

FACE DETECTION TO RECOGNIZE MOOD AND SUGGEST SONGS ACCORDINGLY

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ABSTRACT

The human face plays an important role in knowing an individual's mood. Music plays a vital role in one's mental wellbeing. Based on the mood of a person he/she would like to listen to a specific genre of the songs. This system plays a playlist automatically based on a person's mood. Face Expression Recognition Dataset from Kaggle website contributed by Jonathan Oheix is used as training dataset.

An input of the human face is obtained from the camera. This input is classified and mapped to respective mood such as anger, disgust, sad, happy, fear, surprise, neutral. Based on the mood a specific playlist is recommended for the individual. This entire process is implemented in Python. This system eliminates the time-consuming and tedious tasks of manually creating a playlist by the individual and this system plays an appropriate playlist based on individual's emotional features.

Index Terms— Artificial Neural Network, Classification, Convolutional Neural Network (CNN), Deep Learning

I. INTRODUCTION

This project is based on the principle of detection of human emotions to play appropriate songs for current emotional state. The current emotional state of human being can be easily observed through their facial expressions. It can be achieved with help of image processing and machine learning techniques. Songs can be categorized based on different moods.

Our project aims to recommend and play the appropriate music, based on user's current emotional state with the help of image processing techniques

through user's facial expressions.

II. PROCEDURE

The procedure contains three main steps:

- Face Detection
- Emotion Classification
- Music Suggestion

The image of the person can be captured by using a camera by saving the file as 'photo.jpg' or if the camera conditions are not good then one can upload the image of them.

III. ALGORITHM

Here we are using two major algorithms:

- Haar Cascade Algorithm for Object Detection
- Convolutional Neural Network Algorithm for Emotion Detection

Haar Cascade Algorithm: A Haar Classifier, or a Haar Cascade Classifier, is a machine learning object detection program that identifies objects in an image and video.

Here we use Haar Cascade Frontal Face Classifier.



Fig. 1: Haar Cascade Face Detection

Convolutional Neural Network: A Convolutional Neural Network (CNN) is a type of Artificial Neural Network used in Image Recognition and processing that is specifically designed to process pixel data. CNNs are powerful image processing, Artificial

Intelligence (AI) that use Deep Learning to perform both generative and descriptive tasks, often using Machine Vision that includes image and video recognition, along with recommender systems and Natural Language Processing (NLP).

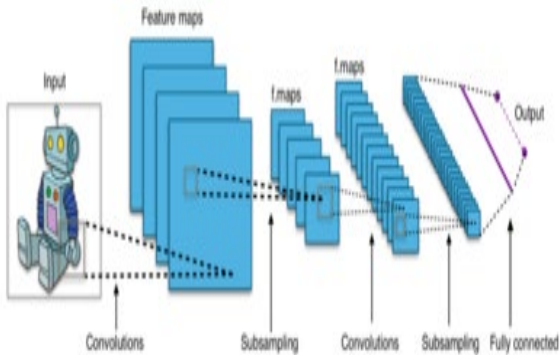


Fig. 2: Convolutional Neural Network Layers

IV. METHODOLOGY

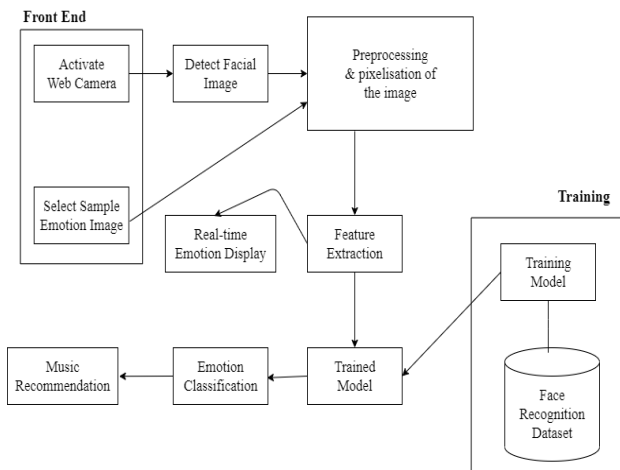


Fig. 3: System Architecture

• Dataset Description:

The dataset used is the Facial Expression Recognition dataset downloaded from the Kaggle website. This dataset contains 35887 images out of which 28821 images are taken as training dataset and 7066 images are taken as testing dataset. All the images belong to seven classes of images {'Angry', 'Disgust', 'Fear', 'Happy', 'Neutral', 'Sad', 'Surprise'}.

