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EMOTION-DRIVEN MUSIC SELECTION USING CONVOLUTIONAL NEURAL NETWORKS

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ABSTRACT

The emotion-based music player is an advanced application that wholly transforms the way the world listens to its music, based on machine learning and recognition of emotions. It has a camera for real images of the user and carries out the analysis of user facial expressions in relation to the determination of the emotional state. Then, it derives individual playlists based on the current emotional state—whether that is happy, sad, serene, or enthusiastic. This is done using algorithms. It gives the player fun and entertaining audio experience due to customized music selection according to the user's mood. 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.

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 efficiently interprets emotional cues by utilizing advanced machine learning algorithms and artificial intelligence. One method used in face expression analysis to extract subtle emotional clues from real-time photographs captured by a camera or smart band is the use of Convolutional Neural Networks (CNNs), which have been trained on big datasets. In order to create links between various emotional states and certain heart rate patterns, the application also analyzes heart rate data using categorization algorithms. The player offers a thorough knowledge of the user's emotions by merging data from several sources. There are many potential applications for the Emotion-Based Music Player 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 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

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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.

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. "Emotion-Based Music Player," by An K. Chankuptarat, R. Sriwatanaworachai, and S. Chotipant, 2019. Even though music listening is an excellent way to relieve oneself of stress, its outcome can be nullified if the listener's current emotional condition does not match up with the selected music. Until now, no music player has been designed to automatically select songs based on the user's mood. For this purpose, the proposed emotion-based music player is going to suggest songs to the user based on their mood-keeping conditions like neutrality, rage, sadness, and happiness. It gathers information from the heart rate or a photo of the face taken through the camera of a smart band or smartphone, and via classification techniques determines the emotional state of the user. Two different approaches that classify, one by heart rate and the other by facial imagery, are presented in this paper. Then, the application recommends songs that match the user's mood.
2. "An Intelligent Music Player Based on Emotion Recognition," by R. Ramanathan, R. Kumaran, R. Ram Rohan, R. Gupta, and V. Prabhu, 2017. Here is an intelligent agent offering a playlist to the user based on his current mood and arranging a music collection along with the emotions expressed by each song. The local music library of the user is initially arranged according to the atmosphere that each song evokes, considering both the melody and the lyrics. The user clicks a picture of himself, and then the system processes it with face-detecting and emotion-recognizing algorithms that pull out the user's mood for creating a mood-based playlist. Then, the application creates the playlist by suggesting songs that most closely correspond to this feeling.
3. "An Intelligent Music Player Using Sentimental Analysis," by Henal Shah, Tejas Magar, Purav Shah, and Kailas Devadkar, 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. This clever music player uses sentiment analysis to adapt to the user's mood.
4. "Emotion-Based Music Player," by Nikhil Zaware, Tejas Rajgure, Amey Bhadang, and D.D. Sakpal, 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. "An Accurate Algorithm for Generating a Music Playlist Based on Facial Expressions," by Anukriti Dureha, 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 userindependent tests, it is 84.3% for sadness, 80% for anger, and 66% for fear. For joy and surprise, the accuracy is 100%.

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III. PROPOSED METHODOLOGY

A. Methodology :

We then input the face of the user to these systems, and the Python library, which is inherent, is then utilised to derive the emotion on the face. After the audio files are matched up against the emotions, which have been categorised beforehand, songs will be suggested. The input by the user will be in text format or speech, mainly in speech format. Speech will be converted into text that, in return, will be sent in the form of Json to the server for analysis. Emotions will also be calculated for the text, and keyword search will also occur. Then millions of songs will pop up, which will then again be filtered under the collaboration filter, optimized to a hundred, and then that hundred will again be sent to mobile and based on the user profile it This record will be sorted in the 20 to 30 songs.

