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Music and Movie Recommendation Through Emotion Detection.

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Abstract : It is sometimes difficult for a person to choose which music and movie to listen to or watch from a vast array of available selections. Depending on the user's mood, there have been numerous recommendation frameworks accessible for concerns such as music, 0dining, and shopping. The primary goal of our music recommendation system is to present consumers with options that match their interests. The examination of the user's facial expression/emotion may lead to a better understanding of the user's present emotional or mental state. Music and Movies are one area where there is a huge opportunity to provide several options to clients based on their preferences and0 collected data. Humans are widely recognized for using facial expressions to indicate what they wish to say and the context in which they meant their words. More than060% of users say that at some point in time, the quantity of 0 songs in their music collection is so enormous that they are unable to determine which song to play. By creating a suggestion system, it may be possible to aid a user in deciding which music to listen to, hence reducing the user's stress levels. The user would not have to waste time searching or looking for songs, and the best track matching the user's mood would be recognized, and songs would be displayed to the user based on0his/her mood. The picture of the user is taken using a webcam. The user's photo is captured, and then, based on the user's mood/emotion, an appropriate song and movie from the user's playlist is shown, suiting the user's requirements.
Keywords— Face Recognition, Feature extraction, Emotion detection, Recognition, Music, Movie, Web-cam.

1 INTRODUCTION

Many studies in recent years have shown that people respond and react to music and movies, and that music has a strong influence on the functioning of the human brain. Researchers revealed that music had an important part in connecting arousal and mood in one study of the reasons why individuals perceive music. Music's capacity to assist participants attain a good mood and become more self-aware is one of its most essential purposes. Movie tastes have been shown to be closely connected to personality characteristics and emotions .

Music's meter, timbre, rhythm, and pitch are controlled by parts of the brain that impact emotions and mood. Individual interaction may be an important component of existence. It shows fine details and a large amount of data in people, whether in the form of body language, speech, facial expression, or emotions. Emotion detection is now widely employed in a wide range of applications, including smart card applications, surveillance, picture database investigation, criminal, video indexing, civilian applications, security, and adaptive human-computer interaction with multimedia environments.

With advances in digital signal processing technology and other effective feature extraction algorithms, automated emotion detection in multimedia attributes such as music or movies is becoming more common, and this system can play an important role in a variety of potential applications such as human-computer interaction systems and music entertainment. We offer a recommender system for emotion detection based on facial expressions that can recognise user moods and recommend a selection of acceptable music and movies. The suggested system identifies a person's feelings; if the individual has a negative emotion, a playlist including the most comparable forms of music that would improve his mood is displayed. And if the emotion is favorable, a special playlist with various sorts of music that will amplify the positive will be provided.

Implementation of facial emotion detection is performed using Convolutional Neural Network which gives approximately 95.14% of accuracy.

2 LITERATURE SURVEY

The review is carried out to get insights into the procedures and the shortcomings that may be remedied. A literature review, also known as a literature survey, is an academic document that incorporates current understanding as well as significant results, as well as theoretical and methodological contributions to a certain area. The latent properties of individuals that may supply inputs to any system in a variety of ways have piqued the interest of many learners, scientists, engineers, and others from across the world.