• Model:

A model with 5 complete CNN layers is built. It is then compiled and optimized with 'Adam' optimizer with a learning rate of 0.0001. After fitting the dataset into model, the model has acquired an accuracy of 73%.

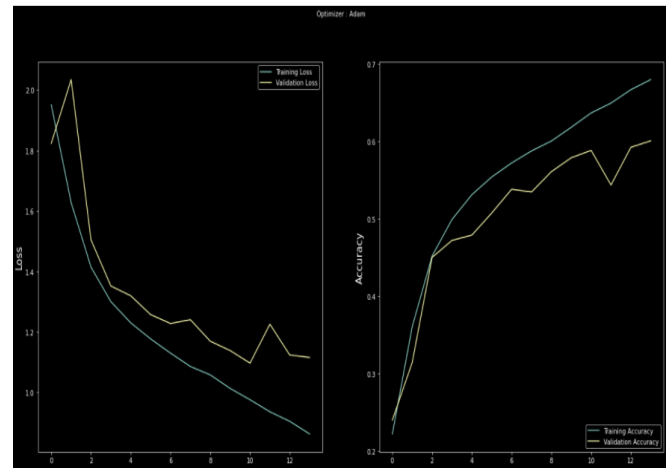


Fig. 4: Loss & Accuracy Plots of the model

• Testing the model:

An input of human face is given either through camera present in the system or if conditions of the camera are not good then one can also upload an image of him/her. OpenCV is used for capturing image and processing image

• Playlist Generated:

A list of songs are taken and manually placed within the respective mood related playlists. We have classified the songs into playlists corresponding to the different moods of the person.

• Audioplay:

Based on the emotion recognized, the playlist corresponding to that emotion is played. Audio of the songs are played using the display module in the Ipython library which provides a default music player consisting play, pause, volume increase and volume decrease options.

V. RESULTS

First the face of the individual is detected by Haar Cascade Classifier and highlighted using a rectangle by converting the image to gray scale. The emotion of the image is recognized and appended on the rectangle. The relevant playlist is played based on the emotion.

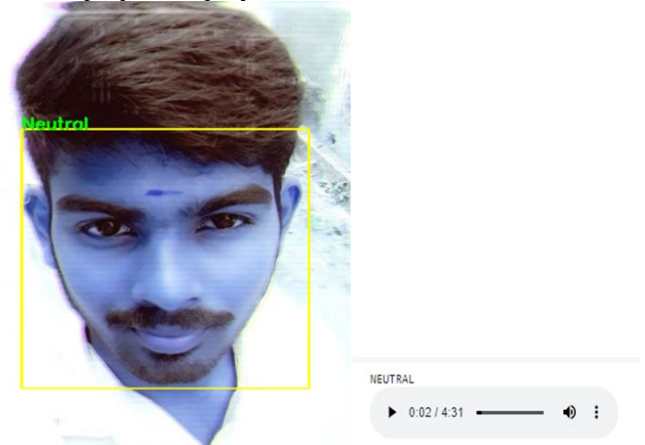


Fig. 5: Results

A. Figures

| Fig. No | Name of The Figure |
|---------|-------------------------------------|
| 1 | Haar Cascade Face Detection |
| 2 | Convolutional Neural Network Layers |
| 3 | System Architecture |
| 4 | Loss & Accuracy Plots of the model |
| 5 | Results |

B. Abbreviations and Acronyms

- CNN: Convolutional Neural Network
- Adam: Adaptive Moment Estimation

VI. CONCLUSION

In this system, we have implemented real-time facial emotion recognition using CNN algorithm in OpenCV. Recognized emotion is passed to the playlists generated which play the music according to mood detected. By passing this mood, the system plays the appropriate songs in that list to improve user’s mood.

This system minimizes the efforts of user to select music according to user’s current emotional state. It may reduce physical stress and also act as a boon for the music therapy system. We believe this system will help user in enjoying their music much more. In future, this system can be enhanced with capability of detecting mood using voice, facial expressions and body postures to get more accuracy. Also, we can improve the analysis and sort the user’s playlist by mood at runtime. At this stage, the support of Pygame to .mp3 files is lagging in Linux based operating system.

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