Music Recommendation Using Emotion Detection

Francis Jency X[1], Kavin Raj D[2], Dharanidharan G[3], Elangkapilann S[4]

[1, 2, 3, 4] Kumaraguru college of technology, Coimbatore

Abstract- *Listening to music is one of the most satisfying things that help us to relax. Music helps us to change our modes and makes feel better. Emotion based music player is one of major tool help us to stay particular emotion or change emotion from angry to calm and sad to happy. This research is all about the image detection and emotion recognition and generating emotion-based playlist. Manual sorting of songs is one of the hated works and more time consuming. There are several algorithms have been implemented to this process but they are less efficient, slow and has very accuracy. This system not only generate the playlist but also have very high accuracy in face detection and emotion recognition. This enhances the system's efficiency, faster and automatic. The main goal is to increase the overall performance by reducing computational time and the cost of the designed system. We have used advanced machine algorithms- haar casade alogorithm to achieve accurate object detection and emotion classfication process.*

Keywords- Haar cascade algorithm, deep learning, emotion detection , image datasets.

I. INTRODUCTION

Growing technologies have been influenced our life in different forms and made our works easy and efficient. Image detection is one of the important methodologies that have been used in various technology. We have used image detection methodology and developed it to emotion detection system. The emotion detection is also used to understand human emotion based on their facial expressions. These helps in various places like social media platform, emotion based music player etc.. Music plays an important role in everyone's life. It is one of tool to express anger, sadness, and happiness. Music has become been attached in our whole journey of life. We like to every moment in life with music and music is always related to our emotion. In today's world with the increase in advancement in the technology, we have lot of music player where we can skip songs ,playback, reverse etc.. These may satisfy the basic requirement, but since emotion plays a major role in listening music the user must need to create a playlist based on the emotions. Emotion based music player is a novel approach that helps the user to stay or express few moments of the particular emotions as it contains of few self generated song playlist. It recognizes the facial emotions of the user by using image detection method and plays the songs according to their emotion.

II. LITERATURE REVIEW

A. **Face Recognition Using Fisherface Method** *Mustamin Anggo1* and La Arapu1 1Department of Mathematics, Universitas Cenderawasih, Jayapura, Indonesia.*

In this paper we learnt about the face recognition method-fisherface method. The purpose of the research is to build and study the face recognition system built using fisherface algorithm .It is one of the highly used face recognization method. This method uses Principal Component Analysis (PCA) method first and uses Fisher's Linear Discriminant (FDL) method to reduce the face space dimension. Minimum Euclidean is used for identification and face matching. This process is used to collect data in the form of face image which is later used to for facial detection because this method can determine image which are predefined in dataset. The images were collected from direct photography where face should be clear and should not blocked by any other objects. Minimum of 5 images has taken at a position .A total of no of students photographed with a distance of $\pm$ 100 cm, which has various image of a student in various position, with the aim to equate the quality and the image of each data taken. This gives quality of dataset.

B. *The paper "Individual Stable Space: AnApproach to Face Recognition Under Uncontrolled Conditions" by Xin Geng*

This paper say that most of the face detection technologies are under controlled conditions. That is the images of the faces should be under certain conditions such as quality , brightness, positions and angles. This affects to use these face detuction methodology in real time world. In the real time world application needed application where the restriction should be minimum. In this paper they used a dataset which have a predefined images that needed to be deducted like attendance. Where we already know the images we are going to detect.

C. *A comparative study on Convolutional Neural Network and Viola-Jones Algorithm for faster Face Recognition Rubeena M M1, Dr.Manish T I2*

This paper tends to give the working of Viola-Jones Algorithm and Convolutional Neural Network. Viola-Jones method is one of the Appearance-based method. Important factors of face detection method are fast processing speed and high accuracy which are accomplished by this technique. The viola jones algorithm has four steps -: Haar-like Features, Integral Image, Adaboost Training, and Attentional cascade. Adaboost alogorithm combines many weak classifier into powerful classifier. CNN is a multi-layer network trained to execute a precise task using classification. In CNN architecture there are mainly four types of layers Convolutional Layer, ReLu, Pooling Layer, and Fully Connected Layer. The Viola-Jones algorithm encounter problems in positions range like side view and for low lighting because haar feature does not work accurate in varying positions. CNN has the ability to detect the image in various position. But CNN require large memory space and more expensive than haar-like features. The Viola Jones algorithm is preceeding algorithm yet least memory requirement of it is implemented much more likely. The CNN can be used as a merger with other efficient algorithms can provide a combo-algorithm which will enhance the technology.

