FRAME OF MIND - PLAY RHYTHM BASED ON EMOTIONS

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***Abstract*— In this paper, we propose an approach to Computer vision techniques which are used in many fields such as traffic control, event monitoring, marketing, healthcare field, quality control, military technology, etc. One of the sub-areas of computer vision is facial expression recognition. Human face acts as the main indicator for the behavioral and the emotional state of the individual. Facial expressions which can be classified as fear, happiness, joy, sadness, aggressiveness are recognizable with computer vision techniques. Here the concept of face recognition is used for detection of an individual's mood. The proposed system can recognize facial expressions from the user's face and recommend or play the song from the list accordingly.**

Keywords*— *Facial expressions, face recognition, detection of mood, recommend the song.

I. INTRODUCTION

Nowadays it has become necessary to identify the facial recognition of human which helps the organization as well as individual to recognize the emotions of a person. It can apply to all different places where recognition plays an important role in identifying the emotion.

Face emotion detection applications is quiet challenging task as face images may be affected by changes in the scene, such as pose variation, face expression, or illumination. Mood detection based on emotion is the one of the current topic in the various fields which provides solution to various challenges.

Music is a thing that enhancing an individual's life. Mood detection based on emotion is one of the current topics in the various fields which provide a solution to various challenges. Most of the music lover's users found themselves in a hectic situation when they do not find songs corresponding to their mood in the situation So there is a need for the system that can reduce human efforts of manually playing the song based on human mood.

II. RELATED WORK

Using traditional music players, a user had to manually browse through his playlist and select songs that would soothe his mood and emotional experience. The existing system contains functions such as Manual selection of Song and Music squares where user has to classify the songs manually according to particular emotions for only four basic emotions. Such features satisfy the user's basic requirements.

Disadvantages of Existing System:-

- It requires the user to manually select the songs.
- Randomly played songs may not match to the mood of the user.
- User has to classify the songs into various emotions and then for playing the songs user has to manually select a particular emotion.

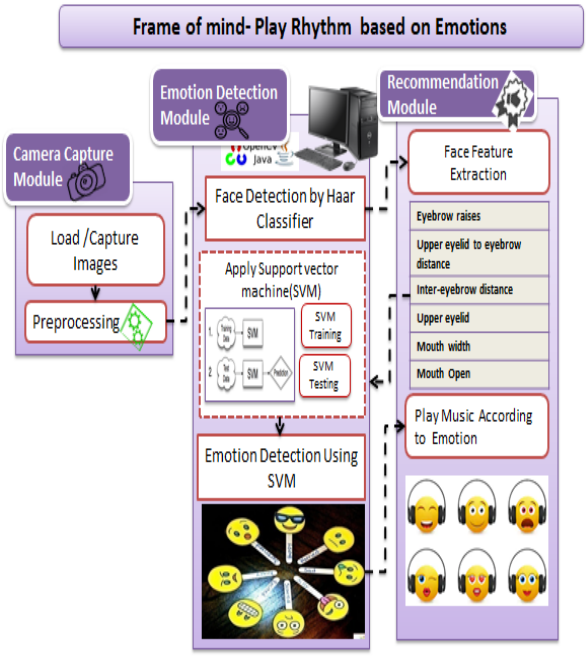
Currently, there are many existing music player applications. Some of the interesting applications among them are:

● Saavan and Spotify -These application gives good user accessibility features to play songs and recommends user with other songs of similar genre.

● Moodfuse - In this application, user should manually enter mood and genre that wants to be heard and recommends the songs-list.

● Steromood - User should select his mood manually by selecting the moods from the list.

III. PROPOSED METHODOLOGY



SYSTEM ARCHITECTURE

A. The Face Detection Using HAAR Classifier

1. Frame Extraction / Live Camera:
   User can upload/capture images using live camera on the application, application then extracts frames from the video. These frames are saved on local machine.
2. Face Detection:
   Apply the Haar cascade Classifier for the face detection in images.
3. Pre-Processing on images:
   Once we get the faces apply the preprocessing on images like noise removal, normalization etc.

a. RGB to Gray Scale Image:
   Convert the image into Gray scale by taking the average of the each pixel RGB.

b. Image Normalization:
   Normalization is a process that changes the range of pixel intensity values to avoid mental distraction or fatigue from the images.

c. Noise Removal:
   Removing errors in the image acquisition process that result in pixel values that do not reflect the true intensities of the real scene.

Haar cascade Classifier for Face Detection:

In this system we used Haar classifier algorithm for face detection when one of these features is found, the algorithm allows the face candidate to pass to the next stage of detection. A face candidate is a rectangular section of the original image called a sub-window. Generally these sub-windows have a fixed size (typically 24×24 pixels). This Sub-window is often scaled in order to obtain a variety of different size faces.

