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Smart Music Player

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Abstract—Music assumes a vital job in human's day by day life and in the cutting edge trend-setting innovations. The investigation of music and emotions proposes that there is a mental connection between a man's emotional state and the kind of music they tune in to. Ordinarily, the client needs to confront the assignment of physically perusing through the playlist of melodies to choose. Here we are proposing a proficient and precise model that would create a playlist dependent on the current emotional state and conduct of the client. The reason for this undertaking is to comprehend and break down different facial redesign algorithms like pca, lda, viola jones and hog for an emotion recognition framework. Facial expression is a noticeable stance underneath the top layer of the face. They are the method for correspondence in humans which pass on numerous things non-verbally. Numerous algorithms have been executed on various static and non-static conditions. Static conditions incorporate static and equal foundation, distinct postures, comparable enlightenment, and nonpartisan front face. Non-static conditions incorporate position, fractional impediment introduction; change helping conditions and facial beard which make recognition process an intricate issue. Every one of these components impact confronts recognition process. The paper focuses vigorously towards machine learning and information mining, where distinctive systems are utilized to decide the emotion of the client and examines the ramifications of utilizing every strategy. Utilizing the decided emotion, the last music library of the client is dealt with.

Keywords: Emotion recognition, pca, lda, viola jones, static condition, non-static condition, machine learning, information mining

I. INTRODUCTION

Facial expressions are an incredible method to discover the condition of a brain for an individual. For sure the most critical approach to express the emotions of an individual is through expressions of face. Humans want to connect the melodies they need to tune in to, to the emotions that they are feeling. The music library however are, on occasion gigantic to deal with consequently. It would be useful if the music player was "sufficiently brilliant" to deal with the music dependent on the present condition of emotion the individual is feeling.

The task embarks to utilize different methods for an emotion acknowledgment framework, breaking down the effects of various systems utilized. From that point it deals with an individual's playlist dependent on the foreordained emotion of the client.

There are two principle parts of the venture; deciding the emotion of the client through a camera and after that dealing with the present playlist dependent on that emotion. The application is created so that it can break down the picture properties and decide the mind-set of the client.

PC Systems dependent on a successful client communication could assume an imperative job in the up and coming age of PC vision frameworks. Facial signals and emotions give pieces of information about a man's emotions. Facial expressions have been used in zones such security, diversion and Human Machine Interface (HMI). For the most part individuals have countless in their databases. The undertaking is an endeavor to limit the exertion taken in dealing with these playlists. For the most part individuals arbitrarily select a tune from their playlists and the given tune probably won't be proper for the present temperament of the client and might frustrate them[1]. Additionally there are not very many programming projects which effectively sort music dependent on the inclination of the client. The undertaking intends to give better pleasure to the music sweethearts in music tuning in. In the model, the accompanying states of mind are incorporated:

a. Happy
b. Sad
c. Angry
d. Neutral

The framework includes the picture handling and facial location forms. The contribution to the model is still pictures of client which are additionally prepared to decide the disposition of client[2]. Utilizing this emotion, the playlist of the client is arranged. A few strategies are utilized for

emotion recognition, the procedures are thought about and assessed dependent on various criteria.

II. RELATED WORK

Different systems have been proposed to group the behavior and emotional condition of the client based on their facial expressions.

Different methods of detection emotion using facial expression have been discovered and various platforms are available to develop music player various methods to classify music have also been discussed in previous papers some of the work related on this field are

Literature survey:

REF NO.	OBJECTIVE	ALGORITHM USED	DATASETS	PERFORMENCE MEASURES	REMARK
1	To analyse and classify the facial expressions into different classes like Happy, Angry, Sad.	AAM(Active Appearance Model) + Artificial Neuro-Fuzzy Inference System	Extended Cohn-Kanade	R,B, G values which are the amount of stimulus of red, green and blue in the recorded scenery.	Gives a higher accuracy but fails when distorted images are used.
2	Implementation Of Different Methods such as SVM and DBM for facial emotion recognition.	Support Vector Machine(SVM) & Deep Boltzmann Machine(DBM)	Samaine	For emotional facial classification problem, the evaluation criteria is F1 measure which is combination of recall R and Precision P.	This paper compares two different algorithm for facial expression recognition.
3	To propose efficient facial expression recognition system to contribute in emotional healthcare system.	Principal Component Analysis(PCA) & Generalised Discriminant Analysis(GDA)	Depth Database Containing 40 Videos of 16 Sequential Frames	Bias Vector for visible layer, Bias vector for hidden layer, Weight matrix 'T' and binary state of Visible Layer.	This Technique assures a higher success rate, but has limitations in low light.