D. IMAGE CLASSIFICATION BASED ON DEEP LEARNING USING PYTHON AND KERAS JETTY MANU PRANEETH1 , P.P.M PRASAD2

In this paper they classified image based on deep learning using python and keras. In this they have step by step process of CNN (Convolution Neural Network). They are two stages forward and backward. The forward layer checks weights and bias of each image in each layer. The backward stage computes with chain rule gradient each parameter. The pooling layer follows the convolution layer. It reduces the dimensions of feature map and network parameters. There are two technique in pooling layer one is Average pooling and another one is Max pooling KERAS and Tensor flow software's are needed for this image classification. KERAS can be classified as an open-source neural network library. It supports Tensor Flow. This gave clear how CNN works and internal process of it and how image is classified using keras.

E. Real Time Emotion Based Music Player for Android D.M.M.T.Dissanayaka1, S.R.Liyanage

In this paper they recognized two emotion happy and non-happy. Emotions are detected by real time using web cam or mobile camera. This images are converted to grey scaled to compress the size of the image. MATLAB is used in this technique the eye and lip areas are sent to MATLAB backend via client server-socket connections. Emotion is recognized by Eigen face-based pattern. In the song database songs have categorized into happy and non-happy. When the emotion of the given image is detected then the songs of the particular category is loaded into android music player and song is played.

F. Cross-lingual Emotion Detection, Sabit Hassan, Shaden Shaarand Kareem Darwish Qatar Computing Research Institute Doha, Qatar

Automated models becomes expensive when it is trained with anno-tated datasets, innoder to reduce the expensiveness of the model we consider the efficiency of the cross-lingual approach. In this approach we use image data from the source to built emotion detection model , so inorder to do this we compare different models I)using inherently multilingual models II) translating training data into target languages III) using automatically tagged parallel corpus.

G. Study on face recognition with combined of support vector machineand fisher algorithm
Lushen Wu

According to face recognition both fisher algorithm and one-against-rest classifier called support vector machine are put to pen and paper. Firstly to compress the dimensions of the image and reduce the timing to train the dataset we use wavelet transform now PCA algorithm is used to reduce the dimension, extract the optimal features of the face some descriptive rules are laidout.to recognize the face the data set must be trained ,to train the simle face we make use of the one-against-rest classifier of SVM which consist of all the features to train the sample face. These trainings are used in ORL and Yale face databases with the accuracy rate of 97.75% and 97.80% respectively, and average recognition time of 9.8ms.from this results we can conclude that Fishers algorithm is more productive and superior the Eigen faces one on feature extraction.

III. PROBLEM STATEMENT

In today's world with the increase in advancement in the technology, we have lot of music player where we can skip songs, playback, reverse etc.. These satisfy basic needs of music player. In the traditional music player, the user has to create their own playlist by browsing songs manually. Each time the user must create new one based on his mood or emotions. We have lot of emotion recognition system but these have low accuracy and lot of image restriction. Hence we have developed high accuracy image detection and emotion recognition model. We have added music based on the emotions.

IV. PROPOSED SYSTEM

The proposed system consists of pretrained model it detects the facial expression of the user and with the help of machine learning algorithm we classify the correct emotion of the user. Once the emotion is classified we play the song for the particular emotion that stored in the dataset. We have used haar casade algorithm for image detection and classification. Then the music player consists of feature like skip, previous , pause.

V. METHODOLOGY

In this we use a self generated data set as the accuracy of the emotion has to be obtained. As emotion expression of the various people differs , we use this method to obtained 100% accuracy. We create dataset by capturing all the emotion of the user like happy, sad, neutral, surprise, angry and store in separate folder. Then we run the program our image is captured. Our face and emotion is detected by fisherface algorithm   and haar casade algorithm.

Database:

The database consists of 21780 images of various emotion Angry, Happy, Sad, Neutral, Surprise and these images have been separated and stored in different folder based on emotions.

Splitting dataset for training:

The proportions of train and test data can be:10% – 90%, 30% – 70%, 50% – 50%, 70% – 30%,90% - 10%. We then split the dataset into 70% of the training images and 30% for testing.

Haar cascade algorithm:

It is **an Object Detection Algorithm used to identify faces in an image or a real time video**. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features" published in 2001. It is machine learning method in which it is trained with lot of positive and negative images.Then used to detect objects in other images.

