

Unmasking of Agony in Software Engineers Applying Machine Learning Approach

Y. Chitty

PG Scholar, Department of Computer Science & Engineering, Guru Nank Institutions Technical Campus Hyderabad.

Dr. Geeta Tripathi

Professor & HOD Department of CSE, Guru Nanak Institutions Technical Campus, Hyderabad.

Abstract: In the modern world with latest technology gadgets, stress is raising most to everyone. Because of this, despite affluence, people are not satisfied. A pressured feeling is stress. Pressure may be mental, emotional, or even physical. Systems for managing stress are essential for identifying the stress levels that disturb our socioeconomic way of life. According to the World Health Organization (WHO), one in four people suffer from the mental health issue of stress. Human stress causes mental and socioeconomic issues, loss of focus at work, strained relationships with coworkers, despair, and in the worst circumstances, suicide. This requires the provision of counseling to help those under stress manage their stress. While it is impossible to completely avoid stress, taking preventive measures can help you manage it. Only medical and physiological professionals can now assess whether a person is depressed or stressed. A questionnaire-based approach is one of the more established ways to identify stress. Our project's primary goal is to identify signs of stress in IT professionals utilizing sophisticated machine learning and image processing methods. Our technology is an improved version of the previous stress detection technologies, which did not take into account the employee's emotions or live detection. However, the system includes both periodic and live employee emotion detection. Automatic detection of stress minimizes the risk of health issues and improves the welfare of the IT employee and the company. Knowing the IT employee's emotions allows the business to provide the right guidance and obtain better results from them. The accuracy of our suggested system model, which is developed using CNN Model Architecture, is 87.34% during training and 98.45% during validation.

Keywords: CNN, Stress Detection, Machine Learning.

INTRODUCTION

To be competitive, the IT industry is continually launching new items and services. Furthermore, employees stress levels have increased over the past year. The problem exists, despite the fact that many firms provide mental health benefits to their personnel. We'll start by looking at the stress patterns and pinpoint the most important factors that influence individual stress levels. According to the WHO, stress is a mental disease that affects one out of every four voters. These days, it aims at providing new technology and items to the economy in order to provide a fresh perspective.

Questionnaires are routinely used in the field of stress research to get insight into overall working experiences, but little is known about the immediate consequences of stressors at work. There will be a hesitation on the side of people to declare whether or not they are worried. Traditional techniques of evaluating workplace stress levels included asking employees to fill out a survey. Employers who use the Stress Detection System can better prepare their employees to deal with stressful events before they occur.

While office workers are concentrated on their task, stress identification might sometimes imply distinguishing between a 'stressed' and a 'relaxed' condition. Employee's headshots are taken, and survey questionnaires are given to them that are similarly standard in style and layout. Physical exertion is reduced, which saves both time and money. This organizational strategy can assist relieve employee stress by using our painstakingly developed questionnaire.

OBJECTIVE

The objective of this project is to develop an innovative stress detection system that utilizes machine learning and image processing techniques to accurately identify stress patterns in IT professionals. By taking into account the emotions of the employees in real-time, the proposed system aims to enhance the mental well-being of employees and boost their productivity. The study aims to achieve a high level of accuracy in stress detection by implementing the Convolutional

Neural Network (CNN) Model Architecture. The system will be designed to provide immediate feedback to the employees and their supervisors, allowing for prompt intervention in high-stress situations.

The proposed system will also assess the impact of various factors on stress levels, including workload, work schedule, and working environment. The project intends to provide insights into the most effective strategies for stress management in the IT industry. Ultimately, the objective is to improve the quality of life of IT Professionals and enhance the overall productivity and efficiency of their organizations.

METHODS

Dataset:

In the first module, we developed the system to get the input dataset for the training and testing purpose. Dataset is given in the model folder. The dataset consists of number of Facial Expression images.

Importing the necessary libraries:

We will be using Python language for this. First, we will import the necessary libraries such as Keras for building the main model, Sklearn for splitting the training and test data, PIL for converting the images into array of numbers and other libraries such as pandas, numpy, matplotlib and tensorflow.

Splitting the dataset:

Split the dataset into train and test. 80% train data and 20% test data.

Building the model:

For building the model we will use sequential model from keras library. Then we will add the layers to make convolutional neural network. In the first 2 Conv2D layers we have used 32 filters and the kernel size is (5,5). In the MaxPool2D layer we have kept pool size (2,2) which means it will select the maximum value of every 2x2 area of the image will reduce by factor of 2. In dropout layer we have kept dropout rate = 0.25 that means 25% of neurons are removed randomly.

We apply these 3 layers again with some change in parameters. Then we apply flatten layer to convert 2-D data to 1-D vector. This layer is followed by dense layer, dropout layer and dense layer again. The last dense layer outputs 7 nodes as the Facial Expression Detection. This layer uses the softmax activation function which gives probability value and predicts which of the 7 options has the highest probability.

Apply the model and plot the graphs for accuracy and loss:

We will compile the model and apply it using fit function. The batch size will be 10. Then we will plot the graphs for accuracy and loss. We got the training Accuracy of 87.34%.

Accuracy on test set:

We got an accuracy of 98/45% on test set.

