

EEG Signal Stress Detection

Pavan Manputra¹ Shreyash Mavle² Akshay Londhe³ Samadhan Narute⁴ Nisha Kimmatkar⁵

^{1,2,3,4}UG Student ⁵Professor

^{1,2,3,4,5}Department of Computer Engineering

^{1,2,3,4,5}JSPM's RSCOE Tathawade, Pune – 411033

Abstract— Health organization shows stress is a significant problem of this generation which affects both physical as well as the mental health of people. According to Research in area of stress detection has improved many techniques for monitoring the human brain and Body which detects Stress. The traditional stress detection system is based on physiological signals and facial expression techniques. This proposes a novel method that detects the stress using EEG signals and reduces the stress by introducing the interventions into the system. Propose methodology delivered system which use SVM Algorithm for divide the subjects into different categories and to measure stress to estimate the stress level. By Result generating throw system humans can take action for determining best solution for stress management. System generates feedback from stress hormones. The collected data was then used to extract a set of features using Discrete Wavelet Transform (DWT). The extracted features are operated to identify anxiety stages using hierarchical Support Vector Machine (SVM) classifier. For categorizing "stressed" and "relaxed" conditions SVM have been planned. Results have shown the possible of using EEG signal to envision different levels of stress. This paper converses the methods and modifications planned earlier in literature for removing entrance from an EEG signal and categorizing them.

Key words: Support Vector Machine (SVM), EEG Signal

I. INTRODUCTION

The stress response can be measured and evaluated in terms of physical response, perceptual and behavioral and physical responses .throughout the research in science and technology has granted methods which can be used to take the stress detection. The measurement of stress using neurophysiologic signals that include neurological signals. Brain activates many neuropeptide-secreting systems in response to stress. In result to this activation, adrenal corticosteroid hormones are released, which are known as "stress hormones". EEG is an important method for deployment in the transient dynamics of the human brain's large-scale neuronal circuits. In EEG, electrodes are located at the bonce casing to make a good interaction with scalp and list the electrical abilities due to neuronal action .EEG provides good observational data of variability in mental status because of its high temporal resolution. EEG waveform (amplitude and frequency) depends on the conscious level of the person. Alpha waves are more active in occipital and frontal regions of the brain. These waves are associated with idleness of the brain. So in no stress condition, when the brain is doing no activity, alpha waves are dominant. In stressful situations, the power of alpha waves falls down showing the change in response under stress. Beta waves show varying behavior in different frequencies in different parts of the brain and power in theta waves increases under stress or mental tasks. EEG signals

are very sensitive to artifacts, whose source is not the brain. Possible sources of artifact in EEG signals include either technical reasons or person's own behavioral and physical activities.

II. PROBLEM STATEMENT

The results generate through the efficiency of the system to detect mental stress and State in real time for Observation and Data Processing on EEG Signals of different Peoples brain wave.

III. LITERATURE REVIEW

Paper Name: The cognitive activation theory of stress.

Author: Holger Ursin, Hege R. Eriksen

Description: This paper presents a intellectual beginning theory of stress, with an official system of methodical meanings. The term 'stress' is used for four features of 'stress', stress incentives, stress knowledge, the non-specific, overall stress answer, and involvement of the stress response. These four meanings may be restrained separately. The straining reply is a overall panic in a homeostatic scheme, creating overall and general neurophysiological beginning from one level of arousal to more arousal. The strain reply happens when here remains rather lost, for occurrence a homeostatic imbalance, or a threat to homeostasis and life of the entity. Formally, the alarm occurs when there is a inconsistency amongst what must be and what is—between the value a variable should have (set value (SV)), and the real value (actual value (AV)) of the same variable. The stress response, therefore, is an essential and necessary physiological response. The unpleasantness of the alarm is no health threat. Though, if continued, the reaction may main to infection and illness through well-known pathophysiological procedures ('allostatic load').

Paper Name: EEG Signals to Measure Mental Stress

Author: Ahmad Rauf Subhani†, Likun Xia, Aamir Saeed Malik

Description: Stress is a physical and psychosomatic reply to intimidating circumstances which need change in homeostatic inequity produced by a overall panic in homeostasis. Normally, the alarm happens once there is a inconsistency between pardon it should be and what it is Innovative exertion on pressure was made by Hans Selye who presented the term 'stress' in medicinal trainings by presenting a general adaptation syndrome (GAS) [2]. The stress response can be restrained and assessed in terms of perceptual, behavioral and physical responses. Psychological forms are usually used to deduce strain in relations of behavioral variations. Growth in science and knowledge has granted methods which can be used to income the impartial dimension of pressure using neurophysiological signs that include nervous signals.

