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Stress Detection using Image Processing and Machine Learning.

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ABSTRACT: In a state of natural psychological equilibrium, tension is generally perceived as a disturbance. When you can't balance what is expected of you and your ability to manage it, you create tension and your mental health suffers. There are mainly two types of difficulty. Depression can be broadly described as a mental imbalance. One of the most important research areas in biomedical engineering is the detection of depression, as adequate prevention of depression may be straightforward. Multiple bio signals (MRI, RGB, oxygenation, FRS, etc.) are available. These signals are useful in identifying levels of depression as they show clear changes in depression induction. For this project, ECG will be used as the first choice because the recording is easily accessible. Several SVM model types have been reviewed by changing feature numbers and kernel types.

KEYWORDS :-support vector machine, ECG,EMG,HR.

I. INTRODUCTION

Depression and anxiety disorders are prevalent throughout the world. We needed to be aware of the negative impact of depression on patient health, and the associated economic burden. To support objective depression assessment, the affective computing community has used signal processing, computer vision, and machine learning approaches to analyze the verbal and nonverbal behaviors of depressed patients [1], making predictions about which patterns should indicate a depressive state [2] [3]. These studies analyzed the relationship between objective measures of vocal, verbal, and nonverbal behavior and clinical subjective assessments of depression severity for the purpose of automated assessment of depression.

Only a small number of depression datasets are currently available due to privacy concerns, and there are hardly any pretraining models for depression. Additionally, there is a lack of consistency in these widely used depression datasets. They are difficult to integrate to increase the number of samples, which makes it difficult to benefit from deep models. They have distinct languages, durations, data kinds, and targets. To increase the number of samples and enhance the model performance, several data augmentation techniques must be used.
We postulate that simultaneous integration of dimensional emotional analysis and depression estimation would result in a more robust depression analysis.

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Stress Detection Systems:

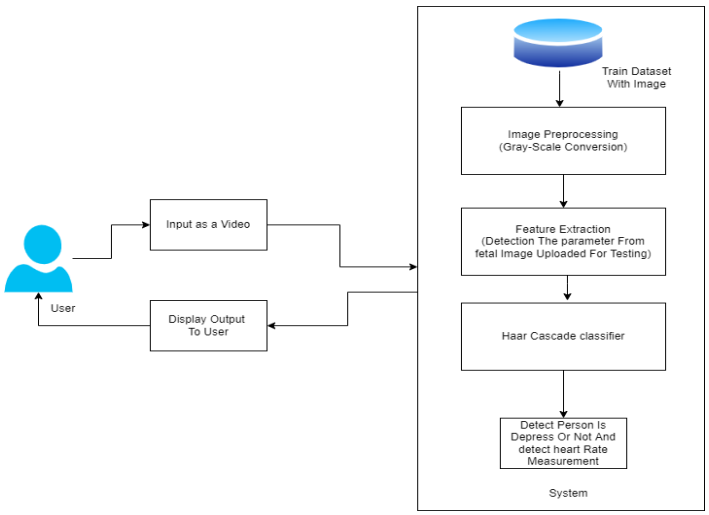

Figure: System Achitecture

Prepossessing: The machine in this module will process the input. Prepossessing machine will enlarge the data set after training it and deleting the messy portions of the input.
Feature Extraction: In this module, the user will provide the machine with EMG, HR, ECG, and other attributes.
Classification: User testing value classify with train data-set using SVM Algorithm (support vector Machine Algorithm).Machine Learning will predicate given input of person is Depression or not. to getting more accuracy, here we use machine learning with SVM (support vector Machine Algorithm).

II. BACKGROUND

1. Haar cascade

No matter where they are in the image or how big they are, objects can be found using the process known as the Haar cascade. This algorithm can operate in real-time and is not overly complex. A haar-cascade detector can be trained to recognise a variety of items, including automobiles, bikes, structures, fruits, etc. The cascading window is used by Haar cascade, which aims to analyze features in each window and determine whether it might be an object.

