

# International Journal of Innovative Research in Science, Engineering and Technology

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## A Survey of Emotion Based Music Player through Face Recognition System

Saurabh Sunil Deshmukh<sup>1</sup>, Ruchika Balasaheb Bangar<sup>2</sup>, Neeraj Mangesh Chandgude<sup>3</sup>, Akash Gajanan Chopade<sup>4</sup>,  
Sunil L. Bangare<sup>5</sup>

BE Students, Dept. of I.T., Sinhgad Academy of Engineering, India<sup>1,2,3,4</sup>

Research Scholar, CSE, Koneru Lakshmaiah Educational Foundation (K. L. University), Green Fields, Vaddeswaram,  
Guntur, A.P., India & Dept. of I.T. Sinhgad Academy of Engineering, India<sup>5</sup>

**ABSTRACT:** The goal of this work is to build an emotion detection system which can analyze basic facial expression of human. In this project a method is presented for mood detection based on human's face emotions. The proposed method used the human's 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 go on. That is we use 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 matches exactly to the emotion's base dataset face then we can identify the human's exact emotion to play the emotion related audio file. Recognition under different environmental conditions can be achieved by training on limited number of characteristic faces. The proposed approach is simple, efficient, and accurate. System plays a very important role in recognition and detection related field.

**KEYWORDS:** Emotions, Feature Extraction.

### I. 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 one of the current topics 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 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 stored in the database. This database is then used 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 of 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 match the train face image to the original input face image.

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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 & Facial expression, 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

## 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.

## II. RELATED WORK

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 [1].

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 [2].

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 [3].

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 [4].

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 [5].

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

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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 [6].

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 [7].

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 in conjunction 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 [8].

Image preprocessing algorithm:

There are many image preprocessing techniques. These are used for noise removal, contrast enhancement and illumination equalization. For noise removal we use various filters such as median filter, wiener filter, gaussian filter etc. For contrast enhancement and illumination we can use contrast stretching. Apart from these many other techniques are available.

MEDIAN FILTER:

- It is a non-linear digital filtering technique used to remove noise from image.
- Noise reduction is pre-processing step to improve result of later processing (eg. Edge detection of image).
- It preserve edges while removing noise and considers each pixel in the image.
- It replaces the pixel value with the median of those values.
- Median is calculated by sorting all the pixel values into numerical order.

Then replacing the pixel with the middle pixel value

GAUSSIAN FILTER:

- A Gaussian filter is a linear filter. It's usually used to blur the image or to reduce noise. If you use two of them and subtract, you can use them for "unsharp masking" (edge detection). The Gaussian filter alone will blur edges and reduce contrast.
- The Median filter is a non-linear filter that is most commonly used as a simple way to reduce noise in an image. It's claim to fame (over Gaussian for noise reduction) is that it removes noise while keeping edges relatively sharp.
- I guess the one advantage a Gaussian filter has over a median filter is that it's faster because multiplying and adding is probably faster than sorting.

WIENER FILTER:

- The most important technique for removal of blur in images due to linear motion or unfocussed optics is the Wiener filter. From a signal processing standpoint, blurring due to linear motion in a photograph is the result of poor sampling.
- Each pixel in a digital representation of the photograph should represent the intensity of a single stationary point in front of the camera.
- Unfortunately, if the shutter speed is too slow and the camera is in motion, a given pixel will be an amalgam of intensities from points along the line of the camera's motion. This is a two-dimensional analogy to

$$G(u,v)=F(u,v).H(u,v)$$

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- where  $F$  is the fourier transform of an "ideal" version of a given image, and  $H$  is the blurring function. In this case  $H$  is a sinc function: if three pixels in a line contain info from the same point on an image, the digital image will seem to have been convolved with a three-point boxcar in the time domain. Ideally one could reverse-engineer a  $F$  estimate, if  $G$  and  $H$  are known. This technique is inverse filtering.

Feature Extraction Techniques:

Sobel edge detection:

A pixel is at an edge when intensity sharply changes to its neighbors. The edge itself is a linear shape along which that change is maximal. Looking at images as functions of intensity, we can rephrase this property to "a maximum of the first derivative". On the level of pixels we have a discrete input  $(x, y) \in Z$  and we can use the discrete differential operator to approximate the first derivative in either direction. For  $x$  that is:

$$(\delta_x(I))(x, y) = I(x, y) - I(x + 1, y)$$

This is already the simplest edge detector, as the minima and maxima in the filtered image ("darkest and brightest spots") are edges. In Practice this Image filter is extremely sensitive to noise, though. Starting with  $E_0 X$  we will now derive the Sobel operator, which cannot be written as a convolution filter but is a nonlinear combination of such linear filters.

