

# Emotion-Driven Music Selection Using Convolutional Neural Networks

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**Abstract**—The Emotion-Based Music Player is a state-of-the-art program that uses machine learning and emotional identification to completely change the way people listen to music. This cutting-edge technology uses a camera to take real-time pictures of the user and interpret their facial expressions to determine how they are feeling emotionally. Then, using sophisticated algorithms, it generates customized playlists according to the user's current emotional state, whether it be joyful, depressed, calm, or enthusiastic. Through customization of song choices based on the user's mood, the player provides an enjoyable and captivating audio experience.

The application also helps users manage their music library and save up storage space on their device by alerting them to tracks that they haven't played in a while, which improves user interaction. The interface of the Emotion-Based Music Player is user-friendly, facilitating playlist customization and navigation for users. Additionally, users can easily explore new music recommendations and directly modify their mood settings. The cutting-edge technology ensures flawless user experience by running efficiently in the background. In conclusion, by employing emotional data to deliver personalized music recommendations, the Emotion-Based Music Player not only meets the fundamental requirements of music lovers but also improves their entire experience. By enabling a more responsive and interactive relationship between users and their music libraries, this application marks a significant leap in personalized music technology.

**Keywords**— Emotional recognition, Machine learning, Realtime image capture

## I. Introduction

The Emotion-Based Music Player incorporates emotional intelligence into music listening, providing a novel take on digital entertainment. This creative program makes real-time music selections based on the listener's mood, unlike conventional music players that rely on static playlists or suggestions made based on past listening preferences. In order to make sure that the music played is in tune with the user's emotional state—whether they are joyful, depressed, calm, or excited—it records and evaluates data such as facial expressions. The user's emotional connection to the music is strengthened and user pleasure is increased by this personalised experience.

The Emotion-Based Music Player uses artificial intelligence and sophisticated machine learning algorithms to effectively understand emotional cues. Convolutional Neural Networks (CNNs), which have been trained on large datasets, are one technique used in facial expression analysis to identify subtle emotional cues from real-time photos taken by a camera or smart band. The program analyses heart rate data as well, utilising classification algorithms to establish connections between different emotional states and certain heart rate patterns.

The player offers a thorough knowledge of the user's emotions by merging data from several sources. The Emotion-Based Music Player has a wide range of potential uses in the future. Emotional recognition will become far more accurate as AI and machine learning technologies develop. To provide a more thorough emotional assessment, this may entail including further data, such as speech tone analysis and physiological signs (such as galvanic skin response). Improved wearable technology will make it easier to monitor continuously and precisely, which will improve emotional detection even more.

Subsequent versions of the Emotion-Based Music Player may incorporate sophisticated natural language processing (NLP) features, enabling users to express their mood and preferences using voice commands, thereby enhancing the intuitiveness of the interaction. Integrating music sharing with social media and other digital platforms could improve

its social component by allowing users to share playlists tailored to their moods and their emotional experiences with friends and a larger community.

In order to provide increasingly contextually relevant and personalised music recommendations over time, the player might also leverage collaborative filtering and other recommendation algorithms to learn from the user's listening habits. The program will always be adaptable to the user's shifting preferences and emotional needs thanks to this continuous learning process.

By adjusting music to users' moods, the Emotion-Based Music Player is poised to transform the way people listen to music. With an emphasis on personalised user experiences and ongoing technological breakthroughs, this application seeks to reinvent digital entertainment and improve emotional well-being. It will continue to be at the forefront of personalised music technology, providing an immersive and emotionally impactful listening experience, by adapting to the most recent technological advancements and user feedback.

#### **OBJECTIVES :**

1. To detect emotion on face to play songs.
2. To determine the mood from answers obtained and play song.

## **II. LITERATURE REVIEW**

1. All An K. Chankuptarat, R. Sriwatanaworachai, and S.Chotipant, "Emotion-Based Music Player," 2019.

Although listening to music is a powerful stress-relieving pastime, its effects may be negated if they are out of tune with the listener's present emotional state. As of right now, no music player can choose songs according to the user's mood. To solve this, the suggested emotion-based music player makes song recommendations based on the user's feelings, including neutrality, rage, sadness, and happiness. Using a smart band or smartphone camera, the program gathers data from the user's heart rate or a face image, then applies classification techniques to determine the user's emotional state. Two approaches of classification are discussed in this paper: one based on heart rate and the other on facial imagery. Next, the application recommends songs that match the user's mood.

2. R. Ramanathan, R. Kumaran, R. Ram Rohan, R. Gupta, and V. Prabhu, "An Intelligent Music Player Based on Emotion Recognition," 2017.

