EMOTION BASED MUSIC PLAYER THROUGH FACE RECOGNITION SYSTEM

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ABSTRACT— **The goal of this work is to build an emotion detect system which can analyze basic facial expression of human. In this project a method is presented for mood detection based on humans face emotions. The proposed method used the humans face to identify the mood of that human and finally using this result play the audio file which related to human's emotion. Firstly system takes the human face as input then the further process will going on. Face detection and eye detection is carried out. After that using feature extraction technique to recognize the human face. This method helps to recognize the human's emotion using feature of face image. Through the feature extraction of lip, mouth, and eyes, eyebrow, those feature points are found. If the input face wills matches exactly to the emotions base dataset face then we can identify the humans exact emotion to play the emotion related audio file also we will fetch the news data based on user preferences using API. Recognition under different environmental conditions can be achieved by training on limited number of characteristics faces. The proposed approach is simple, efficient, and accurate. System play's very important role in recognition and detection related field**

Keywords– Webcam captures image, Machine learning methods, Emotion recognition, Feature extraction

INTRODUCTION

One of the most interesting areas of human computer interaction is face detection and identification. Distinguishing facial features are comparatively low and it is most interesting task to observe these. Detection and identification face objects from face is a challenging task.

Finding a human emotion using human's face which can be one of the most challenging assignments you will handle in your career. A face is the best way to detect and recognize a human. No recognition algorithms will work without face detection step. Rate of detection affects the recognition stage. With all these noise is a very intriguing task to detect and localize an unknown non-face from still image.

mood detection based on emotion is the one of the current topic in the various fields which provides solution to various challenges. Beside traditional challenges in captured facial images under uncontrolled settings such as varying poses, different lighting and expressions for face recognition and different sound frequencies for emotion recognition. For the any face and mood detection system database is the most important part for the comparison of the face features and sound mel frequency components. For database creation features of the face are calculated and these features are store in the database. This database is then use for the evaluation of the face and emotion by using different algorithms.

face emotion detection applications is still a challenging task since face images may be affected by changes in the scene, such as pose variation, face expression, or illumination. The main goal to propose this system is to find the human mood with the help face image as input and after that using these emotion results to play the audio file. A face recognition technique which is used here to matches the train face image to the original input face image.

the proposed approach is simple, efficient, and accurate. This system gives accurate result as compare to existing approach. System play's very important role in recognition and detection related field. That is this gives important result very quickly as compare to traditional methods.

BACKGROUND

Emotional aspects have more impact on Social intelligence like communication understanding, decision making and also helps in understanding behavioral attitude of human. Emotion play important role during communication. Emotion recognition is implemented out in diverse way; it may be verbal or non-verbal. Voice (Audible) is verbal way of communication &Facialexpression, action, body postures and gesture is non-verbal form of communication.Human can recognize emotions without any meaningful delay and effort but recognition of facial expression by machine is a big challenge.

AIM

This paper works to find the mood of human using facial emotion, comparative study of popular face expression recognition techniques & phases of facial expression. So this work gives the brief introduction towards techniques, application and challenges of emotion recognition system.

OBJECTIVES

To find the emotion of human using facial features
To identify the face using training feature data
To study the human face extraction methods
To fetch the online news data based on user preference

MOTIVATION

With the help of this research we can identify the human mood using human emotions. So this project is as important to individual as much to public too.

RELATED WORK

The work presents the study of various famous and unique techniques used for facial feature extraction and emotion classification. Various algorithms of facial expressions research are compared over the performance parameters like recognition accuracy, number of emotions found, Database used for experimentation, classifier used etc [1].

This work proposes a system that will automatically identify the facial expression from the face image and classify emotions for final decision. The system uses a simplified technique called `Viola Jones Face Detection' technique for face localization. The different feature vectors are club together using a subset feature selection technique to improve the performance of recognition and classification process. Finally the combined features are trained and classified using SVM, Random Forest and KNN classifier technique [2].

The proposed technique use three steps face detection using Haar cascade, features extraction using Active shape Model (ASM) and Adaboost classifier technique for classification of five emotions anger, disgust, happiness, neutral and surprise [3].

In this work implement an efficient technique to create face and emotion feature database and then this will be used for face and emotion recognition of the person. For detecting face from the input image we are using Viola-Jones face detection technique and to evaluate the face and emotion detection KNN classifier technique is used [4].

This paper objective is to display needs and applications of facial expression recognition. Between Verbal & Non-Verbal form of communication facial expression is form of non-verbal connection but it plays pivotal role. It expresses human related or filling & his or her mental situation [5].

