EMOTION DETECTION USING ML

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ABSTRACT-Ongoing feeling acknowledgment has been a functioning field of examination in the course of recent many years. This work intends to characterize truly crippled individuals (hard of hearing, idiotic, and confined to bed) and Mental imbalance children's enthusiastic articulations dependent on facial milestones and electroencephalograph signals utilizing a convolutional neural organization (CNN) and long transient memory classifiers by fostering a calculation for constant feeling acknowledgment utilizing virtual markers through an optical stream calculation that works successfully in lopsided lightning and subject head revolution (up to 25°), various foundations, and different complexions. Nineteen college understudies elected to gather EEG signals. At first, Haar-like provisions are utilized for facial and eye location. After ward, virtual markers are set on characterized areas on the subject's face dependent on a facial activity coding framework utilizing the numerical model methodology, and the markers are followed utilizing the Lucas-Kande optical stream calculation.

KEYWORDS- KKN, GUI , CNN Algorithm ,Dataset-training, testing , Pre-processing,

I.INTRODUCTION

One of the significant ways people show feelings is through looks. Look acknowledgment is one of the most powerful, regular and quick means for people to convey their feelings and aims. People can be in certain conditions confined from showing their feelings, like hospitalized patients, or because of lacks; subsequently, better acknowledgment of other human feelings will prompt successful correspondence.

Programmed human feeling acknowledgment has gotten a lot of consideration as of late with the presentation of IOT and savvy conditions at medical clinics, shrewd homes and brilliant urban areas. Astute individual partners (IPAs), like Siri, Alexia, Cortana and others, utilize normal language preparing to speak with people, however when expanded with feelings, it builds the degree of powerful correspondence and human-level knowledge.

For instance, upgraded Misrepresentation Digger utilizes the grouping based information mining technique 'Dialect' to distinguish regular examples. What's more, it is utilized for AI driven advances in the clinical space, for example, income cycle the executives (for example installments) and understanding patient wellbeing through zeroing in on a clinical information rich climate

Humans have always had the innate ability to recognize and distinguish between faces. Now computers are able to do the same. This opens up tons of applications. Face detection and Recognition can be used to improve access and security like the latest Apple I-phone does (see gif below), allow payments to be processed without physical

cards,enable criminal identification and allow personalized healthcare and other services. Face detection and recognition is a heavily researched topic and there are tons of resources online.We have tried multiple open source projects to find ones that are simplest to implement while being accurate.

While emotion detection using Tet is the quite useful industry is now focusing on one more area which is Facial Emotion Detection. Emotion Detection using images is quite useful for identification like driver's drowsiness detection, students behavior detection, etc.

In this article, we will cover this interesting application of computer vision. As we all know nowadays computer vision is getting advanced. major tech giants are building their models to become more like humans, to do so machines must be capable of detecting your emotions and treating you accordingly.

II. PROBLEM FORMULATION

A Look is the noticeable appearance of the full of feeling state, intellectual action, expectation, character and psychopathology of an individual and assumes an open part in relational relations. In this way, in biometric area of the examinations the Programmed Look Acknowledgment has been one of the most recent exploration themes. To accomplish that, identifying face and perceiving the look turns into a crucial and testing task.

Existing Framework: Look acknowledgment has been a functioning examination region in the course of recent many years, and it is as yet testing because of the great intraclass variety. The vast majority of these works perform sensibly well on datasets of pictures caught in a controlled condition, however neglect to proceed as great on more testing datasets with more picture variety and halfway faces. Lately, a few works proposed a start to finish structure for look acknowledgment, utilizing profound learning models.

Face and Feeling acknowledgment can be performed utilizing various provisions, for example, face discourse, and even content. Among these provisions, looks are perhaps the most mainstream, if not the most well known, because of various reasons; they are noticeable, they contain numerous valuable components for feeling acknowledgment, and it is simpler to gather a huge dataset of countenances (different means for human acknowledgment) As of late, with the utilization of profound learning and particularly convolution neural organizations (CNNs) , many elements can be removed and scholarly for a nice look acknowledgment framework.

In this work we propose a profound learning-based structure for look acknowledgment, which considers the above perception, and utilizations consideration component to zero in on the notable piece of the face. It is direct that a framework skilled to play out a programmed acknowledgment of the human feelings is an advantageous undertaking for a bunch of arising applications. As a result, data on the looks is regularly utilized in programmed frameworks of feeling acknowledgment.