In [1] Used image processing technology to develop a monitoring system for elderly people which can detect their emotions from a video image of their face.In 'Human Emotion Detection using Machine Learning Techniques', Punidha Angusamy et al. (2020) reported that a facial expression can be said as the movement of muscles beneath the skin of the face. Facial expressions are a form of nonverbal communication. Machine Learning algorithms build mathematical models based on some sample data.
In [2] A team of researchers has developed a machine learning algorithm which can accurately identify human emotion from an image or video. Natisha Raut (2019) reported on facial emotion recognition using machine learning. Human emotion detection is implemented in many areas requiring additional security or information about the person. The results of the emotion detection algorithm gave average accuracy up to 86% for RaFD database and 87% for CK+ database for cross-validation=5.
In [3] Researchers have proposed a new approach for the recognition of micro-expressions in facial images. Yanju Liu and colleagues (2022) report that the MobileNetV2 block in the MobileViT model is trained as a facial expression feature extractor through migration learning of macro-expressions. The method does not become more complex than lightweight convolutional neural networks by incorporating the visual transform's structure. Deep learning methods are used in micro-expression recognition for efficient feature extraction and classification capabilities. To address the insufficient number of samples in the micro expression dataset, the microexpression migration learning method is used. A grid search method was used to optimize the values of hyperparameters.
In [4] State-of-the-art algorithms for facial landmark detection, and briefly touch on established methods, to encourage further research. Kostiantyn Koriashkina (2022) reported in 'Fast Facial Landmark Detection and Applications' that dense facial landmark detection is one of the key elements of face processing pipeline. Despite a significant growth of methods' quality, few of them focus on the real-world applicability in resource-constrained environments.
In [5] S. Giri et al., "Emotion Detection with Facial Feature Recognition Using CNN & OpenCV," 2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), 2022, pp. 230-232, Doi: 10.1109/ICACITE53722.2022.9823786.
In [6] M. Srivastav, P. Mathur, T. Poongodi, S. Sagar and S. A. Yadav, "Human Emotion Detection Using OpenCV," 2022 2nd International Conference on Innovative Practices in Technology and Management (ICIPTM), 2022, pp. 748-751, doi: 10.1109/ICIPTM54933.2022.9754019.
Renuka R Londhe et al. [7] offered a work focusing on the investigation of variations in curvatures. The intensity of the matching pixels and the intensity of the face. The author employed Artificial Neural Networks. Networks (ANN) were there to categorize emotions.
The author also made other suggestions. techniques to create a playlist. Zheng et al. [8] presented two key face feature groups. Extraction, which covered both appearance-based and geometric-based feature extraction. Extraction, which comprised extraction of certain vital facial areas such as the mouth, eyes, and nose.
Ramya Ramanathan et al [9] presented an intelligent music player based on emotion identification in their study. Emotions are a fundamental component of human existence. They are the most significant people in your life. Human emotions are intended for emotional interaction and mutual understanding. The user's local music collection is initially categorized based on the album's emotional impact. This is frequently computed with the lyrics of the song in mind.
CH Sadhvika et al [10] recommended manual playlist segmentation and song annotation based on a user's present emotional state as a labor-intensive and time-consuming operation. Numerous methods have been developed to automate this process. However, the current algorithms are sluggish, raise the overall cost of the system by requiring more hardware (e.g., EEG structures and sensors), and have substantially lower accuracy.

3 OBJECTIVE

Created a system that uses Machine Learning Algorithms to display a cross-platform music and movie player that recommends music and movies depending on the user's real-time mood through a web camera.

4 PROPOSED SYSTEM AND SOLUTION

We profit from the suggested system by presenting interaction between the user and the system. The system's goal is to adequately capture the face using the camera. Images are captured and sent into a Convolutional Neural Network, which predicts emotion. The recorded image's sentiment is then utilized to generate a playlist of music and movies. The primary goal of our suggested system is to automatically deliver a music and movie playlist to modify the user's mood, which can be joyful, sad, natural, or astonishing. The suggested system recognizes emotions; if the topic involves a negative feeling, a playlist including the most appropriate types of music that will improve the person's mood will be offered. Four modules are used to select music and movies based on face emotion recognition. I. Real-Time Capture: In this module, the system must successfully capture the user's face. II. Face Recognition: In this case, the user's face will be used as input. The convolutional neural network is trained to analyze the characteristics of the user picture. III. Emotion Detection: In this portion, the elements of the user image are extracted to identify emotion, and the system generates captions based on the user's feelings. IV. Music and Movie Recommendation: The recommendation module suggests a music and movie to the user based on their feelings and the mood type of the song.

5 RESEARCH METHODOLOGY

5.1Face Detection

Face detection is one of the applications that fall under the purview of computer vision technology. This is the process of developing and training algorithms to correctly find faces or objects in picture object detection or related systems. This detection can be real-time from a video frame or images.

