

STRESS PERCENTAGE DETECTION USING ML

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Abstract: In this project we propose a stress recognition algorithm using face images and Expressions. We proposed an algorithm that can recognize stress from images acquired with a general camera. We also Designed a CNN that receives facial landmarks as input to take advantage of the fact that eye, mouth, and head movements are different from normal situations when a person is stressed. Stress is a natural reaction to various stress inducing factors which can lead to physiological and behavioral changes. If persists for a longer period, stress can cause harmful effects on our body. The body sensors along with the concept of the Internet of Things can provide rich information about one's mental and physical health.

Keywords: CNN (Convolution Neural Networks).

I. INTRODUCTION

Recently, as modern people suffer from extreme levels of stress, a system is being developed to recognize whether a user is under stress and to give feedback in a direction of reducing stress when under Stress is a natural reaction to various stress inducing factors which can lead to physiological and behavioral changes. If persists for a longer period, stress can cause harmful effects on our body.

Psychological stress today is continually portrayed as a big health concern. Stress is not therapeutic and natural in any lifespan; unnecessary stress can be harmful and excessive stress is a significant cause of self-mortality. Stress should be detected before it is a big health problem and take the precautionary measures to avoid serious problems.

II. RELATED WORKS

Stress detection using deep neural network Gjoreski et al. [21] used a wrist-worn device that contained the accelerometer (ACC), blood volume pulse (BVP), electrodermal activity, heart rate, and skin temperature sensors. 63 features were extracted from these signals and used as inputs for the machine learning algorithm. The random forest machine learning algorithm was used for classification, and the algorithm achieved a 72% accuracy rate. Kim et al. [22] used physiological signals from the electromyography, speed and cadence, electrocardiogram, and respiratory rate sensors for emotion classification. In the experiment run by Kim et al., human participants listened to different songs in order to trigger different emotions.

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The primitive techniques relied on an individual's responses in the case of mock-up and questionnaire rounds and health oriented in case of medical tests which too depended on the time at which the samples were being taken making these methods influential and prone to manual errors.

Shortcut mapping and bottleneck architecture were used to optimize neural network structure. By applying the shortcut mapping to the neural network structure deepened due to the numerous layers, it is possible to simplify the learning process and determine the direction of the learning. This makes it possible to easily optimize the deep neural network and improve the accuracy due to the increased depth. By applying the bottleneck architecture the number of internal parameters can be reduced while increasing the number of feature maps.

III. OBJECTIVES

The proposed work concentrates on developing an IoT system which can efficiently detect the stress level of a person and provide a feedback which can assist the person to cope with the stressors. Detecting the Face Emotions Based on that CNN classifier detect the stress.

IV. METHODOLOGY

Stress is a response to the stimulus from which our physical and mental balance is affected. It affects our emotional and physical factors of our body which in turn brings behavioural changes in us. The moment we disagree to something it results in the release of hormones such as cortisol and adrenaline through the Body. Stress which is intense keeps us careful and helps us to be dynamic in nature, but, 'chronic stress' which is for long term is most dangerous on all levels of being.

It becomes really important to collect the feedback and work on it as it can be dangerous if not given attention to. Therefore, a device is required to identify detect the stress level and taken the preemptive measures if needed. Few methods out of many used to detect stress levels are measurement of pupil diameter, rate of production of sweat, cardiovascular muscle, temperature of the body, the voice of the individual and his/her heart rate.

The principle on which the stress percentage detection is based is that the discrepancy in the resistance that is produced by the skin and the changes in the rate of heart beat of the body are directly converted to analog voltage and transmitted into analog voltage levels into the digital output which gives the indication of human stress in visual format.

Sweat sensors and pulse sensors are used to detect the stress levels of the individual. They provide the heart rate of the individual and the electrical conductivity of the individual's skin which is based on the changes in the temperature of the body, which is detected because there is a continuous release of sweat by the apocrine gland. The stress detection algorithm is based on using face images and landmarks of the face.

We use a general camera to detect the images of the individual. Head, mouth and eye movements differ when a person is in stress, hence, we have designed a deep neural network which helps us to take the inputs of the landmarks of the face. Experimental results give us the output that the algorithm which is used helps us to detect the level of the stress of the individual more effectively.

V. APPLICATIONS

As the results are evaluated using various metrics at the macro and micro levels and indicate that the trained model detects the status of emotions and the variations in body the model can be used in the working places, on working professionals so as to detect their stress, so that they can manage their work and mental health balance accordingly. It can be used on pilots, train engine driver (locomotive driver) or any such person who has to drive or fly for a certain amount of time so as to take any alternative step if needed, as the job they do is a job which comes with the responsibility of lives of many people.

The model can be used for students to detect their stress level and communicate with them about the things leading them towards the stress, from this one step the students, children become more expressive about their thoughts and emotions and suicide rate of the students which is a great problem of our nation and is the need of the hour and has to be addressed now can be brought down. The model can be used to detect the stress level of the aged old people and we can bring the needed changes in their lives.

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