is about the Exception Factor. Which respondent were stressed (NEVER, IN NEED, CONSISTENT, ALWAYS). The some of the factors are shown below:

**a) Academic Factor**

1	How long do you study your subjects every day?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
2	How much you spend for academic related works for a period of time?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
3	Do you expect to achieve good grades for the semester?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
11	Do you get good support from your locality for your education?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
12	Do you face any insult or dishonour in social meetings of your locality?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
13	Do you walk so long to reach the educational institution?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
16	How often Do you have dreams during your class session?			
	NEVER	IN NEED	CONSISTENT	ALWAYS

c) Personal Factor

11	Do you get good support from your locality for your education?			
	NEVER	NEVER	NEVER	NEVER
12	Do you face any insult or dishonor in social meetings of your locality?			
	NEVER	NEVER	NEVER	NEVER
13	Do you walk so long to reach the educational institution?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
14	How often you face problems from your locality women and friends?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
15	Have you got any nightmare from your locality on any study related aspects?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
16	Have you got money tension from your society people?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
17	Do the people in the locality understand your interest in studies?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
18	Do the locality people speak bad about your family for being educated?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
19	Do the locality recommend you to marry early for education?			
	NEVER	IN NEED	CONSISTENT	ALWAYS
20	Rate your Society on their role in your life.			
	POOR	AVERAGE	GOOD	BEST

V. EXPERIMENTAL VERIFICATION

Dataset Analysis:

Research Tools- Stress prediction for adolescent girls is projected and analysed by major research tool MATLAB for Prediction of Stress based on 5 major factors.

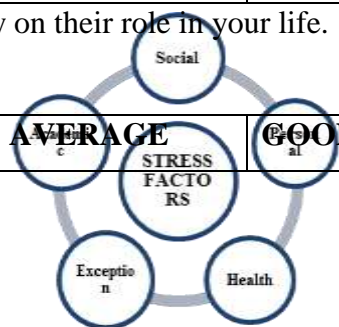


Fig 5 Stress factor of teenage

Matlab is a powerful mathematical tool for matrix calculations and also calculate any other mathematical function we need. A graphical user interface is provided in matlab, it is a user familiar environment

**Stress percentage calculation** - The prediction 1 is a value of high stress. The prediction 2 is an value of overall stress. The percentage is calculated and using the message box the percentage is displayed.

$$\text{strper} = \text{pred1} / \text{pred2} * 100$$

## VI.RESULT AND DISCUSSION

Percentage level of stress factors are:

Factor	Result
Academic	23.95
Social	19.92
Personal	30.00
<b>Health</b>	<b>31.09</b>
Exceptions	30.50

The result showed that Health has maximum percentage comparing to the other factors and hence the research result is concluded with **Health** as the major factor for stress in Adolescent girls in all walks of their life.

## VII.FUTURE WORK

This research is a new dimension of analysis and prediction that may kindle new outcomes for the future. The stress analysis can be carried out with sensor based analysis in a machine and results can be predicted in new dimensions that may physically identify the presence of stress in human beings in the years to come.

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