



## Facial Image Based Emotion Detection and Music Recommendation System

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**Abstract:** Music plays a very important role in human's life. Everyone wants to listen music of their individual taste, mostly based on their mood. Users always face the task of manually browsing the music and to create a playlist based on their current mood. The proposed project is very efficient which generates a music playlist based on the current mood of users. Facial expressions are the best way of expressing ongoing mood of the person. The objective of this project is to suggest songs for users based on their mood by capturing facial expressions. Facial expressions are captured through webcam and such expressions are fed into learning algorithm which gives most problem emotion. Once the emotion is recognized, the system suggests a play-list for that emotion, thus saves a lot of time for a user.

**Keywords** –Face detection, Emotion recognition, Webcam, CNN classification, MusicPlaylist.

**1. Introduction-** Music plays an important role in our daily life. Users have to face the task of manually browsing the music. Computer vision is a field of study which encompasses on how computer see and understand digital images and videos. Computer vision involves seeing or sensing a visual stimulus, make sense of what it has seen and also extract complex information that could be used for other machine learning activities.

We will implement our use case using the Haar Cascade classifier. Haar Cascade classifier is an effective object detection approach which was proposed by Paul Viola and Michael Jones in their paper, "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001. This project recognizes the facial expressions of user and play songs according to emotion. Facial expressions are best way of expressing mood of a person. The facial expressions are captured using a webcam and face detection is done by using Haar cascade classifier.

The captured image is input to CNN which learn features and these features are analyzed to determine the current emotion of user then the music will be played

according to the emotion. In this project, five emotions are considered for classification which includes happy, sad, anger, surprise, and neutral. This project consists of 4 modules-face detection, feature extraction, emotion detection, and songs classification. Face detection is done by Haar cascade classifier, feature extraction and emotion detection are done by CNN. Finally, the songs are played according to the emotion recognized.

### • EXISTING SYSTEM-

The features available in the existing Music players present in computer systems are as follows:

i. Manual selection of Songs ii. Party Shuffle iii. Playlists iv. Music squares where user has to classify the songs manually according to particular emotions for only four basic emotions. Those are Passionate, Calm, Joyful and Excitement.

Using traditional music players, a user had to manually browse through his playlist and select songs that would soothe his mood and emotional experience. In today's world, with ever increasing advancements in the field of multimedia and technology, various music players have been developed with features like fast forward,

reverse, variable playback speed (seek & time compression), local playback, streaming playback with multicast streams and including volume modulation, genre classification etc.

## • PROBLEM STATEMENT-

Music is often considered to be voice of the soul as it makes people emote their feelings no matter what the situation is. An angry person tries to calm himself by listening to music which might calm his nerves. A sad person listens to motivating song which helps him to come out of the depression phase. Music and emotion coexist. Real time dataset allows us to capture the person's image at the particular instant based on which songs can be suggested which complies with his mood..

## 2. Objectives:

Music is often considered to be voice of the soul as it makes people emote their feelings no matter what the situation is. An angry person tries to calm himself by listening to music which might calm his nerves. A sad person listens to motivating song which helps him to come out of the depression phase. Music and emotion coexist.

Our main objective is to

1. Accurately detect the mood of the person
2. To create a playlist according to the identified emotion by using a real time dataset.

Real time dataset allows us to capture the person's image at the particular instant based on which songs can be suggested which complies with his mood..

## 3. Methodology

### • GATHERING DATASETS

Real time datasets are used for emotion classification by using a web camera or mobile camera. Images are captured after getting permission from the user. The captured images are compared with FER 2013 datasets for emotion classification. FER 2013 datasets consist 37887 grey scale images with 7 different emotions where 0 is Anger, 1 is Disgust, 2 is Fear, 3 is Happy, 4 is Sad, 5 is Surprise and 6 is Neutral

### • FACIAL DETECTION AND RECOGNITION

Facial detection is the process of identifying a human face within an image. If there are five faces in an image face

detector must be able to detect all the five faces. Haar's cascade is used for this purpose. It works often by searching for human eye i.e. a valley region.