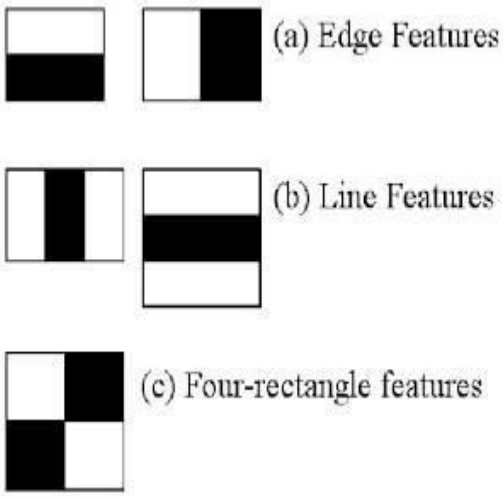

Figure: OpenCV Cascade Classifier

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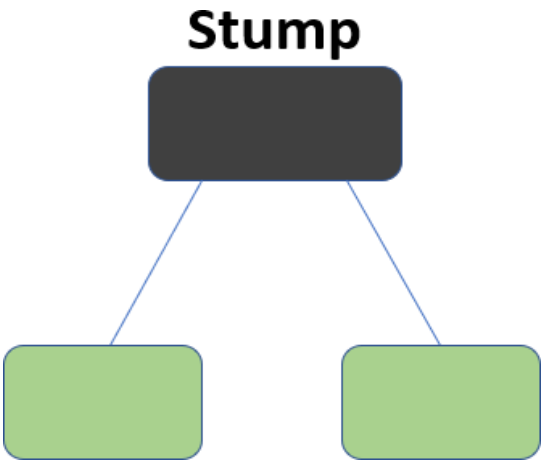
2. OpenCV

Computer vision is a process by which we can understand the images and videos how they are stored and how we can manipulate and retrieve data from them. The foundation or primary tool utilised in artificial intelligence is computer vision. Self-driving cars, robotics, and photo- editing apps all heavily rely on computer vision.
A popular technique for detecting faces is OpenCV. Prior to using the AdaBoost method as the face detector, it first obtains the feature images from a sizable sample set by identifying the face Haar features from the image.

3. AdaBoost

Th An algorithm called AdaBoost creates 'n' decision trees during the data training phase. The improperly classified record in the first model is given priority as the first decision tree or model is constructed. Until we indicate the amount of base learners we wish to create, this process continues.



It creates correct trees with a start node and many leaf nodes. However, AdaBoost's approach only creates the Stump node, which has two leaves. These stumps are poor students, and boosting methods favour this.

III. LITERATURE SURVEY

A research paper is a document of a scientific article that contains relevant ex- pertise, including substantive observations, and also references to a specific subject of philosophy and technique. Some authors have described various methods for building a stress detection system, their approaches are described below:

The author Madhurima Hooda, Aashie Roy Saxena. explored new methods for building a stress detection system. In order to predict depression in people, various models have been developed, and in this article, an overview of three major models is provided: a) Using different classifiers in machine learning and WEKA; b) Using imaging and machine learning methods; and c) Using the Risk factors. D. Future research could explore the use of additional techniques to predict depression with greater accuracy.

The description provided by the authors Gabor Kiss, Art'ur Bendeg'uz Tak'acs, D'avid Sztah'o, and Kl'ara Vicsi. The process of producing speech in the brain is intricate and difficult. As a result, the speech of individuals with neurological or psychiatric disorders like Parkinson's disease or depression differs from the typical speech of speakers who are in good condition. The RoT was the sole input utilised in the classification studies, and it produced rather encouraging findings for differentiating between speakers who are healthy and those who are not, with an accuracy of 81%. The ts (RoT) of the speech was evaluated for speakers who were healthy and speakers who were not healthy (depression and Parkinson's illness). 190 speech samples from speakers who were in good health,
55 speech samples from speakers who were depressed, and 76 speech samples from speakers who had Parkinson's disease were all evaluated in this study.

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The author Prajakta Bhalchandra Kulkarni, Minakshee M. Patil stated, According to the World Health Organization (WHO), more than
300 million people worldwide experience depression in 2017. The model is a Gaussian mixture one (GMM). Fisher vector encoding has excellent computing efficiency. Even with the linear classifier, it produces the best results. On a face, we put these algorithms to use. LTrP is used for feature extraction. echnique can be used for developing a stress detection system. This system can be used in various organisation cases to check whether mental health of employee. This system can used in many healthcare sector and to increase productivity of employees.

V. CONCLUSION

In this study, various kinds of depression detectors were fitted with multiple ECGs. Features like the QT and RR intervals. In order to determine one's psychological and physical health, this method of detecting ECG signal stress will help. From there, a person will be able to take the necessary actions.
Additionally, it was determined that the more attributes we include, the more specific the model gets.

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