

EMOTIONS BASED MUSIC PLAYER

Submitted By

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Abstract - Human expression plays a vital role in determining the current state and mood of an individual, it helps in extracting and understanding the emotion that an individual has based on various features of the face such as eyes, cheeks, forehead or even through the curve of the smile. Music is basically an art form that soothes and calms human brain and body. Taking these two aspects and blending them together our project deals with detecting emotion of an individual through facial expression and playing music according to the mood detected that will alleviate the mood or simply calm the individual and can also get quicker song according to the mood, saving time from looking up different songs and parallel developing a software that can be used anywhere with the help of providing the functionality of playing music according to the emotion detected. By developing a recommendation system, it could assist a user to make a decision regarding which music one should listen to helping the user to reduce his/her stress levels. The user would not have to waste any time in searching or to look up for songs and the best track matching the user's mood is detected, and songs would be shown to the user according to his/her mood. The image of the user is captured with the help of a webcam. The user's picture is taken and then as per the mood/emotion of the user an appropriate song from the playlist of the user is shown matching the user's requirement.

Key Words : Emotion recognition, Computer vision, Camera, Music, Categorization, Recommendations.

1.0 INTRODUCTION

Music plays a very primary role in elevating an individual 's life as it is an important medium of entertainment for music lovers and listeners. In today 's world, with the increasing advancements in the field of multimedia and technology, various music players have been developed with features like fast forward, reverse, variable playback speed, genre classification, streaming playback with multicast streams and including volume modulation, etc. These features might satisfy the user 's basic requirements, but the user has got to face the task of manually browsing the playlist of songs and choose songs supported their current mood and behavior. Emotion based music player is a novel approach that helps the user to automatically play songs according to the emotions of the user. It recognizes the facial emotions of the user and plays the songs according to their emotion. The emotions are recognized using a machine learning method EMO algorithm. The human face is an important organ of an individual 's body and it especially plays an important role in extraction of an individual 's behaviors and emotional state. The webcam captures the image of the user. It then extracts the facial features of the user from the captured image. Facial expression categorized into 2, smiling and not smiling. The foremost concept of this project is to automatically play songs based on the emotions of the user. It aims to provide user-preferred music with respect to the emotions detected. In existing system user has to manually select the songs, randomly played songs may not match to the mood of the user, user has to classify the songs into multiple emotions and then for playing the songs user has to manually select a particular emotion. According to the emotion, the music will be played from the predefined directories.

Each sub-directory contains songs that corresponds to the emotion. Songs in the sub folders can be changed/replaced or deleted by the programmer depending on the requirements of user. At times it is possible that user might like different kinds of songs in certain mood. For example, when a user's emotion is detected to be Sad, then it is totally users choice what kind of mood does he/she wants. There are two possibilities in this scenario:

- a) User wants to continue his/her sad mood.
- b) User wants to elevate his/her mood and wants to be happy.

Therefore, depending on the choice of users the songs in the sub directories can be changed.

As the program runs successfully on system,

System Requirements

The following are the minimum requirements to develop this application

1. Hardware requirements

- Processor : 2 GHz
- RAM : 1 GB

2. Browser

- Chrome 51 or higher
- Firefox 47 or higher
- Opera 37
- Edge 105

3. Database

- Firebase
- NoSQL

4. API : Affective Emotion Recognition API

1.1 PROPOSED SYSTEM WORK

The proposed system can detect the facial expressions of the user and based on his/her facial expressions extract the facial landmarks, which would then be classified to get a particular emotion of the user. Once the emotion has been classified the songs matching the user's emotions would be shown to the user.

