

Music Recommendation System Based On Emotion Recognition

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Abstract:Face recognition technology already has been widely spread and grabbed the attention due to its wide range of applications value and market potential. This technology has been in use in various sectors like security system, digital video-processing, and also many other technologies. Also, music is an art, which is well connected with the person's emotion. It has got the ability to improve one's mood. This paper will focus on establish a very efficient music recommendation system, which can determine the emotion of person using various techniques of face recognition. The algorithm that is used will be proven as the most expertise algorithm than other prevailing systems. Furthermore, on an enormous measurement, this algorithm will save the time and the laboratory procedures which are to be done manually. The purpose of this proposed system is to identify different emotions on face and it should suggest the songs in the most efficient manner. This system is helpful in saving both time and money.

Keywords: Face-Recognition, Securitysystem, Digital Videoprocessing,Music Recommendation.

I. Introduction:

Artificial intelligence has a prominent role in current technology and society on the other hand it is a domain that has attracted many research persons in recent times. This domain has widely spread in very short period of time. It has been incorporated in many daily using gadgets like mobiles, laptops as SIRI and ALEXA. Face recognition is one of the important aspect up of the artificial intelligence.

An example of such technology is assembling of photos of a particular person in google photos.

Already there exists the system of facial emotions and also there is a system of music recommendation but there do not exist a system which can play music based on human facial expression and mood of a person. Bringing these two technologies together a system is developed which will

recognize mood of a person and will recommend the music .

People mostly try to express their feeling and emotions with their face itself. Music has the capability to change an individual mood. A music player has been designed to observe human emotion and capture it with the help of camera on the computer. The software will capture the image of person and with aid of image subdivision and techniques of image managing, it captures the structures from the face of targeted person and it will perceive all the emotions in the user which he is willing to convey. The motivation of the paper is to obtain a technology which has the capability of lightening the mood and expression of the person.

II. Research Background:

Observation 1:

The research paper by Renuka R Londhe has presented a paper which shows that the technology identifies curvature of human facecut and the depth of consequent pixel. An artificial neural network was the technology used by the author to show variations in the emotions of the user. ~~She~~ She has suggested various methods of approaching different songs.

Observation 2 :

The research paper by Zheng it al. he proposed two various sets for the facial quality abstraction, in those, one is extracting the features based on appearance and the other is based on the geometry, which includes the extraction of some important points in face like mouth, eyebrows and eyes.

Observation 3 :

The article by NIKHIL determines the different mind sets of the person using the facial expression. his system helps to play

music as per the mood where the captured images are converted into the RGB to binary code. This process is called feature- point detection system.

Observation 4:

The research paper by Parul tambe suggested an ideology, which can automates interaction between the person and song playlist, where this system has already learnt the activities emotions and expressions of the user.

Observation 5:

The researcher named Jayshree Jha has proposed a music player based on emotion and activities of the person. This system has helped to identify how various algorithms can be used for connection of the user to the music player

Observation 6:

The researcher named ADITYA has developed an application in android which will act as a customized music player. Using image processing for an user. It was an application which was developed with the aid of Eclipse.

Existing Regime:

Presently, there are no committed applications to propose songs in light of feeling of music listeners. There are additionally not many applications that grabs attention on the user preferences and proposals, and these cannot be adjusted, as All Music players .

Different applications recommends predefined (not user specified) song play-records. Application like moodfuse incorporate elements like manual determination of tunes, somewhat mix, playlist. Some famous music applications like Saavn , Spotify give user specified play-lists that is required to be made and refreshed

manually. These applications focuses around broad classification as opposed to explicitness to each user. A specified application that centers more around user inclinations, needs and the making of dynamic play-list which is expected to enhance the user's experience. It must contain user explicit play-list produced in view of the use and must be productive in order. Many broadly utilized Facial appearance classification methods like kanadee, Lucas and so on, can be utilized for introductory stage to observe and decide user's emotion, yet these approaches have greater computational prerequisite.