B. System Design:

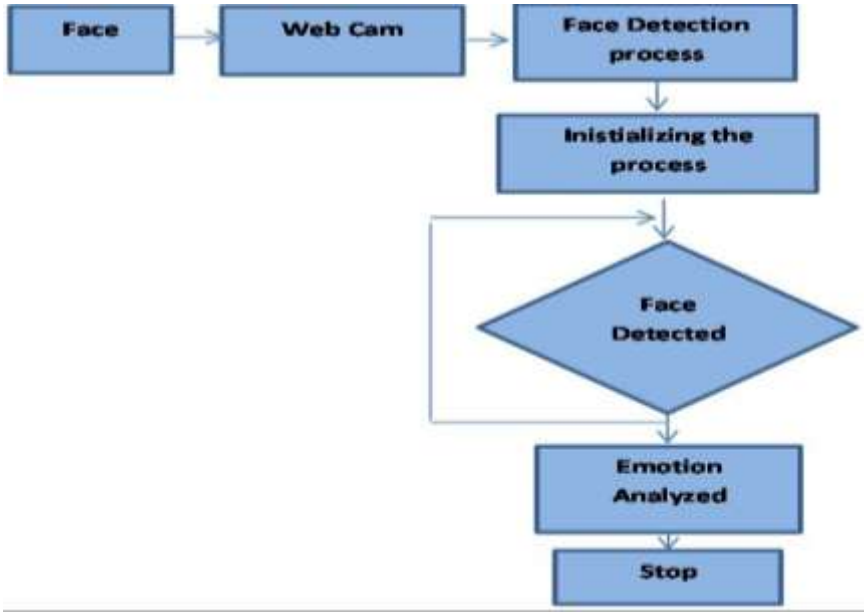

Fig 1: Level Data Flow Diagram

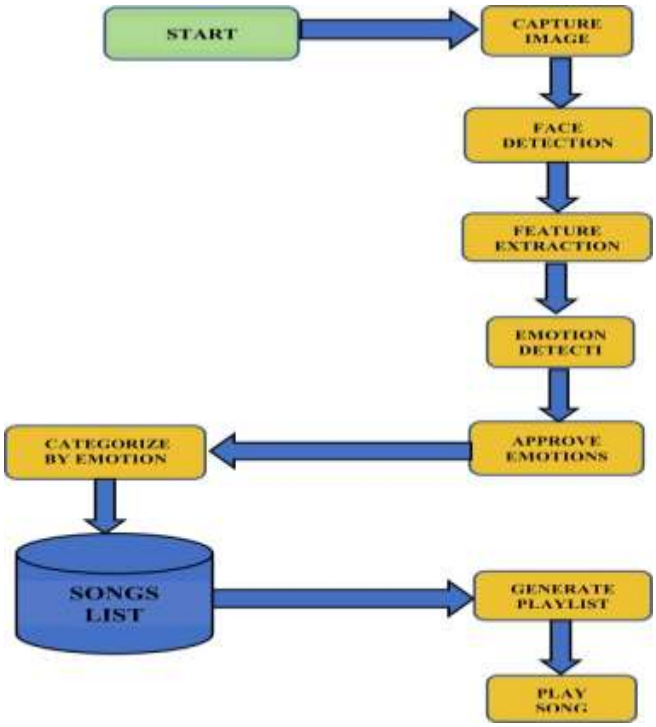

Fig 2: Workflow of the System

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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.
- Emotional Identification. Check the face against one or more known faces in a predefined database.

Module 2: Lyrics Classification

- This would thus enable the music player to enhance the experience of the user by filing the song according to the feelings expressed within the lyrics.
- This classification allows for the formation of a music playlist or even suggests songs correlated to the emotional state the user intends to experience or feels at the moment.
- For instance, a music player can give the user suggestions with cheerful and elating lyrics if the user is in a happy mood. On the other hand, the player can let it suggest songs with more sad or reflective lyrics if the user has a bad day.
- Overall, lyrical categorization allows users to enjoy their music more fully while using personal, special features that help them find the songs for their emotions.