This paper presents an intelligent agent that offers a playlist to the user depending on their current mood and arranges a music collection based on the emotions expressed by each song. The user's local music library is first arranged according to the atmosphere that each song evokes, considering both melody and lyrics. The user snaps a picture of oneself, which is then processed utilizing face detection and emotion recognition algorithms to extract the user's mood in order to create a mood-based playlist. The app then creates a playlist by suggesting songs that most closely correspond with this feeling.

3. Henal Shah, Tejas Magar, Purav Shah, and Kailas Devadkar, "An Intelligent Music Player Using Sentimental Analysis," 2019.

OpenCV is used to store images that are taken with a camera.

Hand motions can be precisely detected and recognised with the use of the Haar Cascade classifier. The XML format is used by this algorithm to store data. A cross-platform framework called Qt is used to create graphical user interface (GUI) applications.

The OpenCV database contains hand gesture motion recordings. As an interface between the arm controller and the PC, RS232 receives hand gestures that the arm controller recognises and transmits. Hand gestures are used to automatically play songs that have been arranged into playlists.

Sentiment analysis is used by this intelligent music player to adjust to the user's mood.

4. Nikhil Zaware, Tejas Rajgure, Amey Bhadang, and D.D. Sakpal, "Emotion-Based Music Player," 2020.

This technology uses facial expression analysis to assess the user's thinking. People frequently use facial expressions, hand gestures, and voice tonality to convey their emotions, with facial expressions being the most used. The emotion-based music player cuts down on the amount of time listeners spend finding music. People frequently have large playlists, therefore choosing music at random could not fit the user's mood.

Music selection is done automatically by this technology based on the user's emotional condition.

5. Anukriti Dureha, "An Accurate Algorithm for Generating a Music Playlist Based on Facial Expressions," 2021.

In contrast to human playlist building, this study suggests an algorithm that uses the user's facial expressions to automatically create audio playlists. The technique seeks to increase accuracy while decreasing system cost and computing time. Validation of the facial expression recognition module is conducted using datasets that are dependent and independent on the user. For user-dependent data, the experiment's accuracy is 100%; for user-independent tests, it is 84.3% for sadness, 80% for anger, and 66% for fear. For joy and surprise, the accuracy is 100%.

## **III. PROPOSED METHODOLOGY**

### **A. Methodology**

We input the user's face into these systems, and the built-in Python library is used to identify the emotion on the face. After the audio files have been matched to the emotions, which have previously been categorized, songs will be suggested. User input will be received in text or speech format, primarily in speech format. Speech will be converted into text, which will then be sent to a server in Json format for analysis. Emotions will also be calculated for the text, and keyword search will occur. The result will

be millions of songs, which will then be filtered again under the collaboration filter, optimized to a hundred, and then that hundred again sent to mobile and based on the user profile it will be sorted in the 20 to 30 songs.