REF NO.	OBJECTIVE	ALGORITHM USED	DATASETS	PERFORMENCE MEASURES	REMARK
4	To classify Music in different Genres based on the text of the Music	Feature Extraction & n-gram text classification algorithm	Symbolic Piano Works	Midi, Pitch, Duration, Contour	Prediction accuracy were above 90% and worked on various inputs.
5	Implements a simple Music Player based on Cordova Framework.	Cordova Cross Platform framework + SQL	-	-	It provides a suitable framework which is robust and efficient to make our application.
6	To build robust prosody speech models to detect emotional speech	Kullback-Leibler Divergence & Logistic Regressor	WSJ1, BMA, EPSAT, SAS	Accuracy, Recall, Precision.	It is tested for 4 different emotions but accuracy is low nearly 70%.
7	Proposes a new model of emotion recognition based on 3D facial points.	Principal Component Analysis, Decision tree and Various Classifier Systems.	Cohn-Kanade	SVM, REF, RF, RT	Accuracy differs from gender to gender.

REF NO.	OBJECTIVE	ALGORITHM USED	DATASETS	PERFORMENCE MEASURES	REMARK
8	Proposes a Novel Face Recognition Method based on image latent semantic features.	Gabor Filter, Local Ternary Pattern(LTP)	FERET & ORL	Testing accuracy of Gabor-SVM and LBP chi.	Accuracy is high but have several limitations such as low light, etc.
9	MIR Classification to label songs to different Genres.	Autotagger	GTZAN Dataset & CAL 500	MixHeir, AutoTag, CBA, AudioSVM	Accuracy is very high compared to other methods. It may increase upto 00%.
10	To give a framework of the interactive application on Android System.	Android Studio	-	-	Provides a Stable, fastened Practical platform to create Android Application.

III. PROPOSED TECHNIQUES

Picture pre-processing systems appears as flag molding, (for example, noise expulsion, difference in pixel position) combine with division, area and is utilized for recognition and following of a human face or its parts. Steps engaged with pre-rocessing of a picture are as informed in this segment:

a) Reading Image:

In this stage a technique that can remove the state of the eyes, mouth, nose and jaw, is utilized and it recognizes the face by separation and size of those parts.

b) Detecting Image:

The primary worry of face location is to recognize all picture areas which contain a face paying little heed to its course, foundation and lighting conditions. Such assignment is precarious since countenances can have an immense collection fit as a fiddle, shading, size or surface.

c) Identifying Facial Feature Points: Feature points of human face which are eyes, nose, lips, eyebrows etc are detected in this phase.

d) Color Space its Transformation and Lighting Compensation:

Color of skin detected is used as middle step of face detection in this phase.

e) High Frequency Noisy Deletion: Noise is removed from images in this phase using various noise deletion algorithms.

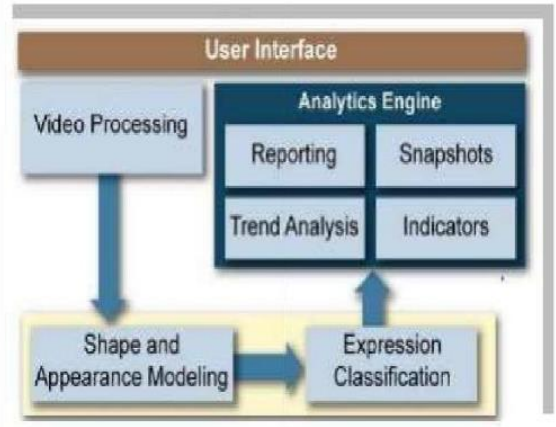
f) Edge Detectin and Reduction of Size:

Image end points are recognised and marked in this phase. This marked locations are uses for dimensionality reduction.

