SONG RECOMMENDER SYSTEM

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ABSTRACT

The purpose of paper entitled "SONG RECOMMENDER SYSTEM" is to recommend music according to the emotion of a person.The face is an important aspect in predicting human emotions and mood. Usually, the human emotions are extracted with the use of camera. There are many applications getting developed based on detection of human emotions. Few applications of emotion detection are business notification recommendation, e-learning, mental disorder and depression detection, criminal behaviour detection etc. In this proposed system, we develop a prototype in recommendation of dynamic music recommendation system based on human emotions. Integration of feature extraction and machine learning techniques, from the real face the emotions are detected and once the mood is derived from the input image, respective songs for the specific mood would be played to hold the users. In this approach, the application gets connected with human feelings thus giving a personal touch to the users. Therefore, our projected system concentrates on identifying the human feelings for developing emotion-based music player. For experimental results, we use OpenCV for emotion detection and music recommendation.

Key words: *Convolutional Neural Network , Open CV.*

1. INTRODUCTION

In the advancement of music field, many inventions are happening in the music field to obtain more customers and increase the business revenue by running advertisements. Since music is connected with listener's feelings and some researchers state that music is a best solution to resolve mental disorders, sleeping problems, depressions etc. Current system predicts and designs a training

model on the basis of consumer hearing patterns; therefore, many systems don't link human feelings to existing systems. As a result, the implementation of designing and implementing a content-based music recommendation framework that automatically detects human emotions has a broader reach. This should involve emotion detection, low feature-based extraction and interface to connect music recommendation.

The human emotions is an dynamic one and keep on changing on timely manner. Few researchers proposed "mental state detection" which states mental states such as happy, sad, anger, disgust, fear, surprise, and serene detections. There are many existing systems that could recognize facial emotions. On the other hand, there are systems that recommend music. Bringing together, a system which will recommend music by recognizing the mood of the user from facial emotions is the overall concept described in the paper. Emotion recognition would have larger scope in the near future in fields like robotics for efficient sentimental analysis without the involvement of another human.

Computer vision is a field of study which encompasses on how computer see and understand digital images and videos. Computer vision involves seeing or sensing a visual stimulus, make sense of what it has seen and also extract complex information that could be used for other machine learning activities. We will implement our use case using the Haar Cascade classifier. Haar Cascade classifier is an effective object detection approach. Convolutional Neural Networks (CNN) is a specific type of Artificial Neural Network which are widely used for image classification.

2. LITERATURE SURVEY

Music is one of the most effective media as it can instill deep feelings and swamp listeners with subliminal messages.It deftly plays with our emotions which in turn affect our mood. Books,movies and television dramas are a few other media but, in contrast to these, music delivers its message in meremoments. It can aid us when we are feeling low and empower us. When we listen to sad songs, we tend to feel adecline in mood. When we listen to happy songs, we feel happier. Manual classification of songs based on mood, for making of a playlist, is time consuming and labor intensive. Our paper proposes a system 'SONG RECOMMENDER SYSTEM', a web application, which help to minimize these efforts by suggesting the user a list of songs based on his current emotion.

This [1] paper explains automatic face recognition system. This explains 3 sessions-Face detection, Feature Extraction and Expression recognition. This paper briefs detection of respective face obtaining the face and perform morphological operations to obtain the feature such as eyes and mouth from the face.

The [2] paper explains we employ Deep Convolutional Neural Network which has an architecture that consists of filter layers and a classification layer. A filter stage involves a convolutional layer, followed bya temporal pooling layer and a soft max unit. Deep learning methods have been proposed to solve the facial semantic feature recognition tasks and to detect facialpoint.

The [3] paper describes and present the latest research about CNN in digital image processing. All humans have facial expression to show their emotional mood. The facial expression has many tools for use in many fields such as robotics, medicine, unmanned aerial vehicle, and lie detectors. Based on knowledge facial expression as follows angry, fear, happy, sad, disgust, neutral, and surprise

The [4] paper The paper constitutes the implementation of Convolutional neural network for the emotion detection and thereby playing a song accordingly.