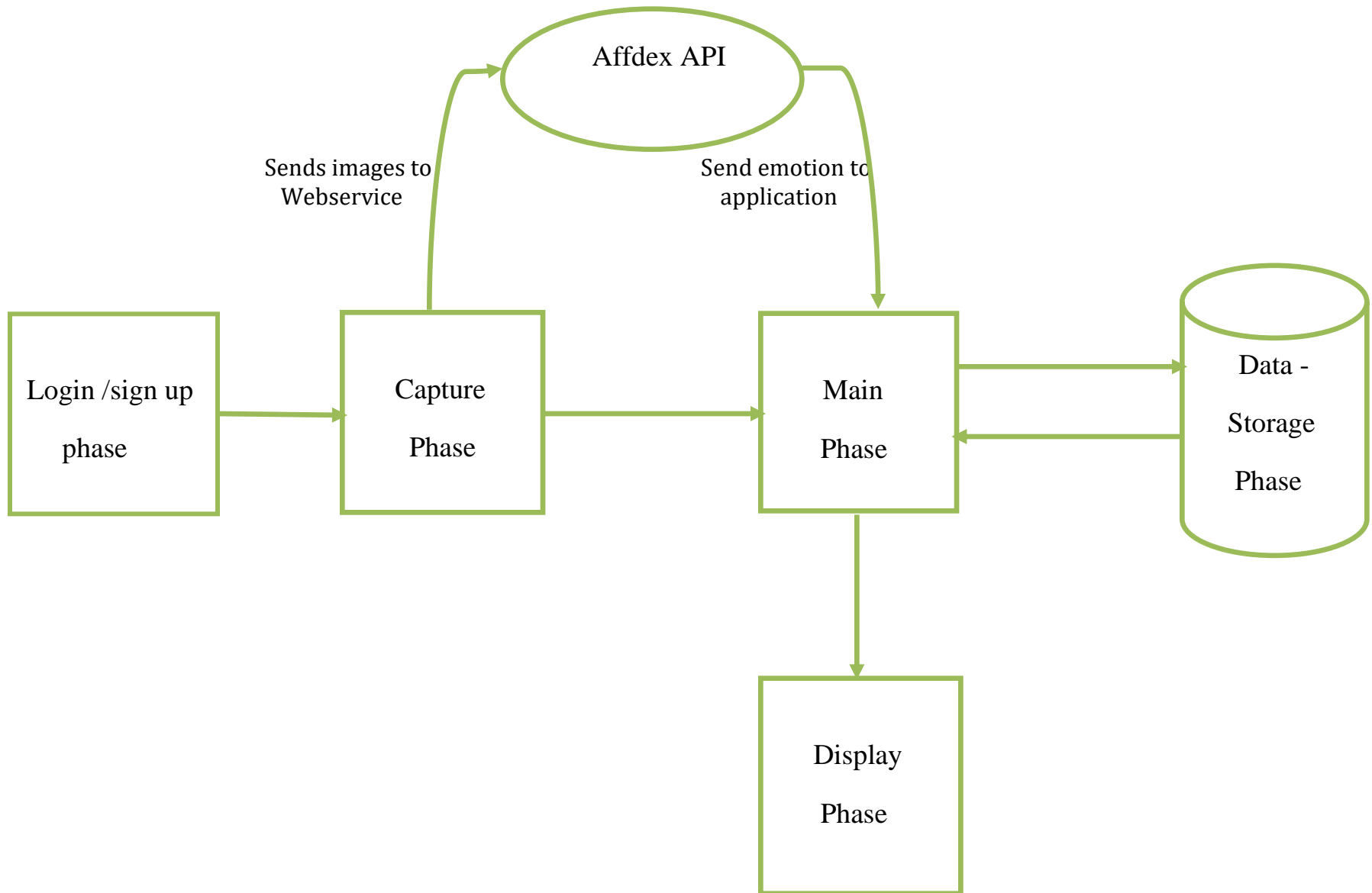


Fig.1.1. Block Diagram of Emotion - Based Music Player

This section illustrates the design and functional phase of the application. Emotion-Based Music Player is installed on a mobile device, where the user can access their customized play-lists and play songs based on their emotions. Fig 1.1 depicts the overview of the application

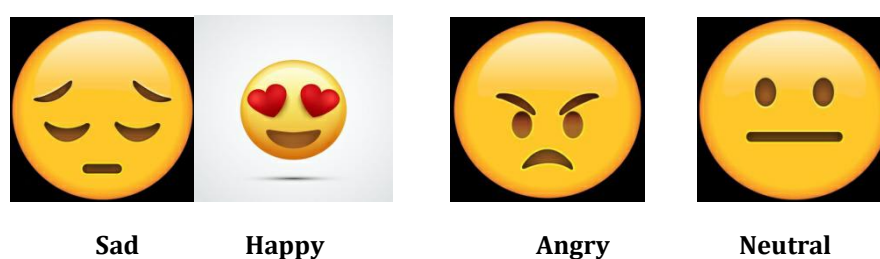
1. Login/signUp phase: Users have to create a profile in order to store personal data. If the user already has an account, they can log-in to their account to access customized play-lists as well as songs. Once user logs-in, their profile is saved on the application, until they manually log-out. While the user adds songs, their input(i.e category and interest level) is taken by the system.
2. Emotion Capture phase: As soon as the authentication phase is done, the application will ask user's permission to access media and photos and will access camera to capture the user's image.
3. Affdex API: After the image is captured, the application sends image capture to Affdex SDK. There, the captured image is processed and the image feedback is sent to the application.
4. Emo-phase: In this phase, the application receives the image information and recognizes the emotion based on the defined threshold. This emotion is sent to the database to fetch the emotion play-list.
5. Display phase: Here, the songs are organized based on EMO-algorithm and the user can play any song from the list displayed. The user has the option to add, remove, modify the songs and also can change category and interest level of a song at anytime in the application. The application also has a recommendation tab where the system notifies the user of songs that are rarely played.

