



## **BEHAVIOURAL, EMOTIONAL STATE BASED MUSIC SELECTION & PLAYLIST GENERATING PLAYER**

Jangid sheetal Kailash<sup>1</sup>, Vaishnika Balmukund Patil<sup>2</sup>, Neha Vinay Patil<sup>3</sup>, Ajahar Ismailkha Pathan<sup>4</sup>

<sup>1,2,3,4</sup>Department of Computer Engineering  
D. N. Patel College of Engineering, Shahada

### **ABSTRACT**

Music plays a very important role in enhancing an individual's life as it is an important medium of entertainment for music player and listener and sometimes even imparts a therapeutic approach. Behavioural and emotional states provide current mind state of a person. The face of human is an important role in extraction of an individual's behavioural and emotional state. Human often use non-verbal cues such as hand gestures, facial expression, and tone of the voice to express feelings in interpersonal communication. Manually segregating the list of song associated, generating acceptable playlist supported an individual's behaviour and emotional state. Extracting desired input can be done directly by the person face by employing camera. This input then will be employed in many ways for extracting the data to deduce the mood of varied algorithms are developed and planned for automating the playlist generation method. Algorithm is developed in such a way that it can manage context accessed by the person analyse the image properties and determine the emotional state of the person. Algorithm aims at scanning and to show the information and with result making a playlist based on the parameter provided.

**Keywords:** Automatically capture and input photograph's, facial expressions recognition, analysing behavioural and emotional state, audio analysis, interface with user & viola-Jones algorithm.

### **1. INTRODUCTION**

Music is an art form and activity whose medium is Sound organized in time. Music plays a very important role in improving an individual's life as it is important medium. As now in today's world, multimedia system and their technology is increasing and advancement of this system is also increasing. Today in the field of music, many new technologies are introduced to world. Various music players are developed with option like quick forwarding, reversing the song back, repeating mode, shuffling, variable playback speed and many other options are increasing in this field. Though all this options satisfy the users basic need. But yet user has got the task to select his particular song on the browser and choose the songs depending on his current behaviour or his emotional state.

So, behavioural and emotional states are classified by the user's facial expressions or with his audio analysis and feature management which is used to detect user's current situation and that particular state are classified and accordingly the playlist is generated. It automatically captures the photographs of the users based on the recognizing the facial expression, mood is classified. In the same manner audio analysis and feature management is done to provide a group of state based on the playlist. And these inputs are provided to classify the user behavioural and emotional state and automatically desired playlist is generated accordingly.

### **2. SURVEY**

The simplest way to express emotions for humans is by using facial expressions. Normally facial expression of human depends on behaviour and emotional state. We human

frequently use nonverbal indications such as hand gesture, facial expression and tone of the voice to express feelings. So, the main perspective is only to focus on some of the basic emotions. That's why, feature management have been categories into two types such as appearance based feature extraction and geometric based feature extraction by Zheng et al[1]. The paper by Hafeez Kabini et al[2] suggested the problem of the existing methods to handle only deliberately displayed and exaggerated expression of prototypical emotions despite the fact that deliberate behaviour differs in visual appearance, audio profile, and timing from spontaneously occurring human affective behaviour have recently emerged. They also proposed and investigate this recent information and discussed human emotion sensibility from a psychological potentially. Nikhil Zaware et al[3] stated that it is very time consuming and lengthy task to create and manage large playlists and to select songs from such playlists. Therefore, it would be very advantageous if the songs are selected itself by the music player as per the current mood of the user using an application to minimize the efforts of managing playlists. In their paper they stated a way to detect the mood of the user automatically and generate playlist of songs which is suitable for the user's current mood. The photo is captured using webcam and that photo is passed under various steps to detect the mood or emotion of the user.

Thus, the application is developed in such a manner that it will be able to manage content accessed by user, examine the properties of image and therefore determining the mood of the user. The application also comprise the comfort of sorting the songs based on mp3 file properties and so that they can be added into appropriate playlists as per the mood. To detect facial and behavioural expression as indicator to cast a music playlist is one task carried out by setiawardhana et al [4] in their technical paper. They work by doing facial expression detection system input performed offline by taking photograph of a subject with nearest position from the camera where facial position should not be tilted. The image is identified as a combination of colour and feature extraction is performed based on location of eyebrow, eye and mouth. They use artificial neural network

back propagation method for facial expression detection.

The paper by Henal shah et al[5] get over our proposed wise music player using sentimental or emotion analysis. Emotions are the most basic part of human nature. It is unpredictable available for detecting human emotions or behaviour for developing emotion based music player, the approaches used by available music players follows to detect human emotions and how it is better to use the proposed system for emotion detection.

Anukriti Dureha[6] suggested manual segregation of a playlist and annotation of songs, in pursuance with the current emotional state of a user, as a labour intensive and time consuming job. So many algorithms are proposed to automate this process. However, the existing algorithms are slow and increase the cost of system. So this paper presents an algorithm that automates the process of generating an audio playlist, which will be based on the facial and behavioural expression of user. The algorithm proposed in this paper reduces the cost and time and also increase the accuracy of the designed system.

