

Music Recommendation Using Facial Emotion Recognition - A Survey

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Abstract: *Emotion plays a vital role in human beings to express their feelings. These feelings can be expressed in various gestures such as in body language, in the voice tone or in face these emotions are helpful for an individual to understand what they are exactly conveying their thoughts or ideas which helps in better interaction. In this 5G generation the majority of the work is done under the influence of machines hence machine human interaction is very much necessary for making our lives easier. Machines can offer us more help if they are able to perceive and recognize human emotions. These interactions can be made possible only through effective communication which can be divided as verbal or non-verbal. Facial Emotion recognition, one of the crucial non-verbal means by which this communication occurs by identifying the state and mood of the person. In addition to facial emotion. Music also plays a very important role in recognizing an individual emotion. It is also a form of art which lightens the mood of a person it's an entertainment medium for music lovers and listeners. Music has a major impact on person's mood the main objective of our project is to create an automated system which plays music according to the user's emotion which can be beneficial for the user.*

Keywords: *Artificial Intelligence (AI); Face Detection; Emotion classification; Convolutional Neural Network*

I. INTRODUCTION

Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is often used to express the developed systems which are bestowed characteristic of humans, such as the ability to

reason, and in adapted learning and in knowing how to apply the knowledge in real-world scenarios.

Even though there's been continuing advances in the computer processing speed and memory capacity, as of now there are no programs which can match the human flexibility or in tasks that require day to day knowledge. On the other hand few of the programs are able to achieve the level of performance of experts and professionals by obtaining the necessary output in a specific task. They have various applications such as computer search engines and voice or handwriting recognition.

The first step in CNN is removal of background so as to extract an emotions correctly from the image.

The primary role of this model is to extract the primary expressional vector (EV).

Music plays a vital role in making an individual's life better, as music is connected with listener's emotions researchers declare that music is the best solution to resolve depression and other mental disorders. Due to the advancement of technology music players can be paused, played or fast forwarded according to the listener's comfort, but one of the major disadvantages is that the listener has to manually search the music which becomes tedious so our aim is to provide a website which makes this job easier by playing the music that matches the user's mood.

A. Convolutional Neural Network

A Convolutional Neural Network is a one of the Deep Learning algorithms which take image as a input and assigns the learnable weights to various objects and differentiate one from another in image. The objective of the CNN to extract features from the input image and also analyze the image. The face which has been detected, the CNN filter recognizes facial features, such as eyes, lips, ears, cheeks, and nose.

Finally, emotion from the current input image is detected.

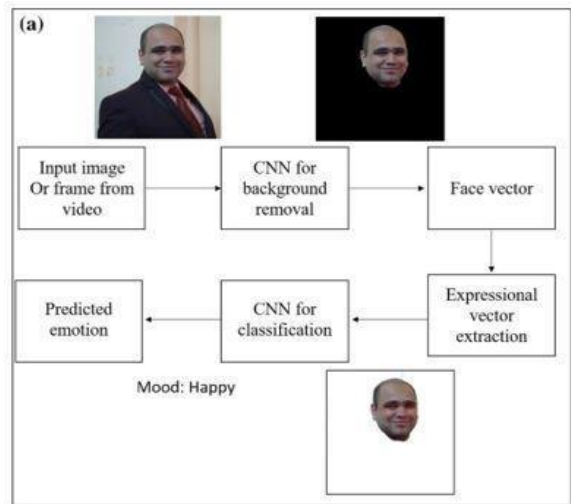


Fig 1. Steps in CNN

II. LITERATURE SURVEY

Ekman and Friesen said that emotion can be represented as happy, surprise, disgust, sad, angry, fear as shown in Fig 2.



Fig 2. Six basic human expressions

Meharabian stated that 55% communicative cues can be judged by facial expression which can be used in smart devices like computer/robots can sense/understand the humans intension from their expression then it will be helpful to the system to assist them by giving suggestions or proposals as per their needs.

