Facial Expression Based Music Recommendation Application Using Haar Cascade Algorithm

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Abstract— Human face play an important role to express each mood. It is taking the required input from human face directly using a camera. This input is extracting the information to deduce the mood of an individual. This data will be use to get songs that suits with mood derived from the input provided earlier. This disposes of the time require and generating a suitable playlist based on and individual's feelings feature. This application focus on scanning and interpretation of data and properly recommending songs based on the input captured. Thus our proposed application focus on detecting facial expressions to developing emotion based music recommendation application which are process used by available playlists of songs to detect feeling, which process our audio player go along with to detect human emotions and how it is better to use our system for emotion detection. A specific idea about working of system, generating of playlist and classification of emotions given below.

Indexed Terms— Face Detection, Emotion Recognition, Facial Feature Extraction, Music, SVM Classification.

I. INTRODUCTION

Humans are capable of guessing the mood of someone's just by looking at them, it's a natural ability. If this can be happened by an electronic device, this will be the great ability of an application in the real world. Music is something that enlightens the human's mood, it is something that touches the human soul. Music is truly effective weapon to elevate the mood. So considering these observations. To simplify this problem, we are offering the advance solution which leads us to create an application which captures and records the emotions of the user according to facial expression. List of song is suggested as per user's mood, once the emotion of the user is recorded.

Human feelings can be mainly classified as: happy, angry, disgust, sad, neutral, fear and surprise. A large number of other emotions such as cheerful and contempt can be categorized under the parasol of emotions. These emotions are very divine. A human being can carry his/her emotions through his/her mouth, eyes, etc. Some people used to keep number of songs in their playlist. To avoid choosing a song manually, most people only hand-pick a song from their playlist at randomly and some of the songs might upset the user. As a result, some of the songs are not compliment to the user's current emotion or mood. There is no any way to utilized program that can play music based on the user's current emotion. It's just like an assistant for a user to make a concern about which music one should listen as a stress buster. The user doesn't want to waste any time in searching or to look up for playlist. [1]

II. LITERATURE REVIEW

1. Anagha S. Dhavalikar and Dr. R. K. Kulkarni Proposed "Automatic Facial Expression Recognition System". There were three phases or steps in the method. 1. Face detection. 2. Feature extraction and 3. Expression recognition. The First Phase, Face Detection is done by the RGB Color Model and its include the ISO illumination processing for obtaining the face and operations for retaining required face. i.e., eyes and mouth of the face. The offered algorithm is also used the AAM i.e. Active Appearance Model. This method is used for facial properties extraction. In the given method the several points and features on the faces like eyes, eyebrows, mouth or lips are first located and then stored into a file which gives the information of the model points detected. The face expressions are given as input and to the AAM Model changes according to expression. [2]

2. Gokul Krishnan K, Parthasarathy M, Sasidhar D and Venitha E proposed "Emotion Detection and Music Recommendation System Using Machine Learning", which provides an automated music playlist along with the user's emotion as an attribute. This project is developed as an Android Application, where the front camera of your mobile phone is used to detect the user's emotion and using it as a parameter in music request to popular services. In addition, this application will also keep track of the songs played, so that the future proposals are made strides by this kind of learning. Here is the innovation of the project where everything is automated, and all the user need to do is to enjoy the music. Detector will stop using power when user start enjoying music. [3]

3. Arto Lehtiniemi and Jukka Holm proposed "Animated Mood Picture in Music Recommendation". On the system the user interacts with a collection of images to receive music recommendation with respect to genre of picture. This music system is developed by Nokia researched Centre. Using textual meta labels the system depicts the genre and process the audio. [4]

4. H. Immanuel James, J. James Anto Arnold, J. Maria Masilla Ruban, M. Tamilarasan and R. **Saranya** presents "Emotion Based Music Recommendation System". They have proposed a system focusing on detecting human emotions for developing emotion based music player, which are the approaches used by available music players to detect emotions, which approach our music player follows to identify human feelings and how it is better to use our system for feelings detection. The face of the person is recorded in the web cam and recorded video is converted in to frames. Using pre-processing the facial expression is converted in to a sequence of Action Units (AUs) from the picture gotten from the webcam. The Facial Action Coding System (FACS) is a system that define all the facial expressions using combinations of the 64 Aus. After Feature Extraction, the Emotions are classified whether it is Happy, Sad, Neutral and Surprise faces. The web services are integrated with them. They may be of SAAS, IAAS, PAAS. The feelings are transferred and the music are played from the feelings detected. [5]