Segregating the songs and playing them in accordance to one's mood could facilitate the music lover. Although there exist a lot of algorithms designed for it, the computation is not as expected. This paper eradicates such an issue by using CNN. In order to obtain minimal processing, multilayer perceptron are implemented by CNNs. In comparison to various algorithms for image classification, CNNs observed to have little-processing. The multiple actions such as capturing, detecting the emotion and classifying the same can all be confined as one step through the use of CNN. The slow performances of the real-time approaches could be enhanced by regularizing the methods and by visualizing the hidden features. Hence the proposed approach could enhance the accuracy and the computation speed.

3. METHODOLOGY

In the proposed system, the application primarily is a song recommender application which incorporates the emotion detection module. In this, we integrate computer vision and machine learning techniques for connecting facial emotion for music recommendation The Web App in the proposed system is called “snap- make all your moods musical”. For experimental results we used PyCharm tool for coding. In this we consider real face input of human using webcam, then image processing techniques are performed on the input acquired image. The features from the input images are extracted using point detection algorithm. The classification algorithm OpenCV is used for training the input images for facial emotion detection. Proposed system is able to process the facial image and recognize basic emotions and then play music based on these emotions and also suggest music that enhances the mood of the user.

In this we consider real face input of human using webcam, then image processing techniques are performed on the input acquired image. This approach primarily focuses on the classifier method using HaarCascade and the deep learning method using Convolution Neural Network. Haar feature-based Cascade classifier is an effective object detection method . Based on the emotions detected music would be automatically played from YouTube.

As a deep learning neural network, convolutional neural network plays an extremely important role in face image recognition. A combination of expression recognition technology of convolutional neural network and automatic music recommendation algorithm is developed to identify a model that recognizes facial expressions and recommends music according to corresponding mood. The facial expression recognition model established in this proposed system uses FER2013 dataset. We proposed a model of facial expression recognition based on convolutional neural network (CNN). After training the model on FER2013 data set, we got a recognition rate of 62.1%. On the basis of the state that facial expression and emotion were both recognized, the content- based recommendation algorithm was applied to automatically recommend music for users. Compared with the existing algorithms that only recommend music according to the users' past listening preferences, the algorithm proposed in this paper increases the user's emotion recognition, so that the recommended music can better meet the users' listening needs.

Convolution Netural Network

A Convolution Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. Convolution neural network algorithm is a multilayer perceptron that is the special design for the identification of

two-dimensional image information. It has four layers: an input layer, a convolution layer, a sample layer, and an output layer. In a deep network architecture, the convolution layer and sample layer mayhave multiple.

OpenCV

OpenCV (*Open-source computer vision*) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by willow garage then Itseez (which was later acquired by Intel). The library is cross platform and free for use under the open-source BSD license. OpenCV supports some models from deep learning frameworks like TensorFlow, Torch, PyTorch (after converting to an ONNX model) and Caffe according to a defined list of supported layers. It promotes Open Vision Capsules. which is a portable format, compatible with all other form.

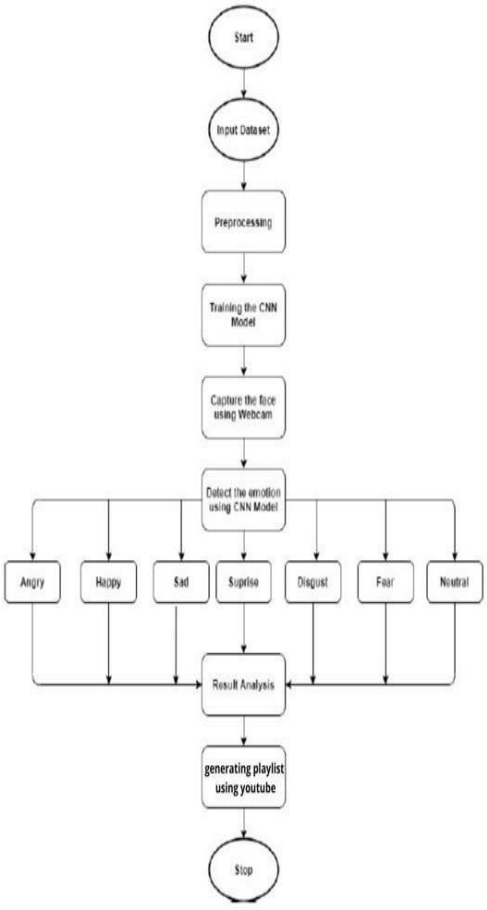

Fig 1: Flow diagram of the proposed system

4. EXPERIMENTS AND RESULTSIMPLEMENTATION

Implementation is the stage of the project where the theoretical design is turned into aworking system. The work was carefully planned to ensure maximum efficiency to recommened song based on emotion.After development of each module, the system was tested to ensure the functionality of therespective components.

