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Song Recommendation Based on Facial Expression Using Machine Learning

[1)] Mr. K. Arjun, [2)] Mr. N. Kabilan, [3)] Mr. P. Rajeshwaran, [4)] Mr. K. S Arun

[1,2,3]Final year / Cyber security, Mahendra Engineering College, Namakkal
Email: arjunkannaiyan@gmail.com, Email: kabilann@myyahoo.com , Email: rajeshwaran5826@gmail.com
[4]Assistant Professor / Cyber Security, Mahendra Engineering College, Namakkal, Email: arunks@gmail.com

ABSTRACT:

Mood Detection model can detect face from any images and then it can predict the emotion from that face. We can do it from both still images and videos. After predicting the emotion from face our recommender system take the predicted emotion as input and generate recommendation by processing spotify dataset from a Kaggle contest. We predicted the music mood from model trained with datasets. The recommender system will generate songs to recommend from the spotify playlist.

Keywords: Face Recognition, Feature extraction, Emotion detection, Convolutional Neural Network, Tkinter,Open CV.

1. Introduction:

People tend to express their emotions, mainly by their facial expressions. Music has always been known to alter the mood of an individual. The project aims to capture the emotion expressed by a person through facial expressions. A music player is designed to capture human emotion through the web camera interface available on computing systems. In some cases, mood alteration may also help in overcoming situations like depression and sadness. With the aid of expression analysis, many health risks can be avoided, and also there can be steps taken that help brings the mood of a user to a better stage. The dataset we used for emotion detection is from HAAR Facial Expression Recognition. Implementation of facial emotion detection is performed using Convolutional Neural Network which gives approximately 95.14% of accuracy. We built the Convolutional Neural Network model using the Kaggle dataset. The database is which is split into two parts training and testing dataset. The training dataset consists of 24176 and the testing dataset contains. There are 48x48 pixel grayscale images of faces in the dataset. Each image in FER is labeled as one emotions: happy, sad, angry, surprise, and neutral. The faces are automatically registered so that they are more or less center in each image and take up about the same amount of space.

1.2 Objective:

He objective of recommending songs based on facial expressions using machine learning involves leveraging facial recognition technology and algorithms to interpret and analyze a person's facial expressions in real-time or through images/videos. The goal is to understand the emotional state of the individual and suggest songs that align with their mood or emotions.

1.3 Overview:

Recommendation systems based on facial expressions and machine learning involve analysing facial cues to understand emotions and preferences, then suggesting songs accordingly. By combining facial expression analysis with machine learning techniques, such a system can potentially offer personalized song recommendations based on the detected emotions, enhancing user experience in music discovery and enjoyment.

2. Literature Review:

Proposed a paper which focused on the study of changes in the curvatures of the face and the intensities of the corresponding pixels. The used Artificial Neural Networks (ANN), which was used to classify the emotions.

Proposed two significant categories for facial feature extraction, which included Appearance-based feature extraction and geometric based feature extraction, which included extraction of some essential points of the face such as mouth, eyes, and eyebrows.

Determines the mindset of the user by using facial expression Humans often express their feeling by their expressions, hand gestures, and by raising the voice of tone but mostly humans express their feelings by their face.

This process of representing the data is called a feature-point detection method. This process can also be done by using Haar Cascade technology provided by Open CV.

2.2 Existing System:

The existing systems mentioned here;

We have used a Convolutional Neural Network for emotion detection. For music recommendations, Tkinter are used. Our proposed system tends to reduce the computational time involved in obtaining the results and the overall cost of the designed system, thereby increasing the system's overall accuracy. Facial expressions are captured using an inbuilt camera.

2.3 Disadvantage of existing system:

Huge storage requirements. Machine learning technology requires powerful data storage detection can be vulnerable. We've outlined the way in which facial detection can be thrown off Potential privacy issues. There is disagreement on whether face detection is compatible with human privacy rights. Huge storage requirements. Machine learning technology requires powerful data storage. Detection can be vulnerable. We've outlined the way in which facial detection can be thrown off. Potential privacy issues. There is disagreement on whether face detection is compatible with human privacy rights.

