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A Real-Time Machine Learning Approach for Stress Detection

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ABSTRACT: The objective of this paper is to apply machine learning and visual processing to identify overworked IT employees. Our technology is an improved version of older stress detection systems that did not include live detection or personal counseling. Stress detection methods that don't include real-time monitoring or individual counselling are being updated in this research. A survey is used to collect data on employees' mental stress levels in order to provide effective stress management solutions. In order to get the most out of your employees, this paper will look at stress management and how to create a healthy, spontaneous work environment.

KEYWORDS: platform, stress, machine learning.

I. INTRODUCTION

Mental stress is a major issue nowadays, especially among youngsters. The age that was considered once most carefree is now under a large amount of stress. Stress increase nowadays leads to many problems like depression, suicide, heart attack, and stroke. Stress has become an embedded part of our daily life and is a noticeable concept in public health. Recently, stress has become an integral part of professional life, especially in today's fiercely competitive economy. In the workplace, an individual has to continuously face several situations, such as work overload, job insecurity, lack of job satisfaction, and the pressure to stay up-to-date. The continuous presence of stress can lead to several negative health effects, such as high blood pressure, lack of sleep, susceptibility to infections, and cardiovascular disease. All these situations result in mental stress, which has become the leading cause of many diseases. Such adverse effects not only affect the employees' health and well-being, but also affect workplace productivity and overall profit character, and social what's more, monetary conditions. Nonetheless, an excessive amount of pressure can cause adverse consequences prompting sadness. As World Health Organization (WHO) says, Stress might be a mental state disadvantage moving the lifetime of one in four citizens. Human pressure results in mental besides as socio-monetary issues, absence of straightforwardness in work, poor working connections, gloom, and in the long run obligation to self-destruction in serious cases. It might in fact leave them in an extremely durable phase of consistent concern and fear. In long haul it can influence physical and psychological well necessarily. Therefore, individuals are unsettled regardless of flourishing. The pressure can be brought about by profound, physical, or even mental. One can isolate pressure into two kinds, Short-term, and the other Long-term or ongoing pressure. Momentary pressure is situational when the circumstance changes, the pressure is gone or over. Long haul pressure is a drawn-out issue. That is the reason it is hazardous. Now and again persistent pressure is generally genetic or qualities related moreover. It can make to end anyone's life. Unreasonable pressure drives one ridiculously. Tolerating pressure is the initial step to lead a calm



blissful life. It is vital to recognize and oversee pressure before it turns intense simple cures are accessible at a reasonable expense..