Save Model:

Once you're confident enough to take your trained and tested model into the production-ready environment, the first step is to save it into a .h5 or .pkl file using a library like pickle. Make sure you have pickle installed in your environment. Next, let's import the module and dump the model into .pkl file.

LITERATURE SURVEY

Widanti, N., Sumanto, B., Rosa, P., Miftahudin, M.F, stress is a form of physical and psychological tension. This tension affects an individual's daily performance. Stress can lead to negative feelings or any feeling that goes against what is truly desired. It can even threaten the emotional well-being. Stress is capable of corrupting the way an individual absorbs reality, solves problem, and thinks logically. Stress is triggered by something called stressor. A stressor is a stimulus initiating or sparking changes. In general, stressor is classified further into internal stressor and external stressor. The first comes from within an individual (for example: the condition of having an illness, menopause, etc.), while the latter comes from things outside an individual or the environment (for example: the death of a family member, problems at work, etc.). Based from that problem, we formulate an idea to (1) detect an individual's level of stress by measuring heart rate, blood pressure, and GSR, (2) process the data obtained from those variables and display it on the LCD showing level of stress experienced by the user. There are four levels of stress, it begins from the lowest, relax, and goes up to calm, tense, and stress. (3) reduce the tension experienced by an individual to a more relaxed state by using infrared ray emitted from the device mounted in a user's neck.

Ravinder Ahujaa, Alisha Bangab, 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. In this project, we are calculating the mental stress of students one week before the exam and during the usage of the internet. Our objective is to analyze stress in the college students at different points in his life. The effect that exam pressure or recruitments stress has on the student which often goes unnoticed. We will perform an analysis on how these factors affect the mind of a student and will also correlate this stress with the time spent on the internet. The dataset was taken from Jaypee Institute of Information Technology and it consisted of 206 student's data.

System Architecture

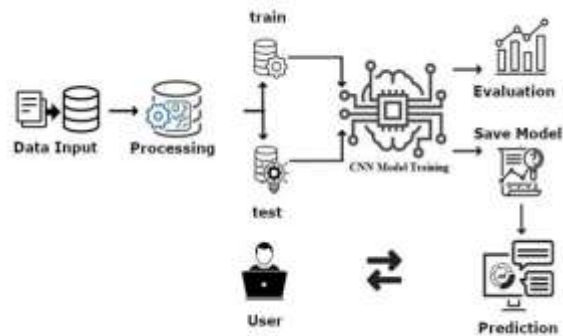
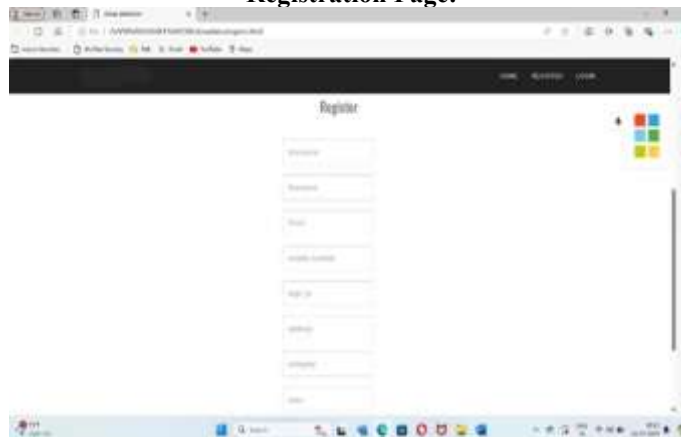


Fig: System Architecture

Registration Page:



Login Page:



Admin page:

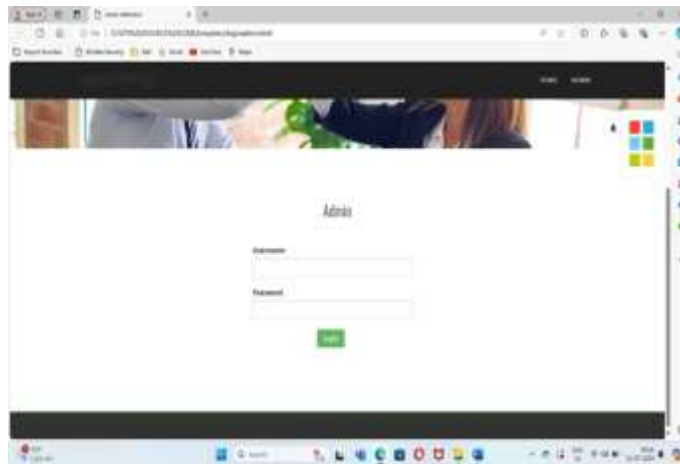


Image path Page:



Image Path Result Page:

V. FUTURE ENHANCEMENT

To identify stress, the proposed method combines image processing and deep learning. To extract features, images were gathered and analyzed. Along with the Live Cam, the video facility can also be benefitting to the future work with various algorithms. The algorithm processing outputs were used to train the model and test it with the test dataset. Despite the fact the acquired results are preliminary due to the small number of persons involved or technical information, the key added value of this project is acquired by permitting end-user to correctly recognize ongoing stress in order to decrease future health risk factor. A broader population study will be part of our future effort.

VI. CONCLUSION

The Agony masking in IT employees is designed to assess stress by reviewing photographs submitted by verified user's, 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 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-measure 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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