A MERN stack approach is used in the development of Emotion-Based Music Player. Here, The MERN stack follows MVC Architecture, with everything written in JavaScript. Both the Server-side and the client-side executions are performed using JavaScript to increase the speed of the application.

Emotion Based Music Player is a useful application for music listeners with a smart phone and an internet connection. The Application is accessible by any one who creates a Profile on the system. The Application is designed to meet the following needs of the users as described below;

1. Creating an account or signing up, signing in
2. Adding songs
3. Removing songs
4. Updating songs
5. Personalized playlist & Recommendations.
6. Capturing Emotions using a camera.

• **Detected emotions:**



From above fig., Accordingly to which we can classify emotion directory for playing song we have chosen this 4 Emotions.

2.0 LITERATURE SURVEY

There are several applications that provides facilities and services for music playlist generation or play a particular song and in this process all manual work is involved. Now to provide there are various techniques and approaches have been proposed and developed to classify human emotional state of behavior. The proposed approaches have only focused on only some of the basic emotions using complex techniques like Viola and Jones.

Several research papers giving a brief about the idea are:

[1] In this paper ,Authors states that ,Music plays a really important role in human's lifestyle and within the modern advanced technologies. Usually, the user has got to face the task of manually browsing through the playlist of songs to pick . Here we are proposing an efficient and accurate model, that might generate a playlist supported current spirit and behavior 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. Speech is that the most ancient and natural way of expressing feelings, emotions and mood and its and its processing requires high computational, time, and cost. This system supported real-time extraction of facial expressions also as extracting audio features from songs to classify into a selected emotion which will generate a playlist automatically such the computation cost is comparatively low.

[2] This paper proposes an intelligent agent that sorts a music collection supported the emotions conveyed by each song then suggests an appropriate playlist to the user supported his/her current mood. The user's local music collection is initially clustered supported the emotion the song conveys, i.e. the mood of the song. This is often calculated taking into consideration the lyrics of the song, also because the melody. Whenever the user wishes to get a mood-based playlist, the user takes an image of themselves at that instant. This image is subjected to facial detection and emotion recognition techniques, recognizing the emotion of the user. The music that best matches this emotion is then recommended to the user as a playlist.

[3] In this paper , Authors states that , Nowadays, people tend to increasingly have more stress due to the bad economy, high living expenses, etc. taking note of music may be a key activity that assists to scale back stress. However, it's going to be unhelpful if the music doesn't suit the present emotion of the listener. Moreover, there's no music player which is in a position to pick songs supported the user emotion. To unravel this problem, this paper proposes an emotion-based music player, which is in a position to suggest songs supported the user's emotions; sad, happy, neutral and angry. The appliance receives either the user's pulse or facial image from a sensible band or mobile camera. It then uses the classification method to spot the user's emotion. This paper presents 2 sorts of the classification method; the guts rate-based and therefore the facial image-based methods. Then, the appliance returns songs which have an equivalent mood because the user's emotion. The experimental results show that the proposed approach is in a position to exactly classify the happy emotion because the guts rate range of this emotion is wide.

[4] Authors says that, Digital audio is straightforward to record, play, process, and manage. Its ubiquity means devices for handling it are cheap, letting more people record and play music and speech. Additionally , the web has improved access to recorded audio. So, the quantity of recorded music that folks own has rapidly increased. Most current audio players compress audio files and store them in internal memory. Because storage costs have consistently declined, the quantity of music which will be stored has rapidly increased. A player with 16 Gbytes of memory can hold approximately 3,200 songs if each song is stored in compressed format and occupies 5 Mbytes. Effectively organizing such large volumes of music is difficult. People often listen repeatedly to alittle number of favorite songs, while others remain un justifiably neglected. We've developed Affection, an efficient system for managing music collections. Affection groups pieces of music that convey similar emotions and labels each group with a corresponding icon. These icons let listeners easily select music consistent with its emotional

Content. Experiments have demonstrated Affection' effectiveness.