II. RELATED WORK

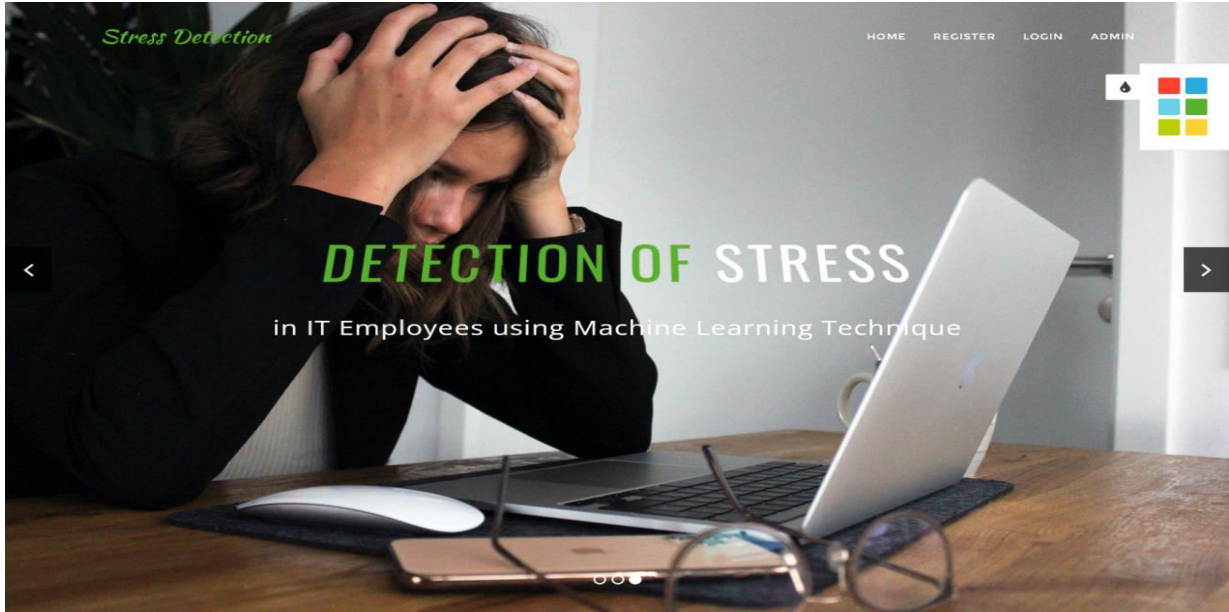
Stress management systems play a major role to notice the stress levels that disrupts our socio-economic mode. This demand counseling to be provided for the stressed people cope up against stress. Stress turning away is not possible however preventive actions help to beat the stress. Currently, solely medical and physiological consultants will verify whether or not one is beneath depressed state (stressed) or not. One in every of the normal methodology to notice stress is predicated on form. Nowadays as IT industries are setting a new peek in the market by bringing new technologies and products in the market. Though there are many organizations that provide mental health related schemes for their employees but the issue is far from control form..Stress is called as an initial stage of depression. stress can be related to finance, work, relationships etc. In corporate world employees are unaware of stress leading conditions while working. It is always observed mostly in employees chronic stress is often ignored. Companies use to give a survey form to the employees to fill and then use to predict stress based on that form. It was not only time consuming but needed whole lot of efforts as forms where distributed manually. There is lack of auto detection of employee's stress or emotions in real-time. Thus we need to develop an efficient real-time detection of tensity or stress or emotions to manage the employee's health.We propose a machine learning and visual processing model to identify overworked employees. Our technology is an improved version of older stress detection systems that did not include live detection or personal counseling. Stress detection methods that don't include real-time monitoring or individual counseling are being updated in this project. A survey is used to collect data on employees' mental stress levels in order to provide effective stress management solutions. In order to get the most out of your employees, this project will look at stress management and how to create a healthy, spontaneous work environment

