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STRESS LEVEL DETECTION OF WORKERS USING NAIVE BAYES ALGORITHM

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ABSTRACT

Mental stress has become a major issue during daily work.Cortisol hormone is segregated by the human brain during stress. The cortisol hormone kills the collection of past experience (Hippocampus). When stress is left unchecked it will leads to blood pressure, heart disease and obesity. Chronic stress will also lead psychological disorder. Psychosocial stress exists in daily life, which has resulted in poor quality of life by affecting people's emotional behaviour, job performance, mental and physical health. The goal is to design a Machine Learning framework to detect the stress level.Naivebayes is the supervised machine learning algorithm used for detecting the stress level. The purpose of naive bayes algorithm is to analyze the uncertain data (level of stress is not constant) to get a desired solution.

KEYWORDS

Stress, Speech, EEG Signal, Naïve Bayes Algorithm ,Machine Learning, Supervised Learning.

1. INTRODUCTION

Stress is all around portrayed as a response of a man to the characteristic demands or weights. It comes to the state due to relationship between a man and his/her condition that are viewed as focusing or outperforming their flexible cutoff points and weakening their prosperity.[3] It can be appreciated from above definition that tension is an indispensable piece of the present way of life. In the occasion that slighted, stress can encourage endless diseases. The danger factors for push related diseases are a mix of individual, social and social variables. In this way, it can impact diverse times of our life. So it is imperative to perceive stress at a starting period and take fitting measures. An ANN depends on an accumulation of associated units or hubs called simulated neurons .Every association between neurons can transmit a flag starting with one then onto the next. The accepting neuron can process the flag and after that flag downstream neurons associated with it. Machine learning is a technique for information investigation that mechanizes scientific model building.[9] It is a branch of manmade brainpower in light of machines ought to have the capacity to learn and adjust through involvement. In this ,the naive bayes classifier is utilized to identify the mental anxiety.[9] Naïve Bayes classifier gives incredible outcomes information investigation, for example, natural Language processing.

2. STRESSLEVEL DETECTION BY USING EEG

EEG (Electroencephalogram) flag is a neuro flag which is created due the diverse electrical exercises in the mind. Distinctive sorts of electrical exercises related to various conditions of the mind[5]. Each physical action of a man is because of some action in the mind which thus distinction between these electric potential levels can be caught and utilized for different applications including stress location.[1] These cerebrum signals are called as EEG signals - Electroencephalogram flag. Diverse sorts of conditions of the cerebrum are because of various sorts of electrical exercises of mind neurons. Thus, extraordinary flag esteems produces an electrical flag. These signs can be caught and prepared to get the valuable data that can be utilized as a part of early identification of some mental maladies. Cerebrum signals are neuron signals.

3. MACHINE LEARNING NETWORK

Fig 1.1 explains the proposed Machine Learning Framework for stress detection. For the identification of stress levels, three analytical cases were performed. In case of one, four levels of stress was compared with the initial level of control management (a binary classification), and In case two, each level of stress was compared with its various level of control management (a binary classification), and in case three, every level of stress was compared with all the opposite levels of stress (one vs. all classification).[1]By comparing the test data and training data the efficiency for stress level were calculated. [6] discussed that the activity related status data will be communicated consistently and shared among drivers through VANETs keeping in mind the end goal to enhance driving security and solace. Along these lines, Vehicular specially appointed systems (VANETs) require safeguarding and secure information correspondences. Without the security and protection ensures, the aggressors could track their intrigued vehicles by gathering and breaking down their movement messages. A mysterious message confirmation is a basic prerequisite of VANETs. To conquer this issue, a protection safeguarding confirmation convention with expert traceability utilizing elliptic bend based chameleon hashing is proposed. Contrasted and existing plans Privacy saving confirmation

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utilizing Hash Message verification code, this approach has the accompanying better elements: common and unknown validation for vehicle-to-vehicle and vehicle-to-roadside interchanges, vehicle unlinkability, specialist following capacity and high computational effectiveness

