# VISUAL EMOSENSE - ANALYZING EMOTION USING REAL FACE

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***Abstract*- In the ever-evolving world of technology, the ability to decipher human emotions through facial expressions has become a pivotal element. Understanding these subtle cues not only unveils the emotions hidden within us but also opens doors to a plethora of applications in the realm of human-computer interaction. In this article, we delve into the fascinating world of machine perception and its profound impact on our daily lives. Facial expressions depict emotions and produce information on the personalities and thoughts of people. The machine performs different tasks constantly in order to increase its use in public. Machines that are able to understand emotions can be used to execute a wide range of tasks. Machines today are in a perpetual quest to understand and interpret emotions displayed through facial expressions. This continuous effort stems from the realization that the ability to discern emotions can revolutionize their role in society. Gone are the days when machines merely executed pre-programmed tasks. Now, they aspire to be empathetic and intuitive, making them more versatile and adaptable. Machines today are in a perpetual quest to understand and interpret emotions displayed through facial expressions. This continuous effort stems from the realization that the ability to discern emotions can revolutionize their role in society. Gone are the days when machines merely executed pre-programmed tasks. Now, they aspire to be empathetic and intuitive, making them more versatile and adaptable.**

***Key Words*: Facial expressions, Xception, model, InceptionV3, Convolutional Neural Network.**

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## INTRODUCTION

Emotions play a very important role in building relationships and having effective communication between people. A variety of emotions are experienced by people on daily basis. People do not realise or understand most of them because they cannot be noticed by the bare eye. Hence, with the help of technologies like machine learning and deep learning, we can detect and recognise the emotions that are generally difficult to be captured with just the naked eye. In the past few years there has been a rapid growth of technology in building smart solutions which has increased the need to detect a persons emotions. Some of the fields in which human emotion recognition can be leveraged are humancomputer interface, animation, medicine and security.

Convolutional neural networks can extract and learn important features from images which can be used to create a Real Time Facial Emotion Detection System. For facial expressions, most of the valuable information is obtained from the mouth, eyes, eyebrows etc. Some applications of automatic analysis of emotions from facial expressions can be seen in many fields, like smart teaching systems, emotionally sympathetic robots, driver fatigue monitoring, interactive gamming experience, and emotion based data retrieval, categorization and management. Anger, disgust, fear, happiness, sadness, neutral and surprise are the 7 universally accepted and recognized emotions. The three main stages in an automatic Facial Emotion Detection System are face detection, facial feature extraction and emotion recognition. Real Time face

detection is done using Open CV and feature extraction and emotion recognition is performed using Deep learning (CNN)

## 1. PURPOSE

In today's digital age, understanding and responding to human emotions in real-time has become a crucial requirement in various fields, including human-computer interaction, healthcare, marketing, and entertainment. The problem we aim to address is the development of an efficient and accurate real-time emotion detection system that can analyze facial expressions, vocal tone, and other relevant cues to identify and categorize human emotions instantaneously. By addressing these challenges, we aim to develop a real-time emotion detection solution that can enhance human-computer interaction, improve mental health monitoring, personalize marketing strategies, and elevate the overall user experience in various domains

Key objectives and purposes of a farmer chatbot include:

**Accurate Emotion Recognition:** Develop algorithms and models that can reliably identify and categorize a wide range of human emotions, including but not limited to happiness, sadness, anger, surprise, fear, and disgust**.**

**Multimodal Integration:** Integrate multiple data modalities, such as facial images, audio recordings, and text inputs, to provide a comprehensive understanding of an individual's emotional state, allowing for more accurate and nuanced emotion detection.

**Real-Time Processing:** Achieve low-latency processing to ensure that emotion detection occurs in real-time, making the system suitable for applications that require instant emotional analysis, such as live streaming, virtual meetings, and customer service interactions.

