A MACHINE LEARNING APPROACH FOR EMOTION BASED MUSIC PLAYER

Ashwini Rokade[1], Aman Kumar Sinha[2], Pranay Doijad[3]

Computer engineering Department, AISSMS Institute of Information Technology, Maharashtra, India
Computer engineering Department, AISSMS Institute of Information Technology, Maharashtra, India
Computer engineering Department, AISSMS Institute of Information Technology, Maharashtra, India

Corresponding Author: Pranay Doijad (pranaydoijad3@gmail.com)

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Abstract: Everybody would rather listen to music based on their frame of mind. But manually selecting a song according to the mood is quite a gradual and effort-taking task that needs to be addressed.

Interpretation of the facial expression may help to find the present emotional state of the user. It is quite easy for humans to identify the emotional status of the individual without any significant delay and effort but recognition of facial expression by machine is a challenging task. Many efforts have been taken to develop an application that suggests songs for the user based on their mood by capturing facial expressions.

This survey paper enlists the different approaches used by the researchers till now for a music player that follows to detect human emotions and abstract view of the proposed system that needs to be implemented for greater precision.

KEYWORDS: *Machine Learning, Image Processing, Facial Expressions Detection.*

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I INTRODUCTION

Music is a melody that connects the soul and mind of the person i.e. we can say that is a "language of emotion", [1] which defines an individual's emotion or feelings. According to the Indian Music Industry Indians are spending 2.7 hours daily listening to music. If any person or music fan's found in a frustrating condition, then they prefer to listen the song according to the mood to fresh an up. Any user's taste in music changes weekly, daily, or even hourly, depending on the mood they're in, and make playlists to get us through the day and to suit the 'vibe' they're feeling. Moreover, music is a form of art, which is recognized to have a better association with a person's feelings. It has got a unique ability to lift one's mood. Many pieces of research state that music can assist people to reduce stress and be more focused.

Most of the time, emotion or mood is revealed by facial expression. It is the natural way to convey emotions or moods incorporated as happiness, sadness, surprise, joy anger, Fear, Disgust [2][3] that helps to understand the behavioral aspect of humans. Unfortunately, listening to music may be unhelpful if the music does not suit the current emotion of the listener. Thus, to reduce stress, music with the proper mood should be chosen.

An associative field like Computer vision helps to convey a high-level understanding of digital images or videos to computers. Due to wide-ranging applications and market potential Face recognition technology grabs more attention of the users. It is the non-verbal form of communication that gives information about the state or feelings of a person.

Although there exist several face detection systems, real-world applications have rarely evolved as such systems are restricted in some functionality such as lack of high quality of images due to lighting effect, the difference in the facial appearance, the person's skin color, and effects of illumination. So it is quite challenging for the machines to recognize emotions from images. Again manually selecting a song in accordance with the mood from the playlist is time- consuming and irritating too.

We have driven music recommendation to the next level, generating playlist which suits with user's mood of listening to music in cost & time-effective way. With the use of this application user would not have to waste any time in searching the best track matching the user's mood. The songs would be shown to the user according to his/her mood.

1The main objective of this paper is to learn about various algorithms and a technique suggested by different authors in their research and it says about connecting the music player along with human emotions. Various methodologies have been proposed to classify the behavioral and emotional state of the user.

II LITERATURE REVIEW

PCA(Principal component approach)

Sushmita G. Kamble and A. H. Kulkarni [3], they proposed a system in which the feature extraction is done by applying PCA(Principal component approach). To classify as well as recognize the expression in the straight line distance between two corresponding points in the space is nothing but the

Euclidean distance classifier. After that the user's co related state of emotion is recognized.

Database Details: - The author used the database with total 7 facial expressions of 4 individual's persons that results into 112 trained images.

Jyoti et al. introduced the strategy that captures the image of an individual person; the image mainly includes the facial mood of the person. It extends the state of an emotion according to the person's mood variations. There are different emotions that mainly includes the mood as angry, fear, surprise and happy. To detect the face of the user automatically facial expression recognition algorithm is been used as well as to remove the noisy data by applying the normalization technique to get the good quality image. The facial features are extracted and the emotions are classified using emotion detection method. The automated facial recognition system mainly involves the process of the calculating the face dimensions. The scattering of image are cut shorted using principle component analysis (PCA) technique.
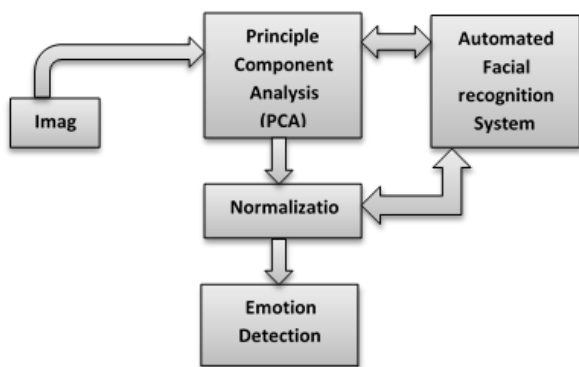

Figure: - Techniques used for Facial Expression Recognition

S. L. Happy and A. Routray focuses on the images from database that are passed to the facial landmark detection stage where the unwanted noise removal is done by applying Gaussian Filter approach. Here attempt is made by the author to use the Viola Jones technique to extract Haar-like features for face detection. The feature detection mainly contains key features of the face that mainly includes Eye detection, Noise detection, Lip corner detection and many more.

Dataset Details	The author has worked on the two dataset namely CK+ (Cohn-Kanade) and JAFEE dataset for training and testing respectively. These databases consist of total 329 images.