### **2.1 Problem:**

In previous year, music plays according to series of songs in the playlist. The songs in the playlist play randomly independent of our mood. Sometimes we want to plays a song according our mood for that, the song was to be searched from the playlist and that was time consuming thing which was appropriate for our mood.

Once a song was selected doesn't mean that next song will be of same category or mood. Every time we required to select songs according to our mood from the playlist. So, that it was time consuming as well as irritating too. For this reason, there should be an application that will play music according to our mood and will take less time consuming and easy to handle.

### **2.2 Existing:**

The current most popular emotion based music player is stereo mood. It lacks capabilities in the sense that the user needs to type in what he is feeling, rather than using computer vision to determine his emotion. To solve the problem of emotion recognition a lot of work has been done in the past. To extract and determine the emotion of a user, we need to extract features

from an image and use them against a trained data set to classify the input and determine the emotion. In the existing system, we need to set mood manually like happy or sad and then get your mood automatically by analysing a periodical camera capture.

#### **Limitations of existing system**

- It requires the user to manually select the songs.
- Randomly played songs may not match to the mood of the user.
- User has to classify the songs into various emotions and then for playing the songs user has to manually select a particular emotion.

#### **2.3 Need:**

The proposed model is able to extract user's expression by capturing of facial expressions of the user using camera and thus will detect user's emotion. The proposed system will only depends on the image captured and the song will play according to the mood specified by analysis and recognition of the image.

### **3. PROPOSED METHODOLOGIES**

As outlined the work is divided in to two major parts: Image Processing, which is used for recognizing human emotions; and mp3 music file analysis used to extract song information and classify songs.

#### **3.1 Past Work:**

The current most popular emotion based music player is Stereo Mood. It lacks capabilities in the sense that the user needs to type in what he is feeling, rather than using computer vision to determine his emotion.

To solve the problem of emotion recognition a lot of work has been done in the past. To extract and determine the emotion of a user, we need to extract features from an image and use them against a trained data set to classify the input and determine the emotion.

##### **3.1.1 Feature Extractors:**

A feature extractor is an application which extracts important points in an image. Different works have been done in the field of Computer vision for feature extractors, the most prominent ones being Scale Invariant Feature Transform (SIFT) and Speeded Up Robust Features (SURF). Each of these has different impacts on classifying the emotion of the user. I initially work with a new technique called Binary Robust Independent Elementary Features (BRIEF) before moving onto techniques such as SURF and SIFT.

#### **3.12 Classifiers and Prediction:**

After extracting features from an image set of training and testing data, a feature classifier is needed to sort out and classify the testing data with relevance to the training data. A Support Vector Machine (SVM) is the most predominantly used classifier to tackle the emotion recognition problem. For experimental purposes I use an SVM and a Naive Bayes Classifier.

#### **3.2 Facial Emotion Recognition:**

Several approaches have been proposed to classify human affective states. The features used are typically based on displacements of specific points or spatial locations of particular points; this technique is known as Facial Action Coding System(FACS).

In an approach taken by Liu et al in, he presents an algorithm for classification of brain electrical signals in human emotions. This algorithm was based on the model of fractal dimension. He proposed a bi dimensional Valence - Arousal approach, where by the six emotions are divided into different categories Black et al explored the use of local parameterized models of image motion for recovering and recognizing the non-rigid and articulated motion of human faces. They used these parametric models to extract the shape of the mouth, eyes and eyebrows. They achieved a high success rate of 95% to classify Happy, 90% to classify Anger and a 100% success rate to classify the Sad emotions. On the other hand the approach used by Yacoob and Davis in which facial expressions are recognized in image sequences using statistical properties of the optical flow with only very weak models of facial shape.

In this project several approaches are considered, including a Principal Component Analysis (PCA) approach, using multiple Facial Action Units and different feature extractors with clustering approaches. Each of these approaches is used with different classifiers to determine the emotion of the user with the accuracy tested on a data set of 40 subjects each.

Project is about an algorithm which generates the playlist by selecting the music. The playlist is generated on the basis of user's behavioural and emotional state. The system tries to provide an interactive way for the user to carry a job of generating the playlist. The proposed system here simply uses the algorithm by its proposed

modules such as automatically capturing the picture, recognizing the facial expression, analysis of audio feature management, analysing users state and interfacing the user and these modules work on the basis of different mechanisms which are carried out and work in such a manner that the desired output that is the playlist is generated.

The working can be started as follows:

- The proposed system works by providing user interface which further prompts the user and detects its state by using algorithm.
- After analysing the interface files are detected, and images are captured automatically.
- Facial expression is recognised using the concept of image processing.
- The recognition is extracted and is then classified accordingly, which is further used to analyse behavioural and emotional state.
- After this the limited set of types based on the audio analysis and the feature management values are to be processed.
- In the next step playlist is generated which divides the songs as per the further analysis and selecting the matched songs are generated in the playlist and from this generated playlist songs are played.