Canny edge detection:

The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. It was developed by John F. Canny in 1986. Canny also produced a computational theory of edge detection explaining why the technique works.

The Process of Canny edge detection algorithm can be broken down to 5 different steps:

1. Apply Gaussian filter to smooth the image in order to remove the noise
2. Find the intensity gradients of the image
3. Apply non-maximum suppression to get rid of spurious response to edge detection
4. Apply double threshold to determine potential edges
5. Track edge by hysteresis: Finalize the detection of edges by suppressing all the other edges that are weak and not connected to strong edges.

Types of Features:

1. Color Feature:

- It is one of the most widely used visual features in image retrieval, for its invariance with respect to image scaling, rotation, translation.
- In this color features are being extracted.
- In this work, an image is divided into equal sized blocks and a centralized image with equal-size.

2. Texture Feature:

- It 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).

3. Edge and Boundary Features:

- Asner and Heidebrecht (2002) discussed edge detection is one of the most difficult tasks hence it is a fundamental problem in image processing.

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- Edges in images are areas with strong intensity contrast and a jump in intensity from one pixel to the next can create major variation in the picture quality.
- Edge detection of an image significantly reduces the amount of data and filters out unimportant information, while preserving the important properties of an image. Edges are scale-dependent and an edge may contain other edges, but at a certain scale, an edge still has no width.
- If the edges in an image are identified accurately, all the objects are located and their basic properties such as area, perimeter and shape can be measured easily. Therefore edges are used for boundary estimation and segmentation in the scene.

#### 4. Shape Features:

- The shape of an object refers to its physical structure and profile. Shape features are mostly used for finding and matching shapes, recognizing objects or making measurement of shapes.
- Moment, perimeter, area and orientation are some of the characteristics used for shape feature extraction technique.
- The shape of an object is determined by its external boundary abstracting from other properties such as colour, content and material composition, as well as from the object's other spatial properties.

#### Algorithm for classification:

##### Naive Bayes Classifier :

It is a classification technique based on Bayes' Theorem with an assumption of independence among predictors. In simple terms, a Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature. Even if these features depend on each other or upon the existence of the other features, all of these properties independently contribute to the probability. Naive Bayes model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.

#### SUPPORT VECTOR MACHINE:

Supervised machine learning algorithm which is mainly used for classification purpose. Support vector machine has good accuracy. Mainly SVM is used to find hyperplane in an N-dimensional space.

Advantages of SVM includes:

1. On experimental results it shows high performance.
2. Data set dimensionality has low dependency.

Disadvantages of SVM includes: In case of categorical or missing value SVM needs pre-processing.

#### K Nearest Neighbors – Classification:

K nearest neighbors is a simple algorithm that stores all available cases and classifies new cases based on a similarity measure (e.g., distance functions). KNN has been used in statistical estimation and pattern recognition already in the beginning of 1970's as a non-parametric technique.

In pattern recognition, the  $k$ -nearest neighbors algorithm ( $k$ -NN) is a non-parametric method used for classification and regression.<sup>[1]</sup> In both cases, the input consists of the  $k$  closest training examples in the feature space. The output depends on whether  $k$ -NN is used for classification or regression:

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- In *KNN classification*, the output is a class membership. An object is classified by a plurality vote of its neighbors, with the object being assigned to the class most common among its  $k$  nearest neighbors ( $k$  is a positive integer, typically small). If  $k = 1$ , then the object is simply assigned to the class of that single nearest neighbor.
- In *k-NN regression*, the output is the property value for the object. This value is the average of the values of  $k$  nearest neighbors

### III. PROPOSED SYSTEM

The proposed method used the human's face to detect the emotion of that human and finally using this result to play the audio file which related to human's emotion. Firstly, the system takes the human face image as input, then the further process will go on. That is, we use here feature extraction techniques to recognize the human face for emotion detection. These techniques help to detect the human's emotion using features of the face image. Through the feature detection of lip, mouth, and eyes, eyebrow, those feature points are found. If the input face matches exactly to the emotions based dataset's face, then we can detect the human's exact emotion to play the emotion-related audio file. Detection under different environmental conditions can be achieved by training on a limited number of characteristic faces.

#### ADVANTAGES OF PROPOSED SYSTEM:

1. Detect the mood of human using human face image.
2. Face image emotion identification using image features is achieved.

