Detection of Stress In IT Employees Using Machine Learning Technique

Ms.V.R.Swetha[1], K. Madhavi[2]

[1]Assistant Professor, Dept of MCA, Audisankara College of Engineering & Technology (AUTONOMO US), Gudur, AP, India.

[2]PG Scholar, Dept of MCA, Audisankara College of Engineering & Technology (AUTONOMOUS), Gudur, AP, India.

ABSTRACT

Stress management systems are essential to identify and address stress levels that can disrupt our socioeconomic functioning. According to the World Health Organization (WHO), one in four people experience stress, which can result in mental and socioeconomic issues, poor work relationships, and depression, and in severe cases, suicide. Counselling is crucial to help people cope with stress, and while stress cannot be avoided, preventive measures can be taken to mitigate its effects. Currently, only medical and physiological experts can determine whether someone is experiencing stress. Traditional stress detection methods rely on self-reported answers, which can be unreliable. Automated stress detection can minimize health risks and improve societal welfare. Therefore, there is a need for a scientific tool that can automate stress detection using physiological signals. Stress detection is an important social contribution that potential to improve quality of life. As IT industries bring new technologies and products to the market, stress levels in employees are also increasing. While some organizations offer mental health services to their employees, more needs to be done to address this issue.

1. INTRODUCTION

Stress is an inevitable part of our lives and refers to the uncomfortable state of emotional tension that

individuals experience in various situations, such as extended periods of computer work. It is essential watch closely the emotional state of someone who spends long hours in front of a computer to ensure their safety. One way to achieve this is by using a camera to capture a frontal view of the person as they work, with the camera mounted in front of them. The main motive of the said research is to improve the man machine interface to make it more user-friendly and flexible. In determining the age of a person, human experts have valuable knowledge about the facial characteristics that change with aging, including skin texture, face shape, lines, inflammation, and under-eye bags. However, this privileged knowledge is not available for test

images in automated age estimation. To address this issue, we propose using asymmetric data to improve the generalize ability of the trained model. By exploring and exploiting this approach, we aim to enhance the accuracy and reliability of age estimation in automated systems.

2. LITERATURE REVIEW

A. Paper Name: A Study and Comparison of Prediction Algorithms for Depression Detection among Millennials: A Machine Learning Approach network Author: Madhurima Hooda,Aashie Roy Saxena.

Depression is a significant problem that can have varying effects on people. Even- though with availability of said research is to help individuals suffering from depression, the challenge lies in identifying those who may not even realize they are experiencing depression. Multiple models have been developed to predict depression in individuals. This article provides a summary of three significant models: (a) the use of machine learning classifiers and WEKA, (b) imaging and machine learning techniques, and (c) risk factors. Depression can affect a person's physical and mental well-being and have various impacts on their quality of life, even if it is not severe. Numerous experiments have been conducted to analyze depression, and the three primary methods were analyzed to determine the most accurate approach. To determine the best method, several factors were considered, such as machine learning classifiers, feature reduction techniques, cross-validation methods, and risk factors. The Bayesnet Classifier for the Percentage Split testing option was found to be the most consistent method. Various datasets were utilized to evaluate the performance of the predictive model. As research in this field continues to evolve, alternative methods may be explored to enhance the accuracy of depression prediction.

B. Paper Name: Detection Possibilities of Depression and Parkinson’s disease Based on the Ratio of Transient Parts of the Speech.

Author: G´abor Kiss, Art´ur Bendeg´uz Tak´acs, D´avid Sztah´o, Kl´ara Vicsi

The process of producing speech is a complex one that involves the brain and can be affected by neurological or psychological disorders such as depression and Parkinson's disease. Those with these conditions may experience slower speech, poor articulation, and a monotonous tone. A recent study aimed to investigate the impact of depression and Parkinson's disease on the ratio of transient parts (RoT) in speech, which refers to the significant and rapid changes in speech. The research analyzed 321 speech samples from individuals with no known health issues, individuals with depression, and those with Parkinson's disease to calculate the RoT using an automatic detection method for transient parts.

