Available online at : http://www.advancedscientificjournal.com
http://www.krishmapublication.com
IJMASRI, Vol. 3, issue 6, pp. 983- 987, June -2023
https://doi.org/10.53633/ijmasri

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY ADVANCED SCIENTIFIC RESEARCH AND INNOVATION (IJMASRI)

ISSN: 2582-9130 **IBI IMPACT FACTOR 1.5** **DOI: 10.53633/IJMASRI**

RESEARCH ARTICLE

MUSICAL THERAPY USING FACIAL EXPRESSIONS

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Abstract

Music therapy is an approach used to improve mood, reduce stress and also helps people overcome depression and anxiety, because of its natural mood-lifting property. It has a huge impact on the overall well-being of an individual. It helps to improve the quality of life of people both in terms of mental and physical health. The project's aim is to detect emotions at real time using webcam and then suggest the playlist which best suits the current mood of the individual whose expressions are being analysed. In this project, convolutional neural network (CNN) has been used for generating music playlist according to the facial expressions of user. Along with CNN, Computer vision has been used to capture the expressions using the webcam, analyze them and then classify it into the 7 categories according to the data set.

Keywords: Face recognition, Convolutional Neural Network, Music therapy, Computer Vision

Introduction

Music has the power to develop emotions in the minds of the listener. Music acts as a therapy it helps to fight negative and unwanted thoughts and stress. It helps to improve the quality of life of people both in terms of mental and physical health.

The healing power of music can be combined with face emotion detection to generate a playlist that will suite the current mood of the user and help them to reduce stress.

Facial expression helps to gather information about the mood of the user.

The project's aim is to detect emotions at real time using webcam and then suggest the playlist which best suits the current mood of the individual whose expressions are being analysed. In this project, convolutional neural network (CNN) has been used for generating music playlist according to the facial expressions of user. Along with CNN, Computer vision has been used to capture the expressions using

the webcam, analyze them and then classify it into the 7 categories according to the data set.

The picture is put through facial recognition and emotion recognition. The tunes that go best with the emotions are then suggested.

In this study, we have used Fer-2013 dataset. The data consists of 48x48 pixel grayscale images of faces. This dataset consists of 35,887 grayscale images. The training set consists of 28,709 examples. The public test set consists of 3,589 examples. The task is to categorize each face based on the emotion shown in the facial expression into one of seven categories (0=Angry, 1=Disgust, 2=Fear, 3=Happy, 4=Sad, 5=Surprise, 6=Neutral).

Related Survey

There has been significant research on predicting user emotions. Some of which are as follows:

1. Facial expression-based automatic emotion recognition is an intriguing study area that has been presented and used in a number of fields, including safety, health, and human-machine interactions. (Jaiswal *et al.,* 2020). Researchers in this discipline are interested in creating methods for human machine interfaces, safety, and health. Researchers in this discipline are interested in creating methods to decipher, encode, and extract these characteristics from facial expressions in order to improve computer prediction. Due to deep learning's exceptional success, its various architectures are being utilised to produce greater results.
2. Facial expression recognition (FER) has gained considerable attention due to its potential applications in various fields such as safety, health and human-machine interactions. Architectures to produce better results in FER. Emotion recognition has several potential applications, including software engineering, website personalization, education and gaming. (Athavle and Madhuri (2021). This study presents a brief overview of affect recognition techniques that use various inputs such as behavioural data. The secenarious discussed in this review illustrate the complexity and challenges of these scenarios leads to some conclusions and highlights the need for further research to address the difficulties with automatic recognition.

Functional Description

The application provides a pre-trained model for emotion or mood recognition which has been trained on Kaggle's 'Fer2013' dataset. It also provides a pre-trained model for music classification which has been trained on GTZAN Genre collection.

In this project, convolutional neural network (CNN) has been used for generating music playlist according to the facial expressions of user. (Karthik Subramanian Nathan *et al.,* 2017). Along with CNN, Computer vision has been used to capture the expressions using the webcam, analyze them and then classify it into the 7 categories according to the data set.