Paper Name: Neurocircuitry of stress: central control of the hypothalamo–pituitary–adrenocortical axis

Author: James P. Herman and William E. Cullinan

Description: Integration of the hypothalamic–pituitary–adrenal stress reply occurs by way of connections between stress-sensitive intelligence electrical system and neuroendocrine neurons of the hypothalamic periventricular center (PVN). Stressors connecting an immediate physiologic risk ('systemic' stressors) are communicated straight to the PVN, probably via brainstem catecholaminergic projections. By contrast, stressors needful understanding by higher brain structures ('processed' stressors) appear to be channeled through limbic forebrain circuits. Forebrain limbic sites connect with the PVN via interactions with GABA-containing neurons in the bed nucleus of the stria terminals, periotic area and hypothalamus. Thus, final amplification of processed stress replies is likely to involve inflection of PVN GAB Aergic tone. The functional and neuroanatomical data obtained suggest that disease processes involving inappropriate stress control involve dysfunction of processed stress pathways.

Paper Name: Stress and Cognition: A Cognitive Psychological Perspective

Author: Lyle E. Bourne, Jr., and Rita A. Yaroush

Description: the direct effects of microgravity on the central nervous system and the motor system of the body and (2) the non-specific effects of multiple stressors. Evidence available to date is consistent with both hypotheses and further experiments are required to settle this question. The matter has applied inferences because the countermeasures wanted to better or avoid presentation deficits will vary giving to which philosophy is correct. Sympathetic and perfecting presentation deficits will surely help safeguard safer processes aboard the Global Collection Place and during a task to Damages.

Paper Name: Studies Of Interference In Serial Verbal Reactions

Author: J. Ridley Stroop

Description: Intervention or reserve (the terms seem to have been used almost wholesale) has been given a great place in investigational works. The search was instigated by the physiologists prior to 1890 (Bowditch and Warren, J. W., 1890) and has been sustained to the current, principally by psychologists (Lester, 1932). Of the frequent trainings that have been available during this period only an incomplete number of the greatest applicable intelligences request our care here.

IV. BLOCK DIAGRAM OF SYSTEM

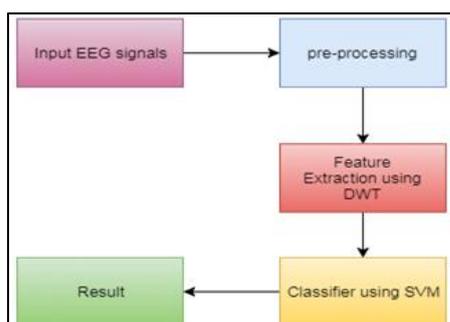


Fig. 4.1: Block diagram of system

In EEG-based stress detection system for individual person to determining stress level for human Body to prevent from major health risks. We have determined that EEG is a reliable tool to detect stress levels. We functional period occurrence examination to excerpt valuable evidence from EEG and applied categorized SVM as classifier and achieved more accuracy.

V. EXISTING SYSTEM

EEG suggestions good observational statistics of inconsistency in spiritual status because of its high time-based resolution. EEG waveform (amplitude and frequency) be contingent on the aware level of the person. Alpha waves are more dynamic in occipital and forward areas of the brain. These waves are related with redundancy of the brain. So in no stress condition, when the brain is doing no action, alpha waves are leading. In stressful situations, the power of alpha waves falls down showing the change in response under stress. Beta waves show varying behavior in different frequencies in different parts of the brain and power in theta waves increases under stress or mental tasks.

Disadvantages of existing system:

- 1) It is cumbersome to maintain a huge set of records.
- 2) It is time Consuming
- 3) Error-prone
- 4) Its leads to wastage of Resources.

VI. PROPOSED SYSTEM

This proposed system an EEG-based stress detection system for individual person to determining stress level for human Body to prevent from major health risks. We have determined that EEG is a reliable tool to detect stress levels. We practical period occurrence analysis to extract useful information from EEG and implemented hierarchical SVM as classifier and obtained more accuracy.

Advantages of Proposed System

- 1) Required less time.
- 2) Increase Efficiency.
- 3) Improve the accuracy.

VII. CONCLUSION AND FUTURE SCOPE

In this system an EEG-based stress detection system for individual person to determining stress level for human Body to prevent from major health risks. We have determined that EEG is a reliable tool to detect stress levels. We useful while occurrence inquiry to excerpt valuable evidence from EEG and applied classified SVM and obtained more precision The outcomes mostly to possibility of using EEG for force exposure .the system is important for scientific interference and deterrence of physical and mental health problems.

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