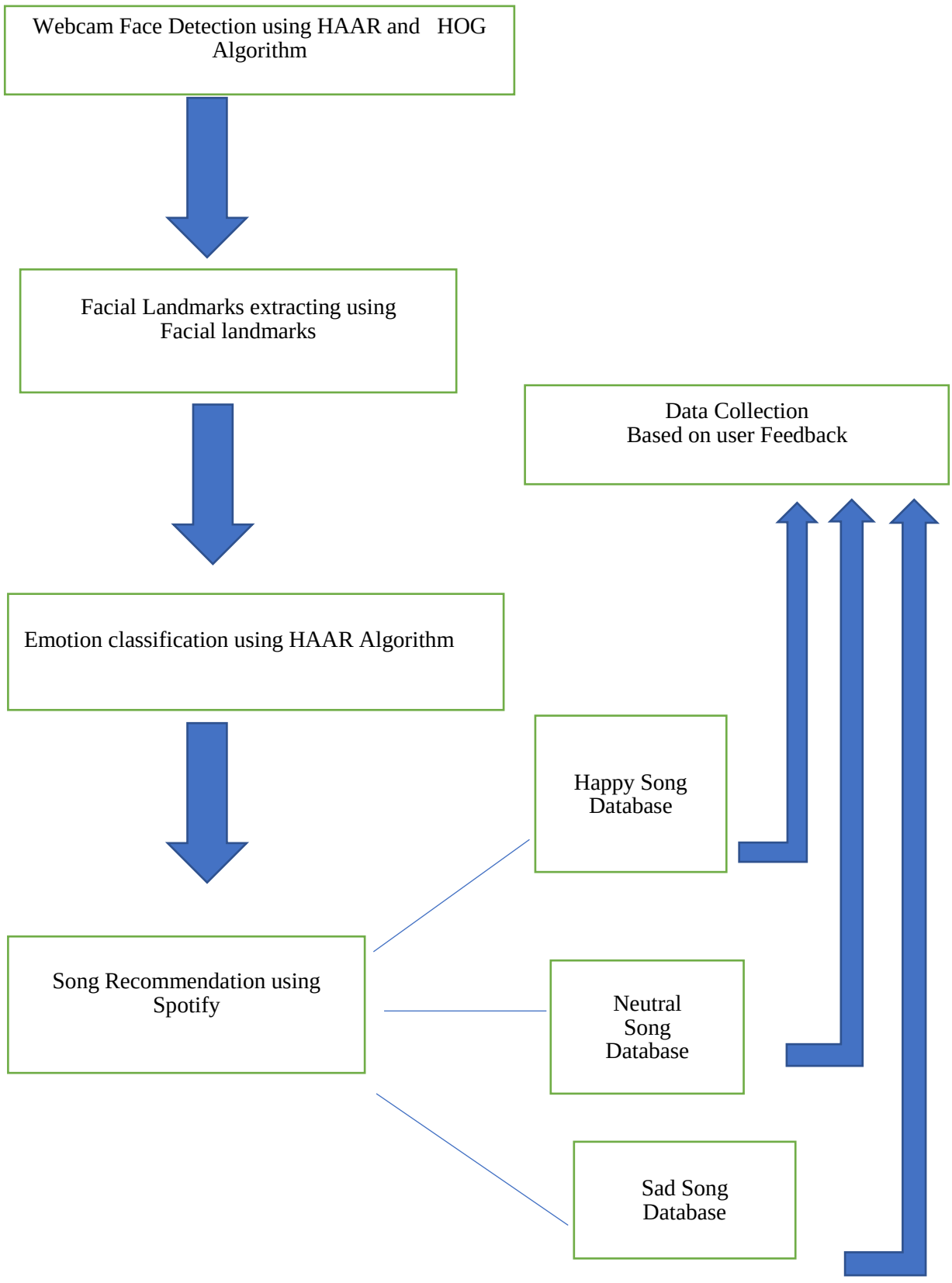
3. Proposed Methodology:

- Real-Time Capture: In this module, the system is to capture the face of the user correctly.
- Face Recognition: Here it will take the user's face as input. The convolutional neural network is programmed to evaluate the features of the user image.
- Emotion Detection: In this section extraction of the features of the user image is done to detect the emotion and depending on the user's emotions, the system will generate captions
- Music Recommendation: Song is suggested by the recommendation module to the user by mapping their emotions to the mood type of the song.

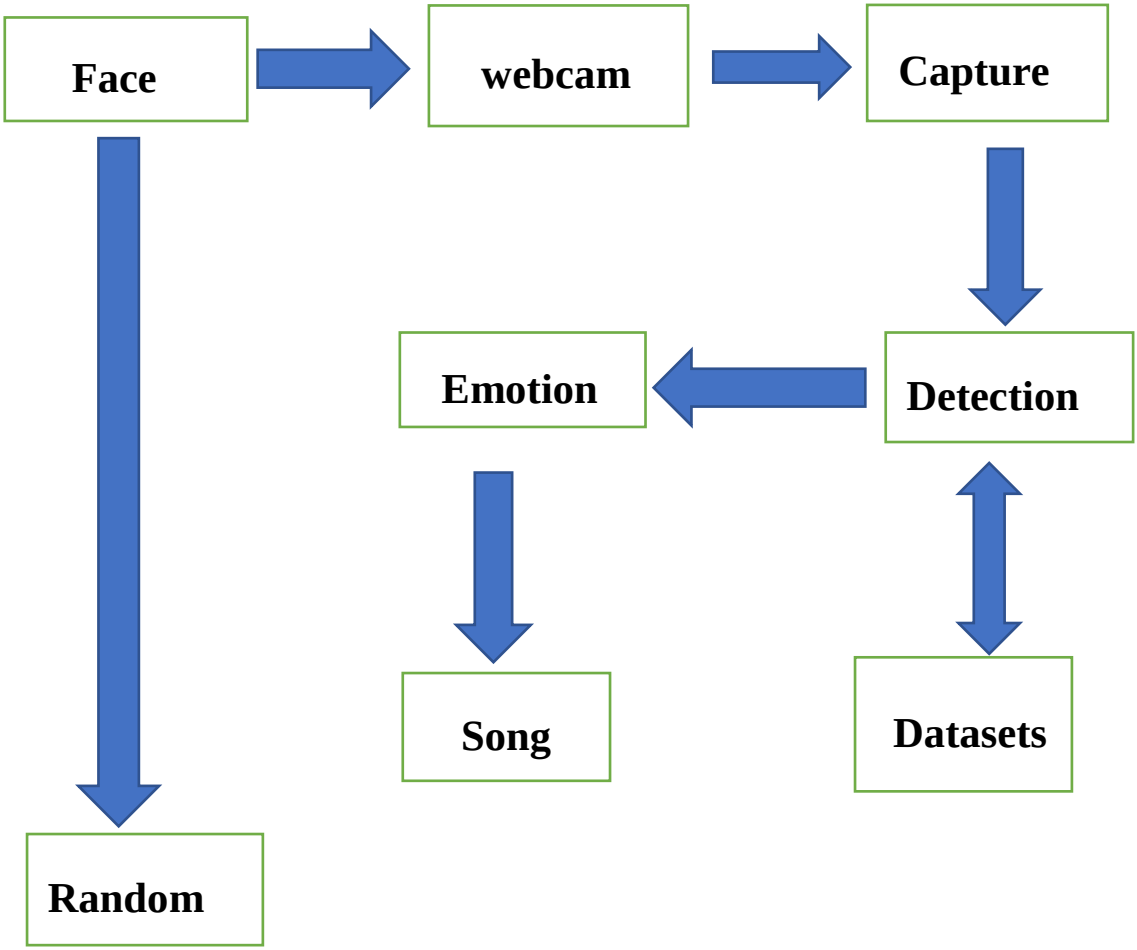
3.1 Modules Description:

- The emotion function takes care of emotion detection. The pretrained model is loaded using the load_model function in TensorFlow. HaarCascade classifier is also loaded from the OpenCV package. The emotion function takes an image as input. It pre-processes the image and applies HaarCascade classifier. If no face is found nil label is returned else it takes the last face found and sends it to the loaded vgg16 model. The model makes predictions about the image. The predictions are analysed and emotion label is returned.
- The requestAuthorization() function takes care of the sets the parameters for requesting authorization and procuring an access token. The callAuthorizationApi() function sends a post request to the Spotify accounts service which returns the access token. This token is used in every request that are sent here after for authentication purposes.
- The server is built on a flask framework. It has two routes namely home and emotion. The home route returns the application webpage and the emotion route receives an image and returns an emotion label. The emotion route uses the emotion function for emotion detection.

3.2 System Architecture:



3.2.1 UML DIAGRAM:



3.3 Result:

Fig.3.5.1 Emotion Music Recommender Happy.

Fig 3.5.2 Emotion Music Recommender Sad.

3.4 Limitation & Future Work:

- The system still is not able to record all the emotions correctly due to the less availability of the images in the image dataset being used.
- The image that is fed into the classifier should be taken in a well-lit atmosphere for the classifier to give accurate results.
- The quality of the image should be at least higher than 320p.

3.4.1 Future Work:

This system, although completely functioning, does have scope for improvement in the future. There are various aspects of the application that can be modified to produce better results and a smoother overall experience for the user. Some of these that an alternative method, based on additional emotions which are excluded in our system as disgust and fear. This emotion included supporting the playing of music automatically. The future scope within the system would style a mechanism that might be helpful in music therapy treatment and help the music therapist to treat the patients suffering from mental stress, anxiety, acute depression, and trauma. The current system does not perform well in extremely bad light conditions and poor camera resolution thereby provides an opportunity to add some functionality as a solution in the future.

3.5 Conclusion:

Thorough review of the literature tells that there are many approaches to implement Music Recommender System. A study of methods proposed by previous scientists and developers was done. Based on the findings, the objectives of our system were fixed. As the power and advantages of AI-powered applications are trending, our project will be a state-of-the-art trending technology utilization. In this system, we provide an overview of how music can affect the user's mood and how to choose the right music tracks to improve the user's moods. The implemented system can detect the user's emotions. The emotions that the system can detect were happy, sad, angry, neutral, or surprised. After determining the user's emotion, the proposed system provided the user with a playlist that contains music matches that detected the mood. Processing a huge dataset is memory as well as CPU intensive. This will make development more challenging and attractive. The motive is to create this application in the cheapest possible way and also to create it under a standardized device. Our music recommendation system based on facial emotion recognition will reduce the efforts of users in creating and managing playlists.

References

- Ahmed M. AlHosani, et al. - IEEE Access
- Jiajia Liu, et al. - IEEE Transactions on Emerging Topics in Computational Intelligence
- Yiran Wang, et al. - IEEE Internet of Things Journal.
- Shaohua Tan, et al. - IEEE Sensors Journal
- Yew Cheong Hou - Institute of Informatics and Computing in Energy.
- Mohd Zafri Baharuddin - College of Engineering, University Tenaga Nasional, Kajang, Selangor, Malaysia.
- Salman Yussof - Institute of Informatics and Computing in Energy.
- Sumayyah Dzulkifly - Institute of Informatics and Computing in Energy.