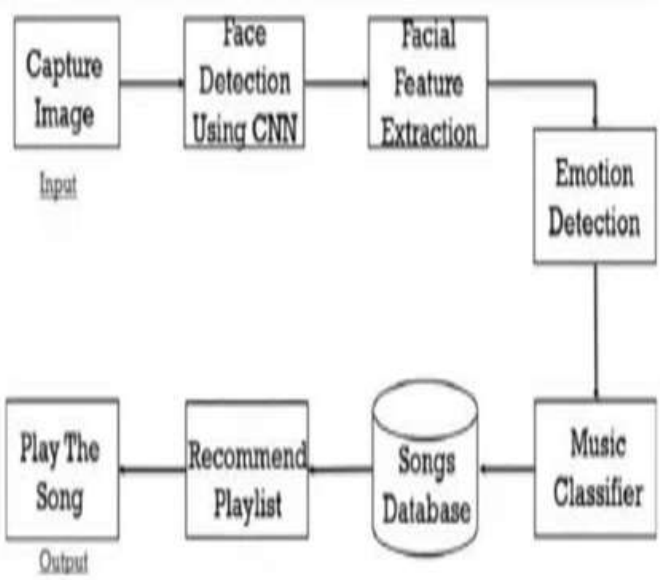

Figure 1. Workflow Diagram

5.2Emotion Detection

The Relu activation function is used by the convolution neural network architecture to generate feature maps or activation maps from the input picture. Feature detectors or filters aid in the identification of numerous picture characteristics such as edges, vertical lines, horizontal lines, bends, and so on. Following that, pooling is used to the feature maps to ensure translation invariance. Pooling is based on the idea that if we modify the input by a little amount, the pooled outputs do not change. We can use any pooling method from minimum, average, or maximum. However, max pooling outperforms min and average pooling. Flatten all the inputs and feed them to a deep neural network, which produces outputs for the object's class.

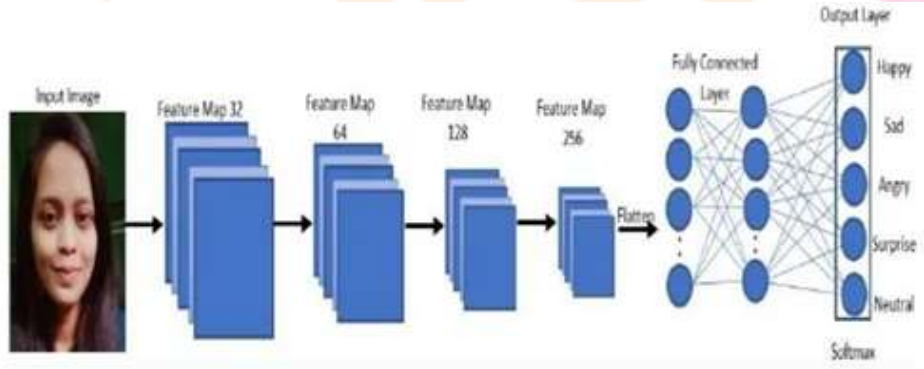

Figure 2. Emotion Detection (CNN).

The image's class will be binary or a multi-class classification for recognising digits or distinguishing different ap-Parel items. Neural networks are like a black box, with no interpretable learning characteristics. In essence, we provide an input image, and the CNN model gives the results. Loading the model, which has been trained by weights using CNN, is used to identify emotions. When a user takes a real-time image, it is submitted to the pre-trained CNN model, which predicts the emotion and adds a label to the image.

5.3 Songs and Movie Recommendation

Song and Movies recommendation is hardcoded with imdb and spotify links for each type of classified image. So, the system recommends emotion for real-time image and according to emotion detected, songs and movies are recommended.

Figure 3. Landing Page.

6. RESULTS AND DISCUSSION

6.1 Results of Descriptive Statics of Study Variables

Landing page consists of features like a “Let’s Start” button and “Team Info” button in the window. If the user clicks “Let's Start” button it will direct him/her to the face detection window.

The system detects faces and provides emotion. After providing emotion it directs to the next page which shows emotion detected and two buttons that are 1. Movies and 2. Songs.

