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Facial Expression Recognition for Mood Analysis

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Abstract: ***Facial expression is the main approach for human to express their emotional state. For example, a smile may indicate a positive and optimistic mood while fear, sadness and disgust indicate a negative mental state. Facial expression recognition is the process of assigning an emotional label to a still image or a video. The purpose of the project is to analyze the mood of the user using facial expression recognition. The existing system does not tell about the mood of the user. The idea is to generate the graph of the user's expressions to get the analysis of the mood. The proposed system is a service which can be integrated with multiple applications to analyze the mood of various users associated with di□erent applications.***
Keywords: Emotional state, mood, facial expressions

I. INTRODUCTION

Todays handheld devices are growing in their capacity to interact with end users. They have access to an ever-growing range of network based services and their sensing capabilities of the location and local environment continue to grow in scope. One challenge for todays devices is to sense and determine the emotional state of the user. This introduces new challenges and requires a range of sophisticated edge technologies that can capture and analyze information from the user on the device. One example is the real-time analysis of speech patterns for detecting emotion. More recently researchers in this field have turned to deep learning techniques. Facial expression analysis is also well known in our literature survey. But it is computationally complex and it is challenging to achieve high recognition rates using conventional feature extraction and classification schemes. In this project we follow the trend from the speech recognition field and explore facial emotion recognition using machine learning techniques. The goal is to demonstrate the potential for high performance solution that can run on relative lightweight convolutional neural networks that can be implemented in hardware. Such a solution could realistically enable a new generation of smartphones that can understand the moods of their owners. Facial Expression Classification: In recent years the facial expressions classification has attracted a lot of attention because of its various potential applications including psychology, medicine, security, man-machine interaction and surveillance. There are two main approaches to investigate the facial expression in a systematic way: Action Unit based and appearance based methods. This technique described the facial expression as a composition of Action Units which are describing the facial muscle motions. This method takes advantage of the strong support of the psychology and physiology sciences since it uses the facial muscle movements for modeling di□erent expressions. The Action Units based methods su□er from the di□culties such as dependencies on invisible muscle motions which makes it extremely di□cult to model the system using machines. So, the idea is to use facial expression recognition for mood analysis .This can be achieved using supervised machine learning algorithms such as Naive Bayes and Fisher face recognition algorithm .There can be multiple moods of a user such as joy, sad, anger, disgust, fear .We are proposing a system which can be extended in future so that it also considers the dozing nature of a user. The same will be helpful in avoiding major accidents which can harm anyone. Mood analysis can be used in multiple applications which makes it a generalize service which o□ers its benefits to all kinds of users.

II. RELATED WORK

By growing the capacity and processing power of the server nowadays, a wide range of capabilities can be implemented in these servers to make them more intelligent and user friendly. Determining the mood of the user can be used in order to provide suitable reactions from the system in different conditions. One of the most studied ways of mood detection is by using facial expressions, which is still one of the challenging fields in pattern recognition and machine learning science. Deep Neural Networks (DNN) have been widely used in order to overcome the difficulties in facial expression classification. The main di□culty is to detect the mood of the user using facial expressions. A single image can produce wrong results so it is better to take multiple images or frames which can be analysed as a whole to produce the correct result of the user's mood. Automatic facial expression recognition (AFER) system is proposed. Machine recognition of facial expression is a big challenge even if human being recognizes it without any significant delay. The combination of SUSAN edge detector, edge projection analysis and facial geometry distance measure is best combination to locate and extract the facial feature for gray scale images. SOM-based automatic facial expression recognition is presented. The proposed system is able to automatically detect human faces, extract feature points, and perform facial expression

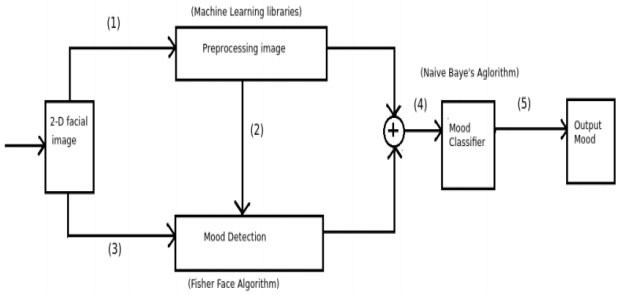
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recognition from image sequences. After a human face is detected, a composite method was proposed to locate pupils so that the located face image can be rotated, trimmed, and normalized to be an image with the size 8060.