In this proposed system it is attention on the human face for recognizing expression. Many techniques are available to recognize the face image. This technique can be adapted to real time system very easily. The system briefly displays the schemes of capturing the image from web cam, detecting the face, processing the image to recognize few results [6].

In this work, adopt the recently introduced SIFT flow technique to register every frame with respect to an Avatar reference face model. Then, an iterative technique is used not only to super-resolve the EAI representation for each video and the Avatar reference, but also to improve the recognition performance. Also extract the features from EAIs using both Local Binary Pattern (LBP) technique and Local Phase Quantization (LPQ) technique [7].

In this study, a frame of emotion recognition system is developed, including face detection, feature extraction and facial expression classification. In part of face detection, a skin detection process is support first to pick up the facial region from a complicated background. Through the feature detection of lip, mouth, and eyes, eyebrow, those feature points are launch [8].

In this work, a new technique for facial emotion recognition is found. The proposal involves the use of Haar transform technique and adaptive AdaBoost technique for face identification and Principal Component Analysis (PCA) technique inconjunction with minimum distance classifier for face recognition. Two techniques have been investigated for facial expression recognition. The former relies on the use of PCA and K-nearest neighbour (KNN) classification technique, while the latter advocates the use of Negative Matrix Factorization (NMF) and KNN technique [9].

PROPOSD SYSTEM

The proposed method used the humans face to detect the emotion of that human and finally using this result to play the audio file which related to human's emotion also we will fetch the news data based on user preferences using API. Firstly system takes the human face image as input then the further process will going on. Face detection and eye detection is carried out. After that using feature extraction techniques to recognize the human face for emotion detection. These techniques help to detect the human's emotion using feature of face image. Through the feature detection of lip, mouth, and eyes, eyebrow, those feature points are found. If the input face wills matches exactly to the emotions based dataset's face then we can detect the humans exact emotion to play the emotion related audio file also we will fetch the online news data based on user preferences using API. Detection under different environmental conditions can be achieved by training on limited number of characteristics faces.
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PROPOSED SYSTEM ARCHITCTURE

METHODOLOGY

Color feature: As most of the color distribution information can be captured by the low-order moments, using only the first three moments: mean, variance and skewness, it is found that these moments give a good approximation and have been proven to be efficient and effective in representing the color distribution of images (Stricker and Orengo 1995).

Edge Detection: Most of the shape information of an image is enclosed in edges. So first we detect these edges in an image and by using these filters and then by enhancing those areas of image which contains edges, sharpness of the image will increase and image will become clearer.

Texture feature: Describes the structure arrangement of surfaces and their relationship to the environment, such as fruit skin, clouds, trees, and fabric. The texture feature in our method is described by hierarchical wavelet packet descriptor (HWVP). A 170- D HWVP descriptor is utilized by setting the decomposition level to be 3 and the wavelet packet basis to be DB2

.MATHEMATICAL MODEL

Face Image Feature Extraction using Global Features

1. Mathematical Equations of Color Feature Extraction Method

The color distribution information can be captured by the low-order moments, using only the first three moments: mean, variance and skewness, it is found that these moments give a good approximation and have been proven to be efficient and effective in representing the color distribution of. These first three moments are defined as:

$$\mu_i = \frac{1}{N}\sum_{j=1}^{N} P_{ij}$$

$$\sigma_i = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(P_{ij} - \mu_i)^2}$$

$$S_i = \left[\frac{1}{N}\sum_{j=1}^{N}(P_{ij} - \mu_i)^3\right]^{\frac{1}{3}}$$

Where, Pij is the value of the ith color channel of the jth image pixel. Only 3 x 3 (three moments for each color component) matrices to represent the color content of each image are needed which is a compact representation compared to other color features.

2. Mathematical Equations of Canny Edge Detector Method

Step1: Smooth the image with a Gaussian filter to reduce noise and unwanted details and textures.

$$g (m,n) = G_\sigma (m, n) * f (m, n)$$

Where

$$G_\sigma = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(\frac{m^2 + n^2}{2\sigma^2}\right)$$

Step2: Compute gradient of g (m, n) using any of the gradient operations (Roberts, Sobel, Prewitt, etc) to get:

$$M (n, n) = \sqrt{g_m^2 (m,n) + g_n^2 (m,n)}$$

And

$$\boldsymbol{\theta} (m, n) = tan^{-1} [g_n (m, n) / g_m (m, n) /]$$

Step3: Threshold M:

$$M_T (m, n) = \begin{cases} M (m,n) \ if \ M (m,n) > T \\ 0 \qquad\qquad Otherwise \end{cases}$$