Fer-2013 Dataset

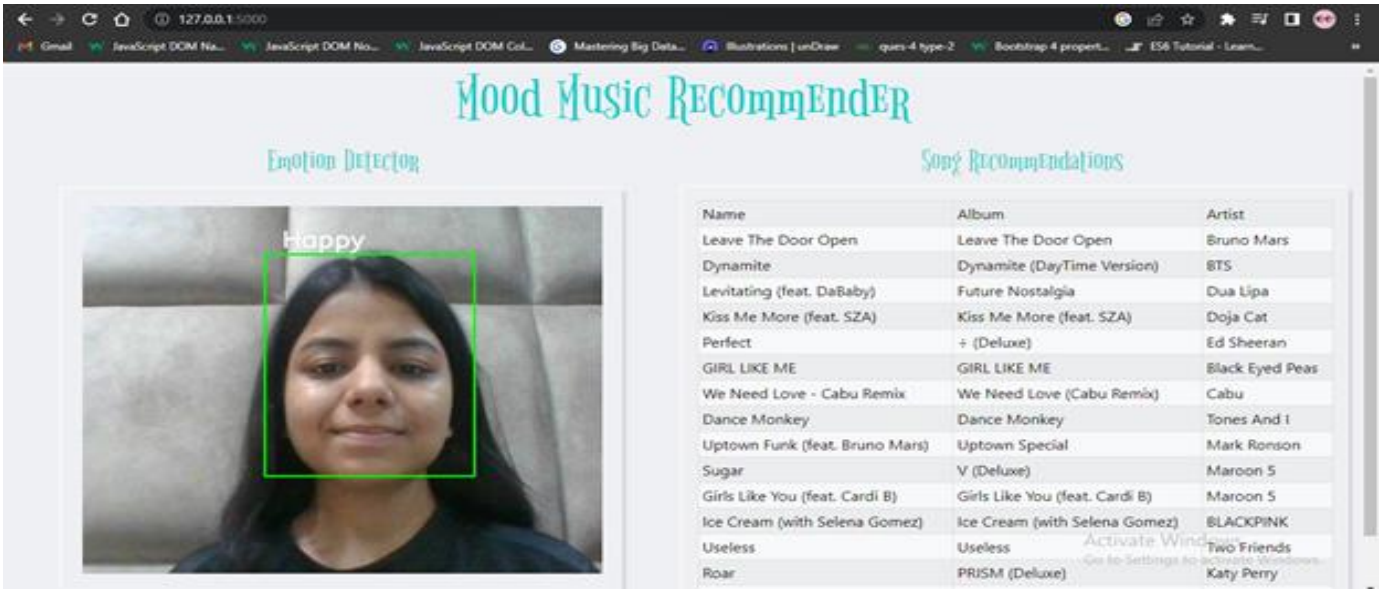
In this study, we have used Fer-2013 dataset. The data consists of 48x48 pixel grayscale images of faces. This dataset consists of 35,887 grayscale images. The training set consists of 28,709 examples. The public test set consists of 3,589 examples. The task is to categorize each face based on the emotion shown in the facial expression into one of seven categories (0=Angry, 1=Disgust, 2=Fear, 3=Happy, 4=Sad, 5=Surprise, 6=Neutral).

