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Real-Time Personalized Physiologically Based Stress Detection for Hazardous Operations

[1] K. Swathi

PG Scholar, Department of Computer Science & Engineering, Siddhartha Institute of Technology and Sciences, Hyderabad, India.

[2] Ms. R. Vijayata

Assistant Professor, Department of Computer Science & Engineering, Siddhartha Institute of Technology and Sciences,

ABSTRACT

The main motive of our project is to detect stress in the IT professionals using vivid Machine learning and Image processing techniques. Our system is an upgraded version of the old stress detection systems which excluded the live detection and the personal counseling but this system comprises of live detection and periodic analysis of employees and detecting physical as well as mental stress levels in his/her by providing them with proper remedies for managing stress by providing survey form periodically. Our system mainly focuses on managing stress and making the working environment healthy and spontaneous for the employees and to get the best out of them during working hours.

1. INTRODUCTION

Stress management systems play a significant role to detect the stress levels which disrupts our socio economic lifestyle. As World Health Organization (WHO) says, Stress is a mental health problem affecting the life of one in four citizens. Human stress leads to mental as well as socio-fiscal problems, lack of clarity in work, poor working relationship, depression and finally commitment of suicide in severe cases. This demands counselling to be provided for the stressed individuals cope up against stress. Stress avoidance is impossible but preventive actions helps to overcome the stress. Currently, only medical and physiological experts can determine whether one is under depressed state (stressed) or not. One of the traditional method to detect stress is based on questionnaire. This method completely depends on the answers given by the individuals, people will be tremulous to say whether they are stressed or normal. Automatic detection of stress minimizes the risk of health issues and improves the welfare of the society. This paves the way for the necessity of a scientific tool, which uses physiological signals thereby automating the detection of stress levels in

individuals. Stress detection is discussed in various literatures as it is a significant societal contribution that enhances the lifestyle of individuals. Ghaderi et al. analysed stress using Respiration, Heart rate (HR), facial electromyography (EMG), Galvanic skin response (GSR) foot and GSR hand data with a conclusion that, features pertaining to respiration process are substantial in stress detection. Maria Viqueira et al. describes mental stress prediction using a standalone stress sensing hardware by interfacing GSR as the only physiological sensor.

2. LITERATURE REVIEW

Paper 1: Stress and anxiety detection using facial cues from videos: This study develops a framework for the detection and analysis of stress emotional states through video-recorded facial cues. A thorough experimental protocol was established to induce systematic variability in affective states (neutral, relaxed and stressed/anxious) through a variety of external and internal stressors. The analysis was focused mainly on non-voluntary and semi-voluntary facial cues in order to estimate the emotion representation more objectively [1] . Paper 2: Detection of Stress Using Image Processing and Machine Learning Techniques: In this system a real-time non-intrusive video are captured, which detects the emotional status of a person by analyzing the facial expression. It detects an individual emotion in each video frame and the decision on the stress level is made in sequential hours of the video captured. The system employs a technique that allows system to train a model and analyze differences in predicting the features [2] . Paper 3: Machine Learning Techniques for Stress Prediction in Working Employees: In this paper, the system applies machine learning techniques to analyze stress patterns in working adults and to narrow down the factors that strongly determine the stress levels. Various Machine Learning techniques were applied to train our model after due data cleaning and preprocessing.[3].

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

In the existing system work on stress detection is based on the digital signal processing, taking into consideration Galvanic skin response, blood volume, pupil dilation and skin temperature. And the other work on this issue is based on several physiological signals and visual features (eye closure, head movement) to monitor the stress in a person while he is working. However these measurements are intrusive and are less comfortable in real application. Every sensor data is compared with a stress