III. METHODOLOGY

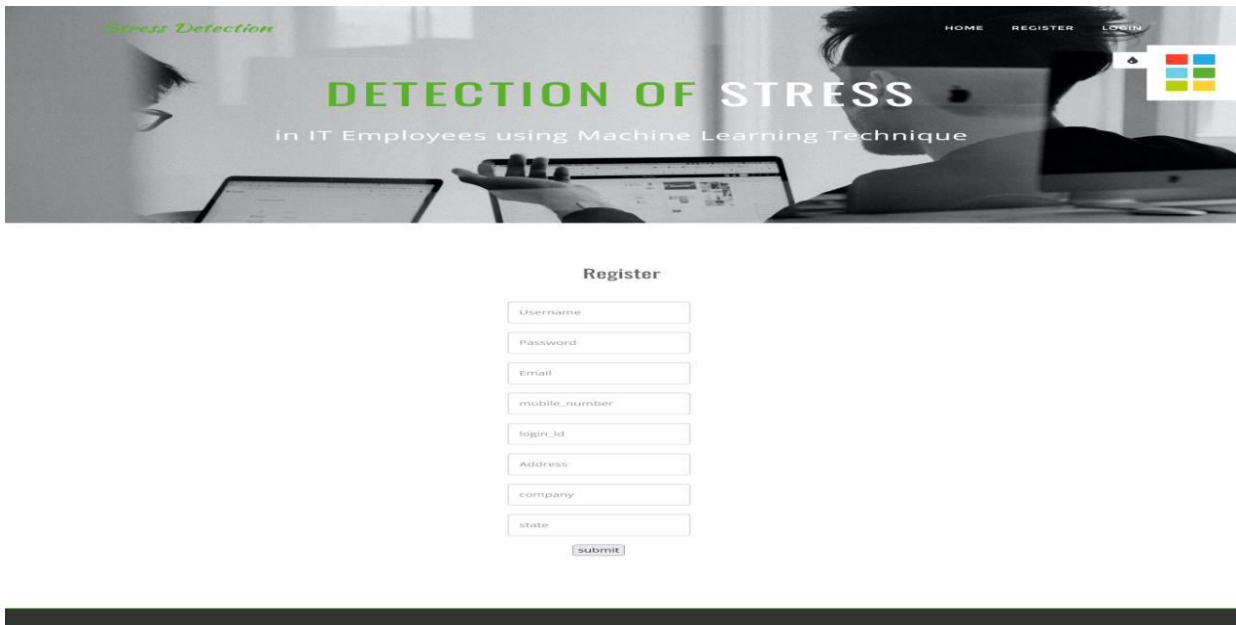
As the title suggests, here the stress is detected using the facial recognition. The dataset used for training is fer2013 dataset. It contains the greyscale images of seven different emotions. The dataset has 35,887 images. The emotions are Happy, Angry, Sad, Disgust, Surprise, Fear and Neutral. The dataset is trained using Convolutional Neural Networks. Here five convolutional layers are used to train the dataset. These layers were implemented using Sequential Model. The entire training process had completed with 100 epochs with a batch size of 64. Adam optimizer is used to compile the model. The trained model is then saved in json file. A camera is used to capture the near front sight of the person while they are working in front of the computer. Captured video is divided into sections of equivalent length and set of similar number of image frames are extracted from each part correspondingly and are examined using some image processing techniques. The stress detection module scans the binary image from the extreme left top to record the co-ordinates of the eyebrow and lips. The image detection includes the calculation of the variation in the place of the eyebrow and lip movements from its mean position. The displacement of eyebrow from its place is considered by examining the image for the eyebrow co-ordinates. The displacement of lips from its place is considered by examining the image for the lip co-ordinates. Emotion is detected for that particular frame. Emotions like Scared, Sad and Angry are classified as Stressed.

