

# Stress Detection using Facial Image for Elderly

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**Abstract:** Stress plays an important role in late-life depression. It is a natural reaction to various factors which can lead to physiological and behavioural changes in human behaviour and performance. Dependence, ill health, loss of social role and recognition, and a lack of opportunity for creative use of leisure are some of the most common medical and psychological difficulties among the elderly. Automatic stress monitoring reduces the likelihood of health problems and promotes society's well-being. Our project's major goal is to use machine learning and image processing techniques to detect stress in the elderly population. Our system is an improved version of previous stress detection systems that did not include live detection, personal counselling, or stress level notification via a mobile device application. Instead, this system includes live detection and periodic analysis of the person in question, as well as detecting mental stress levels and notifying the person's emergency contact. Our system is primarily targeted at the elderly, but it may also be used by students and IT professionals to manage stress and create a healthy, spontaneous work environment for employees, allowing them to give their best during working hours [5].

**Keywords:** Facial image, emotions, encryption, stress, image-processing.

## I. INTRODUCTION

People in today's culture are under a great deal of stress owing to a variety of circumstances. Stress is a leading cause of disease and has a negative impact on longevity, so it's critical to keep it under control. The need of the hour is a system that can identify a user's stress level in real time. Stress and anxiety are typical emotional strain states that have a significant impact on a person's subjective quality of life. Stress may be damaging to our bodies if we are exposed to it for an extended length of time. Psychological stress is frequently described as a major health risk nowadays. Stress that is not essential may be damaging, and extreme stress is a leading cause of self-mortality. We present a technique for

identifying stress in this research by extracting high-dimensional characteristics from pi camera facial photos. Stress management systems are important in detecting stress levels that disturb our socioeconomic lives. According to the World Health Organization (WHO), stress is a mental health condition that affects one out of every four people [1] [2]. Human stress causes mental and socioeconomic issues, as well as a lack of clarity at work, bad working relationships, despair, and, in extreme situations, death. This necessitates providing counselling to anxious persons in order for them to cope with stress.

## II. SYSTEM DESIGN AND IMPLEMENTATION

- Laptop Camera for image input
- HTML 5, CSS 3, PHP 5 for frontend.
- Node Microcontroller, OpenCV
- Python 3 for coding
- LCD display, Buzzer, mobile phone for receiving sms.

## III. METHODOLOGY

- The input to the entire model will be taken via a pi camera where the person whose stress is to be detected is in front of the camera and the Machine Learning and CNN code will detect his/her stress level
- After the face recognition and stress detection is completed as shown in Figure 4.1.2 and we have the resultant data, we transmit the data to the mobile phones of the concerned people, here which are the doctor, patient and also if any emergency contact is given [3] [4].
- The proposed model is based on a real time application in which we store the data of the person and the message is also displayed on the LCD display

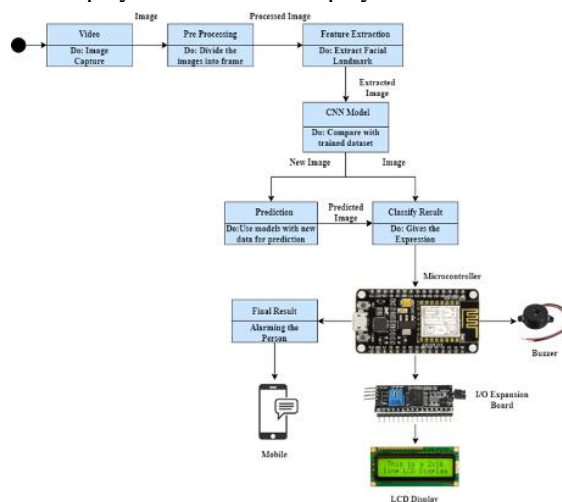


Fig. 1. System Architecture.

Manuscript received on 26 June 2022 | Revised Manuscript received on 03 July 2022 | Manuscript Accepted on 15 July 2022 | Manuscript published on 30 July 2022.

