



Emotional Detection and Music Recommendation System based on User Facial Expression

Channaveeresh V P, Chethan kumar S, Dhanush R Naik, Karnik G shetty

Dept. of Electronics and Communication

PES Institute of Technology and Management, Shimoga

Abstract— People's emotions and moods can be evoked by music, which makes it a popular therapeutic method for reducing tension and anxiety. The development of sophisticated systems that can assess a user's emotional state and suggest music that matches their mood has increased along with technological advancements. The emotional recognition and music recommendation system based on user facial expression is one example of such a system. An intelligent system that analyses a user's facial expressions to determine their emotional state and propose music that will help them feel that way is the emotional detection and music recommendation system. The technology recognises the user's emotions from their facial expressions using computer vision and machine learning algorithms

I. INTRODUCTION

The "Emotion Based Music Player" is a tool designed to recognise a person's emotions and play music selections in line with those emotions. The person will first display his mood through his facial expression. The device will then assess the facial expression's state and interpret the emotion from it. The music player will play songs that can fit the person's present emotion after determining the person's emotion. The system will just analyse facial expressions; it won't take into account head or face movement.

Due to the current state of the economy, high cost of living, etc., the populace is becoming more stressed. Playing obedience music can help you relax. But it might be pointless if The listener's present mood is not reflected in the music. The programme suggests an emotion-based music player to address this issue. This player can suggest songs depending on user emotions such as grief, joy, neutrality, and rage. The user's face features are extracted from the user's taken image by the webcam (png or jpeg). Face is a kind of non-verbal communication, and emotions may be recognised using machine learning (vector support

algorithm). When emotions are identified, the system generates playlists from a website that has playlists for that emotion, saving the user a lot of time compared to choosing and playing songs

directly. The next step is to identify user feelings using the separation method. After that, the app plays a music with a similar mood.

II. OBJECTIVES

- To precisely ascertain, from the user's facial expressions, their emotional condition.
- To improve the user's listening experience by suggesting songs that are in tune with their emotions.
- To offer the customer customised music suggestions based on their emotional condition.
- To serve as a therapeutic aid by suggesting songs that might reduce tension and stress.
- To incorporate the technology into a variety of applications, including social media sites, virtual assistants, and music streaming services.
- To continuously enhance the precision of music recommendations and emotion recognition using machine learning techniques and user input.

III. METHODOLOGY

The suggested model will concentrate on two key features: first, the list of songs played for each emotion category, and second, the identification of facial expressions. In terms of expression recognition, the system is primarily built to identify the four major facial expressions—happy, sad, normal, and surprise. However, tracks will be readily available in each genre. The system will play the ten songs through the music player once the user's emotion has been identified.

Additionally, the database for facial expression detection will have sets of still images with the four distinct expressions. It will be utilised for comparisons. The characteristics (lips and eyes) are displayed when the user's image has loaded.

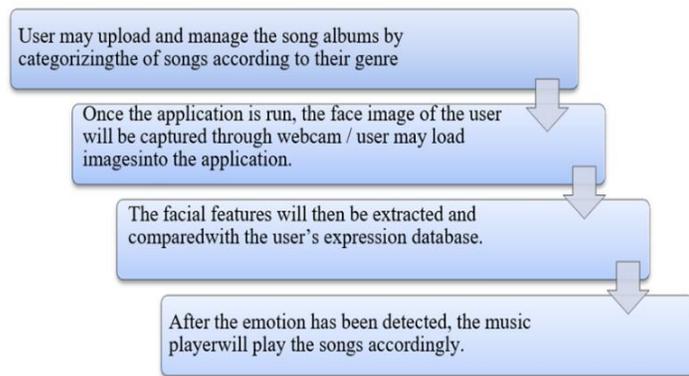


Figure 1 steps involved in the execution

Additionally, the database for facial expression detection will have sets of still images with the four distinct expressions. It will be utilised for comparisons. The characteristics (lips and eyes) are displayed when the user's image has loaded.

Taking a picture of the user's face:

The initial step in this method is to take a picture of the user's face. A camera that is either integrated into the system or attached externally can be used for this. The user's face is captured by the camera, which sends the video information to the system.

Processing the video data:

After being taken, the video data must be processed in order to recognise the user's face features. Using computer vision algorithms, which examine the video frames and recognise face features including the eyes, brows, nose, mouth, and chin, this is accomplished.

Extraction of face feature information:

The following action is to extract from the video frames the pertinent facial feature information. This contains information about the placement and motion of the eyebrows, eyes, mouth, and nose.

Finding the user's emotional state:

After extracting the data for the user's facial features, machine learning techniques are used to analyse the data and find the user's emotional state. These algorithms are taught how to recognise emotions based on face features utilising a dataset of facial expressions and accompanying emotions.

Music track recommendations:

After determining the user's emotional state, the system can make music track suggestions that are appropriate for that state. The

algorithm chooses songs from a library of categorised music recordings based on the user's emotional condition.

