

# STRESS DETECTION IN IT PROFESSIONALS

Manoor Meghana, R.Lakshmi Mahitha, Naryanpally Deepika, Varanasi Sneha,  
Dr.M.Jaganathan(Associate professor),  
Department of CSE,

MALLA REDDY INSTITUTE OF TECHNOLOGY AND SCIENCE, Telangana, Hyderabad.

## Abstract:

Using dynamic machine learning and image processing methods, our project's primary objective is to identify IT workers experiencing stress. As an improved variant of the legacy stress monitoring systems that failed to include real-time monitoring and this method includes live detection, but individual counseling as well as routinely evaluating workers and identifying any signs of physical in terms of psychological distress, by providing them with appropriate solutions for stress management via the distribution of a survey every so often. Stress management is the primary emphasis of our method, and creating an atmosphere that is conducive to health and creativity in the workplace for the to maximize the performance of workers when they are on the clock. Subjects: One-hot encoding, KNN classifier, image processing Linked resume, supervised ML, training dataset.

## 1. Introduction

New technology and goods are entering the market at a dizzying rate these days, thanks to the IT industry. The stress levels of the participants in this research are also chosen to set a high standard. Despite the abundance of groups offering programs pertaining to mental health for personnel, but the problem is out of their hands. The article To get to the bottom of this issue, we're looking for ways to identify employee stress tendencies in the workplaces where we would be interested in using AI and image processing methods for examining strain patterns and for reducing the important aspects that significantly impact the levels of stress. Algorithms used in machine learning, such as KNN classifiers, used to categorize strain. Early on, image processing is used.

stage for detection, the camera is used to get a picture of the worker is the camera that acts as the input. In order to get a better picture or to get some valuable insights from it processing images transforms images into digital format and executes a few adjustments to it. With the use of video input in the form of an image output and frames may be images or traits linked shown there. The core components of image processing include these three procedures: Using image capture tools to import the picture. Looking at the picture and changing it around. The end product is a changed picture or report. built upon analysis of images. The system gains the capability to learn and improve itself autonomously. based on one's own experiences rather than predetermined instructions with the use of machine learning, a branch of artificial machine learning (ML). Programs for computers are created by Machine learning capabilities that can access data and use it for on their own. Task execution using explicit programming using judgments or forecasts develops a mathematical model using "training data" using Artificial Intelligence.

The processing of secret information, picture data connection, and extra pattern images that are not clearly seen as a result of employing Image The mining industry. It is a multi-faceted area that encompasses, Image Computing, Data Mining, ML, and Databases. Medical textbooks provide modest predictions of 50-Stress is the root cause of 80% of all physical illnesses. Pressure is thought to be the primary culprit in heart conditions. Hypertension, ulcers, asthma, and diabetes may all be exacerbated by chronic stress. problems affecting the skin, seizures, sexual dysfunction, and migraines dysfunction. These illnesses, along with a plethora of others, include "psychosomatic" means that they are

brought on or made worse by mental situations) in the natural world, including stress. Three prongs are stress. effects: One of the subjective impacts of stress is the emergence of guilt emotions. negative emotions, agitation, resentment, or annoyance. People who as well as experiencing fatigue, tension, nervousness, irritability, moodiness, or lonely. Observable changes in an individual's conduct are symbolized caused by stress-related behavioral changes. The consequences of employing concerns, including an increase in accidents and the use of substances, inebriation, inappropriate humor, bizarre or conduct that is very contentious, extremely agitated, and/or overconsumption of food or beverages. Mental decline, decreased decision-making, and sudden onset of rash making choices, being forgetful, and/or being too sensitive to Negative thoughts and feelings might manifest as cognitive stress.

## 2. Need of work

Anxiety is often considered the first sign of depression. Problems with money, job, relationships, etc., may all contribute to stress. Workers in the business sector often fail to recognize the signs of stress when putting in time. People who work in IT frequently overlook the signs of chronic stress. It used to be common practice for companies to provide stress assessments to their staff members. form. It required a great deal of effort and time. was done by hand since the forms were distributed. Indicators of Stress System assists workers in resolving their problems induce stress via the use of stress management strategies that aim to avoid it focuses on reducing tension and enhancing workers' well-being. Our team has developed a mechanism that on a consistent basis will take pictures of the worker intervals before distributing the traditional survey questionnaires to the staff member. Manual labor and time will be cut down as a result of this. It has an effective method for enhancing productivity in the workplace diagnose stress with our specifically developed

Questionnaires.: Goalsto use a person's symptoms as a predictor of stress computed from observation.in

order to assess the employee's stress levels.in order to provide the individual ways out of their problem recuperate from the strain

## 3. Methodologies

$G(i, j) = \alpha$  is the pre-processing image. The picture is brightened and contrasted using the gain and bias parameters, which are denoted as  $F(i, j) + \beta$ , where  $\alpha > 0$  and  $\beta$  are respectively. For each input picture pixel, we have  $G(i, j)$ , and Each input picture pixel is represented by  $F(i, j)$ . "Pixel transformation" refers to a method for the purpose of obtaining pixel values in image processing. It has Images may be made generic and diversified via alteration. The a color picture gets transformed into a grayscale version becomes a variety of hues of gray or black and white. A picture's threshold is determined, and then grayscale images are transformed. Convert the picture to binary format; if each pixel's value is more than the value of the threshold pixel is 1 if it is not 0. With only one hot encoding, all of the textual replies were numerical values prioritized based on their importance. The answer is yes. 'no' to be set to 0, and 'yes' to be 1. We transformed the category data into label encoder for numerical data. The process of decoding into code for binary. Despite this, a one-hot state machine isn't concerned with When the nth bit is set, the decoder is said to be in the nth state. rather high.

