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Machine Learning Approaches for Anxiety Detection in It Professionals

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ABSTRACT: The goal of this article is to detect overworked IT staff using machine learning and visual processing. Technology is an upgraded version of prior stress detection systems that lacked live detection and personal counselling. This study involves updating stress detection technologies that do not include real-time monitoring or personalized therapy. A survey is used to collect data on the mental stress levels of employees in order to give effective stress management solutions. This article will look at stress management and how to build a healthy, spontaneous work atmosphere in order to get the best out of your staff. Stress prediction, Boosting, Bagging, Decision trees, Healthcare, machine learning.

KEYWORDS : Stress prediction, Stress management, Machine learning, Stress factors, Technology, Stress detection, Mental health detection in employees, Facial expression, Mood analysis, Stress Analysis.

I. INTRODUCTION

Working-class people are prone to stress-related mental health problems. Several research have already raised concerns about this. According to an Assocham survey, more than 42 percent of working professionals in the Indian private sector suffer from depression or general anxiety disorder as a result of extended work hours and tight deadlines. Firstly A user has to sign up with the following information: user name, login ID, password, mobile, email, locality, address, city, state, and so on. The user can log in using their Login ID and password. Only if admin activates the user will he or she be able to login. If the administrator does not activate that user, the user will be unable to connect into the system, this is for the security of the employees. The suggested method is an improved version of previous stress detection systems that lacked live analysis and individual employee emotional analysis. The CNN Model Architecture is used to create our suggested system model. Using photos as inputs and returning attributes related with the images as output.

II. RELATED WORK

Times story based on an Optum In this study Bhattacharyya, R., & Basu, S,[1]the author propose poll indicating half of working professionals in India suffer from stress. The poll included replies from up to 8 lakh employees from over 70 significant corporations, each with a staff of 4,500 or more. Maintaining a stress-free workplace must be prioritized for increased productivity and employee well-being. Several efforts may be done to aid working professionals in dealing with stress for mental well-being, such as counselling, career counselling, stress management sessions, and health awareness programs. Early identification of employees who will require such assistance increases the likelihood of such measures being successful.

In this study Van den Broeck, J., Cunningham, S. A Eeckels, R., &Herbst, K [2]authors propose to make this procedure easier by utilizing machine learning approaches to create a model that predicts the risk of stress experienced by an individual and if therapy is necessary by using some of his/her professional and personal aspects as parameters collected in the form of well designed questionnaires. Such an approach will not only assist HR managers in better understanding their employees, but will also assist in taking preventive actions to reduce the likelihood of an employee leaving the firm or underperforming. We can also anticipate whether or not a person needs care for his or her mental health. The initial data set includes 750 responses from various individuals and 68 characteristics encompassing both their personal and professional lives. The data was cleaned using different established procedures that verify for data consistency and survey answer validity.

Shwetha, S, Sahil, A, Anant Kumar J[3] the authors proposes Some of these features were ignored in order to create a specific model, and eventually 14 of these above factors were taken into account based on their relevance to our

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research. Our trained algorithms estimate whether or not an employee has received treatment for stress-related problems in the past. Stress is on the rise in today's contemporary society, thanks to the latest technological tools.As a result,

In this study Tomar, D., & Agarwal, S [4]propose despite their wealth, individuals are dissatisfied. Stress is characterized by a pressurized sensation. Pressure can be psychological, emotional, or even physical.

Pedregosa, F., Varoquaux, G., Gramfort, A.[5]present scikit-learn,it's a famous ML library for python,it has large number of tools and algorithms for data analysis and modeling.it highlights user friendly interface .

Gopalakrishna Pillai, Mike Thelwall [6]the authors focus on detecting stress and relaxation magnitudes for tweets.it explores the methods and analyze the stress and relaxation levels from social media data.it is in basis of sentimental Reshmi analysis.

In this study Huijie Lin, JiaJia, and JiezhonQiu[7] the authors addresses stress detection by analyzing social interactions within social networks. the use of social data to identify stress patterns and trends, contributing to the growing field of mental health analysis in online platforms.

The study by SaskiaKoldijk, Mark A. Neerincx and Wessel Kraaij,[8]explores the potential of sensor data to assess and understand the stress level, it monitors the well being and productivity of employees by combining affective computing and sensor technology.

III. PROBLEM STATEMENT

The project purpose is to develop a stress detection system for IT employees using data from various sources, such as physiological sensors, sentiment analysis of communication channels, and productivity metrics. The system will identify and monitor stress levels in real-time to provide timely interventions and support for employee well-being and performance.

Proposed System

Stress management systems are critical for recognizing the stress levels that disrupt our socioeconomic way of life. According to the World Health Organization (WHO), one in every four persons suffers from stress-related mental health problems. Human stress leads to mental and financial problems, a lack of focus at work, strained relationships with coworkers, despair, and, in the worst-case scenario, suicide. This necessitates the provision of counselling to assist persons who are stressed in managing their stress.While it is hard to eliminate stress entirely, adopting precautions can help you manage it. Only doctors and psychologists can now determine if a person is sad or stressed. One of the better accepted methods for identifying stress is using a questionnaire. The major purpose of our study is to detect indicators of stress in IT workers using powerful machine learning and image processing algorithms.