III. SYSTEM ARCHITECTURE

The system architecture diagram represents the overall outline of the software system and the relationships, constraints, and boundaries between components.
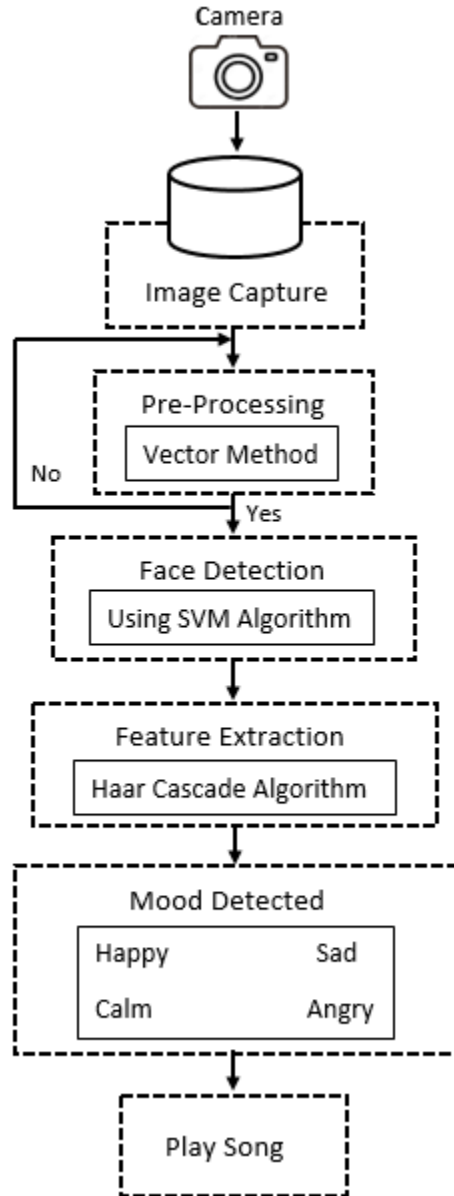

Figure 1. System Architectural diagram

When the user opens the android app, the main screen will be displayed which contains camera button. If the user clicks on "take snap" button, the camera clicks user picture. Pre-processing include step as detecting the image the pre-processing stage can include quality of input image. Vector method technique is used for pre-processing. This picture is provided as input to face detection program. If face is not detected or many

faces are detected, then it will display an accurate error message is display to the user. The picture is given as input to the face detection module, when single face is detected. Then SVM classifier detect the user current mood. The face detection is a process is to extract the face are from background of input image its involve extraction of facial feature from uncontrolled background. Then haar cascade algorithm comes in the picture. The extract feature of the algorithm is given lots of positive images consisting of face, eyes, lips and lots of negative images not consisting of any face to train on them. After that mood will be detected like angry, sad, happy so on. Then it will play song according to the user mood.

IV. HAAR CASCADE ALGORITHM

This Haar cascade classifier is based on the haar wavelet technique to analyse pixels within the image into square by function. This used "integral image" concept to calculate the features detected. The haar cascade algorithm uses the ada-boost leaning algorithm. Which select little number of crucial from a huge set to deliver a proficient result of classifiers at the point use cascading methods to identify the face in a picture. For face detection at first, the algorithm initially requires a lot of positive images (consisting of face) and negative images (not consisting of any face) to train the classifier. At that point we got to extract features from it. In this, algorithm features the displayed in the picture given below are utilized for this. They're just like our convolutionary kernel. Each function is a single value capture by subtracting the pixel under white rectangle below the black rectangle.
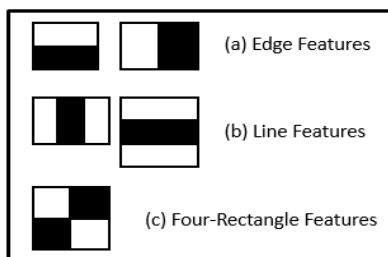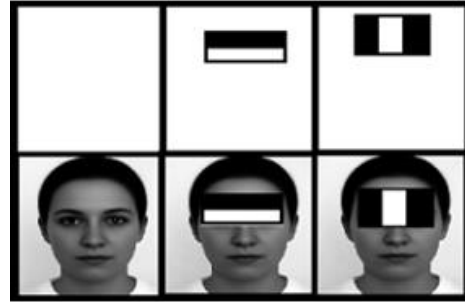

Figure 2. Haar Feature

Figure 3. Haar Extraction on Face

- ADA-BOOST:

Ada-Boost, known as "Adaptive Boosting", is the primary practical boosting algorithm proposed by Freund and Schapire in 1996. It could be a learning algorithm that chooses some vital features from a huge collection. Adaboost is an algorithm utilized to provide precisely boosted classifiers. These classifiers at that point utilize cascading method to in recognize face an image. Ada-Boost is generally utilized to delete additional, unneeded feature and select as it were the valuable contributing feature.

V. ADVANTAGES

1. User can play music effortlessly.
2. Easily usable.
3. Various mixed mood detection.
4. It takes few sec to generate playlist extracted via facial expression.

VI. DISADVANTAGES

1. Sometimes detection result is incorrect.
2. Its more time consuming process.
3. Delicate to lighting conditions.
4. There may be overlapped sub-windows occurs because of multiple detections of the same faces.

VII. FUTURE SCOPE

The future scope in the system would to design a mechanism that would be automatic playing music based on the human facial mood. The system might be helpful as a therapy, the music provided helps needed person who is suffering from disorders like mental stress, anxiety, acute depression.

VIII. CONCLUSION

Facial expression based music recommendation system is an application is developed to give us a great advancement in the field of human behavior.

Different types of moods can be ordinarily found in humans to sort out music based on moods. The main is to give better user experience as user should spend more time to get satisfied result.

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