Module 3: Text Classification

- Text Classification Song lyrics or user reviews can be classified in order to ascertain the emotional content of text for emotion-based music player.
- By this, the music player will be able to suggest songs or playlists to the user that would be in accordance with her current emotional or mood state.
- It may be that the music player could categorize text into the different emotional groups, such as joyful, melancholic, or even exuberant, then tailor the listening experience based on a 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

In that case, the Emotion-Based Music Player significantly increases the happiness associated with using the system since it eliminates the user's need to select the songs manually.

The system relies on advanced machine learning models, specifically CNNs, in order to process facial expressions as well as certain algorithms for heart rate data. This broadly tends to generate the most personalized music recommendations because it categorizes songs on the basis of tempo and rhythm, melody, and even sometimes even the lyrics, which enable accurate, mood-driven 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

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signals and vocal tone analysis for better emotional recognition, as well as wearable technological advancements.

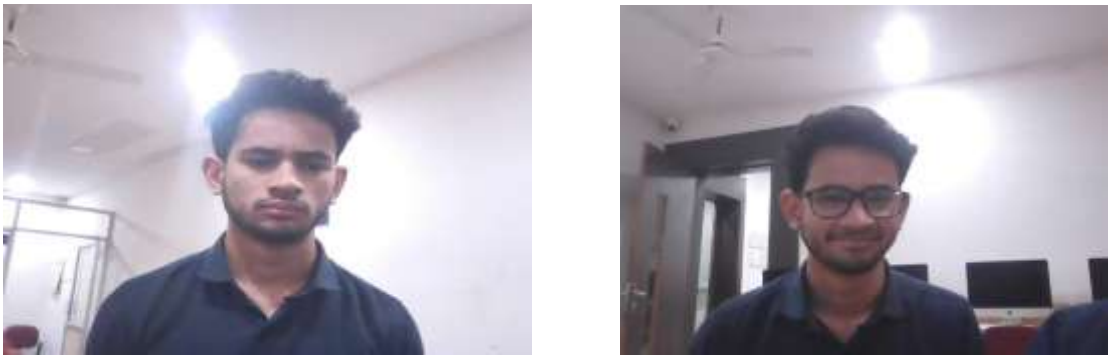

Fig 3:

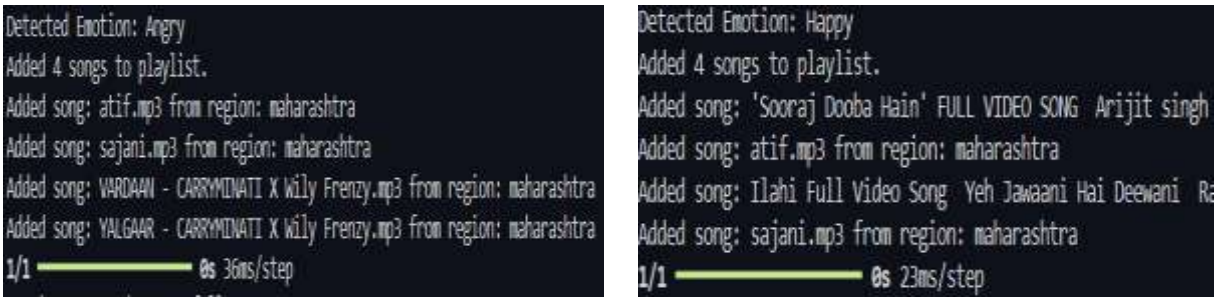

Fig 4:

Fig 5:

V. CONCLUSION

Using the technology of advanced machine learning and emotion identification, the Emotion-Based Music Player changes listening experiences into actual music. It captures real-time pictures of its users through its camera, analyzes them using the facial recognition software that precisely identifies what a user is feeling, then tailors a playlist according to those moods.

For instance, listening to a happy song makes you happy, and listening to a sad song makes you feel relaxed. To save space in the device, the app also scans the user's music library and informs them about tracks that have not been played for a long time. Its user-friendly interface makes it easy to change moods, discover new music, and make playlists. This state-of-the-art player ensures a full and personalized music experience while saving device storage and engaging users. In addition to its core functionalities, an Emotion-Based Music Player provides users with a vast music library through a seamless interface 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.

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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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