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# Review: Mood Detection using Image Processing, AI and Machine Learning

Sudhakar Vishwakarma[1], Sayali Mane[2], Komal Kadlag[3], Pallavi Aher[4], Prof. D. S. Shingate[5]
[1, 2, 3, 4]*BE Computer, SIEM, Mahiravani, Nashik*
[5]*Computer Department, SIEM, Mahiravani, Nashik*

***Abstract:*** ***Behaviors, actions, poses, facial expressions and speech; these are considered as channels that convey human emotions. Extensive re- search has being carried out to explore the relationships between these channels and emotions. This paper proposes a prototype system which automatically recognizes the emotion represented on a face. Thus a neural network based solution combined with image processing is used in classifying the universal emotions: Happiness, Sadness, Anger, Dis- gust, Surprise and Fear. Colored frontal face images are given as input to the prototype system. After the face is detected, image processing based feature point extraction method is used to extract a set of se- lected feature points. Finally, a set of values obtained after processing those extracted feature points are given as input to the neural network to recognize the emotion contained.***

***Computational analysis of emotions has been considered a chal- lenging and interesting task. Researchers rely on various cues such as physiological sensors and facial expressions to identify human emo- tions. However, there are few prior works who work with textual input to analyse these emotions. This survey attempts to summarize these diverse approaches, datasets and resources that have been reported for emotional analysis from text. We feel that there is an essential need to have a collective understanding of the research in this area. There- fore, we report trends in emotion analysis research. We also present a research matrix that summarizes past work, and list pointers to future work.***

***Keywords: Mood Detection, Natural Language Processing (NLP), Machine Learning, Open CV.***

## I. INTRODUCTION

What is an emotion? An emotion is a mental and phys-iological state which is subjective and private it involves a lot of behaviors, actions, thoughts and feelings of humans. Initial research carried out on emotions can be traced to the book 'The Expression of the Emotions in Man and Animals' by Charles Darwin. He believed emotions to be species-specific rather than culture-specific. In 1969, after recognizing a universality among emotions in different groups of people despite the cultural differences, Ekman and Friesen captured six emotional expressions to be universal happiness, sadness, disgust, surprise and fear. Facial expressions can be considered not only as the most natural form of displaying human emo-tions but also as a key non-verbal communication technique. If efficient methods can be brought about to automatically recognize these facial expressions, striking improvements can be achieved in the area of human computer interaction.

Re-search in facial emotion recognition has being carried out in hope of attaining these enhancements. In fact, there exist other applications which can benefit from automatic facial emotion recognition. Artificial Intelligence has long relied on the area of facial emotion recognition to gain intelligence on how to model human emotions convincingly in robots. Recent improvements in this area have encouraged the researchers to extend the applicability of facial emotion recognition to areas like chat room avatars and video conferencing avatars. The ability to recognize emotions can be valuable in face recognition applications as well. Suspect detection systems and intelligence improvement systems meant for children with brain development disorders are some other beneficiaries.

## II. LITERATURE SURVEY

Rituparna Halder et. All, [1] From this paper Behaviors, actions, poses, facial expressions and speech; these are con-sidered as channels that convey human emotions. Extensive research has being carried out to explore the relationships between these channels and emotions. This paper proposes a prototype system which automatically recognizes the emotion represented on a face. Thus a neural network based solution combined with image processing is used in classifying the uni-versal emotions: Happiness, Sadness, Anger, Disgust, Surprise and Fear. Colored frontal face images are given as input to the prototype system. After the face is detected, image processing based feature point extraction method is used to extract a set of selected feature points. Finally, a set of values obtained after processing those extracted feature points are given as input to the neural network to recognize the emotion contained.

Kun-Yi Huang et. all [2], This paper, an extended sub-jective self-report method is generally used for measuring emotions. Even though it is commonly accepted that speech emotion perceived by the listener is close to the intended emotion conveyed by the speaker, research has indicated that there still remains a mismatch between them.

In addition, the individuals with different personalities generally have different emotion expressions. Based on the investigation, in this study, a support vector machine (SVM)-based emotion model is first developed to detect perceived emotion from daily conversa-tional speech.

Then, a denoising auto encoder (DAE) is used to construct an emotion conversion model to characterize the relationship between the perceived emotion and the expressed emotion of the subject for a specific personality. Finally, along short-term memory (LSTM)- based mood model is constructed to model the temporal uctuation of speech emotions for mood detection. Experimental results show that the proposed method achieved a detection accuracy of 64.5compared to the HMM-based method.

Tsung-Hsien Yang, et. all [3], In this paper In mood disorder diagnosis, bipolar disorder (BD) patients are often misdiagnosed as unipolar depression (UD) on initial presenta-tion.