In Song Recommender System, using CNNand FER2013 dataset for the purpose of classify the emotion captured we have achieved better performance .

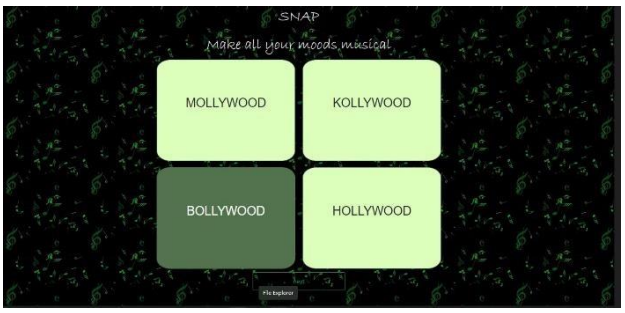

Fig 2: Selection of language

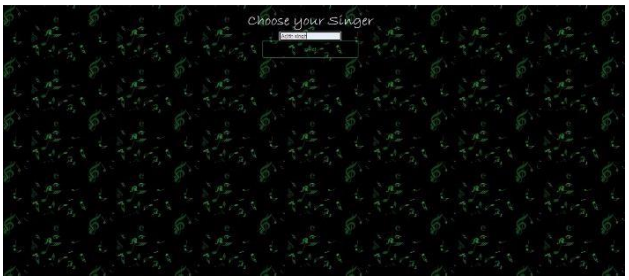

Fig 3: Selection of Singer

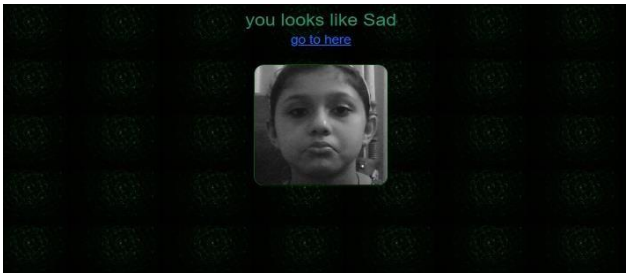

Fig 4: Face Detection

Emotion Detected: Sad
Accuracy: 92.054

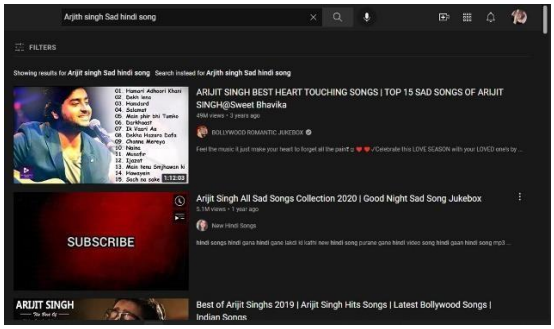

Fig 5: Recommending Song

4.CONCLUSION AND FUTURE SCOPE

Music is an integral part of our lives. In this project, we are generating the playlist according the emotion of the user, we developed an application for predicting the emotion of the user using Convolution neural networks and for generating the playlist we have used YouTube. We have applied it on various images and achieved an accuracy of above 80%.The algorithm proposed in this paper aims to generation music tunes based on facial expressions. Experimental results indicate that the proposed algorithm was successful in automating music tune generation on the basis of facial expressions and hence reduced the amount of labor and time, incurred in performing the task manually. The use of laptop or camera helped in eradicating the requirement of any additional hardware, such as EEG systems and sensors, and thus helped in curtailing the cost involved. Since, face emotion recognition is not performed in real time, the total time taken by the algorithm is equal to the amount of time taken by the algorithm to recognize facial expressions and the amount of time taken by the algorithm to query the meta data file. Hence, the proposed algorithm yields better performance, in terms of computational time, than the algorithms reported in the existing literature. gives input to the convolutional neural network and we get emotions.

However, since the social media platforms like Tik-tok and Instagram have a huge influence on the music charts worldwide, Users are exposed solely to mainstream music, therefore the recommendations on music streaming platforms are not very personalized. An emotion-based recommendation system permits the users to hear their favorite song based on their mood without typing or voice, and strict language specification. In future we would like to implement a well-versed application along with mood related quotes. Suggesting songs from database apart from YouTube.

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