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FACE EMOTION BASED MUSIC PLAYER

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Abstract: A novel approach that provides, the user with an automatically generated playlist of songs based on the mood of the user. Music plays a very important role in human's daily life and in the modern advanced technologies. This music player itself selects songs according to the current mood of the user. Existing methods for automating the playlist generation process are computationally slow, less accurate and sometimes even require use of additional hardware like EEG or sensors. This proposed system is based on extraction of facial expressions using PCA algorithm and generating a playlist automatically using Probabilistic Neural Network Algorithm and Gray Level Co-accurate Matrix thereby reducing the effort and time. The proposed System works by first providing a simple enough interface which prompts the user to scan the memory for audio files when the application is opened. Then after the files are detected, they are scanned for audio features using Gray Level Co-accurate Matrix and the features are extracted. The user image is given as an input to the system. The system first checks for the presence of a face in the input using the face detection process using Viola Jones Algorithm, then classifies the input and generates an output which is an emotion based on the expression extracted from the graphical input using Principal Component Analysis algorithm. After this the classified expression acts as an input and is used to select an appropriate playlist from the initially generated playlists and the songs from the playlists are played.

Keywords: Audio Emotion Recognition, PCA Algorithm, Emotion Extraction, Audio Feature Extraction,MATLAB,Viola and Jones Face Detection, GLCM Algorithm , PCC Algorithm.

I. INTRODUCTION

Music plays a very important role in enhancing an individual's life as it is an important medium of entertainment for music lovers and listeners and sometimes even imparts a therapeutic approach. 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. Although these features satisfy the user's basic requirements, yet the user has to face the task of manually browsing through the playlist of songs and select songs based on his current mood and behavior.The main objective of this paper is to design an efficient and accurate algorithm that would generate a playlist based on current emotional state.

The algorithm designed requires less memory overheads, less computational and processing time, reducing the cost of any additional hardware like EEG or sensors [1]. The facial expression would categorize into 5 different types of facial expressions like anger, joy, surprise, sad, and disgust. A high accurate audio extraction technique is proposed that extracts significant, critical and relevant information from an audio signal based on certain audio features in a much lesser time. The proposed mechanism achieves a better efficiency and real time performance than the existing methodologies.

II.PROPOSED WORK

The proposed System works by first scanning the memory for audio files when the application is opened. Then after the files are detected, they are scanned for audio features and these features are extracted using GLCM and PNN Classification algorithm.The graphical input is provided to the system and features are detected and extracted using Viola Jones algorithm and PCA algorithm. In digital camera terminology **face *detection***, also called ***face-priority AF*** (auto focus), is a function of the camera that detects human faces so that the camera can set the focus and appropriate exposure for the shot automatically [2].

