

SMART MUSIC PLAYER INVOLVING FACIAL RECOGNITION

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Abstract – Music is a significant element of life. People take its help to evoke their emotions and prefer listening to songs according their mood. It takes a lot of efforts to find appropriate music from the list for the particular emotion. Music players in today's world are not giving priority to the emotions of a person. The aim of this project is to develop smart music player that involves facial recognition of human. The emotions can be interpreted from facial expressions through the webcam. We have utilized the CNN classifier to build a neural network model. Songs belonging to particular emotions are classified on the basis of facial feature. A system generates music playlist based on the detected emotion. Our music player will play that generated music playlist to improve user's mood.

Key Words: Emotion, Facial expression, CNN, Machine learning.

1. INTRODUCTION

According to the research facial expression of individual is used to reveal information about the individual emotional state. Music can stimulate emotions in human, also emotions can be identified using facial expressions of human. In today's world, with the development in technology and multimedia, there are many music players which have various features like fast forward, variable playback speed. The user still faces the task of manually selecting the songs through the playlist of songs based on their current mood. This paper mainly

focuses on implementing the music player using facial expression.

2. LITERATURE SURVEY

D. Wen and other co-authors proposed Face Spoof detection with image distortion analysis in which they used face spoof detection algorithm. Here As a convenient user authentication technique, automatic face recognition has attracted increasing attention in various access control application, especially for mobile phone unlocking in android mobile operating system.

A. Mignon and F. Juire proposed reconstructing faces from their signatures using RBF regression in which they used face reconstruction algorithm based on RBF regression in eigenspace. This system could reconstruct the facial images from their signatures.

Weiqing Wang and Kunliang Xu proposed Emotion recognition of students based on facial expression in online class in which they used face expression recognition algorithm in order to recognize the faces of the students in online classes. But it resulted that the proposed system cannot be used all time.

Kyogu Lee and Minsu Cho proposed a system for Mood Classification from Musical Audio using User Group Deendent Model. They used adjective of USPOP's mood label data and last, fm's tags as classification keywords. Among those adjective, they selected 19 terms related to music moods. Also in this important part is preprocessing acoustic.

3. REQUIREMENTS

3.1 Hardware Requirements

- **Processor:** Intel Core i3, 7th Gen
- **RAM:** 4GB or above
- **Input Device:** Keyboard or Mouse
- **Display:** 1920*1080 pixels, 13MP Camera or Higher resolution monitor with color settings
- **Miscellaneous:** Power adapter

3.2 Software Requirements

- **Operating System:** Windows 10
- **Programming Language-Backend:** Python
- **Programming Language-Frontend:** html, Tailwind CSS, java script
- **Development Environment:** Anaconda
- **Application Server:** Python Flask

4. THE MODEL

The Smart Music Player system is completely computer-based software that focuses on implementing mood detection. Also it is prototype of a new product that merges some separate interfaces: face detection, face expression recognition, Playlist generation, play music. For example if an input facial image is categorized under joy the system will display song under joy, joy-excitement, joy-surprize category.

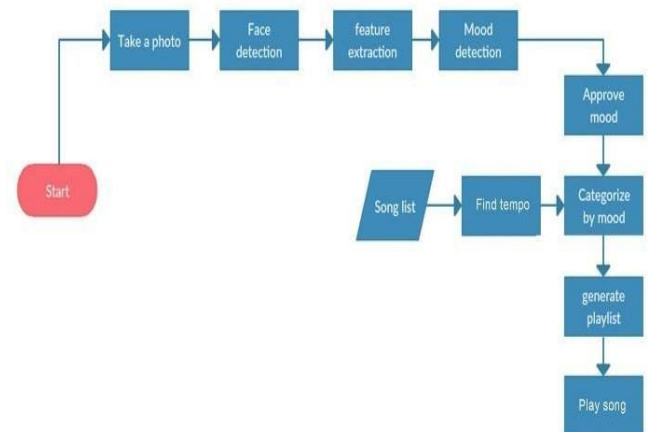


Fig – 4.1: Architecture Diagram

- **Face Detection Module:**

The system will take real time input from web camera. For this we have used OpenCV libraries used to implement face detection through Haar cascade Classifier. Haar cascade classifier is implemented in stages by application of features grouped into criteria such that it will also discard the unwanted part from further analysis. Face detection algorithm detects face and further also it will extract features from it.

- **Mood Detection Module:**

We have used CNN classifier to detect emotional state. Basically CNN is made up of neurons with learnable biases and weights, also it consist of input and output layers. In this each neuron receives several inputs, and pass it through convolution operation function to create an output layer. This function is also emulates the response of an individual neuron to visual stimuli. It takes a weighted sum over all inputs. Each Convolutional Neuron Network processes data only for its receptive field. So it is fully connected neural network made up of number of input layers, that can be used to learn features and differentiate data. Also its accurate decision,

we took frequent mood in time interval of 30 seconds to 1 minute as final mood. Finalized mood is passed to music player module to recommend appropriate songs.

- **Playlist Module:**

By using the API, we can calculate the tempo of songs that is beats per minute. We have also categorized the songs according to the emotions. Beat per minute for the filled with Happy, Sad, and Angry with respectively. finally mood is imported to the playlist module, so that it can recommend appropriate playlist on the basis of result mood and emotion.

- **Music Player Module:**

In our project we have designed music player's module GUI using Python package. Music player imports result mood and emotion and loads recommended playlist from their particular modules, and also plays songs from the playlist. Also we have given basic functionalities to our music player, so that user can play, restart and stop the song in the playlist module and also increases or decreases the sound volume.

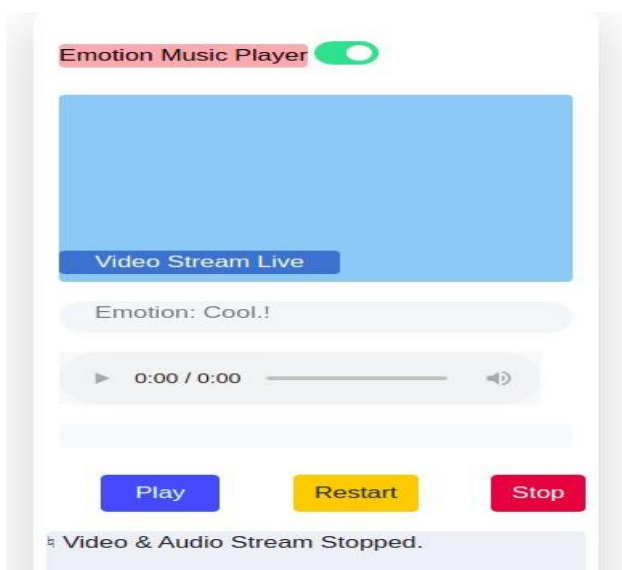


Figure 4.2: GUI of music player

5. CONCLUSIONS

From the proposed system, we can conclude that Smart Music Player will be of great advantage to the users looking for music based on their mood and emotions. The system will help to reduce the time to search the music according to the mood of the user. By reducing the unnecessary time to compute, this increase the overall accuracy and efficiency of the system. 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 smart music system will help user in enjoying their music much more.

6. FUTURE WORK

In future, this system can be amplified with capability of detecting emotion using voice and body postures also facial expressional to get more accuracy. Also we can be improved analysis and sorting of user's playlist by emotion. It is used to support to mp3 files based on operating system. Also we can provided more accurate API module which supports all mp3 files.

Abbreviations and Acronyms

CNN: Convolutional Neural Network.

OpenCV: Open Source Computer Vision Library.

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