## B. System Design

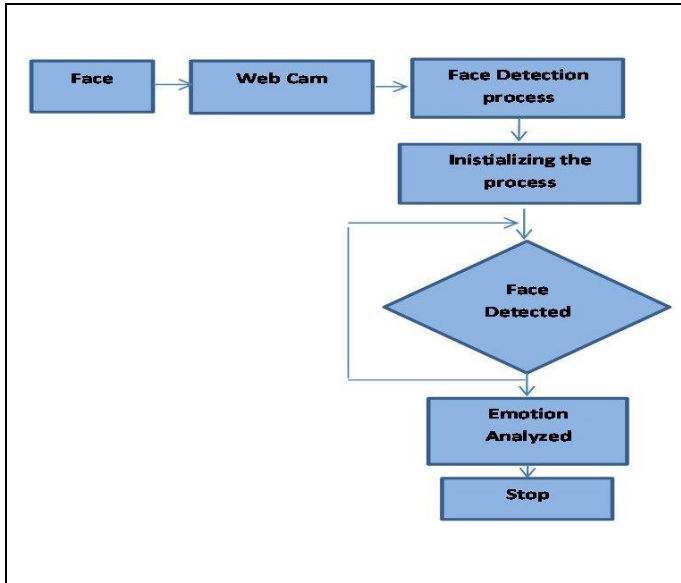


Fig 1: Level 1 Data Flow Diagram

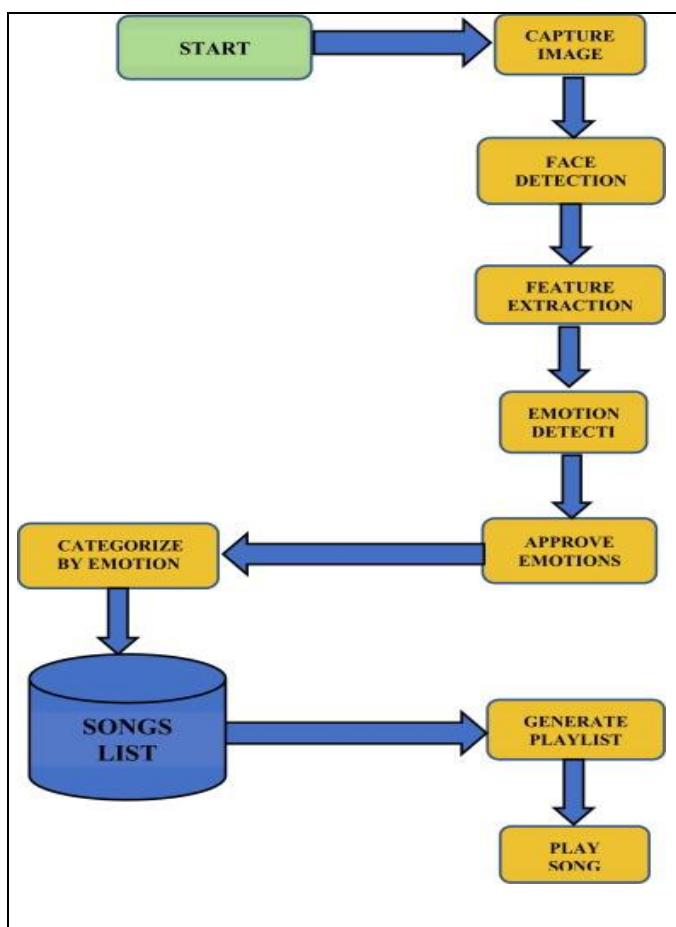


Fig 2: Workflow of the system

## C. Modules

### Module 1 : Face Recognition

- Images are captured using either image or video input.
- These images receive inputs and process them using weights that are modified during training in hidden layers of the network.
- The image is used to detect faces. Find one or more faces in the picture, then use a bounding box to mark them.
- Extraction of features. Take out facial features that will be useful for the process of recognition.
- Identification of Emotions. Compare the face to one or more recognized faces in a database that has been prepared.

### Module 2 : Lyrics Classification

- By classifying songs according to the feelings they express in their lyrics, an emotion-based music player can improve the user experience.
- The music player can make playlists or recommend songs based on this classification, which corresponds to the user's intended emotional state or current mood.
- For instance, the music player might suggest songs with uplifting and cheery lyrics if the user is feeling happy. On the other hand, the player can recommend songs with more depressing or reflective lyrics if the user is having a bad day.
- In general, the categorizing of lyrics enhances the listening experience by adding a personalized touch and assisting users in discovering songs that express their feelings.

### Module 3 : Text Classification

- Text Classification Textual data, such as song lyrics, user comments, or reviews, can be analyzed using text classification to ascertain the emotional content of the text in an emotion-based music player.
- By using this, the music player might suggest songs or playlists that are in line with the user's present emotional or mood state.
- By categorizing text into distinct emotional groups, such as joyful, melancholic, or exuberant, the music player may tailor the listening experience to the user's feelings.

### Module 4 : Songs Recommendations

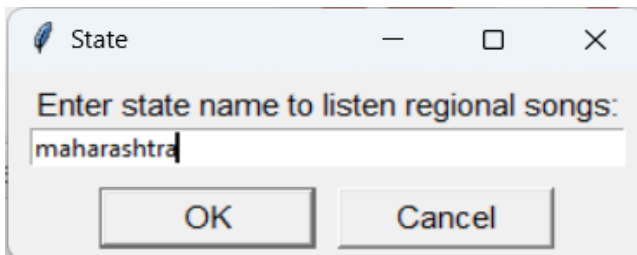
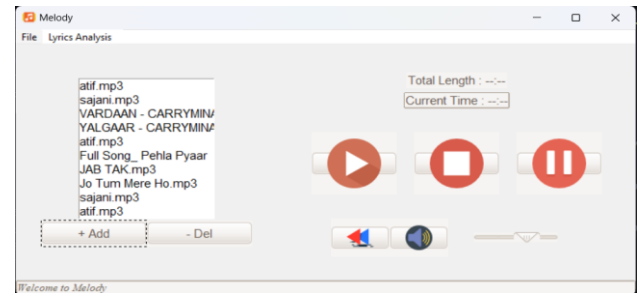
- Song recommendations in an emotion-based music player are intended to improve the user experience by suggesting music that corresponds with or enhances the user's present emotional state.
- These suggestions are derived from algorithms that examine several elements, including the songs' tones, the user's past listening selections, and possibly even physiological information like heart rate or facial expressions.
- The music player can provide a more immersive and customized listening experience by recommending songs that correspond with the user's emotions. This can aid in evoking and elevating particular emotions or moods.

