Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 15, Issue. 1 : 2024
ISSN : **1906-9685**

EMPLOYING VARIOUS ML ALGORITHMS TO DETECT STRESS IN EMPLOYEES

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ABSTRACT_ The principal objective of the research is to detect indicators of stress in IT professionals by employing advanced machine learning and image processing techniques. Our technique is an advancement above earlier stress detection systems that neglected to account for the emotions of the workers or live detection.
Automatic stress detection reduces health risks and enhances the welfare of IT staff members as well as the organisation. Understanding the feelings of the IT staff enables the company to provide them the proper direction and get better work out of them.
This project will look at stress management and how to establish a healthy, spontaneous work atmosphere so that you can get the most out of your employees.

1.INTRODUCTION

Unwinding gives wellbeing while stress influences your health[1]. Situation Stress is increasing the fastest right now. This is why, despite prosperity, people are unhappy. Stress is a compressed inclination. The stress can be mental, physical, or even emotional. Emotional, physical, or even mental pressure can occur whenever someone is under pressure. One feels like they would fail or not succeed when under pressure[2]. Stress can be found anywhere. It is found in every single character. Stress can be brought on by any thought or situation. However, nature is distinct. There are many different types of stress. It's mental, physical, and financial. Stress can result from any thought or circumstance[2]. Under stress, one's denial gradually rises in multiples. Personality shifts dramatically in these circumstances. Stress is also caused by the inferior complex and superior complex. An upset man can barely do anything effectively. Stress can be beneficial or, more often than not, harmful. Valuable pressure makes you work, it keeps you dynamic, occupied and spurred. Negative stress, on the other hand, makes you dull, inactive, afraid, and lonely. So far, there are two types of stress: short-term stress and long-term stress, also known as chronic stress[2]. Situational short-term stress disappears as soon as the situation changes. A problem that lasts a long time is stress. Because of this, it is dangerous. Chronic stress can sometimes be mostly inherited, or it can be linked to genes. It can bring an end to any person's life. One dies from excessive stress. Tolerating pressure is the initial step to lead tranquil blissful life[2]. Before stress becomes acute, it is critical to identify and manage it[3]. Simple, cost-effective remedies are available. Since a long time ago, studies have been conducted to identify people who are stressed. There is a lot of literature on stress detection. There are scientific and traditional methods for identifying stressed individuals. A) Survey: A large questionnaire is provided by the psychiatrist, and the results are used to determine whether or not the patient is experiencing stress. Because frequently the responses are not factual, this method has its own limitations and drawbacks. The questionnaire's questions can sometimes be inappropriate. B) The sensor measuring method is the alternative method. The limit of this technique is, the time has come consuming and a piece costly. Social media is another, more

recent, approach to stress detection[1]. Social media makes it possible to identify stress. A person's posts on social media, how they respond to a particular issue, and the things they like and dislike on social media all contribute to the detection of stress. A psychiatrist can find people who are under pressure, crazy, or mad after a typical subject by reading the constant posts on social media. Additionally, this is a sign of stress. The state of one's mind and thinking can be analyzed through the use of social networking sites[5]. Twitter and Facebook have a wide number of clients. Individuals share their own contemplations, thoughts, belief system, state of mind and so on. Whether a writer is normal or abnormal is evident in their comments on Twitter or Facebook. Furthermore, unusual is doubtlessly under pressure. The individual's comment reveals his personality. The property of tweeter is short, casual and restricted characters. 58 million tweets are sent out every day on Twitter, which is beyond comprehension. Tweets draw out one's own internal, character center, feelings and tension. Tweets describe what they are made of and how they look. One's tweet can without much of a stretch demonstrate whether one is loose or like freedom or under tension. This is early recognition of stress which in the drawn out will be useful to stay away from the extreme issue.

2.LITERATURE SURVEY

2.1 Measuring Post Traumatic Stress Disorder in Twitter.Glen Coppersmith, Mark Dredze, and Craig Harman. 2014.

Traditional mental health studies rely on information primarily collected through personal contact with a health care professional. Recent work has shown the utility of social media data for studying depression, but there have been limited evaluations of other mental health conditions. We consider post traumatic stress disorder (PTSD), a serious condition that affects millions worldwide, with especially high rates in military veterans. We also present a novel method to obtain a PTSD classifier for social media using simple searches of available Twitter data, a significant reduction in training data cost compared to previous work. We demonstrate its utility by examining differences in language use between PTSD and random individuals, building classifiers to separate these two groups and by detecting elevated rates of PTSD at and around U.S. military bases using our classifiers. Introduction Mental health conditions affect a significant percentage of the U.S. adult population each year, including depression (6.7%), eating disorders like anorexia and bulimia (1.6%), bipolar disorder (2.6%) and post traumatic stress disorder (PTSD) (3.5%).