#### PROPOSED SYSTEM ARCHITECTURE

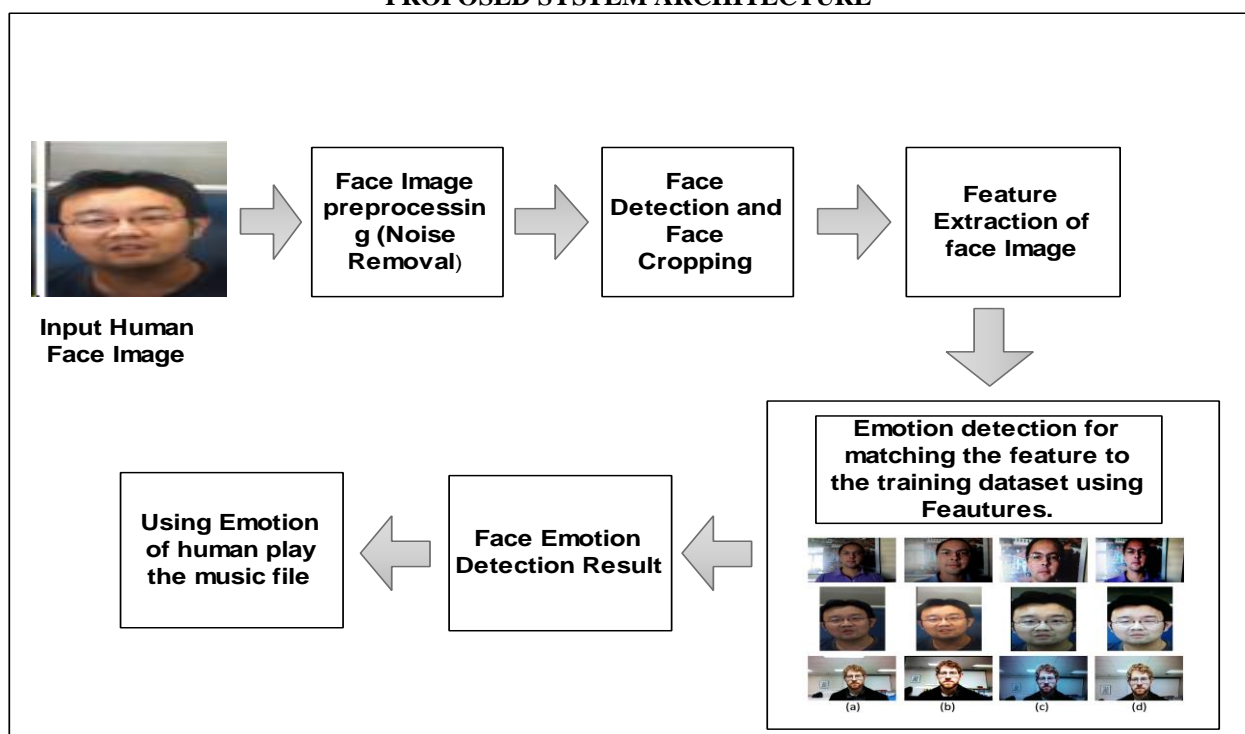


Fig1. Proposed System Architecture



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## IV.CONCLUSION

Identification of a human emotion based on human face emotions 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 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.

## REFERENCES

- [1] J Jayalekshmi, Tessy Mathew, "Facial expression recognition and emotion classification system for sentiment analysis". 2017 International Conference.
- [2] Suchitra, Suja P. Shikha Tripathi, "Real-time emotion recognition from facial images using Raspberry Pi II". 2016 3rd International Conference
- [3] Dolly Roney, Neeta Tripathi, "An Efficient Method to Face and Emotion Detection". 2015 Fifth International Conference.
- [4] Monika Dubey, Prof. Lokesh Singh, "Automatic Emotion Recognition Using Facial Expression: A Review". International Research Journal of Engineering and Technology (IRJET) Feb-2016.
- [5] Anuradha Savadi Chandrakala V Patil, "Face Based Automatic Human Emotion Recognition". International Journal of Computer Science and Network Security, VOL.14 No.7, July 2014.
- [6] Songfan Yang, BirBhanu, "Facial expression recognition using emotion avatar image". 2011 IEEE International Conference.
- [7] Leh Luoh, Chih-Chang Huang, Hsueh-Yen Liu, "Image processing based emotion recognition". 2010 International Conference.
- [8] Jiequan Li, M. Oussalah, "Automatic face emotion recognition system". 2010 IEEE 9th International Conference.