The facial expressions of people are often recognized by systems by teaching it through machine learning techniques. The familiar models that are being used are the Support Vector Machines (SVM) and Convolutional Neural Networks for classification purposes. A. Feature Extraction The feature extraction is the initial process that is carried in any emotion recognition model. This process focuses on extracting the important parts and information from the images. These parts include the eyes,

mouth, positions and some facial features. The feature extraction in emotion recognition is performed mostly through Gabor and log-Gabor filters and Local Binary Pattern Operator (LBP).

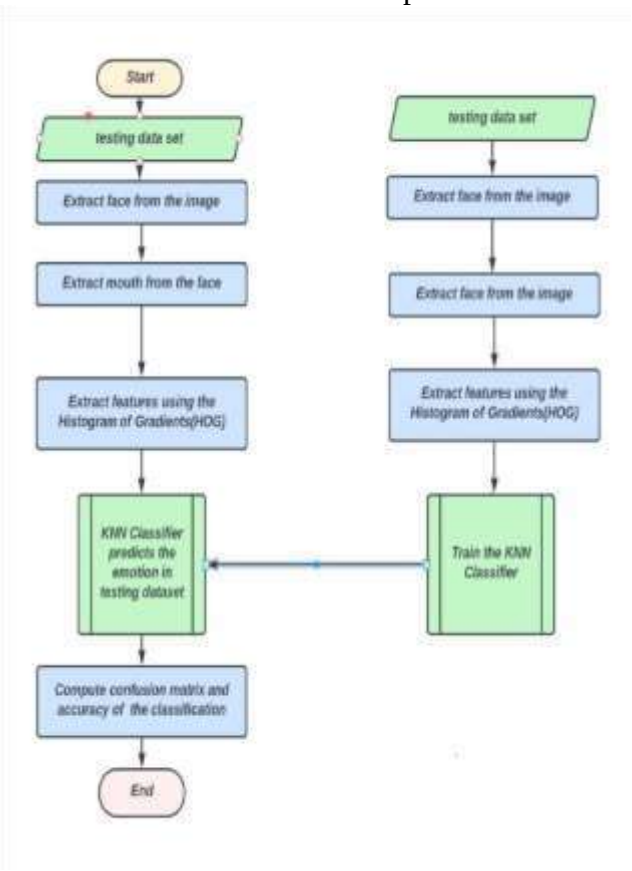
III.FACIAL EMOTION RECOGNITION ALGORITHM

The emotion recognition algorithm that was modelled in this section is non-neural network approach-based or, in other words, a classical approach-based algorithm which is aimed to be efficient for application- specific or dataset-specific requirements.

In this algorithm, the 20-image training dataset as shown in Fig 7.1 is used for training the classifier. Pre-processing is done on these training images and the human face is extracted or identified first.

This algorithm uses facial expressions occurring in the mouth area of the face and identifies the emotions. There are other facial features which could play significant roles such as eyes and eyebrows.

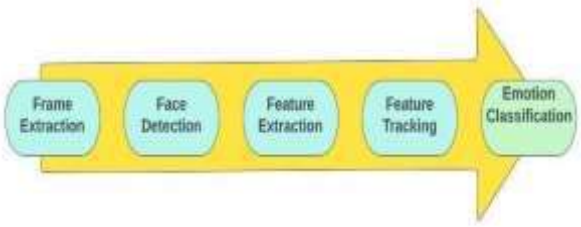
However, for this specific database the mouth expressions gave large variation in emotions. The use of HOG complements mouth expressions by forming feature vectors with large variance.



Flowchart Of The Emotion Recognition

Once the human face is identified, one of the facial features (in this case, mouth) is extracted or identified. Since facial muscle movements reflect emotions, facial feature extraction is crucial in identifying the emotions.

Features of the identified mouth are extracted using HOG and these features, along with the emotion labels, are used to train the KNN algorithm. Hence, this is a supervised algorithm where the emotion labels are explicitly mentioned during the training. This procedure of training is repeated for all the images in the training image dataset. Figure 2.4 shows a high-level process of facial expression recognition.



Facial Expression Recognition Process

The trained KNN classifier is then used to test the feature vectors obtained from the HOG and prior preprocessing of testing images. The distance technique use in KNN classifier is Euclidean distance. The output of the KNN classifier is predicted emotion of the given test image which is then compared with expected test results to compute the accuracy of the algorithm in determining the emotions.

