Emotion Detection By Facial Recognition
and Song Recommendation

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Abstract

It is difficult for us to choose which music to listen to from a vast array of available selections. The main goal of our system is to give consumers with suggestions that are tailored to their tastes. The examination of the user's facial expression will help us in understanding of the user's current emotional as well as mental state. Music and videos are one area where there is a big opportunity to provide clients with a wide range of options based on their preferences and collected data. Humans use expressions to express their motive of speech. More than 70% of the users whom we have interviewed believe that at some stage in the future, the number of songs in their music collection will be so huge that they will be unable to find the song, one needs to play. By building this recommendation system, it might be helpful for a user in deciding which music to listen, hence bringing their stress levels down. There would not be any wastage of time for the user in looking up songs since the best track which will match the user's mood would be detected and music will be displayed to the user based on their mood. The photo of the user is taken from a webcam, and then an appropriate song from the user's playlist is provided that matches the user's demand, based on the user's mood/emotion.

1.   INTRODUCTION

We express our emotions through our expressions. Music always helps us change our moods. Recognising a person's emotion and playing the song which, they wish to hear will comfort the person and calm them by giving a pleasing effect. The goal of our project is to capture a person's emotion through facial expressions. The system is made to capture the emotion a user shows via live camera interface present in the system. Now, after the emotion is displayed, the software takes a picture of the user and later using the image processing techniques, extracts the features from the user's captured image along with the emotion expressed. The goal of this project it to help the user brighten their mood by

playing songs which they wish to hear. Facial expression recognition has been an effective method to perform expression analysis. The best way for people to analyse or conclude the emotion, feeling, or thoughts that another person is attempting to show is through their expressions. This system may also be helpful in clinical aid in the recovery from conditions such as depression and sadness. We can take a step to help improve a user's mood and avoid various health risks.

2. LITERATURE

Renuka Londhe [1] proposed a study of changes in the facial curvatures and how intense are the respective pixel features. To classify the emotion, Artificial Neural Networks (ANN) was used here. The author proposed several approaches for playlist creation.

Zheng [5] showcased two major categories for facial feature extraction: based on appearance and based on geometry, which includes extraction of some key features of the face.

Nikhil [9] use facial expressions to determine the user's mindset. Humans frequently express their emotions through facial expressions, hand gestures, and tone of voice, but they mostly express their emotions through their faces. The user's time complexity is reduced by an emotion-based music player. Usually, the playlist of the user has multiple genres of songs and still then it is not able to satisfy the user and uplift their mood. Here, the captured images are converted to binary from RGB format. A java programme was used to create the music player. The database is taken care by it and the songs are played accordingly.

Zeng [5] investigated developments of affect recognition in humans. This paper also gives different computing methods. There are seven categories of emotions upon which the affect is checked. This paper helps in understanding the challenges faces for creating a robust affect recognizer.

Parul [7] proposed an automated interaction system. Where the music system can play according the preference given by user, and their emotions.

Anukriti et al. [6] proposed an algorithm with less computing time and song according to the emotion is played. The idea it to categorise emotions into five different categories. The approach is to have less time in extracting an audio signal.

Aditya [8] created an application that personalises the music system for a user by analysing and presenting songs based on the user's mood. To implement facial recognition algorithms, the application was built with Eclipse and OpenCV. This paper also provided a comparison of various facial feature detection algorithms. It is an android application with

front camera used as the live camera. Its goal was to satisfy music fans by eliciting their emotions.

Methodolgies

We are employing the CNN classifier. Convolutional Neural Network (CNN) is majorly used in CV tools and in classification task. CNN is a powerful algorithm which is used in classification tasks suck as recognition of patterns and also in processing of images. It has many advantages, including an easy and user understandable structure, fewer parameters involved for training, and its highly adaptive nature. BGP (Binary Gradient Patterns) is proposed here, as it is an effective image descriptor. There are some structures in BGP, which extracts gradient patterns in the form of a binary string. This is done to represent its effectiveness in local regions. A set of binary strings are created by computing various image gradients from different directions. This computing is done to find the local structures. Some of the binary strings which are encoded contain meaningful structures which allow high discrimination. The representations of faces in these structural BGP histograms are extremely resistant to various facial image variations, particularly illumination.
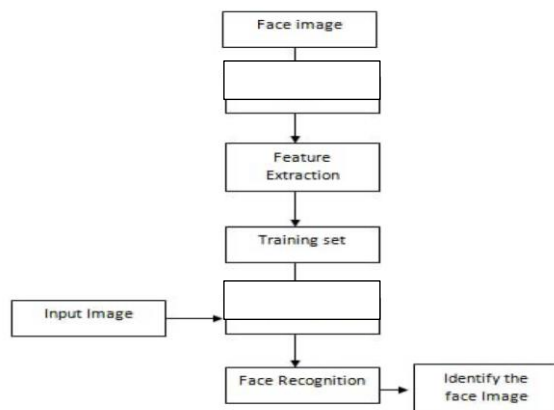
Figure 1: Working of BGP

1. **Emotion:**

A live camera is used for taking a real-time picture of the user. After an image is taken, the captured image is framed with respect to grayscale as it helps in increasing the performance when we are classifying an image. After the conversion to grayscale, the picture is sent for classification. Here, the extraction of features from the image takes place which is useful in detecting emotion. Individual features are extracted from the classified image and is sent to a network which detects the emotion. The introduction of new pictures to the classifier each time is important, in order to make the classifier ready for entirely

unknown image's feature extraction, where it has to work based on the knowledge gain. The network where images are sent for emotion detection are trained with huge data.