The technique is an upgraded version of prior stress detection methods, which did not take employee emotions or live detection into consideration. This technology, on the other hand, contains both periodic and real-time employee emotion detection. The automatic identification of stress reduces the risk of health problems and enhances the well-being of both the IT employee and the firm. Knowing the emotions of IT employees enables the company to give better direction and get better outcomes from them. Proposed system model, which is built using CNN The current stress detection system relies on digital signal processing and physiological signals, such as Galvanic skin reaction, blood volume, pupil dilation, and skin temperature, to assess a person's stress level while working. However, these invasive measures prove uncomfortable in practice. Stress levels are determined by comparing each sensor data point with a stress index threshold. The system utilizes the K-Nearest Neighbors (KNN) algorithm, a non-parametric and straightforward machine learning approach, to predict stress levels based on data from multiple classes. Despite its simplicity, KNN faces challenges with large datasets and high dimensionality, as it involves computationally expensive distance calculations. Additionally, the model is sensitive to noisy images and missing data, requiring correct scaling in all dimensions. Overall, the unique responses individuals exhibit under stress make it challenging to establish a generalized stress pattern. model Architecture, has an accuracy of 87.34% during training and 98.45% during validation.

IV. METHODOLOGY

Gathered data and conducted quantitative experiments to assess the efficacy of the stability. Firstly The user must register with the following information: user name, login ID, password, mobile, email, locality, address, city, state. The user can log in using their Login ID and password. Only if admin activates the user will he or she be able to login. If the administrator does not activate that user, the user will be unable to connect into the system; this is for the security of the employees. When a user clicks on the live cam, the camera goes on and watches the face of the person in front of it, displaying the results. The user must supply a picture. The administrator will see the admin page. The Stress Recognition Technology assists employees in addressing challenges that contribute to stress by providing proactive

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stress management solutions. In the suggested system, employees may also utilize live cam to identify tension, which reveals their emotional characteristics.

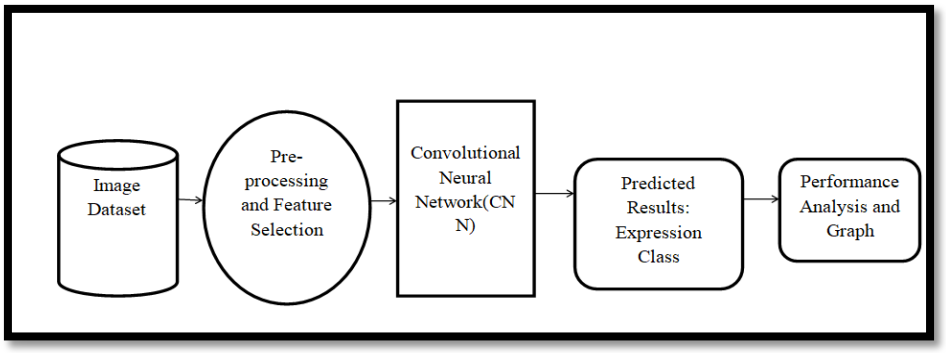

Fig1:System architecture

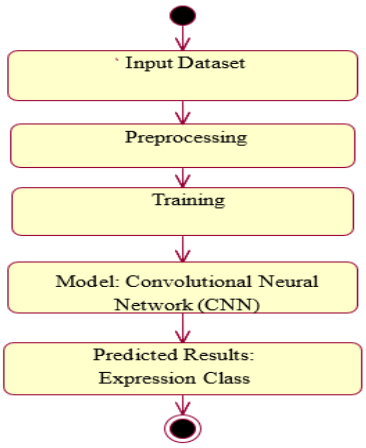

Fig2 : Flow chart of Stress Detection

Stress Detection System assists employees in dealing with difficulties that contribute to stress by providing preventative stress management solutions. The suggested system model is extremely accurate, and it automatically recognizes significant aspects without the need for human intervention.