## IV. RESULTS

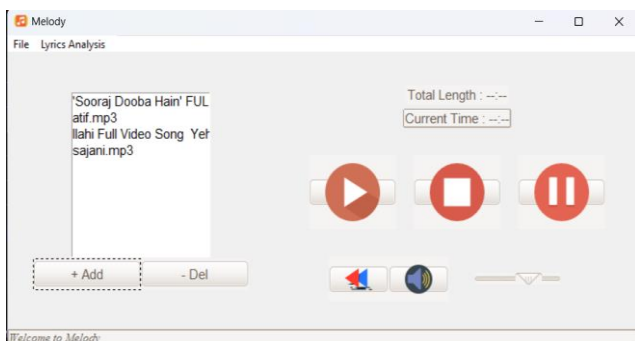
By selecting music based on the user's emotions, the Emotion-Based Music Player greatly increases user happiness by removing the need for manual song selection.

The system achieves great accuracy in emotional detection by using sophisticated machine learning models, such as Convolutional Neural Networks (CNNs) for face expression analysis and specialized algorithms for heart rate data. This produces highly customized music suggestions by classifying songs based on tempo, rhythm, melody, and lyrics, enabling accurate, mood-based playlists.

The music player also enhances user involvement by lowering the need for manual input with voice command capabilities and an easy UI. Continuous emotional monitoring is made possible by integration with wearable technology, which further streamlines the user experience. Additionally, the technology effectively maintains music libraries by alerting users to songs that aren't being used and making it easier to archive or remove tunes to keep the collection current and uncluttered. Future developments offer even more accurate emotional monitoring and a more customized music experience. These developments include improved physiological signals and vocal tone analysis for better emotional recognition, as well as wearable technological advancements.



```
Detected Emotion: Angry
Added 4 songs to playlist.
Added song: atif.mp3 from region: maharashtra
Added song: sajani.mp3 from region: maharashtra
Added song: VARDAAN - CARRYMINATI X Wily Frenzy.mp3 from region: maharashtra
Added song: YALGAAR - CARRYMINATI X Wily Frenzy.mp3 from region: maharashtra
1/1 0s 36ms/step
```



```
Detected Emotion: Happy
Added 4 songs to playlist.
Added song: 'Sooraj Dooba Hain' FULL VIDEO SONG Arijit singh
Added song: atif.mp3 from region: maharashtra
Added song: Ilahi Full Video Song Yeh Jawaani Hai Deewani Ra
Added song: sajani.mp3 from region: maharashtra
1/1 0s 23ms/step
```

## V. CONCLUSION

With the use of cutting-edge machine learning and emotion identification technology, the Emotion-Based Music Player revolutionizes the listening experience to music. It uses a camera to take real-time pictures of users, analyses those images using facial recognition software to determine how they are feeling, then creates customized playlists depending on those feelings.

For instance, listening to happy music makes you feel happy, and listening to sad music makes you feel calm. To conserve storage, the program also scans the user's music collection and alerts them to underplayed tracks. Its intuitive design makes mood modifications, discovering new music, and customizing playlists simple. This cutting-edge player guarantees an immersive and customized music experience while maximizing device storage and user engagement. Apart from its fundamental functionalities, the Emotion-Based Music Player guarantees users have an extensive music catalogue by providing a smooth interaction with well-known streaming providers.

Users can enjoy their customized playlists without an internet connection thanks to its offline mode support. Through the integration of state-of-the-art technology and

user-focused design, the Emotion-Based Music Player not only fulfils the changing needs of contemporary music enthusiasts but also enhances their overall experience.

## VI. FUTURE SCOPE

Future developments in technology and user experience are just two of the many bright possibilities for the Emotion-Based Music Player. The improvement of algorithms for emotional recognition is one important area for development.

To better comprehend delicate and complicated emotional states, the application can adopt increasingly advanced deep learning models thanks to current breakthroughs in artificial intelligence and machine learning. To provide a more thorough and nuanced picture of the user's emotional state, this might involve merging several data sources, such as voice tone analysis and physiological signals (such galvanic skin reaction) along with facial expressions and heart rate. Furthermore, the program can integrate with a larger range of devices, providing more precise and continuous emotional monitoring, as wearable technology advances and becomes more widely used. Further progress around improving user engagement and personalization features seems promising.

The integration of sophisticated natural language processing (NLP) functionalities into the music player may facilitate users in orally expressing their moods and preferences, hence improving the intuitiveness and user-friendliness of the interaction. Additionally, the app might make use of collaborative filtering and other recommendation algorithms to gradually learn from the user's listening preferences and offer more contextually appropriate and individualized music recommendations. Additionally, users may be able to share customized playlists and emotional insights through connection with social media sites and other digital services, creating a feeling of community and increasing the app's attractiveness. Along with enhancing user experience, these developments will establish the Emotion-Based Music Player as a preeminent resource at the nexus of emotional well-being and digital entertainment

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