## OBJECTIVE OF SYSTEM

- **Adaptability:** Create a system that can adapt to diverse cultural contexts and individual variations in emotional expression, ensuring that it remains effective and accurate across different demographics.
- **Privacy and Security:** Implement robust data privacy and security measures to protect the personal and sensitive emotional data of users, complying with all relevant privacy regulations and standards.
- **Scalability:** Design the system to be scalable, capable of handling a large volume of users and data simultaneously, making it suitable for widespread adoption in various industries.
- **User-Friendly Interface:** Develop an intuitive and user-friendly interface for both developers and end-users to seamlessly integrate and interact with the emotion detection system.
- **Application Diversification:** Explore a wide range of applications for the emotion detection system, including but not limited to mental health monitoring, human-computer interaction, market research, and entertainment..

## LITERATURE SURVEY:

**Deep Learning for Audio Visual Emotion Recognition**

**Year 2022**

Human emotions can be presented in data with multiple modalities, e.g. video, audio and text. An automated system for emotion recognition needs to consider a number of challenging issues, including feature extraction, and dealing with variations and noise in data. Deep learning have been extensively used recently, offering excellent performance in emotion recognition. This work presents a new method based on audio and visual modalities, where visual cues facilitate the detection of the speech or non-speech frames and the emotional state of the speaker. Different from previous works, we propose the use of novel speech features, e.g. the Wavegram, which is extracted with a one-dimensional Convolutional Neural Network (CNN) learned directly from time-domain waveforms, and Wavegram-Logmel features which combines the Wavegram with the log mel spectrogram.

**Face Emotion Detection Using Deep Learning**

**Year 2021**

Human facial expressions convey abundant information visually instead of vocally. Face expression recognition plays an important role within the world of human-machine interaction. Recognition of facial

expression by computer with high recognition accuracy remains a challenging task. This article gives the summary of current Facial Emotion Recognition (FER) stages, techniques, and datasets. FER is usually carried out in three stages involving face detection, feature extraction, and expression classification. In this work, we have used deep learning algorithm to identify the basic human emotions (e.g., anger, fear, neutral, happy, sad, surprise, etc.) on multiple datasets, including FER-2013 (Facial Expression Recognition 2013) and CK+ (Extended Cohn-Kanade). The accuracy of our model, using CNN is 60% for FER 2013 dataset, and for CK+, we achieved significant improvement, highest accuracy was 99.1% and average accuracy was 93% which is better than the one reported.

**Emotion Recognition System from Speech and Visual Information based on Convolutional Neural Networks**

**Year 2019**

Emotion recognition has become an important field of research in the human-computer interactions domain. The latest advancements in the field show that combining visual with audio information lead to better results if compared to the case of using a single source of information separately. From a visual point of view, a human emotion can be recognized by analyzing the facial expression of the person. More precisely, the human emotion can be described through a combination of several Facial Action Units. In this paper, we propose a system that is able to recognize emotions with a high accuracy rate and in real time, based on deep Convolutional Neural Networks. In order to increase the accuracy of the recognition system, we analyze also the speech data and fuse the information coming from both sources, i.e., visual and audio. Experimental results show the effectiveness of the proposed scheme for emotion recognition and the importance of combining visual with audio data.

**Human Emotion Recognition Models Using Machine Learning Techniques**

Researchers have always been curious if a computer can detect human emotions precisely and accurately. Many research publications have been reported on human-machine interaction systems. The emotion classifiers using machine learning techniques are developed using the feature dataset extracted from physiological and non-physiological parameters. Emotion recognition can be done either by using facial, speech or audio-visual data paths or using physiological signals like ECG, EEG, EMG, GSR and Respiration signals. Many have explored facial recognition techniques for emotion recognition but facial expressions can be masked. A sad person can pretend to have a smiling face and vice-versa. Physiological signals like ECG, EEG, GSR and respiration signals are non-maskable due to their involuntary source of generation. There are many datasets available publicly for researchers to use and develop an efficient emotion classifier system. In this work, the publicly available datasets of EEG, ECG and GSR recorded while watching emotional video are utilized to develop emotion classifiers using machine learning techniques. Here three physiological feature datasets named LUMED-2 (EEG+ GSR), SWELL (HRV), and YAAD (ECG+ GSR) are used to train models and classify emotions. The deep learning classifiers used are Random Forest, SVM, KNN, and/or Decision Tree. The maximum average classification accuracy achieved is close to 100% at least for one classifier in each dataset. It is observed that physiological signals like EEG, ECG, and GSR possess differentiable emotional features which can be used to detect the emotional state of a person precisely using the trained machine learning .