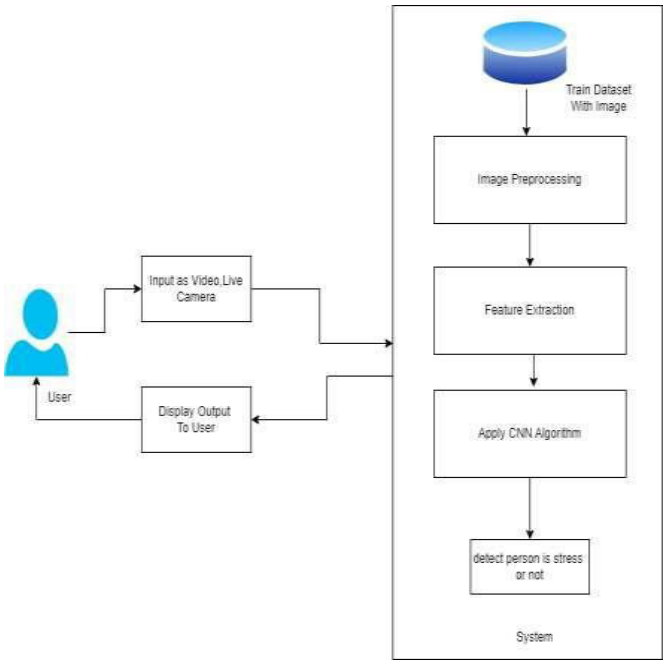
The findings showed that the mean value of RoT decreased by 9-10 speakers for those with Parkinson's disease, and the RoT was used with an 81 percent accuracy rate to differentiate between healthy and non-healthy speakers. People suffering from neurological disorders can have difficulties with articulation, particularly co-articulation, which is an essential aspect of the speech process. This impairment may impact the length of transient parts in their speech compared to healthy individuals. The research examined 190 speech samples from healthy individuals, 55 from depressed individuals, and 76 from individuals with Parkinson's disease. The analysis revealed that the mean value of RoT was lower in non-healthy speakers, indicating a distinct speech pattern compared to healthy individuals.

C. Paper Name: Clinical Depression Detection in Adolescent by FaceAuthor: Prajakta Bhalchandra Kulkarni,Minakshee M . Patil

Depression is a widespread illness that poses a significant threat to the lives of many individuals worldwide. According to the World Health Organization's 2017 report, approximately 300 million people were affected by depression globally. In India, the percentage of adolescents struggling with depression ranges from 0.3 to 1.2, which can have harmful effects on their lives. Various factors can trigger depression, such as the loss of a loved one or stress. Persistent symptoms of depression, such as social isolation, suicidal thoughts, and mental disturbances, can have severe consequences. Early detection of depression is essential in preventing its progression to more severe stages. In this paper, the authors propose a safe, simple, and reliable method for detecting depression without the need for a psychiatrist's assistance. The authors utilized two algorithms, namely the Fisher vector algorithm and LTrP, for depression detection. The Fisher vector algorithm is used to represent and describe an image, using the Gaussian mixture model (GMM). It encodes the Fisher vector efficiently even with a linear classifier, giving the best results. The authors applied these algorithms to a face, and for feature extraction, they used LTrP. LTrP uses a central pixel as a reference to generate magnitude and tetra patterns with its neighboring pixels. To achieve limitations of the bag-of-words and local binary pattern methods, the LTrP method offers better results. The method classifies the person as "Depressed" or "Not depressed."

3. PROPOSED METHODS

A. System Architecture:



B. Proposed Approach:

This project can be implemented in following steps:

1. Preprocessing: -

This module involves the use of a machine to process a given input. During preprocessing, the machine is trained on the dataset and eliminates any unwanted parts of the input. Additionally, the dataset is resized as necessary to optimize the processing of the input data.

2. Feature extraction: -

The process of feature extraction involves converting raw data into numerical features that can be processed while retaining the original data's information. Utilizing feature extraction generally produces more accurate results than applying machine learning algorithms directly to raw data sets.

3. Classification: -

The CNN algorithm is used to classify the user testing value with the train data-set and determine if the given input indicates depression in the person. Machine learning is utilized to increase the accuracy of the prediction.

C. Algorithm:

 Convolutional Neural Network (CNN): The convolutional neural network is used as it is very accurate in image recognition and classification. It is also efficient and takes less computation time. In our case, we used the algorithm to identify the user's face and clearly classify the expressions in real time. CNN is useful in real time applications and processes the image to classify it in the given category. It is trainedusing supervised learning methods to recognize the patterns and classify accordingly. We used labeled data to train the model to recognize the person's expressions like angry, happy, neutral, sad, fearful and others. CNN recognizes the expression through real time input and classifies accordingly. Due to these advantages the CNN model is used and implemented successfully.

- Haar cascade Algorithm:

The Haar cascade is an efficient algorithm for identifying objects from a given image. It finds its use because of its ease and simple execution. This algorithm can be used on low end devices, with less computation and works in real time. The said algorithm runs smoothly with OpenCV python library, hence included in the project. It makes use of a function called the cascade function along with a cascading window for calculating features for window and classifying as positive or negative. It is positive when the window is part of the object, and it is negative if the window is not a part of the object.