IV. EXPERIMENTAL RESULTS

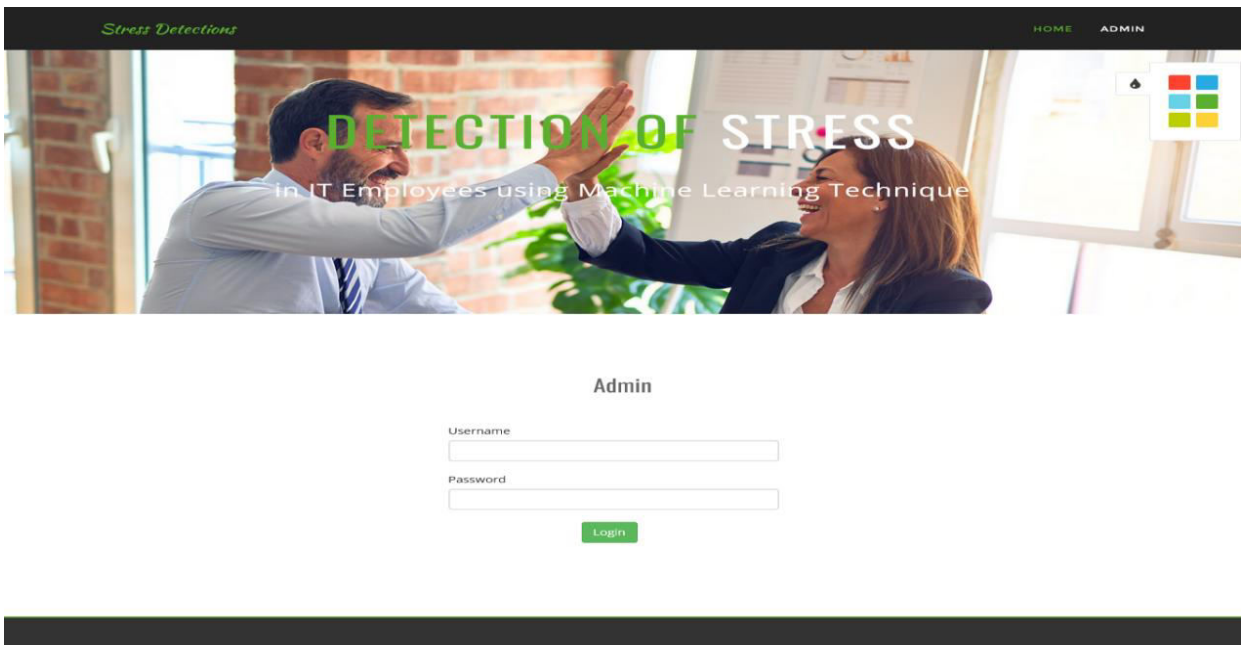
Figures show the result of a Real-time Machine Learning Algorithm For Stress Detection. Fig(a) shows the interface. (b) shows the interface for user to register. (c) shows the interface to admin login (d) shows interface to user after successful registration (e) shows the interface to upload image. (f) shows the interface of customer to admin