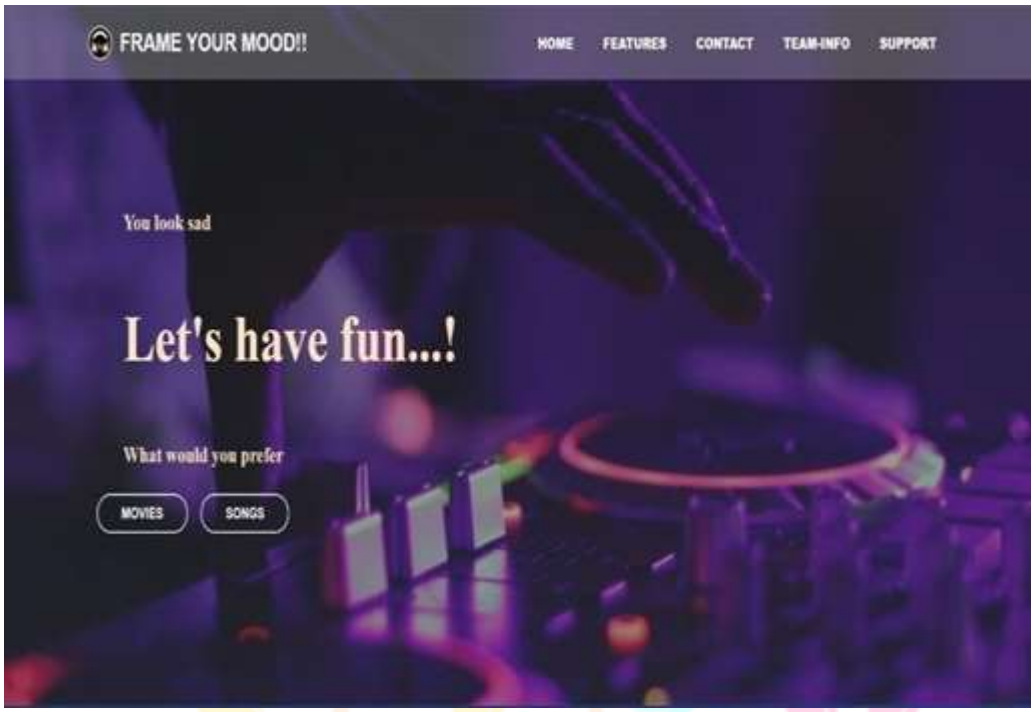

Figure 5. Emotion Detection

Clicking on the “Movies” and “Songs” button will take you to the recommendation page where all movies and songs are recommended according to mood. Also these movies and songs recommended by clicking on it, u will be directed to imdb and spotify links for respective movie and song clicked.

Figure 6. Movie Recommendations\

Figure 7. Songs Recommended.

7 FUTURE SCOPE

This system, while fully functional, has room for development in the future. There are several components of the programme that may be tweaked to generate better results and a more seamless overall user experience. Some of them are an alternate way based on extra emotions such as contempt and fear that are not allowed in our system. This feeling includes instinctively supporting the performance of music. The system's future scope would design a mechanism that might be used in music therapy treatment and assist music therapists in treating patients suffering from mental stress, anxiety, acute depression, and trauma. Because the present system performs poorly in extremely low light circumstances and has poor camera resolution, there is a potential to add additional functionality as a remedy in the future.

8 CONCLUSION

According to a thorough examination of the literature, there are several techniques to implementing a Music Recommender System. A review of past scientists' and developers' methodologies was conducted. Our system's objectives were set based on the findings. As the power and benefits of AI-powered apps become more prevalent, our project will be a cutting-edge use of this growing technology. We present an explanation of how music may affect the user's mood and how to pick the correct music tracks to improve the user's moods in this system. The technology in place can identify the user's emotions. The system can identify happy, sad, angry, neutral, or shocked emotions. Following the determination of the user's sentiment, the suggested system presented the user with a playlist of music matching that recognised the user's mood. Processing a large dataset is memory and CPU expensive. This will make development more difficult and appealing. The goal is to construct this application as cheaply as feasible while using a standardized hardware. Users' efforts in constructing and managing playlists will be reduced by our music recommendation system based on facial emotion detection

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