2.2 Role of Social Media in Tackling Challenges in Mental Health.Munmun De Choudhury. 2013.

Mental illness is a serious and widespread health challenge in our society today. Tens of millions of people each year suffer from depression and only a fraction receives adequate treatment. This position paper highlights some recent attempts examining the potential for leveraging social media postings as a new type of lens in understanding mental illness in individuals and populations. Information gleaned from social media bears potential to complement traditional survey techniques in its ability to provide finer grained measurements of behavior over time while radically expanding population sample sizes. We conclude highlighting how this research direction may be useful in developing tools for identifying the onset of depressive disorders in individuals, for use by healthcare agencies; or on behalf of individuals, enabling those suffering from mental illness to be more proactive about their mental health.

3.PROPOSED SYSTEM

❖ Our proposed system is an updated version of prior stress detection systems that did not include live analysis or individual employee emotional analysis. Our proposed system model is developed using the CNN Model Architecture. By taking a picture as inputs and returning a characteristics associated with those images as output. We use a bounded box to show the employee's feeling, and also the emotions are shown at the top of the bounded box. The proposed system uses the emotional class such as: Angry, Disgusted, Fearful, Happy, Neutral, Sad and Surprised for detecting the emotion of the IT employee.

❖ To check the efficiency of the stability, we gathered information and executed quantitative experimental investigation. Firstly

User has to register with the required details user name, login ID, password, mobile, email, Locality, Address, city, state et. with all the required details user has to register. User can login with registered Login ID and password. The user can successfully login only if admin activates that user. If admin does not activate that user then the user cannot login into the system, this is for the security of maintaining the employees. If user clicks on the live cam then camera turns on and monitors the face of a person who is in front of the camera and displays
the result. The user needs to upload their image. The admin will see the predicted results in the admin page. The admin has the options of seeing the performance analysis parameters and their graphical representations..

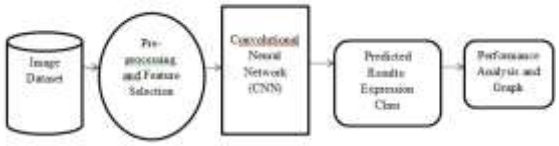


Fig 1:Architecture

3.1 IMPLEMENTATION

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 49,543 Facial Expression images. The dataset is referred from the kaggle website.

The link of the dataset is given below.

Kaggle link: https://www.kaggle.com/datasets/jayaprakashpondy/emotion-dataset

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.

Retrieving the images:

We will retrieve the images and their labels. Then resize the images to (48,48) as all images should have same size for recognition. Then convert the images into numpy array.

Splitting the dataset:

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

Convolutional Neural Networks The objectives are:

- To understand the convolution operation
- To understand the pooling operation
- Remembering the vocabulary used in convolutional neural networks (padding, stride, filter, etc.)
- Building a convolutional neural network for multi-class classification in images

4.RESULTS AND DISCUSSION

REGISTER_DETAILS

user_id	User_name	Email	Mobile	company	State	Status	Action
1	dell	sonsandy1993@gmail.com	9878	sdfasadf	kji	Approved	Approved
2	santhosh	sonsandy1993@gmail.com	12331	sdfsadf	sdf	Approved	Approved
3	jp	jp@gmail.com	9789178	jpinfotech	pondicherry	Approved	Approved