Jayshree et al. construct a bridge between the music player and user's expression. Extracting the song from the audio player and playing it is time consuming process. The camera detects the face of the user and that image is imported using ANN- back

propagation method. The expressions are classified and the noise is removed by emotion recognition algorithm. The classified expressions are then further imported by applying algorithm as well as they are verified with the help of graphical based classification method. The audio from the phone are scanned and extracted using audio feature extraction and it provide a graphical input. Depending on the user's expressions, the audio files get sorted and the songs are played from the created playlist.

Advantage	ANN- back propagation technique helps to reduce the time consumption and automatically plays the song according to the expressed mood of the individual.

Nathan et al introduced an efficient and accurate approach that is completely dependent on real-time extraction of facial expressions. It also extracts the features of the audio from melody/tune to categorize it into a certain category that will cause a playlist, which has very low computation cost.. The face images are categorized into 4 different main facial expressions like. Sad, Anger, Neutral and Happiness respectively.

Advantage	Its computational time as well as the storage is less. It also reduce the cost of the additional hardware that is been used
Problem	• Due to the sufficient storage space the song storage capacity is less. • This system is not capable of identifying the complex emotions.
Solution	Making use of cloud storage.

Henal et al. proposed intelligent approach for music player according to the human's emotion detection by using sentimental or emotion based analysis. The proposed system is unique from the above mentioned system. It gets the input in the form of textual information. It extracts the lyrics of the song and analysis of the mood is done. Lastly the playlist is generated in a complete format. The proposed system not only reduces the time of the user but it also helps in sorting the data in music player automatically and playing it according to the user's mood.

S. Deebika,K. A et al.[3] designed a system that plays a song based on the user emotions. The main aim of the system is to change or maintain the emotional state of the user and match personal music preferences by exploring music tracks with specific attributes. After taking an input image, feature points are extracted using Point detection algorithm. The CNN algorithm is

used for feature extraction form the input image and SVM classifier helps to detect the emotion and classified as happy, sad, anger, sad, neutral and surprise.

| Advantages : | 1. The system helps to reduce the time of searching for the song that suits user's mood. |
| | 2. Helps to enhance the accuracy and the computation speed in detecting & classifying the emotions. |

Problems with the Present system:

Existing processes are very difficult in terms of memory and time requirements for dealing with facial

emotion recognition in real-time.

The music players are arranged sequentially to a add

songs in the playlist. The available apps like Gaana or Spotify are recommending songs based on the data available.

If any user wants to listen the song based on

individual's mood, then he/she needs to search the song manually to the respective playlist. when he/she finally picked the song which he/she prefer to listen to, then the next song will not be the same as of the previous category, so it is quite irritating to select the song every time according to the mood.

We are implementing a system that can play the music based on user's emotion with greater accuracy.

III SYSTEM OVERVIEW

Here we are trying to implement an application that helps to recommend a song considering the users mood from face. The structural design of our approach is given below.
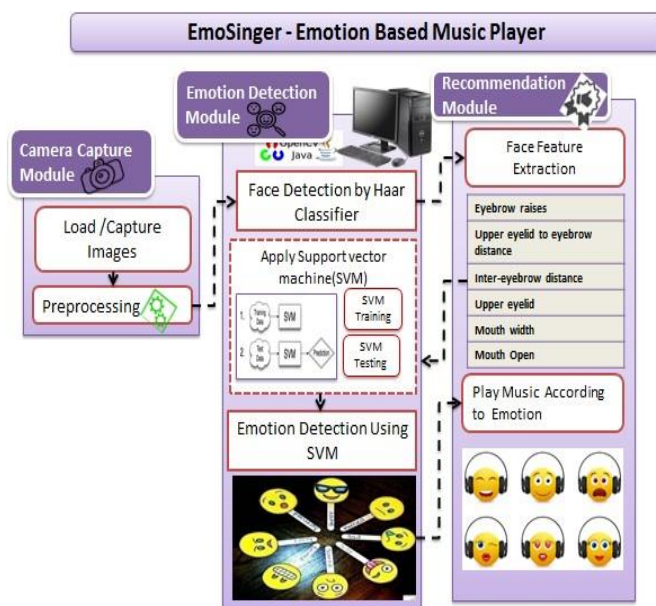

Figure 1: System Architecture

The above design represents the overall flow of the system that we are going to implement. Our system initially captures the user's face image. By applyingsome of the image preprocessing techniques, face detection is done using the HAAR cascade. In the next step, face features are extracted like mouth width, Mouth open, inter eyebrow distance, etc that help to detect the face emotions like happy, sad, or neutral from face image using machine learning techniques. Based on the detected emotions the song is played from the list.

Objectives of Proposed System:

•The main intension of the proposed work is to focus more on emotion recognition and music recommendation based on the emotions.

•The system helps to recommend a song based on users emotion

•Initially the user captures the image and then by applying the image processing techniques the fine-tuned image is obtain for feature extraction.

a)Mood Detection strategy: By capturing the face image and extracting various features points of the nose, lips, and eyes, it is classified as sad, angry, the party relaxed, happy with the use of SVM classifier.

b)Music Recommendation strategy: After detecting the face emotion, the specific song from the playlist is played.

IV CONCLUSION

This work survey and analyzed the automatic facial expression based on human emotions. Here number of technologies developed for emotion detection and music recommendation has been studied. This survey revealed that a significant amount of efforts have been made on enhancing emotion detection from the human face in real life.

It just make simple the process of selecting the song manually all the time depending on the type of the song he/she want to listen. This survey also establishes classification and detection of the human emotional/ expressions state of behavior for playing music accordingly.

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