Extensive e□orts have been made over the past two decades in academia, industry, and government to discover more robust methods of assessing truthfulness, deception, and credibility during human interactions. The objective of the research study is to give brief introduction towards techniques, application and challenges of automatic emotion recognition system. A key idea in this model is to linearly combine a set of face spaces dening some basic emotion categories. The model is consistent with our current under- standing of human perception and can be successfully exploited to achieve great recognition results for computer vision and HCI applications. Variety of ways has been listed in which the machine learning community can get involved in this research project and briefly discussed applications in the study of human perception and the better understanding of disorders. The review of framework of facial expression recognition has been highlighted. In this, the di□erent components and phases required for facial expression recognition have been discussed. The datasets which plays very important part of this research area are considered. And di□erent facial expression datasets those are widely used for research purpose are listed.

III. PROPOSED SYSTEM

The framework can be use by any person or organization to analyze the Facial Expression on the basis of mood analyzer and machine learning API. Data to be analyzed is then processed by our system.



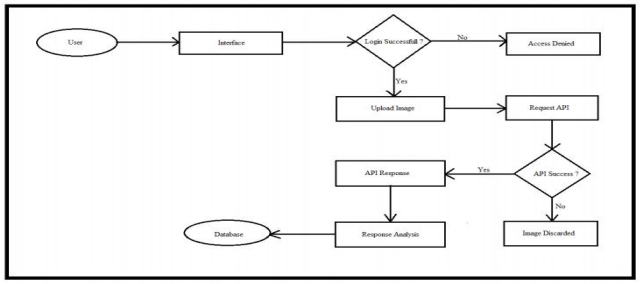
First using Data Acquisition methods the data is acquired in raw format from the Video uploaded. Then the data is properly filtered and normalize for further processing. This data is then send as an input to the Machine Learning API for detailed analysis on the basis of Face - fisher algorithm and Natural Language Processing and the Deep learning of the mood behaviors from all over the world over cloud. Once this data is processed the result of API is then stored back to our data store where we summarize it.

IV. METHODOLOGY

A. To upload the video on the cloud server.

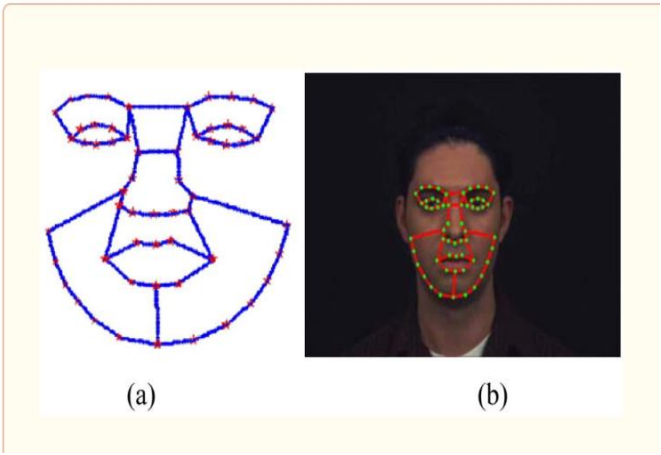
B. The video will be divided into n number of frames randomly.

C. To extract the images from the frames of the video and detecting the mood based on face edges using fisher face recognition algorithm.

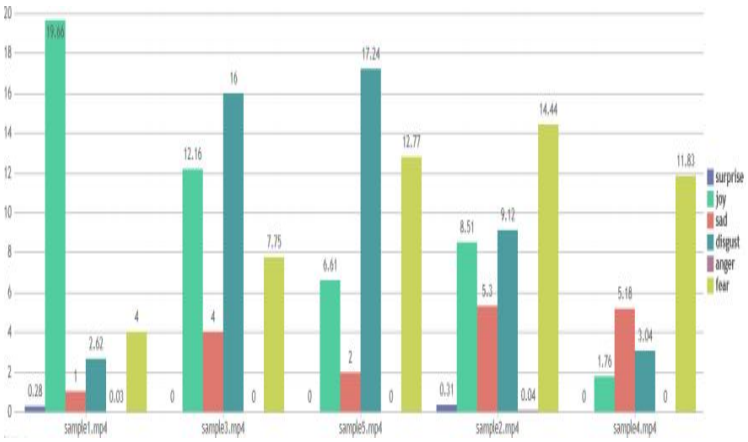


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D. To analyze the mood of the user using Naive Bayes classifier algorithm by classifying the generated result of fisher face algorithm.
E. Generating reports based on the expressions observed for applied input.
F. Recognition of face expressions using only static images may produce wrong results or disturbed results.
G. It is better to work with dynamic images which can be produced by a video.
H. Live video of few seconds gets divided into different images using randomized selection of frames.