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IV. SYSTEM FUNCTIONAL SPECIFICATION

A. Functions Performed

- Creation Of GUI
- Dataset creation
- Dataset preprocess
- Feature extraction
- Building a Model
- Classification

Creation of GUI:

We are creating a desktop application using the python library.

Dataset Creation:

We have downloaded the dataset from the website Kaggle.

Data Preprocess:

In this stage we detect face & crop, resize, add noise, and normalizations. It aims to remove background and non- face areas, then crop the face area.

Next pre-processing is down-sampling (resize) the resolution to the image to be 32x32 Feature extraction:

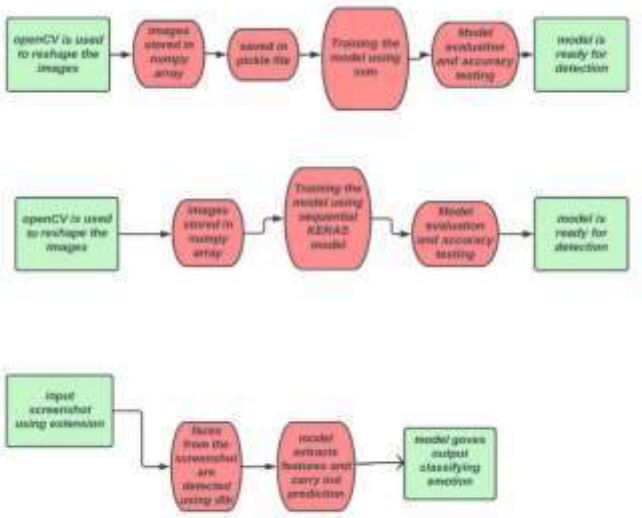
We have reduced the redundant data and extracted the implicit features of facial expressions.

Building a model:

We have built a CNN model using CNN algorithm.

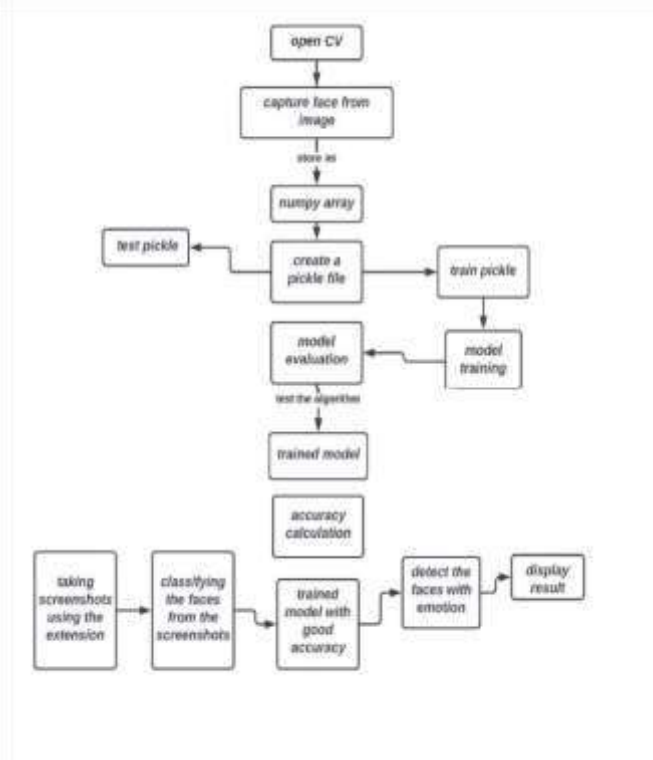
Classification:

In the classification step we classify the images and predict the emotion as angry, sad, neutral, surprise, happy.



Functional modeling

ARCHITECTURAL DESIGN:



Architectural Design

B. Training :

Step 1 :

Collection of a data set of images. (pre-cropped, 48- by-48-pixel grayscale images of faces each labeled with one of the 7 emotion classes: anger, disgust, fear, happiness, sadness, surprise, and neutral.)

Step 2 :

Pre-processing of images.

Step 3 :

Detection of a face from each image.

Step 4 :

The cropped face is converted into grayscale images.

Step 5 :

The pipeline ensures every image can be fed into the input layer as a (1, 48, 48) numpy array.

Step 6 :

The numpy array gets passed into the Convolution2D layer.

Step 7 :

Convolution generates feature maps.

Step 8 :

Pooling method called MaxPooling2D that uses (2, 2) windows across the feature map only keeping the maximum pixel value.

Step 9 :

During training, Neural network Forward propagation and Backward propagation performed on the pixel values.