[5] In this paper, a sensible music system is meant by recognizing the emotion using voice speech signal as an input. The target of the speech emotion recognition (SER) system is to work out the state of emotion of a person's being's voice. This study recognizes five emotions-anger, anxiety, boredom, happiness and sadness. The important aspects in implementing this SER system includes the speech processing using the Berlin emotional database, then extracting suitable features and selecting appropriate pattern recognition or classifier methods to spot the emotional states. Once the emotion of the speech is recognized, the system platform automatically selects a bit of music as a cheer up strategy from the database of song playlist stored. The analysis results show that this SER system implemented over five emotions provides successful emotional classification performance of 76.31% using GMM model and an overall better accuracy of 81.57% with SVM model.

[6] In this paper, Authors states that Music is ubiquitous in our lifestyle. People actively or passively hear music at different locations and consciously or non-consciously experience it as a sort of emotion expression. During this paper, we present a replacement location and emotion aware web-base interactive music system. It aims to supply the user preferred music with location and emotion awareness. The system starts recommendation with expert knowledge. If the user doesn't just like the recommendation, he/she can decline the advice and choose the specified music himself/herself. During this process, the user's interactions with the system, current location and emotion are logged for music preference learning. Thus, the system can adapt to the user's latest music preference. Also, the more the user uses the system, the more personalized music are often adapted to him/her.

[7] Authors presented a completely unique multi-modal access to large MP3 music databases. Retrieval are often fulfilled either during a content-based manner or by keywords. As input modalities, speech by tongue utterances or singing, and manual interaction by handwriting, typing or hardkeys are used. so as to realize especially robust retrieval results and automatically suggest music to the user, contextual knowledge of the time, date, season, user emotion, and listening habits is integrated within the retrieval process. The system communicates with the user by speech or visual reactions. The concepts shown are especially designed for home and mobile access on tablet-PCs, PDAs, and similar PC solutions, The paper discusses the concept and a working prototype called Shangrila. An evaluation by a user study results in an impact of the capabilities of the suggested approach to multimodal music retrieval.

3.0 EXISTING SYSTEM

Currently, there are many existing music player applications. Some of the interesting applications among them are:

- Saavan and Spotify { These application [16] gives good user accessibility features to play songs and recommends user with other songs of similar genre.
- Moodfuse - In this application [12], user should manually enter mood and genre that wants to be heard and moodfuse recommends the songs-list.
- Steromood - User should select his mood manually by selecting the moods from the list and the application [17] plays music from YouTube.

4.0 EXPERIMENT RESULTS AND ANALYSIS

This study proposes a music recommendation system which extracts the image of the user, which is captured with the help of a camera attached to the computing platform. Once the picture has been captured, the captured frame of the image from webcam feed is then being converted to a grayscale image to improve the performance of the classifier that is used to identify the face present in the picture. Once the conversion is complete, the image is sent to the classifier algorithm which, with the help of feature extraction techniques is able to extract the face from the frame of the web camera feed. Once the face is extracted individual features from the face is extracted and is sent to the trained network to detect the emotion expressed by the user.

Instructions Explained to the User. In this scenario the users were given instructions as to what is to be done to perform the prediction of the emotion expressed which provided the following results. Sometimes in cases where the inner emotion is sad and facial expression is happy it resulted in a fail case. The values are given in Table 1 and the result is shown in;

Fig. 4.0. Instructions Explained to the User

User	Emotion	Facial Expression	Accuracy
1	Happy	Happy	100
2	Sad	Happy	0
3	Happy	Happy	100
4	Sad	Sad	100

5.0 FUTURE SCOPE

Image capturing can be made more efficient in low light environment.

More accurate playlist can be generated.

Even more compact device can be designed.

Facial expressions are a great indicator of the state of a mind for a person. Indeed, the most natural way to express emotions is through facial expressions. Humans tend to link the music they listen to; to the emotion they are feeling. The song playlists though are, at times too large to sort out automatically. It can be a great relief if the music player was "smart enough" to sort out the music based on the current state of emotion the person is feeling. The project sets out to use various techniques for an emotion recognition system, analyzing the impacts of different techniques used.

6.0 CONCLUSIONS

The Emotion-Based Music Player is used to automate and give a better music player experience for the end user. The application solves the basic needs of music listeners without troubling them as existing applications do: it uses increase the interaction of the system with the user in many ways. It eases the work of the end – user by capturing the image using a camera, determining their emotion, and suggesting a customized play-list through a more advanced and interactive system. The user will also be notified of songs that are not being played, to help them free up storage space.

The application can be improved by modifying and adding few functionality.

Current application uses Affectiva SDK that has a lot of limitations, creating custom emotion recognition system that can be merged into the current application improves functionality and performance of the system. Making the application run without needing an internet connection. Including other emotions,

Playing songs automatically, Optimizing the EMO-algorithm by including additional features which helps system to categorize user based on many other factors like location and suggesting the user to travel to that location and play songs accordingly.

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