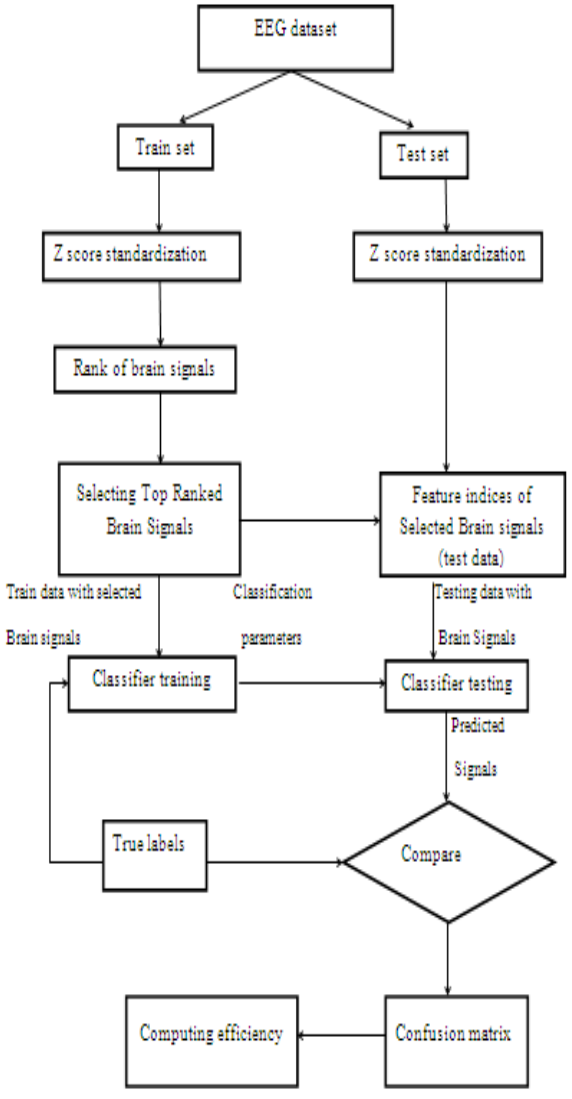

Figure 1.1 Proposed ML Framework

4. STRESS AND STRESS INTELLIGENCE

Feelings are very complicated condition of feeling that effect/realize the physical and mental changes that control our conduct. The physiology of feeling is specifically connected to the excitement of the sensory system because of different states evidently, to specific feelings.

Emotional intelligence increasingly relevant to organizational development and developing humans, due to the fact the emotional quotient ideas affords a new way to understand and assess humans's behaviors, control styles, attitudes, interpersonal talents and potential. Emotional intelligence provides a buffering effect in perceiving the paintings environment to be less worrying. individuals with high stage of emotional intelligence, said by means of the capacity to recognize and express emotions as well as to control and control them show the potential to higher deal with pressure and go through much less from unfavourable health consequences. For that reason emotional intelligence in addition to occupational stress of workers is measured.

4.1 OBJECTIVE OF THE STUDY

- To measure the emotional intelligence of the employees.
- To measure the occupational stress of the employees.
- To ascertain the relationship between emotional intelligence and occupational stress of the employees.

Fig 1.2 explains a real-time monitoring system that is capable of estimating different speech from different biofeedback signals, especially for the people who cannot express their speech, for example, the paralysis stricken patients. This system will be user–friendly as shown in the following diagram.

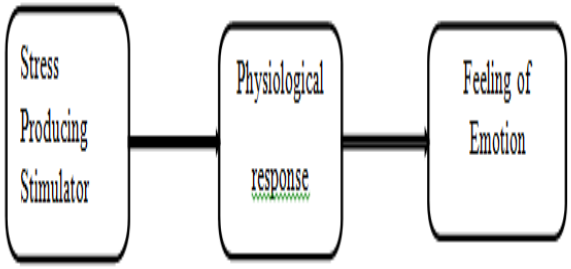

Figure 1.2 Sequence of Speech

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In spite of the fact that individuals see that stress can have negative effect on wellbeing and prosperity, they regularly don't make any move to anticipate stretch or to oversee it. Effectively detecting the stress well in-time not only provides a way for the people to understand their stress condition better but also provides the physicians with more reliable data for intervention and stress control. Identifying the stress level using the psychological sensors has been a hot research topic in the recent years. The existing studies have shown that psychosocial stress can be recognized by the physiological information of human being. The physiological information can be acquired by using the biological or physiological sensors(Healey and Picard, 2005), such as Electrocardiogram(ECG), Galvanic Skin Response (GSR), Electromyogram (EMG), and Respiration (RESP).

