

Music Recommendation Based On Facial Expression

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Abstract: *We proposed a new approach for automatically playing music using facial emotions. Most existing approaches involve manually playing music, using wearable computing devices, or classifying them based on audio features. We used a Convolutional Neural Network for emotion detection. Pygame and Tkinter were used for music recommendations. Facial expressions were captured using a built-in camera. Feature extraction is performed on input face images to detect emotions such as happy, angry, sad, surprised, and neutral. An automatic music playlist was generated by identifying the current emotions of the user.*

Keywords: Face Recognition, Feature extraction, Emotion detection, Convolutional Neural Network, Pygame, Tkinter, MusicPlayer, WebCam.[7]

I. INTRODUCTION

Music plays an important role in daily life. It is not just a source of entertainment in our lives. It provides relief and reduces stress; thus, music also offers a therapeutic approach. This helps to improve mental health. Computer vision is a field of study that encompasses how computers view and understand digital images and videos. Computer vision involves seeing or sensing a visual stimulus, making sense of what it has seen, and extracting complex information that can be used for other machine-learning activities. Our project recognizes the facial expressions of the user and plays songs based on their emotions. Facial expressions are the best way to express a person's mood. Facial expressions were captured using a webcam and face detection was performed using a Haar cascade classifier.

The captured image was inputted to the CNN, which learned the features. These features were analyzed to determine the current emotion of the user, and music was played according to this emotion. In this project, five emotions were considered for classification: happiness, sadness, anger, surprise, frustration, fear, and neutral

Our project consists of four modules: face detection, feature extraction, emotion detection, and song classification. Face detection was performed using the Haar cascade classifier, and feature extraction and emotion detection were performed using a CNN. Finally, the songs are played according to the recognized emotions.

II. PROBLEM STATEMENT

Develop a Musical system that generates a musical playlist for the user based on his/her mood by capturing his/her facial expression.

III. PROPOSED SYSTEM

To design and implement a real-time music player that plays music according to the emotion of the user, a convolutional neural network is used to capture the images that will be used as input to the proposed method. The expression detector classifies it into one of eight classes: Happy, Natural, Sad, Angry, Contempt, Fear, Surprise, and Disgust.

PROPOSED STATEMENT:



PROPOSED SYSTEM ADVANTAGES

- Generate new user tunes based on emotions.
- When user emotions are the same, new tunes are generated.
- This method is efficient and rapid.

IV. METHODOLOGY

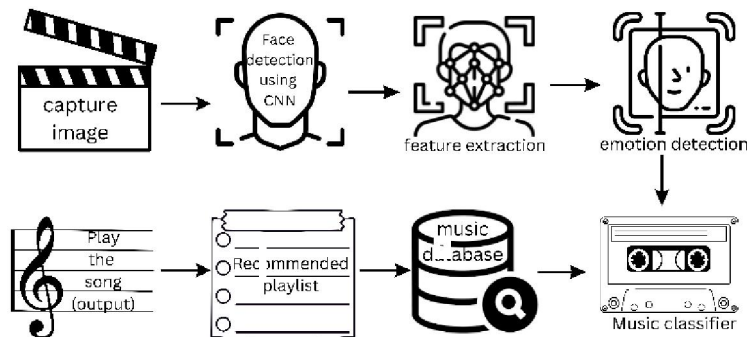


Image Acquisition:

As a first step in the proposed system, we begin by acquiring an image of the user’s face using a built-in laptop webcam (or any external camera that can be employed). To be correctly processed in the proposed system, the face image must contain one face in the frontal position on a uniformly illuminated background. In addition, it should not be on the user’s face; anything that could impede the detection process, such as glasses.

Face Detection:

Face detection is an application that is considered in computer vision technology. In this process, algorithms are developed and trained to properly locate faces or objects in object detection or related systems in images, which refers to the process of identifying and locating human faces in an image or video. To detect the images, we used the Convolutional Neural Network Algorithm and Media pipe library. Face detection using CNNs has many advantages over traditional methods such as Haar cascades. CNNs are much more accurate and can detect faces under a wide range of lighting conditions, orientations, and poses. They can also detect multiple faces in an image and provide a bounding box for each face.

Feature Extraction:

Feature extraction involves identifying and extracting relevant features of a face that are necessary for emotion recognition. The most commonly used facial emotion recognition features include the positions and shapes of the eyes, eyebrows, mouth, and nose. Other features such as the texture and color of the skin and the shape of the face may also be used. Haar cascades are one of the most common techniques for feature extraction in facial emotion recognition.

Haar cascades are essentially a set of features used to detect objects in an image. In the case of facial emotion recognition, these features are designed to detect the eyes, nose, mouth, and other relevant facial features. Haar cascades work by scanning an image at different scales and sizes, looking for the presence of the features. These features are essentially rectangular regions of the image in the dark and light regions. By combining multiple features, it is possible to detect more complex objects such as faces. Once the features have been detected, they can be used to train a machine learning model such as CNN to recognize emotions.