It is crucial to establish an accurate distinction between BD and UD to make an accurate and early diagnosis, leading to improvements in treatment. In this work, facial expressions of the subjects are collected when they were watching the eliciting emotional video clips. In mood disorder detection, first, facial features extracted from the DISFA database are used to train a support vector machine (SVM) for generating facial action unit (AU) profiles. The modulation spectrum characterizing the fluctuation of AU profile sequence over a video segment are further extracted and then used for mood disorder detection using an ANN model. Comparative experi-ments clearly show the promising advantage of the modulation spectrum features for mood disorder detection.

Bhuiyan et. all [4],In this paper We present EmoTxt,a toolkit for emotion recognition from text, trained and tested on a gold standard of about 9K question, answers, and comments from online interactions. We provide empirical evidence of the performance of EmoTxt. To the best of our knowledge, EmoTxt is the first open-source toolkit supporting both emo-tion recognition from text and training of custom emotion classification models

Shadi Shaheen et. all [5] ,In this paper the growth of the Internet community, textual data has proven to be the main tool of communication in human-machine and human-human interaction. This communication is constantly evolving towards the goal of making it as human and real as possible. One way of humanizing such interaction is to provide a framework that can recognize the emotions present in the communication or the emotions of the involved users in order to enrich user experience. For example, by providing insights to users for personal preferences and automated recommendations based on their emotional state. In this work, we propose a framework for emotion classification in English sentences where emotions are treated as generalized concepts extracted from the sen-tences. We start by generating an intermediate emotional data representation of a given input sentence based on its syntactic and semantic structure.

We then generalize this representation using various ontologies such as WordNet and ConceptNet, which results in an emotion seed that we call an emotion recognition rule (ERR). Finally, we use a suite of classifiers to compare the generated ERR with a set of reference ERRs extracted from a training set in a similar fashion. The used classifiers are k-nearest neighbors (KNN) with handcrafted similarity measure, Point Mutual Information (PMI), and PMI with Information Retrieval (PMI-IR). When applied on dierent datasets, the proposed approach significantly outperformed the existing state-of-theart machine learning and rule-based classifiers with an average F-Score of 84%.

## III. SYSTEM ARCHITECTURE

This system is an automated system which will help many people to get over multiple emotional barriers which are been caused because of stress or any other emotional attachment. It will make a clear view about human behavior and can be used for further study of human behavioural synthesis.

In this system we will have a user whose mood is to be detected that is going to be done in two ways one is with the help of his facial expressions and other is based on the textual data. In textual data it will involve chat box through which the user can chat and the system will respond to the text using the artificial intelligence and it will send data such as funny videos and funny text messages etc.

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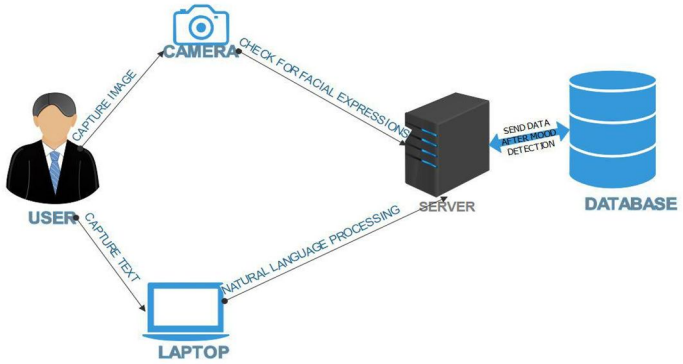


Fig1. Architecture Diagram

## IV. MATHEMATICAL MODEL

### A. *System Description*

S = (I,O,F) Where,

S: System.

*1)* I=fI1, I2g g are set of Inputs Where,

*a)* I1 : Textual data.

*b)* I2 : Human Face.

*2)* F = fF1, F2, F3, F4g are set of Function Where,

*a)* F1 : Image Processing.

*b)* F2 : Natural Language Processing.

*c)* F3 : Machine Learning From Data.

*d)* F4 : Data Sending.

*3)* O = fO1, O2 g are set of Output

*a)* O1 : Mood Detection.

*b)* O2 : Refreshment.

Success Condition : To do proper facial Recognition, Perform proper Natural lan-guage processing, data sending for refresh-ment.

Failure Condition : No database, No internet connection.

Of a computer program to understand human language as it is spoken. NLP is a component of artificial intelligence (AI).It is an area of computer science and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to process and analyze large amounts of natural language data. Challenges in natural language processing frequently involve speech recognition, natural language understanding, and natural language generation.

### B. *Artificial Intelligence*

AI (artificial intelligence) is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction. Particular applications of AI include expert systems, speech recognition and machine vision.

