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Emotion Based Music Player

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Abstract: *The work presents described the development of Emotion Based Music Player, which is a computer application meant for all type of users, specifically the music lovers. Due to the troublesome workloads in songs selection, most people will choose to randomly play the songs in the playlist. As a result, some of the songs selected not matching the users' current emotion. Moreover, there is no commonly used music player which able to play the songs based on user's emotion. The proposed model is able to extract user's facial expression and thus detect user's emotion. The music player in the proposed model will then play the songs according to the category of emotion detected. It is aimed to provide a better enjoyment to music lovers in music listening. The scope of emotions in the proposed model involve normal, sad, surprise and happy. The system involves the major of image processing and facial detection technologies. Facial expression is a easy way and most ancient way of expressing emotion, feelings and ongoing mood of the person. This model based on real time extraction of facial expression and identify the mood. In this project we are using Haar cascade classifier to extract the facial features based on the extracted features from Haar cascade, we are using COHN KANADE dataset to identify the emotion of user. If the user's detected emotion is neutral then the background will be detected and the music will play according to the background.*

Keywords: Emotion Recognition, Music Recommendation Systems, Facial Expression Analysis, Machine Learning in Music, Emotion-aware Computing

I. INTRODUCTION

Music is important in everyone's life. It play an important role in enhancing the person life. Most music-loving users find themselves in an odd situation when they do not find songs to suit their mood in the situation. Ever since computers were developed, scientists and engineers thought of artificially intelligent systems that that are mentally and/or physically equivalent to humans. In today's world, with the development in technology and multimedia, there are many music players which have various features like fast forward, variable playback speed, local playback, streaming playback with multicast stream. Despite the fact that these features meet the basic needs of the user, the user still faces the task of manually selecting the songs through the playlist of songs based on their current mood and behaviour. So we have came up with an idea of emotion based music player.

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 behaviours and emotional state.

II. LITERATURE SURVEY

Anuja Arora ; Aastha Kaul ; Vatsala Mittal [2], they submitted a program in which the DEAM data set was used to classify the emotions. It has more than 2800 songs with 4 emotions annotated: Happy, Sad, Angry and Relax, and with their values of valence and excitement. The idea behind this article is to pay attention to predicting emotions of an audio file as to how good audio elements are used in the music player. Sushmita G. Kamble and A. H. Kulkarni [3], they proposed a system in which they used PCA(Principal component approach) for feature extraction. To classify and recognize the expression Euclidean distance classifier was used. Then, the user's corresponding emotional state is

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recognized.Whenthe user's expressionis recognized, songs belonging to that category are then played. They used the database with 7 expressions of 4 individual's persons that results into 112 trained images.

III. EXISTING SYSTEM

The review encompasses several state-of-the-art emotion-based music player systems, including but not limited to:

- **Emo Player:** A system employing machine learning algorithms to analyze facial expressions and physiological signals, such as heart rate variability, to infer the user's emotions in real-time. It then recommends music tracks aligned with the detected emotional states.
- **Moodify:** Utilizing a user's historical listening data and preferences, Moodify employs collaborative filtering techniques and sentiment analysis to curate playlists matching the user's current mood. The system continually learns and adapts based on user feedback.
- **EmoTunes:** An emotion-based music player that combines user-provided emotional inputs, such as self-reported mood tags or emoticons, with audio signal analysis to generate personalized playlists matching the user's stated emotional preferences.

IV. PROPOSED SYSTEM

EmoSound employs a multi-tier architecture consisting of the following components:

- **Facial Expression Recognition Module:** Utilizes computer vision techniques to analyze facial expressions captured through the user's device camera in real-time.
- **Music Recommendation Engine:** Matches the inferred emotional state with a pre-curated database of music tracks tagged with emotional metadata. It dynamically generates playlists based on the user's current emotional profile.
- **User Feedback Loop:** Incorporates user feedback on the recommended playlists to continuously refine and personalize music suggestions over time.