IV. SYSTEM DESIGN AND ARCHITECTURE

The framework comprises of two noteworthy areas: Image investigation; and music document examination. The programs vigorously analyze focal points of picture examination utilizing different preparing tests to prepare and predict information. It comprises of different classifiers, different component extractors and an assessment work. Previous works and research intensely impacted the methodology considered towards improvement for this task.

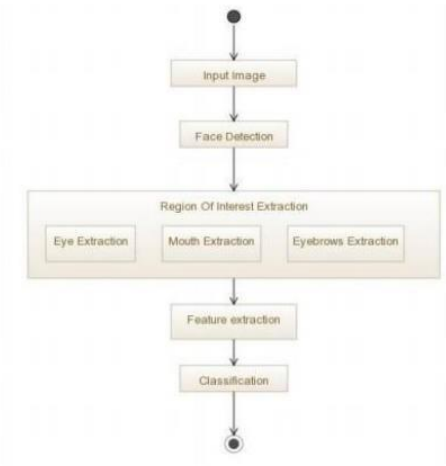
The key highlights incorporate; alive learning algorithm for partner every music class with an emotion dependent on the preference of the client, recording photos of the client dependent on a previously defined time scale to catch changes in emotion and arranging music playlists in a lexicographic request at last to yield a music playlist.



User interface overview

The framework for emotion recognition is separated into 3 sections: confront area assurance, highlight extraction and emotion order. The task and framework vigorously centre around the last two sections, the component extraction and order.

When the face area has decided and the face separated, the framework moves onto extricating areas of enthusiasm, specifically, the eyes, eyebrows and mouth of human face. This stage is trailed by an element extraction arrange, where different algorithms are utilized to execute various strategies. Their outcomes are assessed and presented in the later for the process of Testing and Evaluations. This separated information is nourished to a classifier which decides the emotion of the user.



Emotion recognition system

V. MODULES AND ALGORITHMS USED

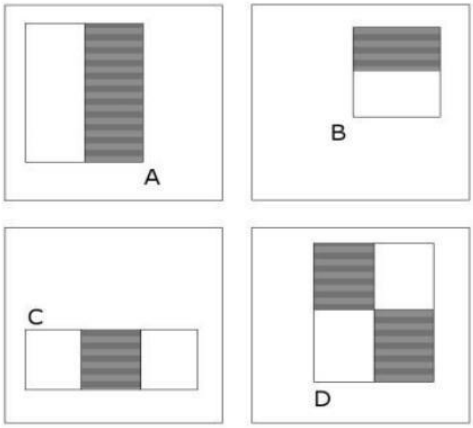
The proposed algorithms for various steps involved in the above mentioned system are:

i. Voila Jones for face detection:

Voila Jones is one of the most widely used algorithm for facial detection purpose.

This algorithm is divided into four phases:

a) Haar- feature selection
b) Creation of integral imge
c) Adabosost training algorithm
d) Cascade classifiers



Haar Feature of Voila Jones

Detection occurs inside a detection window. A base and most extreme window measure is picked, and for each size a sliding advance size is picked[3]. At that point the detection window is moved over the picture as pursues:

1. Set the base window measure, and sliding advance comparing to that size.
2. For the picked window estimate, slide the window vertically and on a level plane with a similar advance. At each progression, an arrangement of N confront recognition channels is connected. In the event that one channel gives a positive answer, the face is recognized in the current dowager.
3. On the off chance that the measure of the window is the most extreme size stop the system. Generally increment the extent of the window and comparing sliding advance to the following picked estimate and go to the stage 2.