PROPOSSED SYSTEM FLOW CHART

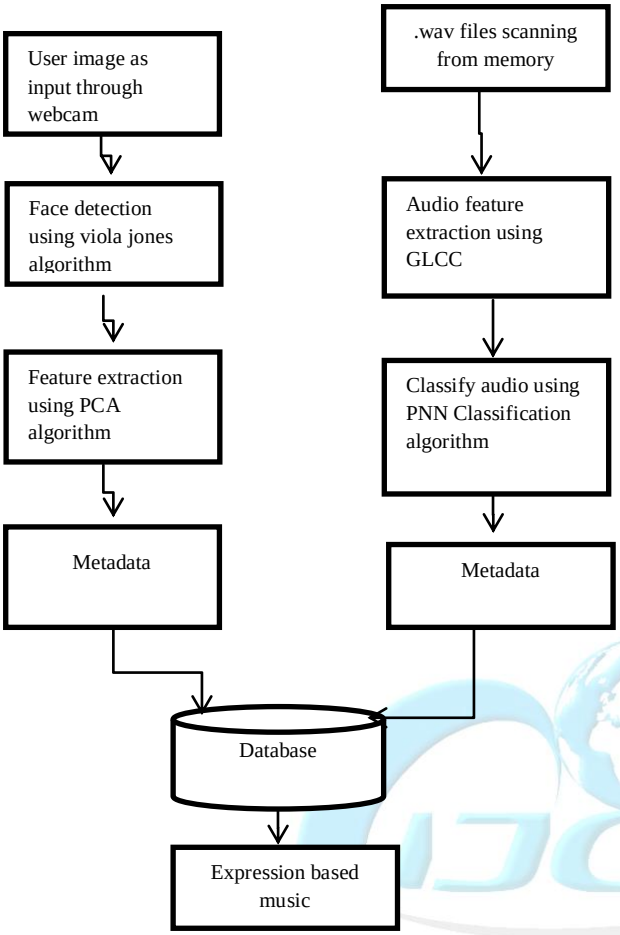

Figure 1: System Architecture

Viola Jones Face Detection Algorithm: The characteristics of viola –jones algorithm which make it a good detection algorithm are Robust, Real time, Face detection only not recognition. These algorithm contains four stages.
They are

- Haar Feature Selection.
- Creating an integral Image.
- Adaboost Training.
- Cascading Classifiers.

In this paper the viola jones algorithm is used for detecting the facial expression in MATLAB tool and this expression is further processed to play music.

III.FEATURE EXTRACTION

In image processing, feature extraction starts from an initial set of measured data and builds derived values(features) intended to be informactive and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to dimensionality reduction[7].

IV.PCA ALGORITHM

Principle Component Analysis is a classical feature extraction and data representation technique widely used in pattern recognition[3]. It is one of the successful techniques in face recognition. But it has drawback of high computational especially for big size database.
The goal is to reduce the dimensionality of the data by retaining as much as variation possible in our original dataset. The best low-dimensional space can be determined by best principal components. This algorithm is used to extract the feature from the face which we have detected.

V.MUSIC SEPERATION

The proposed System works by first providing a simple enough interface which prompts the user to scan the memory for audio files when the application is opened. Then after the files are detected, they are scanned for audio features and these features are extracted using GLCC algorithm in MATLAB [5]. Then the extracted feature values are subjected to PNN classification algorithm according to the parameters provided. These parameters include a limited set of genre types based on which the audio feature values will be processed. After this, the songs are segregated into different playlists based on the feature extraction process. Hence lists of similar sounding songs or songs belonging to similar genres are generated.

VI.PNN ALGORITHM

The purpose of this module is to convert the audio waveform, using PNN(Probabilistic Neural Network), to a set of features (at a considerably lower information rate) for further analysis. This is often referred as the signal-processing front end. The audio signal is a slowly timed varying signal (it is called quasi-stationary). When examined over a sufficiently short period of time (between 5 and 100 msec), its characteristics are fairly stationary [4]. However, over long periods of time (on the order of 1/5 seconds or more) the signal characteristic change to reflect the different speech sounds being spoken. Therefore, short-time spectral analysis is the most common way to characterize the speech signal.

VII.EMOTION AUDIO INTERACTION

Emotions extracted for the songs are stored as a meta-data in the database. Mapping is performed by querying the meta-data database. The emotion extraction module and audio feature extraction module is finally mapped and combined using an Emotion-Audio integration module. The pattern of behavioral and physiological and electrophysiological reactions elicited by emotional sounds is comparable to emotional pictures[6]. The features which is extracted in previous algorithms are interacted with this sound and the comparison is based on the expressions and music categories.

VIII.PLAYLIST GENERATION

The main objective of this paper to generate the automatic playlist that matches the user expression well. The feature which is extracted before using various algorithms are used to generate the songs. The feature is compared and songs are generated. Finally, the songs are played based on the emotions.

IX.CONCLUSION

Music Player has changed in many different ways since it was first introduced. Now-a-days people like to get more out

of different applications, so the designing of applications and the thought process behind it has changed. The users prefer more interactive & sophisticated yet simple to use applications. The overall accuracy of the audio emotion recognition algorithm is 98%. This indicates that the information retrieval mechanism employed by the audio emotion recognition algorithm is highly efficient. Further, the mood model, employed in the algorithm, excelled in capturing the perception of a user in real time. The proposed algorithm was successful in crafting a mechanism that can find its application in music therapy systems and can help a music therapist to therapize a patient, suffering from disorders like acute depression, stress or aggression. The system is prone to give unpredictable results in difficult light conditions, hence as part of the future work, removing such a drawback from the system is intuited.

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