Proposed system

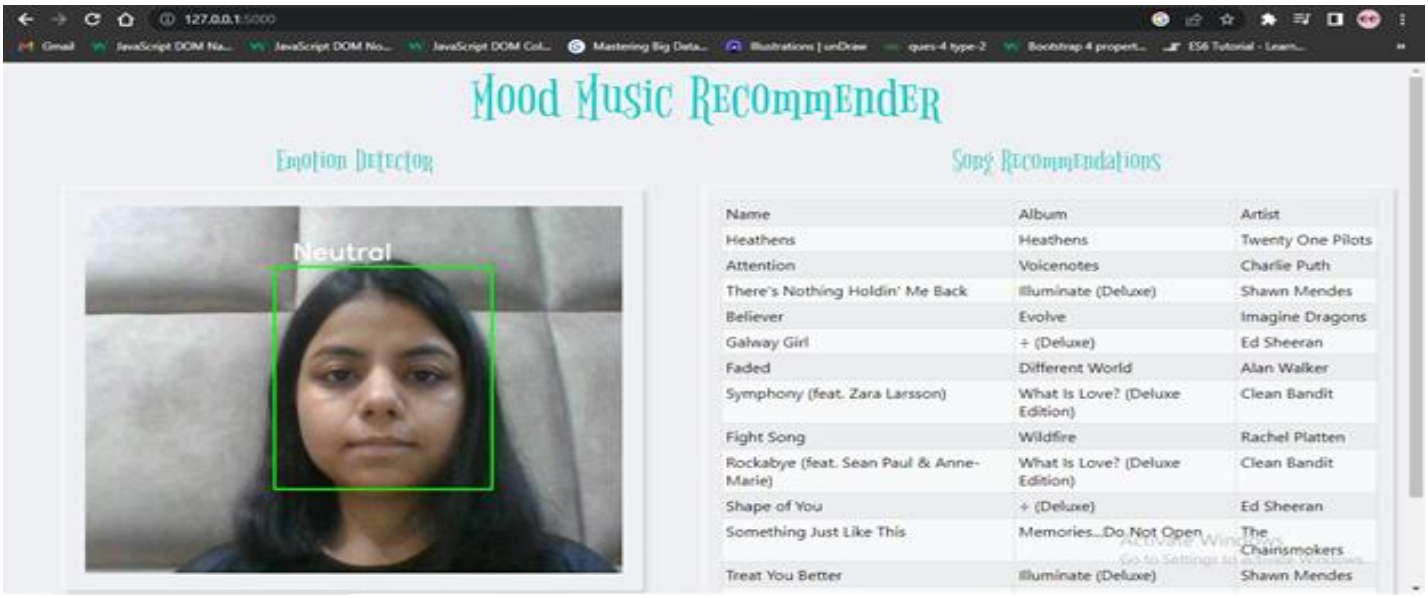
The proposed system benefits us to present interaction between the user and the music player. The purpose of the system is to capture the face properly with the camera. Captured images are fed into the Convolutional Neural Network which predicts the emotion. Then emotion derived from the captured image is used to get a playlist of songs. The main aim of our proposed system is to provide a music playlist automatically to change the user's moods, which can be happy, sad, angry, disgusted, fear, neutral, or surprised. (Krittrin Chankuptarat *et al.*, 2019). The proposed system detects the emotions, if the topic features a negative emotion, then a selected playlist is going to be presented that contains the foremost suitable sorts of music that will enhance the mood of the person positively. Music recommendation based on facial emotion recognition contains four modules.

- Real-Time Capture: In this module, the system is to capture the face of the user correctly
- Face Recognition: Here it will take the user's face as input. The convolutional neural network is programmed to evaluate the features of the user image.
- Emotion Detection: In this section extraction of the features of the user image is done to detect the emotion and depending on the user's emotions, the system will generate captions.
- Music Recommendation: Song is suggested by the recommendation module to the user by mapping their emotions to the mood type of the song.

Result



Happy Face recognition and music recommendation



Neutral Face recognition and music recommendation

Conclusion

In this project, we are generating a playlist according to the emotion of the user. It detects our emotions at real time using webcam feed and smartly classifies your playlist into genres, at last playing a song that suits the mood specified by the facial analysis. We are predicting the emotion of the user using Convolution neural networks and for generating the playlist we have used API.

Future scope

- This project can be further enhanced by bringing in more emotions like dissatisfaction, confused etc. which can be done by increasing the dataset.
- With every emotion analysed in various situations for a particular person, a hypothesis of their mental health can be produced to further use this in medical diagnosis and psychological experiments.
- It can also be used to be made specialized for each and every user based on their likes and dislikes of the songs, their listening pattern etc.

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