The other option is, including a cloud-supported web administration which can process the computation in web-cloud. The on-going framework utilizes, Affective SDK for emotion acknowledgment, a framework that has as of now examined feelings from north of 5,000,000 appearances. This SDK assists the application with capturing and deciding the various emotions from an image. Afterward, this feeling can be utilized to association of users play-list.

IV. Proposed Methodology:

The human face will play a vital part in projecting one's mood. Camera is utilised to acquire input data that is required from user's face. Upon those applications one of the inputs can be used for extricating all the data to perceive the person's frame of mind. Those "emotions" that are actually extracted from given input which is made available already are depleted to obtain play list. This task of Separating with manual method or combining songs into the variety of playlists are shortlisted and will help in generation of suitable playlist which is suitable for individual's face appearance/mood. Face

Expressions which is depended on the Music Player will aim for scanning and will also interpret the user's data and accordingly it will create a playlist depending on the constraints that are predefined. Thus our proposed system will focus on identifying the various reactions of human for improving the emotion-recognised music playlist system, this is the approach followed by existing musical players for identifying emotions, that can approach our musical player and follows to identify the human reactions and will explain how will it be better to utilise our method for identification of emotion. A transitory idea regarding this system work method; list of songs generation and also emotion grouping has also proven. In the paper, we are using Jupyter Notebook for the analysing.

The upshot of the paper has been catogorised into 2 different phases: [I]. Developing a programme to identify person reaction depending on the reactions on face by using a programme called Python. [II]. Assimilating the developed python programme and then play music from playlist based on the user's facial expression.

Methodology:

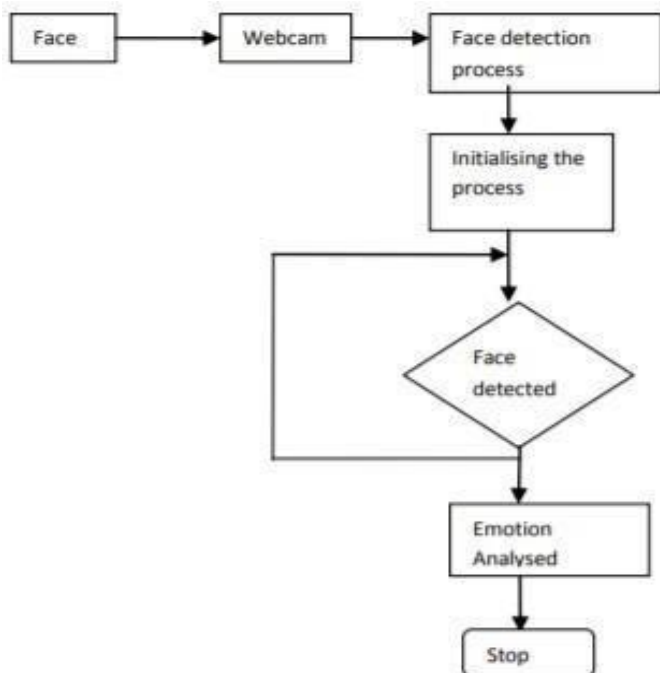
FACIAL IDENTIFICATION:

The motive of facial identification process is to recognise user's face in the mounted box by minimizing the outer sounds and even other considerations also.

The procedure that have been incurred in FACIAL IDENTIFICATION Procedure - I. Image pyramid II. features of the Oriented Grades III. Linear Attributer. All The information which are aquired will be splitted into sampling images and by using picture pyramid, into many bands. By using such method we can obtain the features

while cancelling noise and all the various explicit factors also. short pass image processing pyramid (which is well known as the Gaussian pyramid) with softening frame and also sub-sampling it with aid of diminishing its high pixel quality, this required method that is needed to reprise for several times for the exact outcome which at the final complete process, one can acquire a structure familiar to actual image with some diminished quality and with an improvised level of softening.

Although these specifications will satisfy the person's basic needs, yet the person need to notice the obstacle with user normal searching through list of songs and select the songs depending on their present frame of mind. That is the need of an individual, a user sporadically bothered through their needs and desire of surfing through their playlist, as per their mood and emotions.