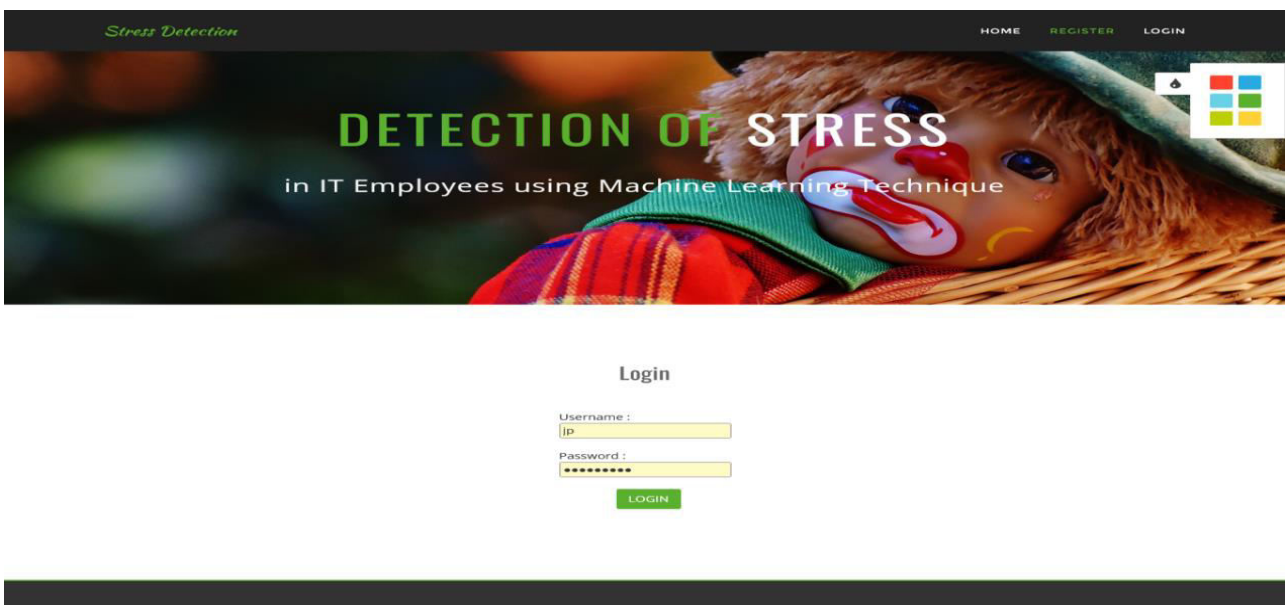
Fig(a)showstheinterfaceofwebsite



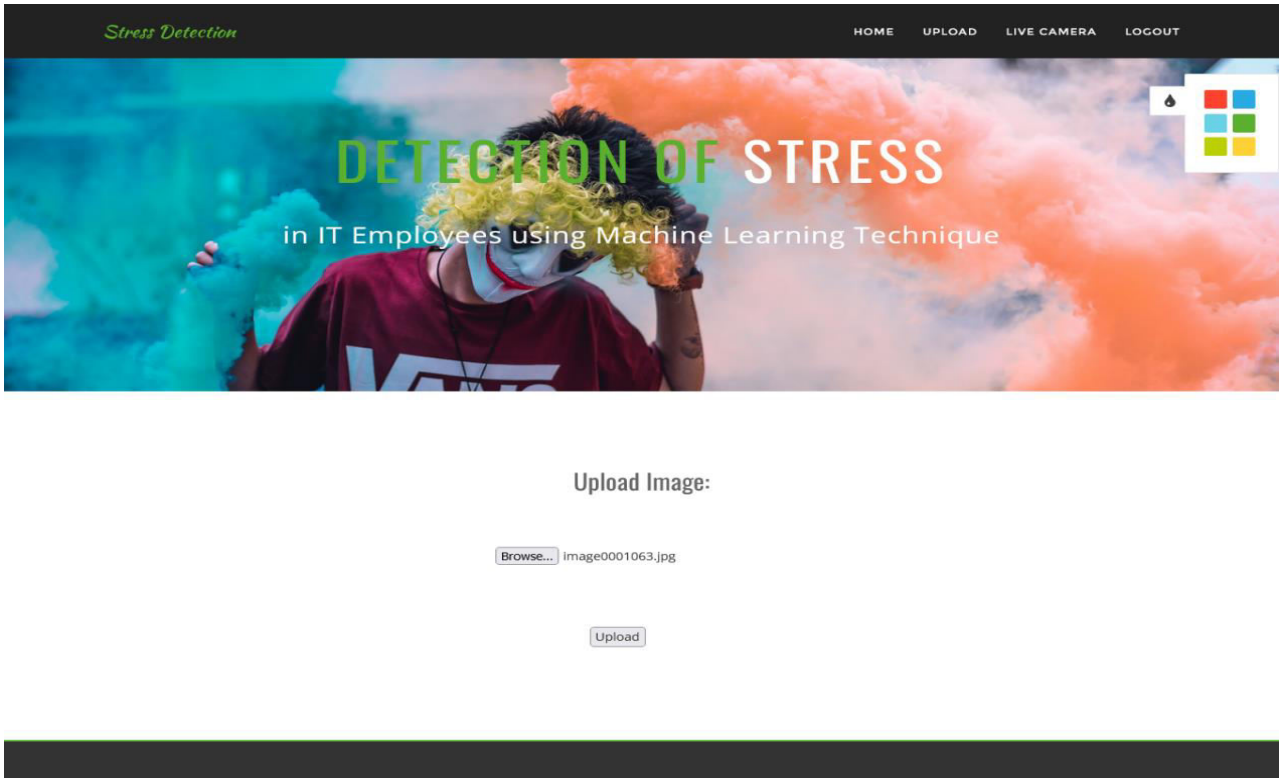
Fig(b)showstheinterfacefor user to register