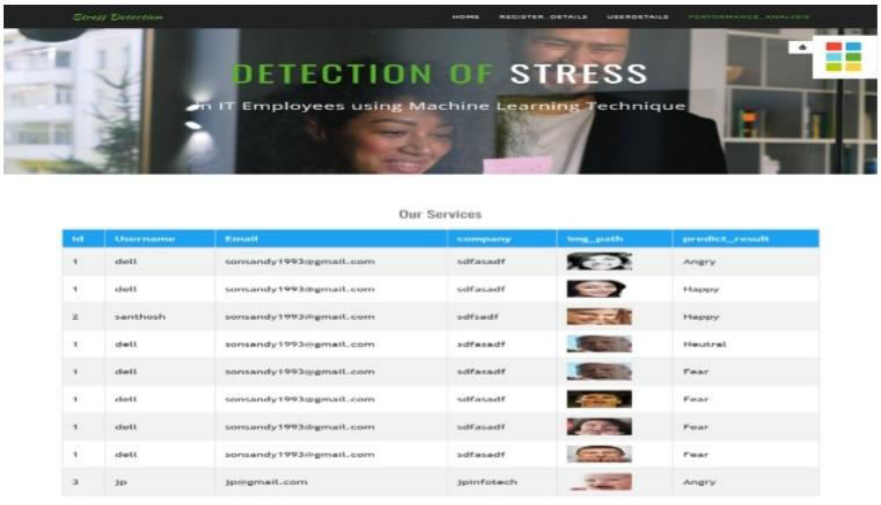

Fig3: services snapshot

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V. RESULT

- CNNs are instrumental in stress detection among IT employees due to their ability to automatically identify essential stress-related characteristics without human intervention.
- CNNs excel in picture identification and categorization, making them well-suited for analysing visual cues indicative of stress levels.
- Their deep learning capabilities enable CNNs to process complex visual information, allowing them to detect subtle signs of stress that may be overlooked by human observers.
- CNNs leverage weight sharing, using the same set of weights across different parts of the network, which enhances feature extraction and generalization for accurate stress detection.
- The computational efficiency of CNNs, requiring fewer resources compared to traditional neural networks, makes them ideal for stress detection applications.
- Leveraging these unique capabilities, CNNs offer an effective and automated means of detecting stress in IT employees, facilitating early intervention and promoting overall employee well-being.

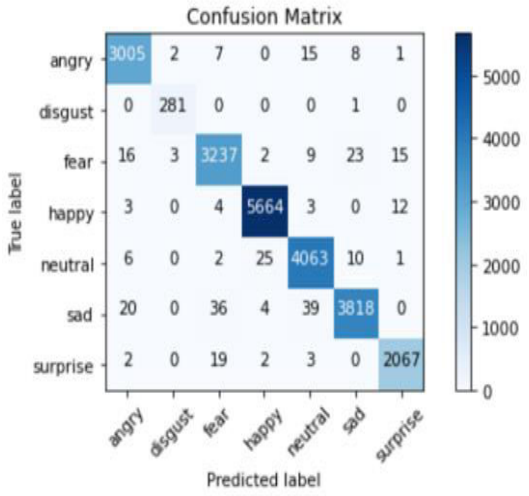

Fig 3:PERFORMANCEANALYSIS

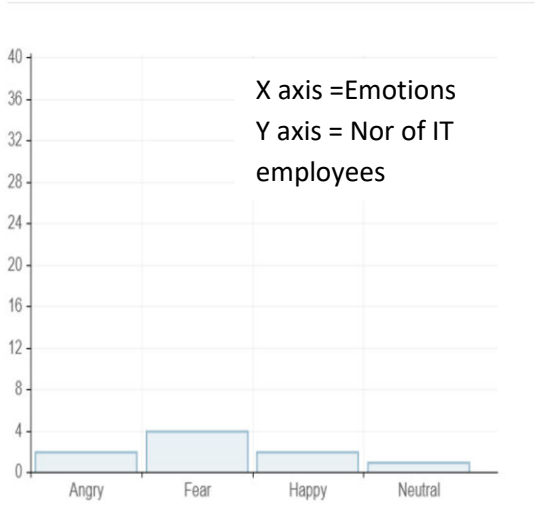

Fig 4:Chart

There are a number of factors that could be contributing to the high levels of stress among IT employees. These include:
The demanding nature of the work
The long hours that many IT employees work
The constant pressure to meet deadlines
The increasing use of technology, which can lead to burnout

VI. CONCLUSIONS

The gender system, while family history of disease, and whether a business provides mental health benefits to its employees were found to be more important than other factors in determining whether or not a person can acquire mental health disorders. Based on research, persons who work in a tech business are marginally more likely to suffer stress, even if their employment is not technically related. Corporates may utilize these information to create better HR policies for their staff. Furthermore, ensemble approaches such as boosting outperformed random forest in terms of classification accuracy and precision. A 75.13% accuracy indicates that the use of Machine Learning methods for predicting stress and mental health conditions yields substantial findings and may be investigated further, thereby accomplishing the goal of this work.
Further approaches, such as the Naive Bayes classifier, can be used to assess the model's effectiveness. Deep learning techniques such as CNN (Convoluted Neural Networks) can be used to test how well a model performs on a given dataset. Because the number of replies in our scenario is constrained, a lot more specialized and large dataset may be employed as a training model. We may also tailor the survey to obtain replies in the appropriate manner and enhance

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the number of attributes based on relevancy. Questionnaires on stress and mental health from reputable institutions and organizations, such as the World Health Organization, might be considered for use in conducting a survey.

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