Step 10 :

The Softmax function presents itself as a probability for each emotion class. The model is able to show the detailed probability composition of the emotions in the face.

V. RESULTS

The main component of this paper is the module that we are designing to identify a person's mood and help him enhance it, if he is sad or stressed. It is an Android based system with python and AI module in background. Beyond that, the application is a selfcontained unit and will not rely on any other Desktop O.S related software components or any extra storage space.

This application will be interacting with user when user registers on it through a reliable user interface. For the system to be more precise and accurate with results, modern deep learning algorithms like Neural networks will be used for classification. The application doesn't affect any other features on the machine and no hardware other than camera is used. The application will be able to detect emotions of a person through his facial expressions, quickly and efficiently.

Application will help business professionals of any company to manage stress levels. This will create a healthy work environment and surge productivity. Application will provide relevant recommendations to the user based on the obtained result, so that their mood will be enhanced. The CNN algorithm used will work efficiently with the used operating system, to provide much accurate results**.**

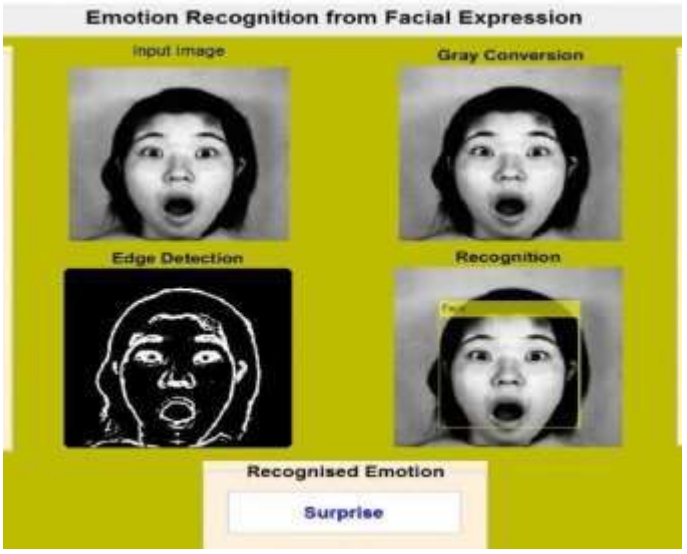


Fig 11.1 surprise

OUTPUTS:

Fig 11.2 Happy emotion

Fig 11.3 Angry Emotion

VI. ADVANTAGES

Emotion-sensing technologies can help employees make better decisions, improve their focus and performance in the workplace, manage stress, and also help them adopt healthier and more productive working styles. Voice-based emotion analysis in real time opens up many business opportunities by enabling an automated customer service agent to recognise a caller's emotional state and adapt accordingly. Such information can also be helpful in analysing and managing stress levels of human workers.

Emotion-sensing technology will also enable companies to establish deeper emotional connections with their consumers through virtual assistants. Data collected through such devices can help companies understand how internal and external environmental factors impact their employees. As a result, companies can redesign processes accordingly, to help keep their personnel better engaged and productive.

Emotion sensing through wearables can help monitor the user's state of mind in terms of mental and other health conditions. Mood sensor technology can help children or the elderly, who are in need of care, to receive timely assistance and support from family members or caregivers, who can then alert doctors. Technology that deduces human emotions based on audio-visual cues may enable businesses to detect consumers' positive and negative moods to better understand their preferences. Such technology can help analyse customer choices that can be utilised for marketing and help detect their annoyances to improve product usability.

VII. CONCLUSION

It tends to be seen that AI calculations can be applied for location of feeling from faces. We utilized svm calculation to prepare the model and in the end we changed the model to convolution neural organization (cnn) with tensorflow gpu for preparing. We prepared the model utilizing a more modest informational index. The look acknowledgment framework introduced in this exploration work contributes a tough face acknowledgment model dependent on the planning of conduct attributes with the physiological biometric qualities.

The physiological attributes of the human face with significance to different demeanors like joy, trouble, dread, outrage, shock and loathing are related with mathematical constructions which are reestablished as base coordinating with format for the acknowledgment framework. Online instruction because of the sudden conditions prompts insufficient correspondence where our model

will assist with recognizing the feeling of the understudy and can be continued during addresses and toward the finish of the talks it very well may be wound down to catch the feeling of the class gave the camera of the understudies is on.

Our model when completely prepared will give great precision svm and cnn. It predicts the feeling with ideal precision.

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