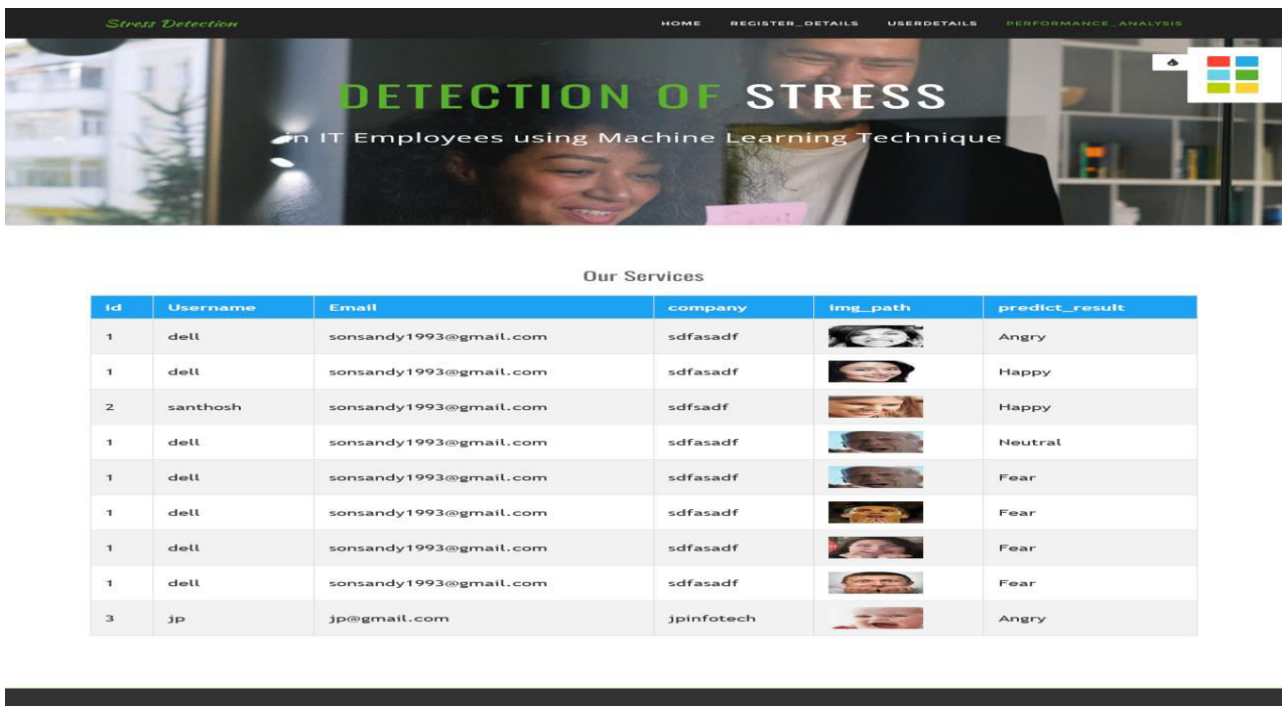
Fig(c)showstheinterfacetoadmin login



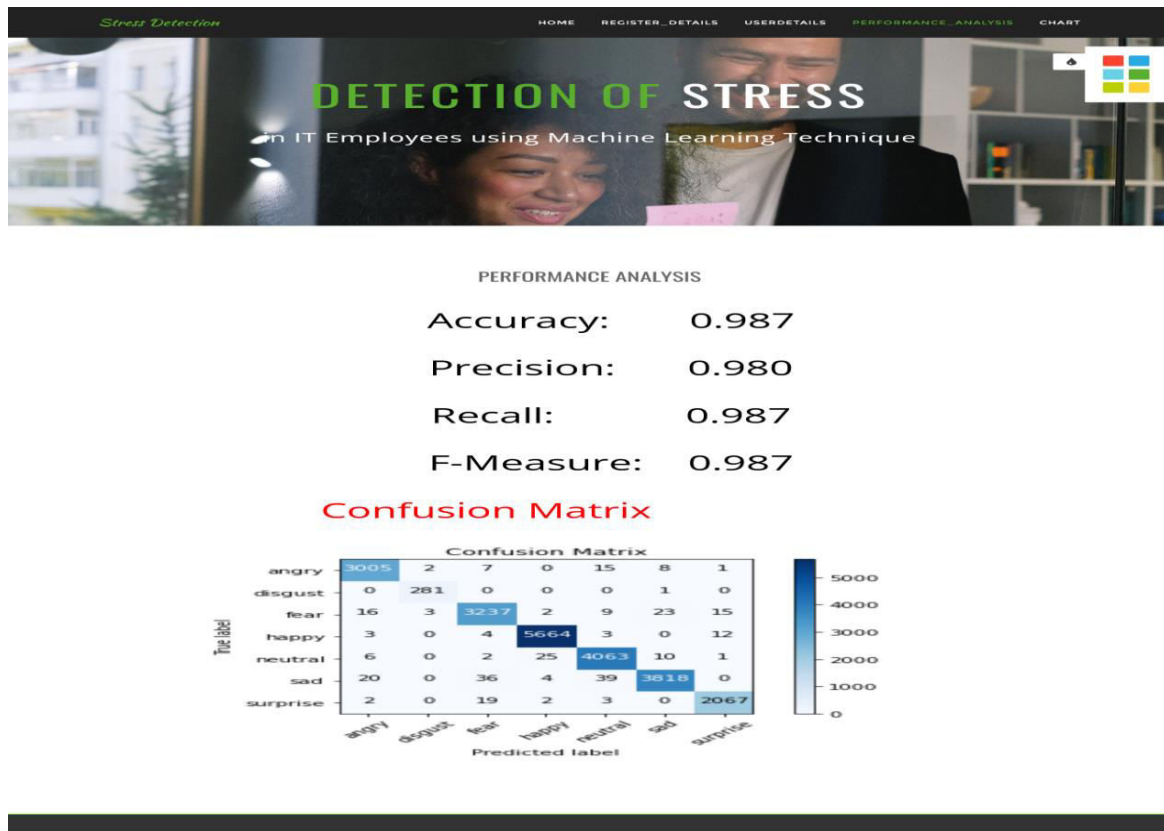
Fig(d)showstheinterfacewhereusercanloginafter successful registration



Fig(e)shows the interface to upload image



Fig(f)showstheinterfaceofcustomer to admin



Fig(g) shows the interface of performance analysis

VI. CONCLUSION

The Stress Detection System is designed to assess employee stress by reviewing photographs submitted by verified users, making the framework is reliable. After the successful registration and login, user uploads the image and also uses the live cam. After uploading the image, we will get the output of the stress level on the top of bounded box as angry, sad, happy, disgusting, and neutral. We develop this model by using CNN Model Architecture. We use CNN Model Architecture and predict the accuracy of the model. Along with the accuracy we also predict, recall, f1 and confusion matrix. We can supply successful solutions for stress management, keeping the working conditions sound and unconstrained for representatives, and capitalizing on them all through work hours.

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