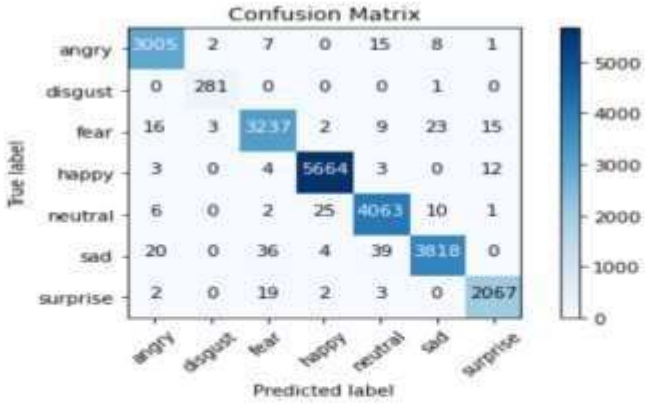
Our Services

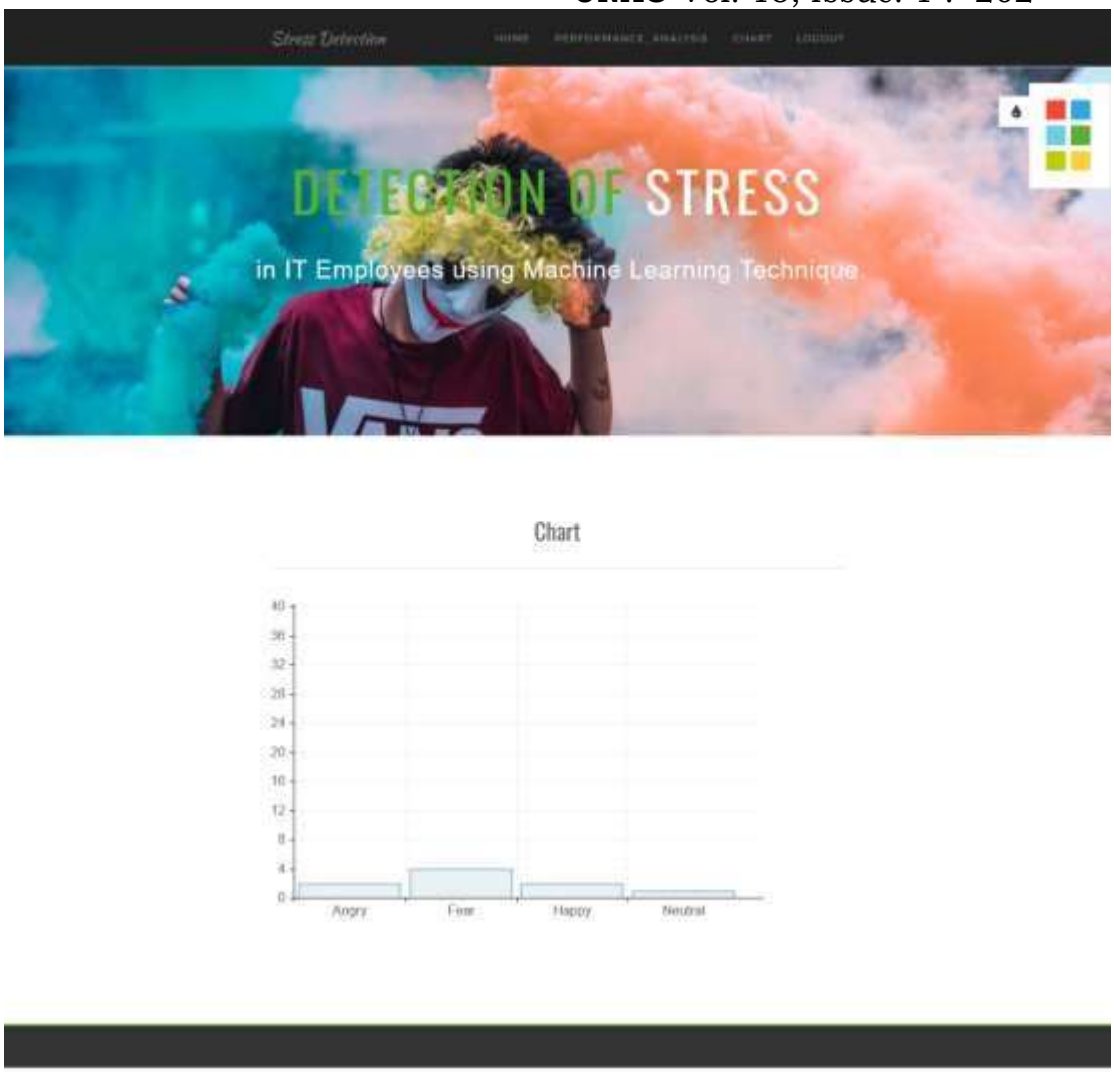
id	Username	Email	company	img_path	predict_result
1	dell	sonsandy1993@gmail.com	sdfasadf		Angry
1	dell	sonsandy1993@gmail.com	sdfasadf		Happy
2	santhosh	sonsandy1993@gmail.com	sdfsadf		Happy
1	dell	sonsandy1993@gmail.com	sdfasadf		Neutral
1	dell	sonsandy1993@gmail.com	sdfasadf		Fear
1	dell	sonsandy1993@gmail.com	sdfasadf		Fear
1	dell	sonsandy1993@gmail.com	sdfasadf		Fear
1	dell	sonsandy1993@gmail.com	sdfasadf		Fear
3	jp	jp@gmail.com	jpinfotech		Angry

PERFORMANCE ANALYSIS

Accuracy:	0.987
Precision:	0.980
Recall:	0.987
F-Measure:	0.987

Confusion Matrix





5.CONCLUSION

The structure of the Stress Detection System is dependable since it evaluates user-submitted images to determine the level of stress experienced by employees. Following a successful login and registration, the user uploads an image and makes use of the live camera. We will receive the result of the stress level as angry, sad, joyful, disgusting, and neutral on top of the bordered box after submitting the image. CNN Model Architecture is what we use to construct this model. We forecast the model's accuracy using the CNN Model Architecture. We also have predictability, recall, f1, and confusion matrix in addition to accuracy. We are able to provide effective stress management solutions, ensuring that representatives have safe and unrestricted working circumstances and making the most of them throughout working hours.. **REFERENCES**

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