Papers	Approach and methods	Gaps
[1]	Here different approaches such as PCA, LDA, Gabor Filter, Neural Network, ICA, and SVM is used with the help of necessary dataset to recognize the facial expression and calculate the accuracy and computational time.	The drawback was timing which is called recognition rate.
[2]	The review of framework of facial expression recognition using various methodology involved in facial emotion recognition. These methods are measured.	The PCA comes under unsupervised linear model the interpretation of important features in data maybe difficult due to information loss.
[3]	The project is focused on emotion recognition by EEG and audio signal using method LSTM-RNN.	EEG features to learn DNNs that avoid the local information within multiple frequency bands in the EEG signals. In this paper, we propose a emotion recognition method using a CNN(convolutional neural network) which prevents the loss of local information
[4]	They have built CNN using Conv-ReLU-Pool architecture and softmax loss accuracy we obtained using this architecture was 60.7%.	Over here they classified the emotions over stored images which made it difficult to classify due to varying size of those images.
[5]	Here they have used 4 different models such as Decision tree, Feed forward NN, Simple CNN, Proposed CNN here the accuracy is 60%	Due to insufficient information of lower amount of data on emotions certain emotions weren't able to be classified
[6]	The model generated through this module uses keras and TensorFlow for pre-processing and uses deep neural networks algorithm to enhance the model respectively. After several iteration the model reaches an accuracy for 95% for training tuples and approx. 56% for testing tuples.	In this paper there were only 5 emotions were classified such as happy, sad, surprise, anger, neutral
[7]	A microphone is connected to Raspberry Pi. They have converted those speeches into text for speech-to-text conversion. Results can be seen there is accuracy in mood prediction and recommendation	As it is a simple implementation of algorithm it won't be user friendly
[8]	They proposed a project to detect facial expression and suggest music using JAFEE dataset.	This system not give the exact results for happy emotion due to less images in dataset.

Table 1. Literature Survey Conducted

Based on the literature survey it's evident that most of the existing models are prototype based and not much of them are real time based applications .

Our project aims to implement a real time facial emotion recognition prototype which will be a web based application .

III. WORKING

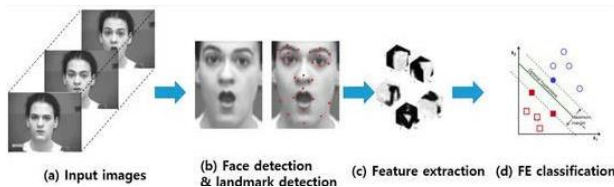


Fig 3. Working of the model

Steps followed by our model to classify the facial emotion is as follows:

Step 1: The face is detected in the real time through the webcam using HaarCascade Classifier.

Step 2: The captured face is then converted into a grayscale in 48x48 pixels frame.

Step 3: After Converting to the greyscale image, face image or image sequence is generated. From these images, features are extracted and sent to classifier.

Step 4: The model then predicts the expressions. Model is saved in a json file and then it will be imported to the OpenCV module to recognize the real time images in the videos taken from the user.

Step 5: The emotion is recognized and compared with the wide array of pre-recorded dataset and the suitable emotion is displayed.

Step 6: Based on the emotion recognized suitable songs are being suggested. The user can choose a particular song and can play it.

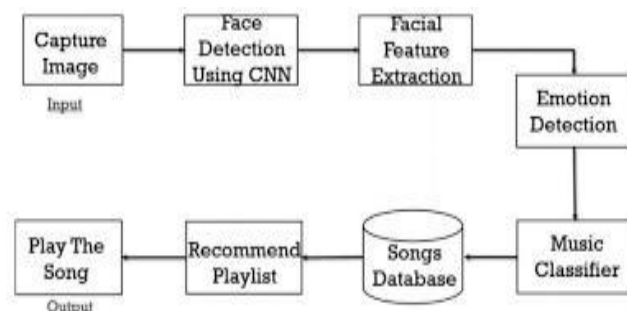


Fig 4. Flowchart



Fig 5. Expected output

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