Binary	Gray code	One-hot
000	000	0000001
001	001	0000010
010	011	0000100
011	010	00001000
100	110	00010000
101	111	00100000
110	101	01000000
111	100	10000000

Fig. 1. Values after one-hot encoding operation

logistic regression is a kind of predictive analysis, as are other regression techniques. When one binary variable depends on many independent variables, this method is used. variables. In statistics, a logistic regression is a kind of model in which the dependent variable is binary. When doing regression analyses, statistical examination, logistic regression [8] involves calculating the parameters of one that uses logistic regression. Binary logistic models are defined mathematically as having a dependant variable that may take on two values, being denoted by an indicator variable, with the two possible values being with the numbers "0" and "1" labels. Mini-Batch Gradient Descent: A portion of the coursework is thinking about it; it's capable of making rapid changes to the model's parameters as well as take advantage of the vectorization-related performance boost code. It is possible to make the changes, depending on the batch size.

The threshold value is set using Mini Batching and is updated by gradient, which makes the method more resilient. K-Nearest Neighbor (KNN) is a classifier that is used for analytics, including regression and classification. The process is overseen learning system that may determine the likelihood that an individual need medical attention. The dependent variable is classified using KNN. independent variables are related to one another according to their degree of similarity instance based on the previously known information. Grid view of previously saved datasets is included in the dataset. containing a large number of properties[8], as determined by the process of Property Extraction brand-new dataset emerges, including just numerical factors that were considered during Principal Component Analysis converting feature selection into six fundamental mponents that condition (no stress), interruption, time pressure, Physical Demand, Performance and Frustration.

The image shows a screenshot of a spreadsheet titled "RAW DATASET (WITHOUT PROPERTY EXTRACTION)". The table has multiple columns, including "ID", "Age", "Gender", "Education", "Income", "Stress", "Performance", "Frustration", "Physical Demand", "Time Pressure", "Interruption", and "Condition". The rows contain numerical data for each of these variables across many individual records.

Fig. 2. Dataset without property extraction

Essential properties namely Condition (No stress, Time pressure, Interruption), Stress, Physical Demand, Performance and Frustration from raw dataset are extracted to build a new property extracted dataset.

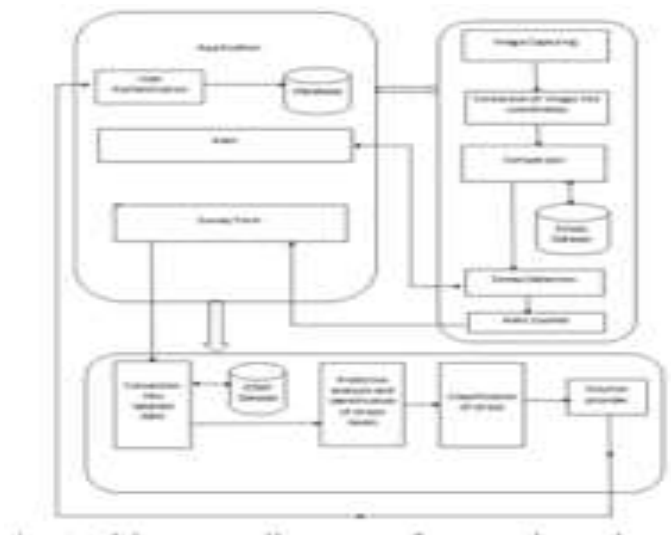


Fig. 3. Architecture diagram of stress detection system

The stress detection system is broken down into three components, as shown in Figure 4, which describe its flow and operation. After the employee is registered and notifications have been sent, the second module supplies questionnaires. The second module processes data from images. taking a picture, transforming it into coordinates, and subsequently

analyzing the picture, forecasting the effects of stress, and the The third component is responsible for the binary representation of data, which a measure of stress is taken, and the answer is given to alleviate tension.

## CONCLUSION

The purpose of the Stress Detection System is to foretell when the by keeping an eye on the photos taken of verified people using the system, which ensures its safety. Capturing images is carried out mechanically upon user login authentication depending on a certain period of time. The photos are saved for later usage in determine the user's level of stress using a set of common conversion metrics and algorithms for processing images. Once it is done, the technology will examine the levels of stress using methods developed by Machine Learning which produces more effective outcomes.

## References

- [1]. G. Giannakakis, D. Manousos, F. Chiarugi, "Stress and anxiety detection using facial cues from videos," *Biomedical Signal processing and Control*, vol. 31, pp. 89-101, January 2017.
- [2]. T. Jick and R. Payne, "Stress at work," *Journal of Management Education*, vol. 5, no. 3, pp. 50-56, 1980.
- [3]. Nisha Raichur, Nidhi Lonakadi, Priyanka Mural, "Detection of Stress Using Image Processing and Machine Learning Techniques", vol.9, no. 3S, July 2017.
- [4]. Bhattacharyya, R., & Basu, S. (2018). Retrieved from 'The Economic Times'.
- [5]. OSMI Mental Health in Tech Survey Dataset, 2017
- [6]. U. S. Reddy, A. V. Thota and A. Dharun, "Machine Learning Techniques for Stress Prediction in Working Employees," 2018 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC), Madurai, India, 2018, pp. 1-4. [7] <https://www.kaggle.com/qiro/stres>