EMOTION BASED MUSIC RECOMMENDATION SYSTEM

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Abstract - *Human emotion play a vital role in recent times.Emotion is based on human feelings which can be both expressed or not.Emotion expresses the human's individual behaviour which can be in different forms.Extraction of the emotion states humans individual state of behaviour. The objective of this project is to extract feature from human face and detect emotion.and to play music according to the emotion detected.*

However, many existing techniques use previous data to suggest music and the other algorithms used are normally slow,usually they are less accurate and it even require additional hardware like EEG or physiological sensors. Facial expressions are captured a local capturing device or an inbuilt camera.Here we use algorithm for the recognition of the feature from the captured image. Thus,the proposed system is based on the facial expression captured and will music will be played automatically.

Keywords: Emotion Recognition,music recommendation, Facial Extraction, real time capturing images.

1.INTRODUCTION:

   In this concept music is recommended to the user by detecting the real time capturing of user's emotions. Existing technique were using collaboration technique which will use previous user data to recommend music and This technique requires lot of manual work so, we proposed a system to arrange different music in different categories such as happy, sad or angry etc. Emotion-Based-music-player It's music player with chrome as front-End which has the capability to detect emotions I.e, the face of user with the help of machine learning algorithm using python. Based on the detected user's mood song list will be displayed/recommend to the user. In this application image of a person is captured using a real time machine that has the access to the local machinery.and depending on the captured image it compares the database data sets that already saved in the local device through processing it defines the present mood of the user in numerical form based on this music will be played other than that we have some common features that are queue playlist so that we can have a individual playlist and the last one is random it uses python Eel library so that it can pick a random song with out any order.for this we have used libraries like OpenCV, EEL, numpy etc.this system is mainly proposed because music play a vital role in recent times that is to reduce stress.so,in order to detect the emotion we are using face as a main source of data because normally face expression defines the Emotion so according to the mood we play the music that it can change the user's mood.

2.LITERATURE SURVEY:

The process of multidimensional reduction by taking the primary data that is lowered to many other classes for sorting out or organizing.Emotion of a user is extracted by capturing the image of the user through webcam.The captured image is enhanced by   the process of dimensional reduction by tracking the primary data. These data is converted into binary image format and the face is detected using Fisher Face and

Harcascade methods.

The initial or the primary data taken from the human face that is lowered to many other classes.These classes are sorted and organized using the above methods.Emotion is detected by extracting the feature from the human face.The main aim in feature extracting module is to diminish the number of resources required from the large sets of data.

Features in an image consists of 3 parts.

1. Boundaries/edges

2. corners/projection points

3. field points

Fisher Face Algorithm :

This image processing system is used for reducing the face space dimensions using the principal component analysis(PCA) method and then it applies fishers linear discriminant(FDL) or the LDA method to obtain the feature of the image characteristics, we especially use this because it maximizes the separation between classes in the training process. this algorithm helps to process for image recognition is done in fisher face while for matching faces algorithm we use minimum euclidean it helps us to classify the expression that implies the emotion of the user.

➢ Haarcascade Algorithm :

It is an machine learning algorithm to categorize objects in an captured image. It is mainly used for object detection.The cascade classifier has different stages of collection which resembles from weak learners. These weak classifiers are the simplest form classifiers that have a name called boosting.If the label ranges in positive state then it goes to the next stage showing the result.These have a positive side and a negative side where they identify the images according to the labels.These have a set of positive images over negative images on various stages. As images with higher resolution has greater quantity are preferred as better quality results.

Here, we use haarcascade frontal face_default.xml to detect the object in the image.Objects here are nose,eyes,ears,lips in face.Haar cascade which is designed by open cv is to detect the frontal face. It also has the capacity to detect the features from the source.It works by training the negative images over the positive images which are superimposed by it.Positive images contains the images only which we want our classifier to categorize.Negative Images contain the Images of everything else, which do not contain the object we want to detect.