The algorithm scans the entire image with this window and denotes each respective section a face candidate. The algorithm uses an integral image in order to process Haar features of a face candidate in constant time. It uses a cascade of stages which is used to eliminate non-face candidates quickly. Each stage consists of many different Haar features. Each feature is classified by a Haar feature classifier. The Haar feature classifiers generate an output which can then be provided to the stage comparator. The stage comparator sums the outputs of the Haar feature classifiers and compares this value with a stage threshold to determine if the stage should be passed. If all stages are passed the face candidate is concluded to be a face.

a) Haar Feature Classifier

A Haar feature classifier uses the rectangle integral to calculate the value of a feature. The Haar feature classifier multiplies the weight of each rectangle by its area and the results are added together. Several Haar feature classifiers compose a stage. A stage comparator sums all the Haar feature classifier results in a stage and compares this summation with a stage threshold. Each stage does not have a set number of Haar features. Depending on the parameters of the training data individual stages can have a varying number of Haar features.

b) Haar Features:

Haar features are composed of either two or three rectangles. Face candidates are scanned and searched for Haar features of the current stage. Each Haar feature has a value that is calculated by taking the area of each rectangle, multiplying each by their respective weights, and then summing the results.

B. Emotion Detection Using SVM

4.Feature Extraction
   A SVM consists of an input and an output layer. SVM will classify the features on the basis of training dataset. Extracts the Features of faces from the image like nose, lips, and eyes in the form of points as follows,
   i. Eyebrow raises
   ii. Upper eyelid to eyebrow distance
   iii. Inter-eyebrow distance
   iv. Upper eyelid
   v. Mouth width
   vi. Mouth Open

5. Feature Calculation
   In the phase all extracted features are calculated and determine the eyes, mouth and nose location on person face. On basis of this calculation face motion is detects.

Support Vector Machine (SVM)

- SVM is a powerful classifier that is able to distinguish two classes. SVM classifies the test image in to the class with highest distance up to the neighboring point in the training.
- SVM training algorithm built a model that predict whether the test image fall into this class or another.
- SVM necessitate a vast training data to decide a decision boundary and computing cost is very high although we are using single pose (frontal) detection.
- The SVM is a learning algorithm for classification which attempt to discover the finest distinguishing hyper plane which minimize the error for unseen patterns.

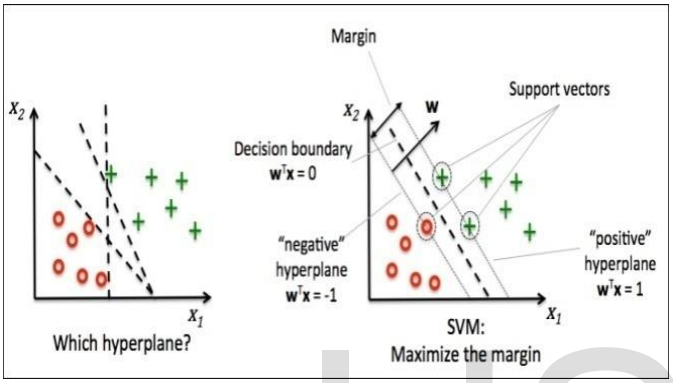


Fig 3. Distinguishing Hyper Plane to Minimize The Error

➨ The data which cannot be distinguished the input is mapped to high-dimensional attribute space where they can be separated by a hyper plane. This projection is well performed by means of kernels.

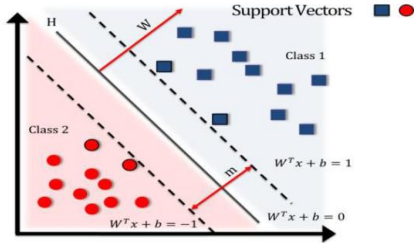


Fig 2. Separating Hyper Plane by Equation

If training set of samples and the equivalent resultant values {-1, 1}. So SVM intend to get the best separating hyper plane specified by the equation WTx+b that make use of the distance between the two classes as shown in above figure.

C. Recommendation Module

By applying SVM classifier on the extracted features the emotion Happy, Neutral, Sad are detected. Based on the user's mood like sad, angry, party, relaxed, happy the particular song from the playlist is played.

FUTURE SCOPE

This system, does have scope for improvement in the future. There are various aspects of the application that can be modified to produce better results, and a smoother overall experience for the user.

CONCLUSION

This project give us great advancement in the field of machine learning technology. Frame of mind- Play rhythm based on emotions fulfills to play the music based on the emotions of the user such as whether it is happy or sad. So, totally our work aims to develop a player which is based on user need and it helps to revive in case of free time or leisure time if we want to hear music based on our current situation.

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