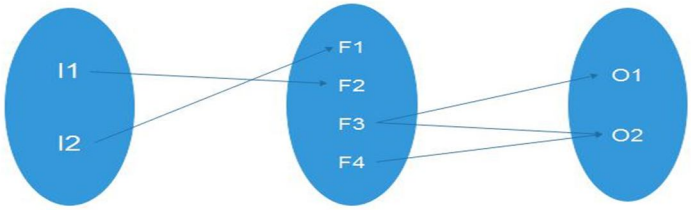


Fig2. Venn Diagram

## V. METHODOLOGY

The basic requirement of the system is to improve the existing situation of mental pressure and stress. This will try to reduce the mental stress and other emotional barriers which are caused to human. There could be number of factors which could effect on human emotions so he can use this system to analyze as well as to get over their own emotions. Other thing is that people can enjoy with this system as this system is made to make people emotionally stable and fresh. We have used EEM and SSIM algorithms which will be used in image processing and detection of human mood.

### *A. System Analysis*

1) *Image Processing:* In computer science, digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.
2) *Natural Language Processing (NLP):* Natural language processing (NLP) is the ability

## VI. CONCLUSION

This system is going to give a new way of human relaxation because of which people could focus on many new things in their life.People working in the offices will also be relaxed and they will work more efficiently. The time which was used by the employees for refreshment will be done on their desk so time will also be saved and people could concentrate on their work more. This system can also be used in medical field to analyze human behaviour because of which people suffering through many mental disorders can be monitored. So all over i conclude this system as very beneficial for all.

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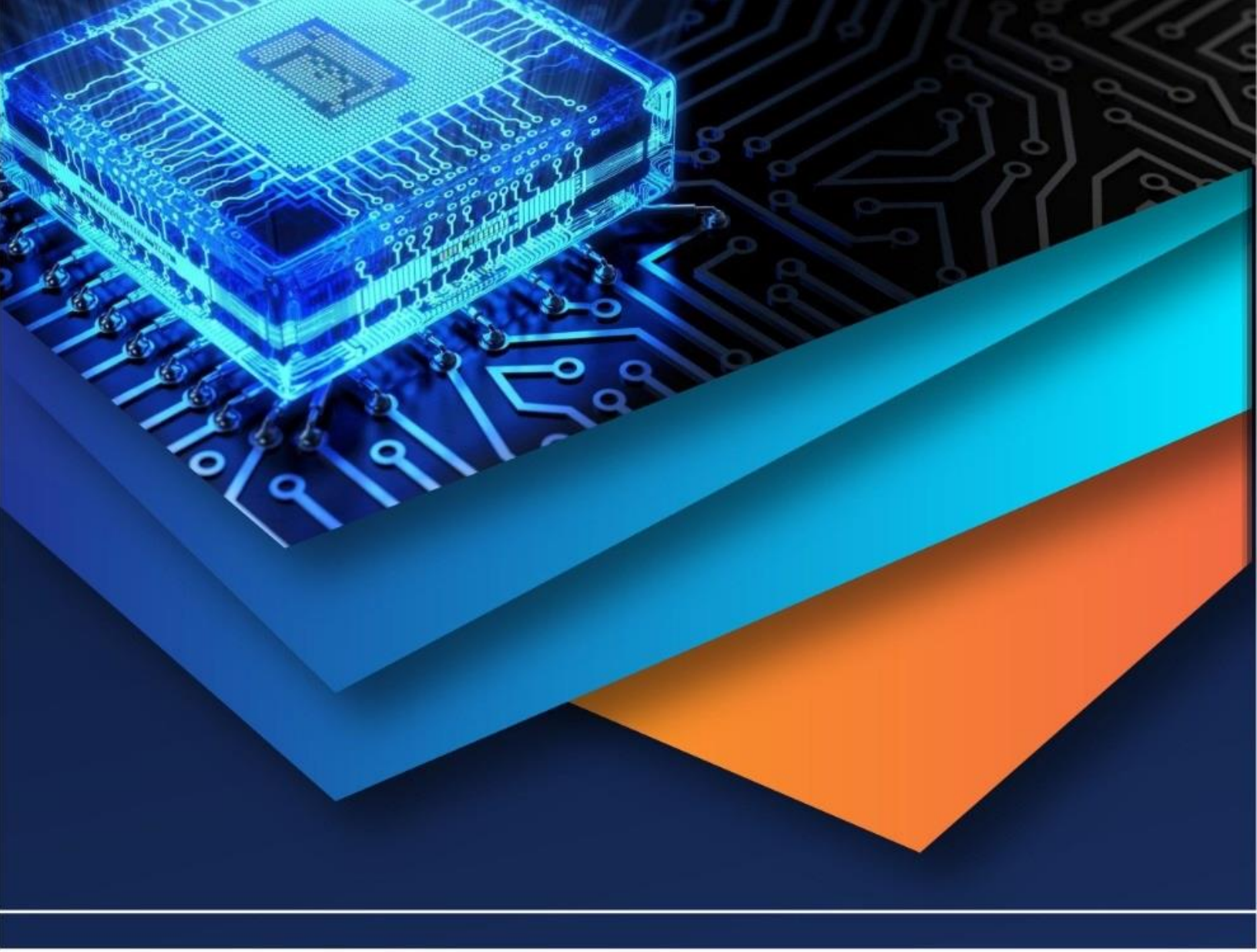

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