3.PROPOSED SYSTEM:

Humans have a tendency to show their emotions unknowingly mainly they reflect the face. The proposed system helps us to provide an interaction between the user and the music system. This project mainly focuses on the user's preferred music that is recommended due to the emotional awareness. In the initial stage of the proposed system, we have given 3 options and each contains its functionality. To this, we have given a list of songs and emotions based on spatial recognition. Once the application starts working it captures images with the webcam or any other physiological devices. our main aim in this system is making a sophisticated music player that could make the user mood better and music is one of the best aid to change the mood.In this images captured by the system are compared with the data sets, and mainly 4 emotions are taken because human have many emotions and it is hard to predict because they differ from person to person and it will be hard to predict so, four common and easily identifiable moods of the person. And here there is another alternative methods can be used with the main concept i.e, random picking of songs that could help us to brighten our moods and the other mode is queue mode with this we can make a playlist on our own and in all the modes we are not using the previous user data but we using individual user data.
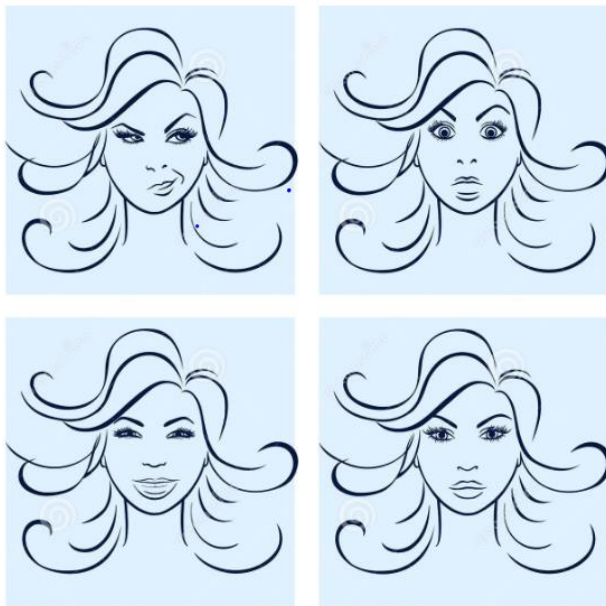
Figure 1: Different Types of Emotions

4. SYSTEM ARCHITECTURE:

5. In this paper,In this project, by running the main web page it will trigger an XML file that then Opencv helps in capturing images from the webcam as well as for processing purposes. made the implementation of the fisher face methodology of OpenCV for classification. And fisher face to train the model and store it in a model-file(XML). While using a player it uses for prediction for the emotion which will show you the main media player web page. In this, it contains 2 options one for emotion-based detection and the other for random selection of songs Rando picking we are a small library in python i.e, Eel. On the other hand, we are having the emotion-based music system in this we are using 3 main algorithms for capturing, detection and playing of the music.this system, describes the facial expressions using detection and combination of spatial expressions. After Feature Extraction, the Emotions are classified it is in 4 forms I.e, Happy, Angry, Sad and neutral face. The emotions that are transferred to last step are in numerical form and the music is played from the emotions that are detected. The main objective of face detection technique is to identify the frame I.e, face. And the other phase of the project is the random mode for this we are using Eel for the random picking of songs irregular to the queue. The win sound module is used to access the local sound-playing machinery that is provided in the Windows platforms.
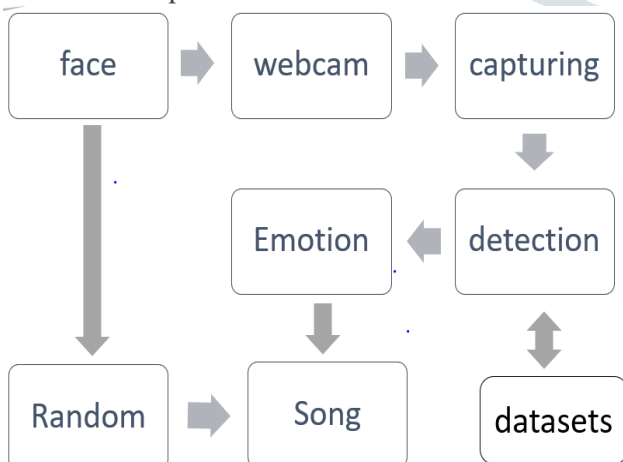

Figure No.2: Architecture Diagram of EMOTION BASED MUSIC RECOMMENDATION SYSTEM.