IV. SOFTWARE APPLICATION

The well-known Integrated Development Environment (IDE) PyCharm was created especially for the Python programming language. The Community Edition, which is free and open-source, and the Professional Edition, which is a paid version with extra features, are the two versions that it is produced in by JetBrains. The following are some of PyCharm's important characteristics and requirements:

- A code editor with syntax highlighting and code completion tools to facilitate and speed up coding.
- Tools for searching and navigating code to make it easier for developers to find and manage code.
- The ability to manage code changes with the use of version control tools like Git, Mercurial, and Subversion.
- Integrated debugging tools make it simpler and more efficient to troubleshoot Python code.



Fig 2 pycharm software

Algorithms:

The Haar cascade

Face detection is a trendy issue with a wide range of practical applications. Face detection software embedded into modern smartphones and computers can verify the user's identification. Many apps can capture, recognise, and process faces in real time while also determining the user's age and gender and adding some truly spectacular filters. Face detection has several applications in surveillance, security, and biometrics, therefore the list is not limited to these mobile applications.

Fisherface

is one of the most widely used face recognition algorithms. It is superior to other techniques like eigen face because it seeks to maximise the distinction between classes during training. The goal of this research is to create a programme of face recognition application utilising the Fisherface approach by utilising GUI apps and databases that are used in the form of a Papuan facial picture.

V. RESULTS

The mood detection module uses those extracted attributes to determine the user's mood and then sends the information to the music player's backend. After analysing the results, it searches for the lists that are corresponding to each mood before playing the songs that are included in that list. The user has the option of

changing his favourite song list. The following sample moods can be recognised: happy, sad, angry, and neutral.

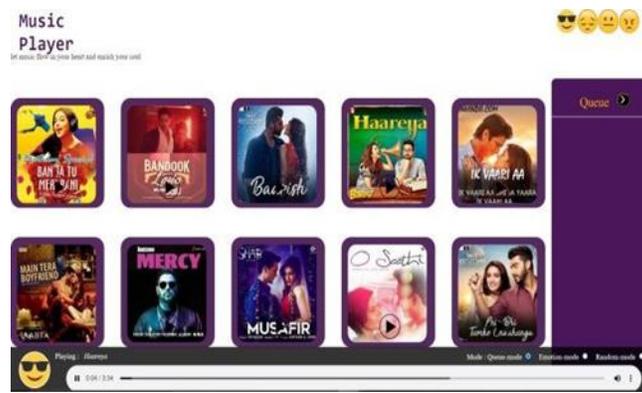


Fig. 2. Emotion Based Music Player playing Happy song

VI. CONCLUSION

In conclusion, a facial expression-based system for emotion identification and music recommendation can have a number of benefits, including tailored music suggestions and increased user engagement, but it also has some drawbacks, including a lack of precision and privacy concerns. Applications for such a system include social media platforms, gaming, fitness and wellness apps, retail and hospitality, mental health and treatment, and streaming music. In general, developing an efficient emotion detection and music recommendation system based on users' facial expressions necessitates knowledge in computer vision, machine learning, and music recommendation algorithms in addition to access to vast databases of music and facial expression data. We may anticipate seeing more avant-garde applications of artificial intelligence as this field develops.

VII. FUTURE SCOPE

1. This kind of technology may benefit users in a number of ways, including better user engagement and personalised music recommendations.
2. The system has some drawbacks that need to be addressed, such as its lack of accuracy and privacy issues.
3. The system might be used for a variety of things, such as music streaming services, social media sites, apps for fitness and wellness, retail and hospitality, mental health and treatment, and gaming.
4. Access to big datasets of music and facial expression data, as well as knowledge of computer vision, machine learning, and music recommendation algorithms, are necessary for creating an efficient system.
5. The system has a broad range of potential applications in the future, including increased precision, integration with wearable technology, and use in other sectors.

VIII. REFERENCE

- [1] Deebika, Indra, Jesline 'A machine learning based music player by de- tecting emotion' at 5th international conference on science technology engineering and mathematics (STEM) 2019.
- [2] Karthik Subramanian Nathan, Manasi Arun and Megala S Kannan 'An emotion based music player for android' at IEEE international symposium on signal processing and information technology, 2017.
- [3] Ramya Ramanathan , Radha Kumaran, Ram Rohan R, rajath guptha 'An Intelligent music player based on emotion recognition', at 2nd IEEE international conference on computational systems and information technology for sustainable solutions, 2017.
- [4] S satoh, F Nack "Emotion based Music Visualization using photos" Verlag Berlin, Heidelberg, Springer, 2008.
- [5] Charvi, Kshijith, Rajesh, Rahman "Emotion Detection and Characteri- zation using FacialFeatures" IEEE Access, 2018.
- [8] Yoh Iwasa and C. Dan, "Optimal Growth Schedule of a Perennial Plant", American Naturalist, vol. 133, no. 4, pp. 480-505