### • Haar Cascade

This method gives the output as one if the region show any feature or object and zero when no object is detected. By moving the search window an individual can search every location for identifying objects and features.

The classifier is structured with the goal that it tends to be effectively resized so as to have the capacity to discover the objects of various sizes, which is more proficient than resizing the picture itself. Thus, to discover an object of an obscure size in the picture the output strategy ought to be completed a few times at various scales.

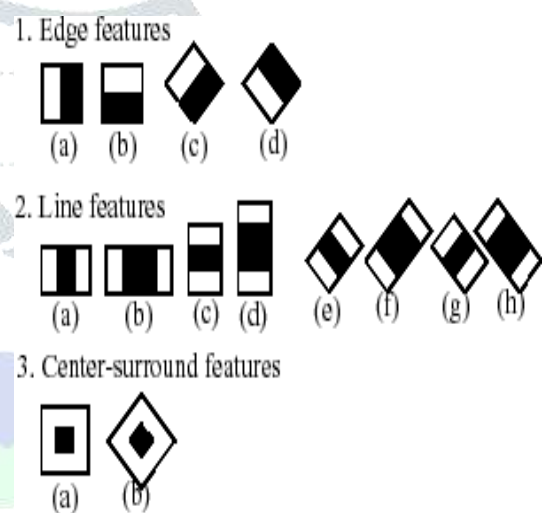


Fig3.1 Haar-Cascade Classifier

In order to find one person from the five people facial recognition is used. It does something beyond just recognizing faces. It uses a biometric technology that snaps the image of the human's face and compares it with the existing images that are already stored in a database. It will be able to identify the person to whom the face belongs to. LBPH face recognizer is used for this purpose. LBPH face recognizer extracts the face, crops them and resizes them. Finally, these processed images are converted to grey scale.

## 4. RESULT

After the image classification, we could successfully and accurately identify the emotion of the person. The different emotions are Angry, Sad, Neutral and Happiness.



Fig 4.1 Angry

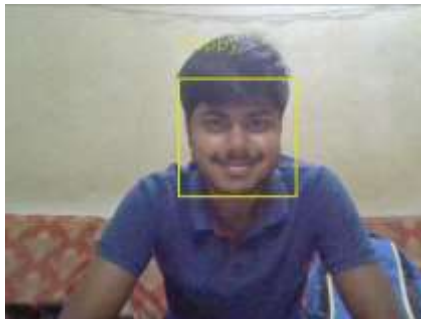


Fig 4.2 Happy



Fig 4.3 Neutral

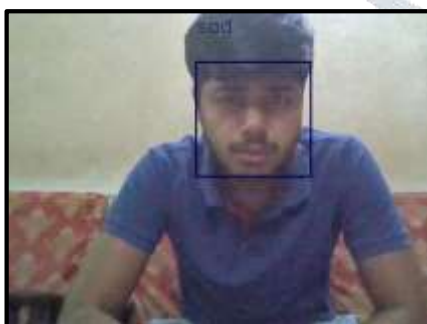


Fig 4.4 Sad

## 5. CONCLUSION

The algorithm proposed in this paper aims to generation music tunes based on facial expressions. Experimental results indicate that the proposed algorithm was successful in automating music tune generation on the basis of facial expressions and hence reduced the amount of labor and time, incurred in performing the task manually. The use of laptop or camera helped in eradicating the requirement of any

additional hardware, such as EEG systems and sensors, and thus helped in curtailing the cost involved. Since, face emotion recognition is not performed in real time, the total time taken by the algorithm is equal to the amount of time taken by the algorithm to recognize facial expressions and the amount of time taken by the algorithm to query the Meta data file. Hence, the proposed algorithm yields better performance, in terms of computational time, than the algorithms reported in the existing literature. Also, since the time taken by the algorithm to query the Meta data file is negligible (0.0008 sec), the total time taken by the algorithm is proportional to the time taken to recognize facial expressions. Viola Jones algorithm Detect face of the user accurately. Then this gives input to the convolutional neural network and we get emotions.