5.METHODOLOGY:

5.1 FACE CAPTURING :

The main objective of this session is to capture images so here we are using the common device i.e, webcam or can use any other physiological devices.for that purpose we are using the computer vision library.This makes it easier to integrate it with other libraries which can also use NumPy and it is mainly used as a real time computer vision.In the initial process when execution starts it starts to access the camera stream and captures about 10 images for further process and emotion detection.so, in the initial phase of this project in order to capture the images and face detection. We use an algorithm that could take the authentic images so classify the images and we are need of lot of positive images that they actually contain images with faces only on the other hand, negative images that contain the images without faces .in order to train the classifier. The classified images are taken as a part of the model .

5.2 FACE DETECTION:

The face recognition is considered as one of the best way to determine a person's mood. this image processing system is used for reducing the face space dimensions using the principal component analysis(PCA) method and then it applies fishers linear discriminant(FDL) or the LDA method to obtain the feature of the image characteristics, we especially use this because it maximizes the training process classification in between classes.this algorithm helps to process for image recognition is done in fisher face while, matching faces algorithm we use minimum euclidean it helps us to classify the expression that implies the emotion of the user.

Fisher face with open CV mainly it mainly emphasis on the class specific transformation matric so, they don't take illustrative images as the subject.and emotion is mainly concluded by the model that the value evaluated from the process can help us to deduce the mood of the user.by comparing the data sets that each emotion is compared with tens of stored images and scale gives the exact emotion so that it can play the music based on the recommendation made by the system by using the following steps and methods. And it does not depend on the other personal details like the other existing software's.

linear classification step in the face detection process. It helps to simplify the linear classification rather than SVM.it is for decreasing the computational time so,that the classification process will take and makes a better detection.

Figure 3: Flow diagram of the module – Face Detection
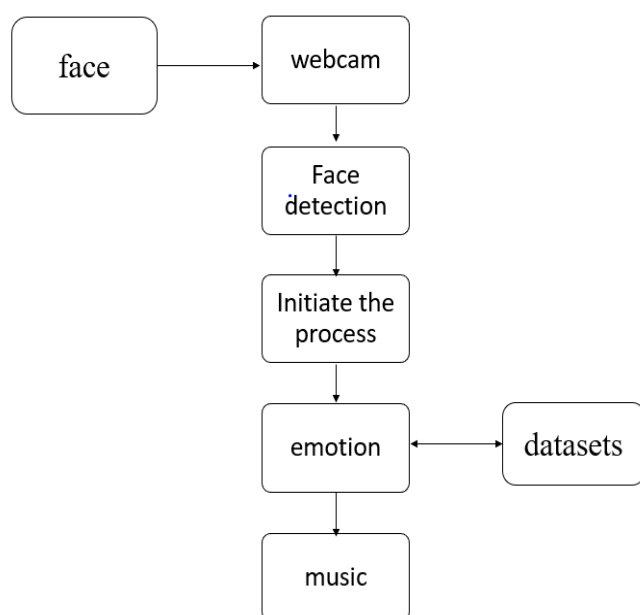
A.EMOTION CLASSIFICATION:

When the face is detected successfully , a box will appear as and it   overlay the image to extract the face and for the further analysis.in the next step The images that are extracted previously will processed using the function .The code will extract the facial spatial positions from the face image and it is based on the pixel's intensity values that are   indexed at   each point and it   uses boosting algorithm. It is performs the comparision between   the input data and with stored one so it can predict the class that contain the emotion. If it contains one of the four emotions anger, sad,neutral or happy . and detection of the emotion as seems to be decreasing speed command and it will be executed so that it can reduce the speed of the wheelchair so,that we could prevent the user from endangerment.
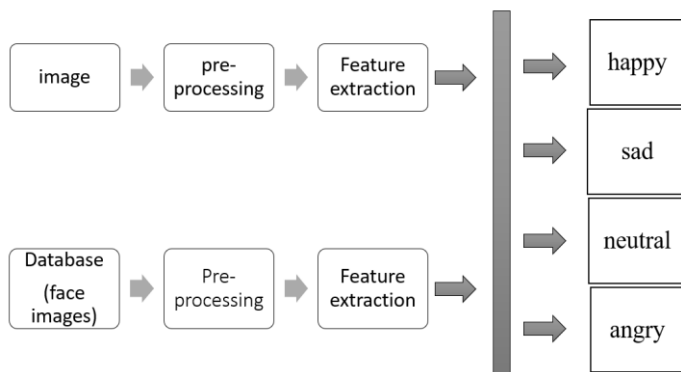
B.MUSIC RECOMMENDATION:

The input images that is acquired is from the web camera and is used to capture real-time images. And here we are four main emotions because it is very hard to define all the emotions and by using limited options it can help the compilation time and the outcome is more sophisticated. it compares the values that are present as a threshold in the code. The values will be transferred to perform the web service. The song's will be played from the detected emotion. The emotions are assigned to every song. When the emotion is transferred the respective song and the emotions are numbered are arranged and assigned to every song. however, we can use many kinds of models to recommend because of their accuracy. and we are using a fisherface that contains the PCA and LDA algorithms so it gives the accuracy better than other algorithms.and for the sound mechanism we are using the win sound and with frequency and duration it the commonly used python library for basic sound playing for the mechanism.obtained are being compared the values that are present as a threshold. and there are other alternative options other than the emotion-based system that queue mode and the random mode.in queue mode, we can make a playlist as the other usual music software's and the last one is the random mode it is for random picking of songs rather than the order and other and it is also one of the therapies that can brighten up our moods. when the song is played on the basis of users' emotions at the same time it also represents emotions in the form of emoticons in four different emotions. each emotion is assigned with a number and that implies to music and also emoticons that are detected respectively.

6.FUTURE ENHANCEMENT:

The music player that we are using it can be used locally and nowadays everything became portable and efficient to carry but it the emotion of a person can be taken by different of wearable sensors and easy to use rather than the whole manual work it would be possible using GSR(galvanic skin response) and PPG(plethysmography physiological sensors).that would give us enough data to predict the mood of the customer accurately. This system with   enhanced will be able to benefit   and the system with advanced features and needs to be constantly upgraded. The methodology that enhances the automatic playing of songs is done by the detection.The facial expression's are detected with the help of programming interface that is   present in the local machine. An the alternative method, that is based on the additional emotions which are being excluded in our system.

6. CONCLUSION:

In this project,music recommendation model it is based on the emotions that are captured in real time images of the user. This project is designed for the purpose of making better interaction between the   music system and the user. because Music is helpful in changing the mood of the user and and for some people   it is a   stress reliever. Recent development it shows   a wide prospective in the   developing the emotion based music recommendation system. Thus the present system presents Face(expressions) based recognition system so that it could   detect the emotions and music will be played accordingly .

RELATED WORK:

Reading facial expressions of emotion (By David Matsumoto and Hyi Sung Hwang)**.**

Image Recognition and Classification: Algorithms, Systems by Bahram Javidi**.**

Deep Learning for Computer Vision: Image Classification, by Jason Brownlee**.**

Kernel Learning Algorithms(fisher face,harcasscade) for Face Recognition By Jun-Bao Li, Shu-Chuan Chu, Jeng- Shyang Pan – 2013

IEEE Reseach papers.(semantic scholar.org)

Github (emotion based music player wearing sensors)