3. Mathematical Equations of Texture Feature Extraction Method

According to co-occurrence matrix, there are several textural features measured from the probability matrix to extract the characteristics of texture statistics of remote sensing images. Correlation measures the linear dependency of grey levels of neighboring pixels.

$$\text{Correlation} = \frac{\sum_{i=0}^{Ng-1} \sum_{j=0}^{Ng-1} (i,j)p\,(i,j) - \mu_x\,\mu_y}{\sigma_x \sigma_y}$$

DATASET DESIGN

1. We will use the Japanese Female Face Expression dataset.
2. This data set consists of several facial expression images of Japanese female models.
3. The JAFFE database is available free of charge for use in non-commercial research.
4. We will divide this data set as testing and training.

RESULT

Let us consider the face image in figure 1. Gray scale conversion is completed which is shown in figure 2 and Median filtering is implemented on the acquired images to get rid of the unwanted noises. The outcomes are displayed in the figure 3 respectively.
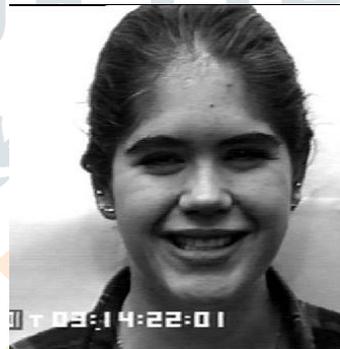
Fig. 1 Input Face Image
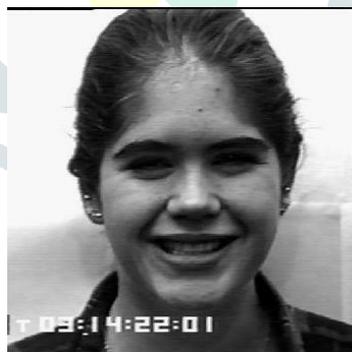
Fig. 2 Gray Image

Fig. 3 Noise Removed Image

After noise remove, next step to detect the actual face. So using cascade classifier, the face detection is done. The outcomes are displayed in the figure 4.

Fig. 4 Face Detected Image

After face detection, next step is to crop the detected face from image for feature extraction process. The outcomes are displayed in the figure 5.
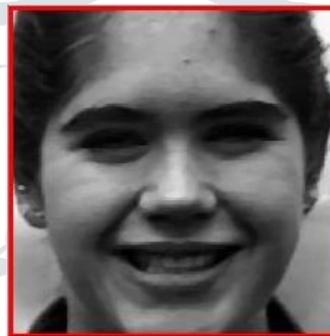
Fig. 5 Face Crop Image

Next, image feature extraction process, all features are extracted from image and using that feature and also training data features to recognized the mood of person.
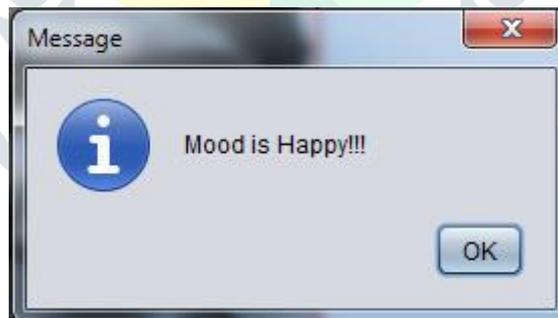

Fig. 5 Mood Detection
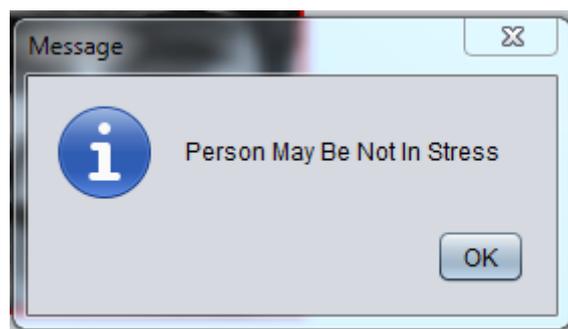
Fig. 6 Stress Detection

CONCLUSION

Identification of a human emotion based on human face emotions n has many applications in real life. The face recognition in the images is challenging. In this work a method has been proposed where the algorithm has been modified for the detection of human emotion using the face image, extraction of the feature information and matching the features to the training emotion's based human face dataset. After that using these results to play the audio file also we will fetch the news data based on user preferences using API which is the additional work. The work can further be extended for improving the recognition accuracy as well as time for large face databases. So our system can perform the very important role in human emotions based emotion detection.

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