Positive images- The positive image consists of portion of faces in the image which are needed for classification. Negative images- It consists of portions of background of the images which are not needed for classification. These positive and negative images are neede to train the classifier. For this,

Haar features shown in below image are used. They are just like our convolutional kernel. Each feature is a single value obtained by subtracting the sum of pixels under the white rectangle from the sum of pixels under the black rectangle.
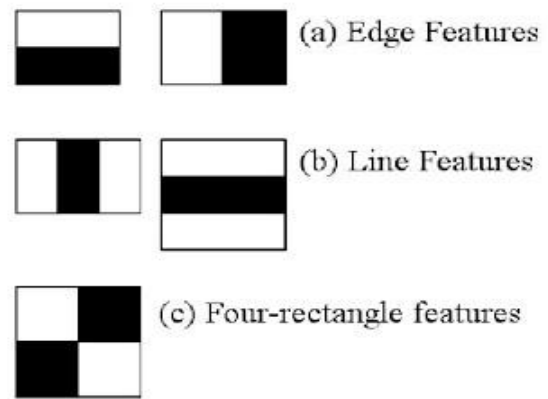

Emotion detection and music player:

We have used haar casade algorithm for emotion detection and with the help of dataset images we have classified the emotion of the user and give the result. Based on the emotion result the music player will retrieve the playlist from the database of the particular emotion and the song is played. The music player consists of basic operation like next song , previous song.

VI. FLOW DIAGRAM
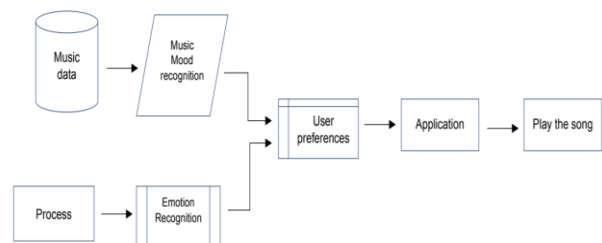
VII. IMPLEMENTATION SCREENSHOTS

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Mood: Happy song is playing
Song:2
Song:3
Song:4
Song:3
Song:4
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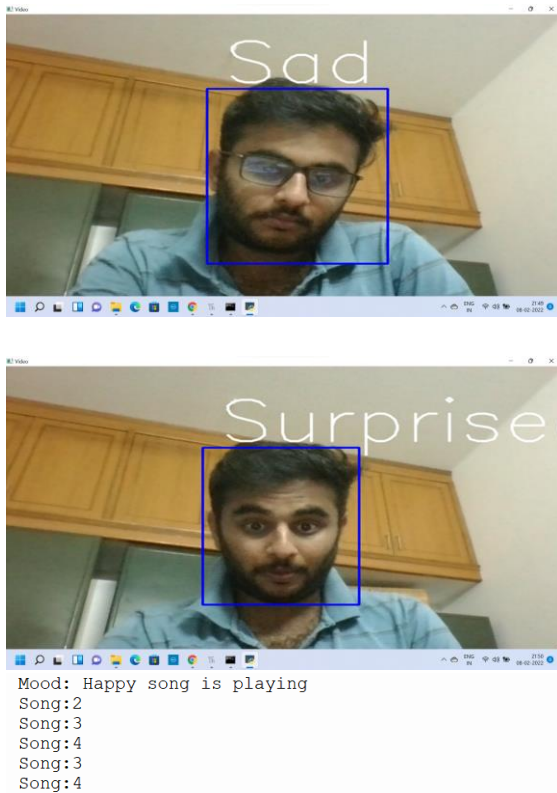
VIII. CONCLUSION

This research is study how image recognition technique works and how it used in various places and enhances the usage to the user. We have learned how various image detection methodology works and how it is better from others. The Emotion-Based Music Player is an automated process which plays songs based on their emotions. This application has high accuracy in image detection and emotion classification in real time. It also helps user to enjoy music based on their emotions. This application can be developed in automated home music studio where the music changes based on the activity we do like exercise, meditation. We have achieved a good accuracy in emotion detection.

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[6] Cross-lingual Emotion Detection,Sabit Hassan, ShadenShaarandKareemDarwishQatar Computing Research InstituteDoha, Qatar

[7] Study on face recognition with combined of fisher algorithm and support vector machineLushen Wu; Peimin Wu; Fanwen Meng; Weijing Yu

[8] PERFORMANCE ANALYSIS OF FACE RECOGNITION SYSTEM USING FISHERFACES Rupali Sunil Salunke1 , Prof. K. N. Pawar 2 1Student, 2Professsor 1,2 Department of E&TC SPPU University, Jalgaon, India