2. **Audio***:*

After an emotion is detected by the network, the audios which the user can play from the playlist created for that emotion's genre are displayed. The user has the convenience of playing any song they wish to by shuffling that playlist.
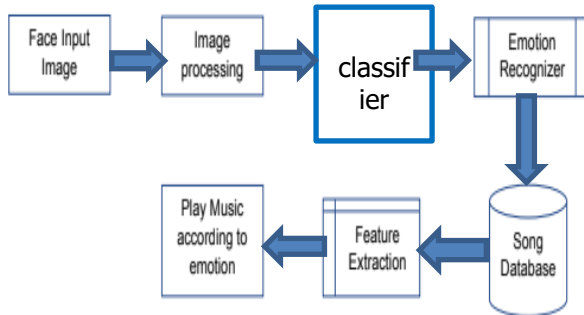
3. **Linking Emotion and Audio**

Now, the song is played where the emotion which is extracted corresponds to that particular playlist. If the emotion is angry, then a song from the angry database of songs is played for the user.
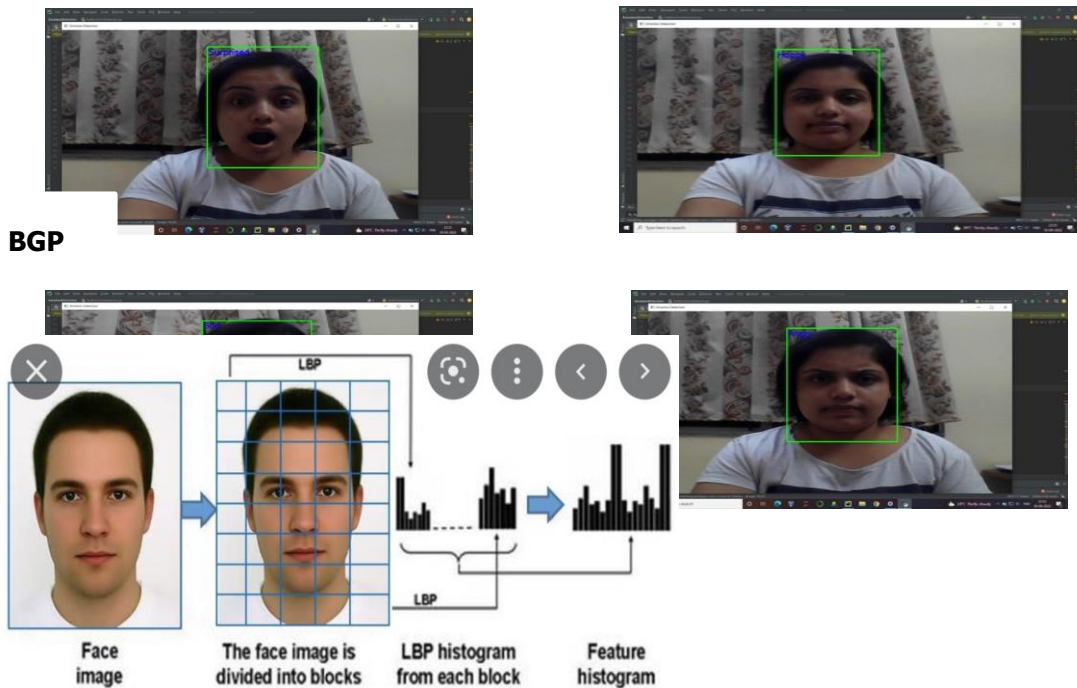
Proposed Algorithm:

i)The system which we are proposing will work by using an interface which will scan the face of the user through live camera or it can also scan the pre-stored images from the system.

ii)Then the system will filter the images and check for different features and delete the ones which are irrelevant or unwanted.

iii)Now, only the images which have positive value are classified under given parameters.

iv)These parameters are the ones which help in providing a certain collection of genres in songs, and based on this the audio is processed.

v)Various songs are distributed into different playlists based on its genre. Therefore, a list is created which has songs on similar emotion.

vi)A suitable music system is provided to the user.

vii)This system first detects if there is a presence of any face on camera. If a face is detected, then an emotion is displayed which corresponds with the feature selection performed by the system.

viii)Finally, when the emotion is detected, the screen shuts down the camera and a music from the playlist created starts playing which corresponds with the emotion identified.

4. Block Diagram

5. EXPECTED RESULT

Emotion detection:

BGP

Face image	The face image is divided into blocks	LBP histogram from each block	Feature histogram

6. CONCLUSION

Our system was able to successfully capture a user's emotion. This predicate in tested in a real time. To determine its robustness, it must be tested in various lighting conditions. This system is also able to seize the user's recent images and update its classifier. It can also

inform the training dataset. This system is designed using the facial landmarks scheme and, is it also tested under numerous conditions to determine its outcome. When tested live on a user, we can see that the classifier is able to predict the user's expression in a real-time environment accurately.

7. APPLICATION

- Health care industry is using this technology where an automated recognition software is helping them assess emotional response of patients in clinical trials.

- Reducing the prevalence of stress-related diseases.

- It can also be used to keep an eye on bedridden elderly people at home. When no one is around, this system can function as an automated system, playing songs based on their mood to keep them engaged.

8. References

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