The architectural view for this proposed system is given below:

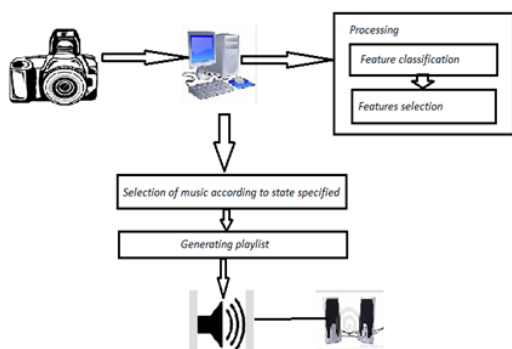


Fig. 3.1 System Architecture

## 4. WORKING MODULES

### 4.1 Automatic capture and Input Photographs:

In this module camera is opened and with help of image processing system camera automatically captures the photographs of the user and takes the real-time images which are provided for further use.

### 4.2 Facial expression Reorganization:

After capturing the images the recognizing of that particular image is processed i.e. recognition of facial expression of user.

### 4.3 Analysing behavioural and emotional state:

While detecting the images state recognition is generated with help of image processing system and required state is analyzed for further generating a playlist.

### 4.4 Generating the playlist:

Different types of songs are generated but accordingly the playlist is generated.

### 4.5 Audio analysis and feature management:

In this module a list of songs are generated in the form of input. The input is then matched with the output.

## 5. OBJECTIVES

The key objectives of this project can be split into two parts, the recognition of the emotion of the user and music analysis. The project is centered and focused more towards different approaches to emotion recognition and the impact of each technique used. The emotion recognition stage is heavily based on image processing and machine learning. The music analysis is done by reading the MP3 metadata of a music file.

### 5.1 Emotion Recognition:

The key aim of this section is to implement and analyze various techniques to extract features and classify the emotion of a person. The image processing step requires turning the image to grayscale and resizing it. This is followed by extracting multiple features using different techniques and adapting different classifiers to determine the mood of the user. Using these different methods and techniques, an analysis is made to determine the best solution for the emotion recognition problem based on my project.

### 5.2 Music Analysis:

Using the bit stream from mp3 files, we extract metadata to determine the required information for each particular song. Using the determined emotion, create a playlist of songs for the user.

## 6. EXPECTED RESULT

As paper "Behavioural, Emotional State Based Music Selection & Playlist Generating Player" suggest generating a playlist which will refresh the mood of user by his/her particular behavioural and emotional state. The result will

produce a song based on the basis of which the playlist will be generated.

A wide variety of image processing techniques was developed to meet the facial expression recognition system requirements. Proposed system will be able to process the video of facial behaviour, recognize displayed actions in terms of basic emotions and then play music based on the behavioural and emotional state.

## 7. CONCLUSION

From the above chapter we concluded that the generate playlist according to the user behavior and emotional state will be of great advantage to users looking for music based on their mood and emotional behavior. It will help reduce the searching time for music thereby reducing the unnecessary computational time and thereby increasing the overall accuracy and efficiency of the system. Also with its additional features mentioned above, it will be a complete system for music lovers and listeners.

## REFERENCES

- [1] Z. Zeng - A survey of affect recognition methods: Audio, visual, and spontaneous expressions, IEEE. Transaction Pattern Analysis, vol 31, January 2009 M. Young, The Technical Writer fs Handbook. Mill Valley, CA: University Science, 1989.
- [2] Hafeez Kabini, Sharik Khan, Omar Khan, Shabana Tadvi "EMOTION BASED MUSIC PLAYER" International Journal of Engineering Research and General Science, Volume 3, Issue 1, 2015.
- [3] Nikhil Zaware, TejasRajgure, Amey Bhadang, D.D. Sakpal "EMOTION BASED MUSIC PLAYER" International Journal of Innovative Research & Development, Volume 3, Issue 3, 2014.
- [4] Setiawardhana, Nana Ramadijanti, Peni Rahayu "FACIAL EXPRESSIONS RECOGNITION USING BACKPROPAGATION NEURAL NETWORK FOR MUSIC PLAYLIST ELECTIONS" JurnalIlmiahKursor, Volume 6, Issue 3, 2012.
- [5] Anukriti Dureha "AN ACCURATE ALGORITHM FOR GENERATING A

- MUSIC PLAYLIST BASED ON FACIAL EXPRESSIONS" International Journal of Computer Applications, Volume 100-No.9, 2014.
- [6] Roger S. Pressman, "Software Engineering: A Practitioner's Approach", Fifth Ed., MGH, ISBN 0-07-365578-3
  - [7] Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Publisher: Addison Wesley, First Edition October 20, 1998, ISBN: 0-201-57168-4, 512 pages
  - [8] Silberschatz, Korth, Sudarshan, "Database System Concepts", Sixth Edition, The McGraw-Hill Companies, 2001, ISBN 0-07-255481-9
  - [9] Wallace Jackson's (2011) "Android Appsfor Absolute beginners" Apress Publications.