V. EXPECTED RESULTS



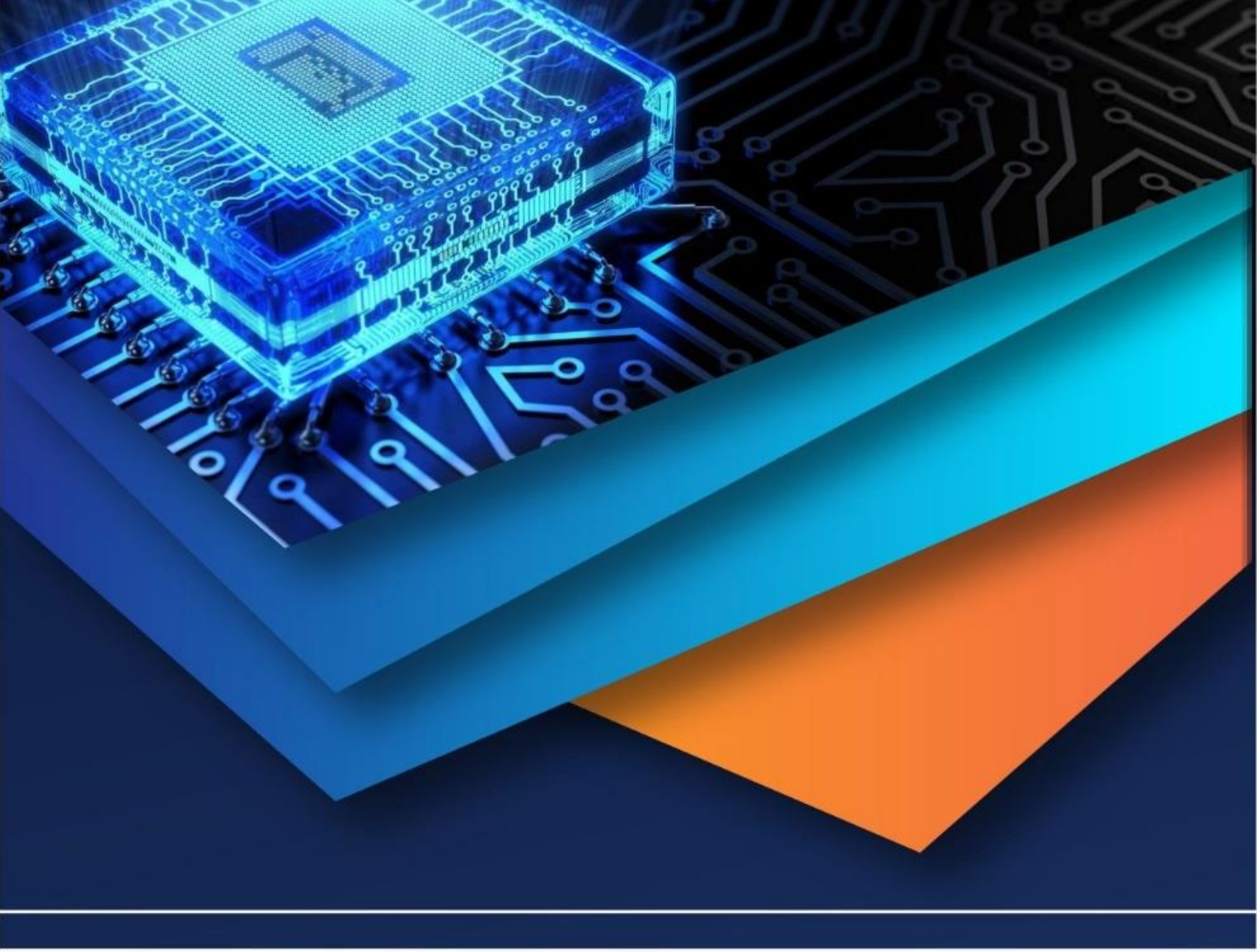
VI. CONCLUSION

The idea is to use known image media forensics approaches to detect the face expressions of the given input image and exploring visual-based approaches for mood analysis. Determining the mood of the user can be used in order to provide suitable reactions from the system in di□erent conditions. The solution is general and can be integrated with multiple applications.

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