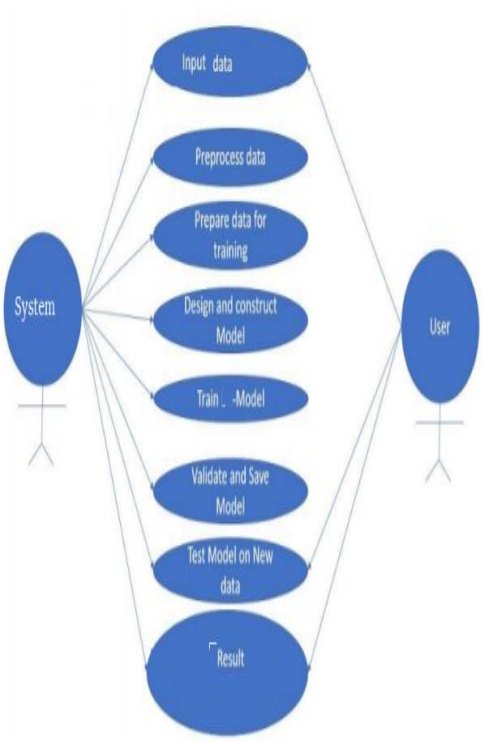
index which is a threshold value used for detecting the stress level.

3.2 PROPOSED SYSTEM:

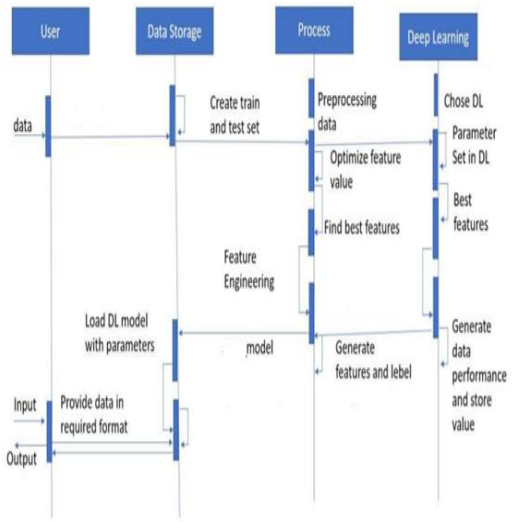
The proposed System Machine Learning algorithms like KNN classifiers are applied to classify stress. Image Processing is used at the initial stage for detection, the employee‟s image is given by the browser which serves as input. In order to get an enhanced image or to extract some useful information from it image processing is used by converting image into digital form and performing some operations on it. By taking input as an image and output may be image or characteristics associated with that images. The emotion are displayed on the rounder box. The stress level indicating by stressed, normal stress..

4. SYSTEM DESIGN

4.1 USE CASE DIAGRAM



4.2 SEQUENCE DIAGRAM



5. IMPLEMENTATION

To conduct studies and analyses of an operational and technological nature, and To promote the exchange and development

of methods and tools for operational analysis as applied to defense problems.

5.1 Input and Output Designs

5.1.1 Logical design

The logical design of a system pertains to an abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modeling, using an over-abstract (and sometimes graphical) model of the actual system. In the context of systems design are included. Logical design includes ER Diagrams i.e. Entity Relationship Diagrams

5.1.2 Physical Design

The physical design relates to the actual input and output processes of the system. This is laid down in terms of how data is input into a system, how it is verified / authenticated, how it is processed, and how it is displayed as output. In Physical design, following requirements about the system are decided.

6. CONCLUSION

Stress Detection System is designed to predict stress in the employees by monitoring captured images of authenticated users which makes the system secure. The image capturing is done automatically when the authenticate user is logged in based on some time interval. The captured images are used to detect the stress of the user based on some standard conversion and image processing mechanisms. Then the system will analyze the stress levels by using Machine Learning algorithms which generates the results that are more efficient. “Stress and anxiety detection using facial cues from videos”, IEEE January 2017 and according to implementation and conclusion to predict stress in the employees by observing the captured images of authenticated users which makes the system secure. The image is captured automatically when the authenticate user is logged in based on some time interval. The captured images are used to detect the stress of the user based on some standard conversion and image processing mechanisms. Then the system will analyze the stress levels by using Machine Learning algorithms which generates the results that are more efficient.

7. REFERENCES

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