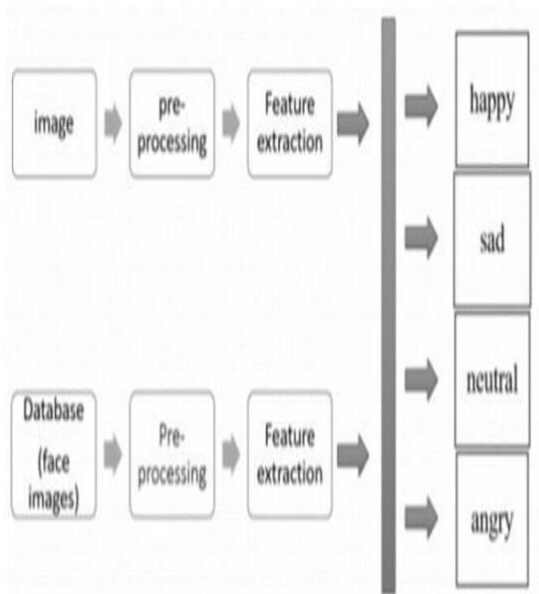
THE MUSIC RECOMMENDATION TECHNIQUE:

Predefined data is obtained in the actual processing so the camera is utilised for capturing video, after that outlining is prepared. The concealed model which is marked for classification is spent in processing all the outlined pictures. The outlines which are acquired are viewed as in all pixel layout with final goal of emotion grouping. The worth of every significant points in the face is determined and is preserved for some time later. Proficiency of the classifier is around 91-96%. So, in any event, when there are significant modifications in the face because of ecological circumstances the framework can work in any case distinguish the facial structure and the inclination to be communicated. The facial emotions are recognized utilizing the qualities that have been acquired which are set and as on results of the photo quality which has being contrasted with the qualities that are available as level in programme. The result is shifted to internet administration, and the songs will be played from inclination identified. All necessary feelings are allocated for each music. At a point when inclination is moved, the individual song will be played. There are four feelings that can be utilized for identifying emotions they are angry, happiness, sadness, surprising.

THE EMOTION CLASSIFICATION TECHNIQUE:

Immediately as the face is detected, a green box-shape will be appeared on the screen of the user's face. The ROI which has been extracted will be handled using the "predictor". It is the function, that can be

also called as the draft to excerpt all the 69 face points, they are saved in matrix form of array.



Code figures out how to extricate the facial milestone guide of a given face picture in view of the image quality values ordered of every point utilizing regression trees prepared with an algorithm of gradient boosting.

Immediately as the next step PCA decrease activity, the obtained information is utilized for characterization. Multiclass with aid linker kernal has been utilized to compare the initial entered information and stored value in which class the emotion is belonging to. In the event that one of the emotion like angry, fearful, or shock and so on is distinguished in a speed diminishing order which will be implemented to lessen the velocity of the wheelchair to safeguard person from the risk.

MULTITASK CNN:

Multitask CNN is cascade convolution neural networks which is an algorithm that consists of three stages. In first stage the input picture is reduced to multiple times to

build a pyramid image. And each image will be processed through its individual CNN.

In the second and third stages the image patches will be extracted and will be resized (in 2 stage-24X24, in 3 stage 48X48). Then they will be again processed by CNN. After being processed through MTCNN we can get solid classification results. With this process we need not to perform all the 68 Point Face landmark identification

FER(2013) DATASET

The data will be consisting of 49X49 Picture quality with black and white images of users. The person face will be registered automatically.