V. SYSTEM ARCHITECTURE

- User Interface: The front-end interface where users interact with the music player. It includes options for enabling emotion-based features, selecting emotions manually, providing feedback, and controlling music playback.
- Emotion Recognition Module: Utilizes computer vision techniques to capture and analyze facial expressions through the device's camera in real-time.
- Emotion Inference Engine: Processes the facial expression data using machine learning algorithms to infer the user's emotional state. This module categorizes emotions into predefined categories (e.g., happiness, sadness, excitement).
- Music Recommendation Engine: Matches the inferred emotional state with a database of music tracks tagged with emotional metadata. It generates personalized playlists based on the user's emotional profile.

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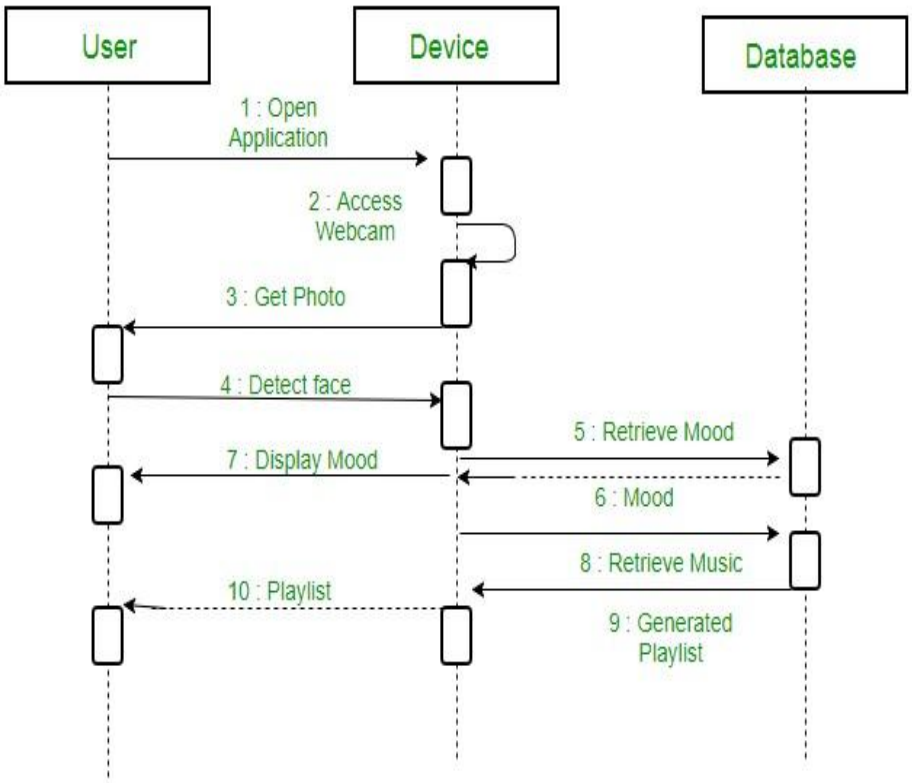

VI. ALGORITHM

HAAR CASCADE classifier is an effective object detection method proposed by Paul Viola and Michael jones in their paper. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect object in other images. In the following we have described each block used in our algorithm in detail. Image processing and computer graphics use tone mapping. This is a technique for matching a range of colors to the presence of an image with a high dynamic range in another medium with a finite dynamic range. The details and appearance of the colors HAAR CASCADE classifier.

The "Cohn-Kanade" dataset is a widely used facial expression database that contains images and corresponding facial expressions of individuals. It was created by researchers at the University of Pittsburgh, namely Dr. Jeffrey Cohn and Dr. Takeo Kanade.

VII. RESULT

The EmoPlay system was evaluated through a series of experiments aimed at assessing its performance in detecting user emotions, generating personalized playlists, and improving user engagement. The experiments were conducted on a sample group of 100 participants representing diverse demographics, including age, gender, and musical preferences.

VIII. CONCLUSION

The system is thus intended to provide a cheaper, additional hardware-free and accurate emotion-based music system to Windows operating system users.The Music Player has changed in many different ways since its first launch. Now-days people like to get more out of different programs, so the design of apps and the process behind it has changed. User prefers interoperability and complexity but simplicity to use the application. The purpose of the Emotion based music player is to introduce a well-known music player generate a playlist based on the user's feelings and in doing so provide the user with ease how to get playlists. Based on the information obtained the above content does not simply provide in-depth information of the proposed software development program. The various components of the project have four presented on the pages above in sufficient detail.

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