4. CONCLUSION

Stress has recently been part of our lives, which is an unpleasant state of mind and emotional arousal that individuals experience in situations where there are challenges or unfavorable events. So, to monitor such a state of a person who is working in front of a computer device for longer duration is very crucial for their well- being. The Stress detection system will help monitor the stress levels of the given individual and help the individual in managing stress levels by real time updates through mails. This will spread awareness regarding mental health and to manage or reduce stress during longer working periods. Declaration by Authors Acknowledgement: None Source of Funding: None Conflict of Interest: The authors declare no conflict of interest.

5. REFERENCES

1. Y. Kwon and N. Lobo, “Age classification from facial images,” Comput. Vis. Image Understand., vol. 74, no. 1, pp. 1–1, 1999.

2. W. B. Horng, C. P. Lee, and C.W. Chen, “Classification of age groups based on facial features,” Tamkang J. Sci. Eng., vol. 4, no. 3, pp. 183–92, 2001.

3. J. Hayashi, M. Yasumoto, H. Ito, Y. Niwa, and H. Koshimizu, “Age and gender estimation from facial image processing,” in Proc. 41st SICE Annu. Conf., vol. 1. Osaka, Japan, Aug. 2002, pp. 13–8.

4. A. Lanitis, C. Taylor, and T. Cootes, “Toward automatic simulation of aging effects on face images,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 24, no. 4, pp. 442– 55, Apr. 2002.

5. Fevre, Mark Le; Kolt, Gregory S.; Matheny, Jonathan,. ”EuDepression, diDepression and their interpretation in primary and secondary occupational Depression management interventions: which way first?”. Journal of Managerial Psychology, 2006, 21 (6): 547 -565. doi:10.1108/0268390610684391.

6. Das S, O’Keefe J. “Behavioral cardiology: recognizing and addressing the profound impact

of psychosocial Depression on cardiovascular health". CurrAtheroscler Rep. 2006; 8:111-

7. Shuster man V, Aysin B, Gottipaty V, Weiss R, Brode S, Schwartzman D, Anderson KP. "Autonomic Nervous System Activity and the Spontaneous Initiation of Ventricular Tachycardia." ESVEM Investigators. Electrophysiologic Study Versus Electrocardiographic Monitoring Trial. J Am Coll Cardiol. 1998; 32:1891-9.

8. Leenhardt A, Lucet V, Denjoy I, Grau F, Ngoc DD, Coumel P. "Cate- cholaminergic polymorphic ventricular tachycardia in children. A 7-year follow- up of 21 patients." Circulation. 1995;91:1512-9.

9. LSTM BASED STOCK PRICE PREDICTION" Pritam Ahire, Hanikumar Lad, Smit Parekh, Saurabh Kabrawala, IARJSET ISSN ONLINE International Journal of Creative Research Thoughts(IJCRT) vol 8,2021

10. Prof. Pritam Ahire, Abhijeet Mowade, Nikhil Bankar. "MACHINE LEARNING BASED INTRUSION DETECTION SYSTEM" International Journal of Advanced Research in Computer and Communication Engineering(IJARCCE) Vol 10,2021.

11. A. Jaya (Editor), K. Kalaiselvi (Editor), Dinesh Goyal (Editor), Dhiya Al-Jumeily (Editor). Predictive and Descriptive Analysis for Healthcare Data, A Hand book on Intelligent Health Care Analytics - Knowledge Engineering with Big Data" Wiley Group, 2021.

12. Prof Pritam Ahire, Hariharan Achary, Pratik Kalaskar, Sourabh Shirke. Voice-Print Recognition system using python and machine learning with IBM watson" International Advanced Research Journal in Science, Engineering and Technology (IARJSET) vol 8,2021.

13. Prof. Pritam Ahire, Akanksha Kale,Kajal Pasalkar, Sneha Gujar,Nikita Gadhve. "ECG MONITORING SYSTEM", International Journal of Creative Research Thoughts (IJCRT), Vol 9,2021.

14. Pritam Ahire, Sonal Bhatter, Pratibha Kasar, Mrunal Gaikwad, Yash Chikane. "Software Piracy Detection using deep learning Approach", International Journal of Engineering Research & Technology (IJERT) Vol-9, Issue 2 February 2020.

15. Er. PRITAM R. AHIRE, Dr. PREETI MULAY. Discover Compatibility: Machine Learning Way, Journal of Theoretical and Applied Information Technology JATIT (Elsevier SCOPUS) (Published) Vol.86. Issue No.3 30th April 2016.

Author's Profile:

Ms.V. R. SWETHA currently working as

Assistant Professor in Audisankara college of

Engineering & technology AUTONOMOUS

Gudur,Tirupati(Dt),Andhra Pradesh,India

Ms. K. MADHAVI is pursuing MCA from Audisankara college of Engineering & Technology, AUTONOMOUS, Gudur. Affiliated to JNTUA, Andhra Pradesh, India