The task will be classified from one of the seven groups (0=anger, 1=disgusting, 2=frightened, 4=happiness, 3=sorrow, 5=surprising, 6=calm, 7=normal)

IMPLEMENTATION:

Use the JUPYTER notebook to run this project code

```

1: | import cv2

cam = cv2.VideoCapture(0)
cv2.namedWindow("test")

img_counter = 0
speak("press space to capture")

while True:
    ret, frame = cam.read()
    if not ret:
        print("failed to grab frame")
        break
    cv2.imshow("test", frame)

    k = cv2.waitKey(1)
    #speak("press space to capture")
    if k < 256 == 27:
        # ESC pressed
        print("Escape hit, closing...")
        speak("closing")
        break
    
```

The camera will be opened when the above code will run and a message will pop up as “To capture, press space; to end, press esc”
 Now the expression in the face will be captured using the FER library



we need to capture the image and it will be saved by the computer and can be accessed later by the program. Now for detecting the faces and landmarks of the face, a box will be drawn around face

```

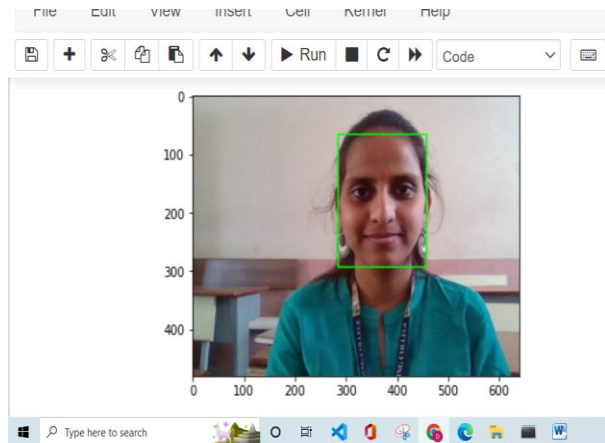
import matplotlib.pyplot as plt
from fer import FER

#import Matplotlib as plt
img = plt.imread(r"C:\Users\hp\OneDrive\Desktop\imp\newPic.jpg")

detector = FER(mtcnn=True)

bboxes=detector.detect_emotions(img)
plt.imshow(img)

#for box in bboxes:
#    x1, y1, w, h = box['box']
#    cv2.rectangle(img, (x1, y1), (x1+w,y1+h), (0,255,0), 2)
#    plt.imshow(img)
    
```



Result:

Now the face is detected and image is captured and also the emotion is detected using FER library. The score will be printed as follows:

```

emotion, score = detector.top_emotion(img)

print(emotion,score)

speak(emotion)
speak(score)

neutral 0.96
    
```

Here the detected score is 0.96 now based on this score the play list will be displayed and the songs from the same playlist needed to be selected and they will be played.

```

mixer.music.stop()

your mood looks neutral
song 1
song2
song 3
select a song you would like to play
    
```

We can press esc to exit from the player

```
mixer.music.stop()
```

```
your mood looks neutral  
song 1  
song2  
song 3  
select a song you would like to play  
1  
playing song 1  
press 1 to exit/stop
```

The above shown images are the working model that are developed using python programming language and by using JUPYTER notebook

CONCLUSION:

Emotion recognition utilizing expression is one of the significant subjects of exploration and has accumulated a lot of consideration before. It can be clearly noticed that issue of reaction (emotion) recognition with picture handling calculations aid, has been expanding progressively. Analysts, who are consistently dealing with ways of settling this by the utilization of various types of highlights and picture handling techniques. The uses of picture handling calculations in field of both clinical and human science are important. Consistently new ways and techniques are being fostered that utilize picture handling calculations to separate the feeling of the person and utilize all the removed reactions to deal with that person. Emotion identification technique has acquired lots of significance in each and every parts of livelihood and on the off chance that a powerful calculation carried out which can precisely characterize the emotions of the individual, then, at that point, a lot of headway in the business can be accomplished with the assistance of this. The

framework has effectively had the option to procure the emotion/mood of a person.

Be that as it may, it must try by various calming conditions for deciding the vigor of framework that is created. Also, framework had the option to capture the new pictures of client and should properly update their classifier and preparing dataset. Framework is planned utilizing the landmark spots in face conspire and was tried in different situations for required outcome which sounds got, truly. It is seen that the classifier has a precision of in excess of 80% for a large portion of the experiments, which is very great exactness with regards to feeling characterization. One can observe that a classifier will precisely anticipate the outflow of the client/person in an on-going situation when tried live for a user.

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