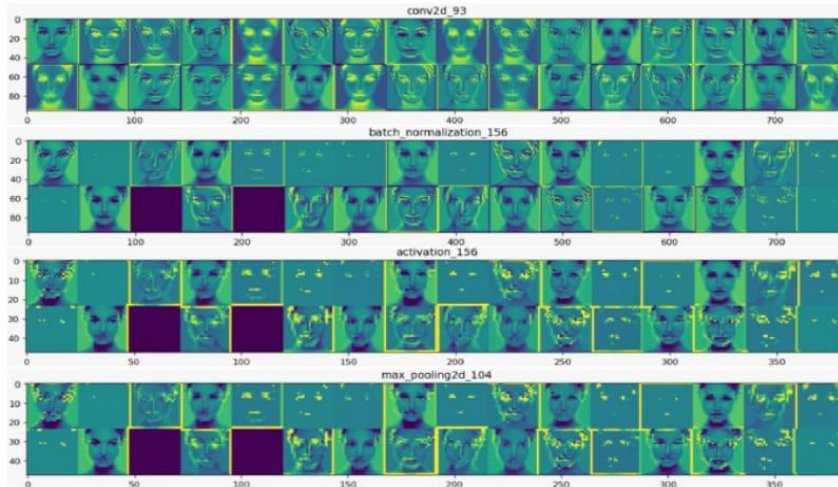


Fig1: Feature Extraction

Emotion Detection:

Next, we detect user sentiment. A well-known approach is to detect facial emotions. It constructs the face space, and eigenvectors with the highest eigenvalues are selected. In addition, we projected the acquired image onto the face space. Subsequently, the emotion was detected by computing the scores of each emotion for the user image. The feeling of the image was determined by obtaining the maximum of the calculated emotion scores

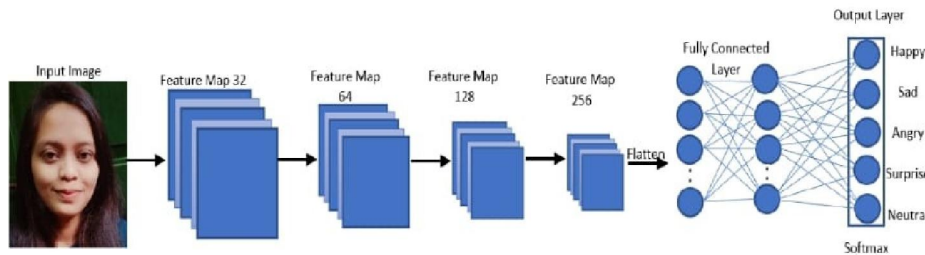


Fig 2: Emotion Detection [2]

Enabling the correspondent Emotion playlist:-

The proposed system presents the corresponding music playlist based on the detected emotion. Because we have eight emotions, we also have eight playlists that offer carefully chosen music clips. The classical music playlist will be activated for happy emotions, while the new age music playlist is dedicated to natural emotions. For the negative and sad feelings, we will enable the designer music playlist to enhance the user’s mood to a better mood.

Music Classifier:

A music classifier is a machine-learning model trained to recognize different types of music based on audio characteristics. These characteristics include tempo, rhythm, melody, and timbre.

Developing a music classifier for a facial emotion-based music-recommendation system requires a large dataset of labeled music samples. A musical example should be labeled with the emotion it evokes. Be happy, sad, or angry. Once audio features are extracted, they can be used to train machine learning models such as convolutional neural networks.

During the training process, the model adjusted the parameters to minimize the difference between the predicted and actual outputs. Once a music classifier is trained, it can be used to classify new music samples based on their audio characteristics. Once a user's facial emotions are recognized by the facial emotion recognition system, the music classifier can recommend music that is appropriate for the user's emotional state.

V. FUTURE SCOPE

1. Improving the Accuracy of Sad and Disgust Emotions.
2. Collaboration with music therapist.
3. Create a web or Android application.
4. Incorporation of physiological data.
5. To observe more human emotions and incorporate them into a project

VI. ADVANATGES

1. Ease Of Use.
2. Play's songs per user's mood.
3. There was no difficulty in selecting the songs manually.[1]

VII. CONCLUSION

Our project is generating a Music Playlist according to the emotion of the user, In this system, we provide an overview of how music can affect the user's mood and how to choose the right music tracks to improve the user's mood. The implemented system can detect user emotions. The emotions that the system could detect were happy, sad, angry, neutral, or surprised. After determining the user's emotion, the proposed system provided the user with a playlist that contained music matches that detected the mood. In conclusion, we proposed a music recommendation system using facial expression analysis and machine learning provides an Innovative approach to personalize music recommendations based on a user's emotional state. The system can be further improved by incorporating additional features, such as user feedback and contextual information, to enhance the accuracy and Relevance of recommendations.

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