**Emotion Recognition from Facial Expressions Using Deep Learning-CNN Model**

Emojis are a type of emoticon that are often used in text messages sent across social media platforms. A contemporary manner of communication is characterized by the inclusion of both textual and graphical information inside the same message. Emoticons and avatars are both examples of non-verbal communication tools. These indicators have rapidly become an important component of a wide variety of activities, including online talking, product reviews, brand emotions, and many others. It also resulted in an increase in the amount of data science research devoted to narratives driven by emojis. It is now feasible, as a result of improvements in computer vision and deep learning, to identify human emotions based only on visual cues. In this deep learning project, we will classify human facial expressions in order to map and filter avatars or emojis that correspond. This project's goal is to make the talking world appear more vibrant; it is not intended to offer a solution to an issue that occurs in the real world. Emojis is a piece of software that makes it easier to create avatars and emojis.

## SYSTEM ARCHITECTURE

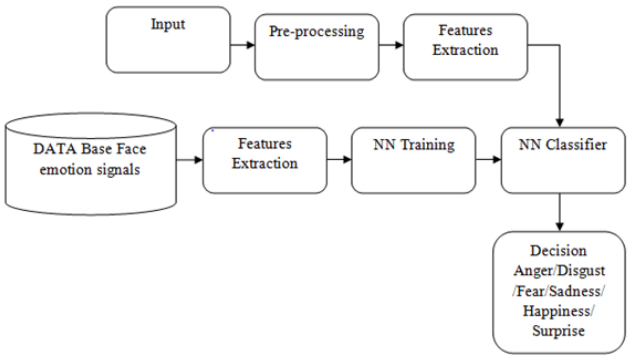


**Fig -1**: System Architecture Diagram

Emotion detection systems will evolve to adapt seamlessly to diverse cultural norms and individual differences in emotional expression, making them more inclusive and globally applicable.

**Emotion Regulation and Intervention:**

Emotion-aware technologies may not only detect emotions but also offer real-time interventions or recommendations for individuals to manage and regulate their emotions effectively.

## ADVANTAGES

- Easy to used system
- Avoid the internet

## SYSTEM REQUIREMENTS

- **Software Used:**

1. Operating System: Windows XP and later versions  Front End: HTML,CSS
2. Programming Language: Python
3. Tool: Python
4. Domain: Computer Vision
5. Algorithm: ML

- **Hardware Used:**

1. Processor – i3 or above
2. Hard Disk – 150 GB
3. Memory – 4GB RAM

## ALGORITHMS

**S={I, O, P, S, C, P, Ad, Q, G,H/w,S/w,Failure,Success} Where**
**S**=System
**C**= Check Mood **U**=User
**Ad**=Admin
**G**=Face Detection
**I is Input of system**
**Input {I}** = {Input1, Input2} **Where,**
**Input1**=Image
**Input2**=Pixel
**Procedures {P}**= {Pr, Cc, Qid, Amt} Where,
**Pr**= Check Features
**Qid**= Find Face Mood
**O is Output of system**
**Output {O}** = {Output1, Output2, Output3} **Where,**

**Output1=**Image Scan successfully Verify
**Output2=**Match with train data(Faces).
**Output3=**Detection of mood

## CONCLUSION

A. Conclusion As a result, an effective and secure Real-time Emotion Recognition System is developed to replace a manual and temperamental framework. This framework aids in saving and reducing manual work done by organisations utilising effective electronic equipment. There are no prerequisites for this system\'s presentation because it simply makes use of a PC as well as a camera. B. Future Scope Provision of Personalised Services: Analyse emotions to display personalised messages in smart environments provide personalised recommendations. Customer Behaviour Analysis and Advertising: Analyse customers' emotions while shopping focused on either goods or their arrangement within the shop. Healthcare: Detect autism or neurodegenerative diseases, predict psychotic disorders or depression to identify users in need of assistance, suicide prevention ,detect depression in elderly people ,observe patients conditions during treatment.

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