5. NAIVE BAYES

Naive Bayes is a characterization technique, which depends on the Bayes administer for making the expectations, and it relegates the case x to the class mark ωi with the biggest back likelihood P(ωi | x). Naive Bayes depends on a rearranging presumption that the properties are restrictively free given the class. This assumption specifically simplifies the computational complexity that is associated with the estimating class conditional probabilities, which are estimated for each attribute separately (Theodoridis&Koutroumbas, 2006)[10]. Naïve Bayes has shown to offer a competitive performance against other widely used and more sophisticated classification methods, such as decision trees and neural networks (George & Pat, 1995; Theodoridis&Koutroumbas, 2006). It is also a useful classifier that can easily deal with the high dimensional data because of its short training time (Hand et al., 2001)[10].

The Bayesian Classification speaks to an supervised learning technique and in addition a factual strategy for grouping.. It assumes an underlying probabilistic model and allows us to capture the uncertainty about the model in a principled way by determining the probabilities of the outcomes. It can solve various diagnostic and predictive problems. Following are the uses of Naïve Bayes classification:

Naive Bayes text classification(Zhang and Li, 2007), The Bayesian order is utilized as a probabilistic learning strategy (Naive Bayes content arrangement). Naive Bayes classifiers are among the best known calculations for figuring out how to characterize documents[10].

Spam filtering(Androutsopoulos et al., 2000) is the best known use of Naive Bayesian text classification. It makes the use of a naive Bayes classifier to identify the spam e-mails.

Hybrid Recommender System(Burke, 2002), Naive Bayes Classifier and Collaborative Filtering Recommender Systems are utilized to apply the machine learning and information digging strategies for sifting the inconspicuous data and to foresee whether a client might want a given resource.Online applications(Haffner et al., 2005), This online application has been set up as a basic case of managed machine learning and speech registering. Utilizing a preparation set of illustrations, which reflect decent, dreadful, or unbiased conclusions, we are preparing Ditto to recognize them.

Naïve Bayes is further divided into three types classification(Lewis, 1998)

- Independence
- Conditional Independence
- Conditional probability

6.EXPERIMENTAL OUTCOME

In the above diagram Fig 1.3the red colour denotes the real stress level and the blue colour denotes the predicted stress level .It is seen that the real stress is slightly greater than the predicted stress. Sometimes it has been found that the real stress had occurred without the assumption of the predicted stress. From it is seen that the stress is the one which is always greater than the available resources. The level of the stress reaches high when the workload of the employees get maximized.

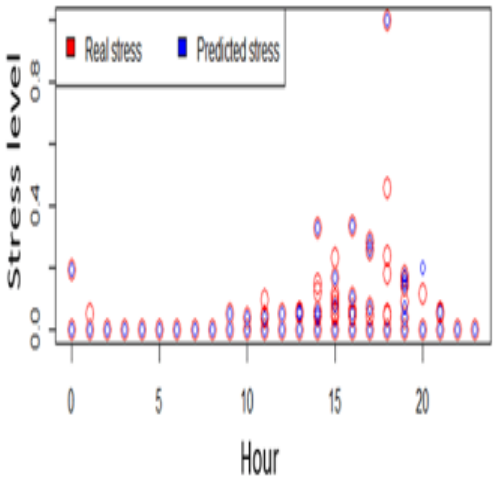

Figure 1.3 Experimental Outcome for Stress Level Detection

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7. CONCLUSION

The principle contribution of this paper lies in developing an experimental paradigm for effectively inducing pressure at more than one stages and supplying a framework related EEG data evaluation for the identification of strain at more than one ranges. The proposed framework recognize stress with a most accuracy of 94.6% among2 ranges of strain and the manipulate and83.43% between pressure and the other rank of strain. Our outcomes advise that EEG alerts have the capability to reliably identify pressure levels. But, multiple ranges of pressure require similarly evaluation and validation. The compactness of the EEG gadget makes it a sturdy modality for medical use for the analysis of intellectual Pressure .methodology and evaluation framework.

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