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A. Flow Chart



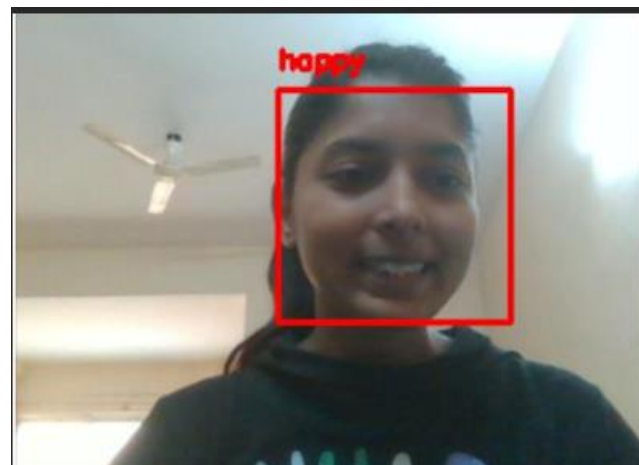
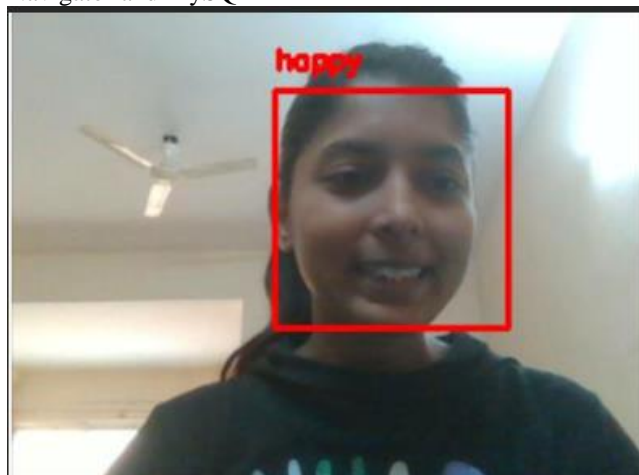
Fig. 2. Flow Chart.

- From Figure, first the image will be captured through the camera and image pre-processing would be performed on it.
- The next step is feature extraction using Machine Learning. Features under investigation include eye-related events, mouth activity, head motion etc.
- The extracted features are then compared with the dataset provided and on the basis of the comparison of all features will predict the emotion.
- From the predicted emotion, the result will be classified as Stressed or Not Stressed.
- The last step is alarming the person by sending message to the concerned and this will be done by using Node Microcontroller, LCD display and Buzzer [6][7].

IV. RESULT AND DISCUSSION

The main purpose of this project is to detect the stress level of a person using facial expressions and based on comparisons and results tell whether stress is detected or not. The captured images are used to detect the stress of the user based on the CNN Model trained using data sets and image

processing mechanisms. After the detection of stress level using the CNN Model, the result of the stress level will be transmitted to the application on the patient, emergency contact and prescribed doctors phone and also will be displayed on the LCD Display connected to the hardware module. Live detection and periodic analysis notifies the concerned like doctors and emergency contacts so that proper action and care can be taken. The requirements of the project will be met and successfully executed using the technologies like Python, PHP5, HTML5, CSS3, Anaconda Navigator and MySQL



V. CONCLUSION

- The model for detecting stress on elderly people is tested and verified.
- The alarming system is working and notifying the doctor and patients emergency contact.
- The stress detection algorithm is working accurately and detecting stress.
- Multiple face detection features can be added in order to decrease the number of cameras and increase the throughput.
- Basic stress relieving suggestions can be displayed on the screen until proper medical help can be given.

## APPENDIX

It is optional. Appendixes, if needed, appear before the acknowledgment.

## ACKNOWLEDGMENT

It is optional. The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments. Avoid expressions such as “One of us (S.B.A.) would like to thank... .” Instead, write “F. A. Author thanks ” Sponsor and financial support acknowledgments are placed in the unnumbered footnote on the first page.

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