## 6. REFERENCES

- [1] Anagha S. Dhavalikar and Dr. R. K. Kulkarni "Face Detection and Facial Expression Recognition System "Institute of Electrical and Electronics Engineers (IEEE 2014)
- [2] Byeong-jun Han &Seungmin Rho &Sanghoon Jun &EenjunHwang"Music emotion classification and context-basedmusicrecommndation" Springer Science + Business Media, LLC 2009
- [3] Renata Lopes Rosa, DemóstenesZegarra Rodríguez and GraçaBressan"Music Recommendation System Based on User's Sentiments Extracted from Social Networks"2015 IEEE International Conference on Consumer Electronics (ICCE)
- [4] Yajie Hu and MitsunoriOgihara "NEXTONE PLAYER: A MUSIC RECOMMENDATION SYSTEM BASEDON USER BEHAVIOUR"12th International Society for Music Information Retrieval Conference (ISMIR 2011)
- [5] Kyoungro Yoon, Senior Member, IEEE, Jonghyung Lee, and Min-Uk Kim "Music Recommendation System Using Emotion Triggering Low-level Features"IEEE Transactions on Consumer Electronics 2012
- [6] FilmMusic" 2005
- [6] Hye-Rin Kim, Yeong-Seok Kim, SeonJoo Kim, In-Kwon Le"Building Emotional Machines: Recognizing Image Emotions through DeepNeural Networks"IEEE TRANSACTIONS ON MULTIMEDIA 2018
- [7] DegerAyata, Yusuf Yaslan and Mustafa E. Kamasak "Emotion Based Music Recommendation System Using



Wearable Physiological Sensors" IEEE TRANSACTIONS  
ON CONSUMER ELECTRONICS, 2018

[8] Anukriti Dureha "An Accurate Algorithm for  
Generating a Music Playlist based on Facial Expressions  
"IJCA 2014

[9] Anagha S. Dhavalikar and Dr. R. K. Kulkarni, "Face  
Detection and Facial Expression Recognition System"  
2014 International Conference on Electronics and  
Communication System (ICECS -2014).

[10] Yong-Hwan Lee , Woori Han and Youngseop Kim,  
"Emotional Recognition from Facial Expression Analysis  
using Bezier Curve Fitting" 2013 16th International  
Conference on Network-Based Information Systems.

[11] Arto Lehtiniemi and Jukka Holm, "Using Animated  
Mood Pictures in Music Recommendation", 2012 16th  
International Conference on Information Visualisation.

[12] F. Abdat, C. Maaoui and A. Pruski, "Human-  
computer interaction using emotion recognition from facial  
expression", 2011 UKSim 5th European Symposium on  
Computer Modelling and Simulation.

[13] T.-H. Wang and J.-J.J. Lien, "Facial Expression  
Recognition System Based on Rigid and Non-Rigid  
Motion Separation and 3D Pose Estimation," J. Pattern  
Recognition, vol. 42, no. 5, pp. 962-977, 2009.

[14] Renuka R. Londhe, Dr. Vrushshen P. Pawar,  
"Analysis of Facial Expression and Recognition Based On  
Statistical Approach", International Journal of Soft  
Computing and Engineering (IJSCE) Volume-2, May  
2012.

[15] S. Yang and B. Bhanu, "Facial Expression  
Recognition Using Emotion Avatar Image," 2011, pp.  
866-871.

[16] M. Bejani, D. Gharavian, and N. M. Charkari,  
"Audiovisual emotion recognition using ANOVA feature  
selection method and multiclassifier neural networks,"  
Neural Comput. Appl., vol. 24, no. 2, pp. 399-412, 2014.