Each face recognition channel contains an arrangement of cascade-associated classifiers. Every classifier takes a gander at a rectangular subset of the detection window and decides whether it would seem that a face[4]. On the off chance that it does, the following classifier is connected. In the event that all classifiers give a positive answer, the channel gives a positive answer and the face is perceived.

ii. Principal Component Analysis for Emotion Detection:

Principal Component Analysis(PCA) also known as eigen face way of facial emotion detection is one of the most famous and widely used approach for facial expression detection because of its easy to implement algorithm and accuracy[11]. The face can easily be reconstructed by taking only a small amount of given information from the whole image[11,12]. Following steps are involved in eigen face algorithm

1. The pictures from the traning Dataset are used to make a lower dimensional face space as compared to real image. This is accomplished by performing PCA on the preparation pictures and choosing the principal components with the more higher Eigen.
2. The file is converted into the projected eigen version of its previous image.
3. The test image is projected in the free space.
4. All the test images are shown in form of the selected eigen faces or principal component.
5. The average of each and every emotion is created from the given dataset.

Once calculated we will use this mean and average to classify the emotion of the given image.
The approach is to compare the mean face of subject with the mean value of every emotion present in dataset. In order to do so we determine the Euclidian distance between the mean value of subject and mean values of emotions present in dataset.
The distance is compared with the given sets of predefined distance and hence the emotion is detected.

iii. Histogram of Oriented Gradients (HOG):

A HOG is a component descriptor for the most part utilized for article identification. HOGs are generally known for their utilization in person on foot recognition. A HOG depends on the property of items inside a picture to have the dispersion of power gradients or edge bearings[7]. Gradients are determined inside a picture for each square. A square is considered as a pixel matrix in which slopes are established from the extent and bearing of progress in the forces of the pixel inside the square.

iv. Music Player

It is the fourth and final module of the project. In this module we will provide an application for emotion detected in above modules. Here we are using the emotion detected to play music. In this project there will be a set of predefined playlist for emotions. This will consist of emotions like

a) Happy
b) Sad
c) Angry
d) Neutral

- Connecting User Interface With backend:

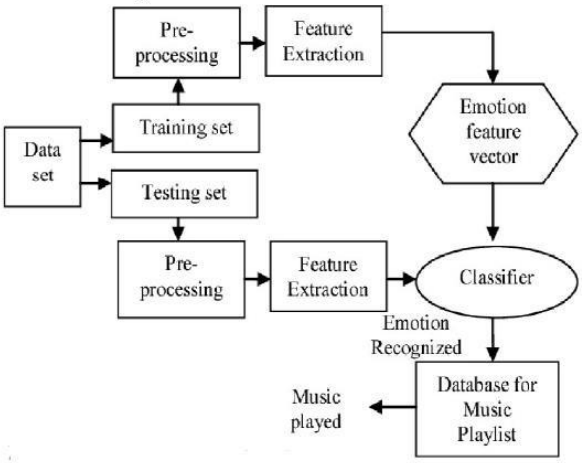
We have executed the connecting of python with javascript through eel library. Which give us the benefit to get to python techniques from js just as the other way around. Here the striating stream will be in python code as the library is executed in python then it exchange the control to html, JS. Furthermore, as indicated by the outcome we show emojis.

- Methods to choose playlist:

In JavaScript document we have actualized a lot of techniques for the exchanging of song.

a) Queue
b) Based on Emotion
c) Random

In the first as queue works it has been actualized. In second one we call python code to get emotion from client's facial expression and as indicated by that picked next song which is additionally randomly and played it. In third one we straightforwardly utilized random function and every one of the strategies are dynamic it can deal with as change in number of songs as needs be.



Architecture of music player

For user interface we have used HTML for basic structure the styling of player is done through CSS and javascript is used to interact with music player on the go making it a easy to use and dynamic player.

VI. CONCLUSION

In this paper we talked about Facial Emotion Detection Technique dependent on Viola and Jones algorithm and

principal component analysis with the assistance of this strategy, we can perceive an exact and fast feeling detection framework The procedures utilized in this work identify human facial expressions and remember them based on precision and computational time. Some of the algorithms contain downsides in term of detection rate, precision or timings. The most ideal detection rate can be gotten through mix of given procedures, separate the highlights from the pictures according to ones need and last examination should be possible to discover the outcomes. The accomplishment of execution relies upon pre-processing stage on the pictures in view of light and highlight extraction. By combining more than one given algorithm the accuracy of facial emotion detection can be increased and can be used to play songs depending on live human emotions using a music player.

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