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Facial Recognition Music Player Based On Emotions

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ABSTRACT:

The grimace of a man is a vital organ in the human body that communicates the individual's mood and emotional condition. [3] Creating and managing big playlists, as well as selecting songs from these playlists, takes a lot of time and effort. As a result, it would be really beneficial if the music player chose a song based on the user's current mood.. As a result, an application might be created to reduce the time spent managing playlists. In this paper, we will look at how to automatically determine a user's mood and give him with a playlist of songs that are appropriate for his current mood. The image is recorded with a camera and then passed through many stages to determine the user's mood or expression.. As a result, the application was created in such a way that it can manage user-accessible content, assess image attributes, and identify the user's mood. The application also allows you to sort songs by mp3 file attributes so that they can be added to appropriate playlists based on your mood [2].

KEYWORDS:

Emotion Recognition, Facial Landmark Extraction, Linear Classifier, SVM Classification

1. INTRODUCTION

Technology has transformed things that used to be done manually to automation. Music player is not an exception. Every day, new ideas are invented to make living easier. A person's facial expressions can disclose a lot about their mood and feelings. A person's affective state, cognitive activity, purpose, and psychopathology are all visible in their facial expression. The ability to interpret and analyze an individual's emotional state has been bestowed to Homo sapiens. Machines, on the other hand, were devoid of a complex brain like

a human's, which could precisely recognize, distinguish, and perceive various emotions. As a result, the desire to create advanced intelligent systems with such abilities persists. Facial Expression Recognition (FER) developed an algorithm that excelled at meeting such requirements. FER allowed computer systems to effectively monitor and react to an individual's emotional state [5]. Computer systems could exploit these phenomena to better human-machine interaction (HMI), bridging the gap between humans and technology.. Faces can be characterized in a variety of ways, including non-prototypic expressions like "raised brows." emotive labels (e.g., 'happy') or facial movements (e.g., the action units described in the facial action coding system (FACS) [9]) are prototypic expressions. Most people have a large number of songs in their Music Player and prefer to listen to the song that is presently playing rather than browse through it. When the song does not fit the user's current emotion, the user becomes stressed. In addition, there is no commonly used Google Play Store app that can play songs based on the user's current mood. Multidisciplinary efforts such as emotion description, emotion detection/recognition, feature-based classification, and inference-based recommendation are necessary to create a content-based music recommendation system. To help the system understand the user's emotions, we use facial expression. Using our computer's camera, we can capture the user's facial expression. Many emotion recognition systems employ a captured image as an input to determine the emotion. In this application, we use neural networks to recognize emotion.

LITERATURE SURVEY

To enhance people's behavior, various strategies and procedures have been devised. The approaches provided are limited to a few basic emotions. Nikhil Zaware et al. pointed out that creating and managing big playlists, as well as selecting songs from them, requires a lot of time and effort.

Face detection algorithms are classified into two types: holistic (where the face is examined as a whole unit) and analytical (where the face is viewed individually) (where the co occurrence of characteristic facial components is investigated). Pantic and Rothkrantz established a method for processing frontal and profile facial photos. Vertical and horizontal histogram analysis are used to define face borders. To obtain the facial contour, the image is then threshed and held with HSV color space values. Kobayashi and Hara used a

monochrome image to determine the face brightness distribution. The position of the face is estimated using iris localization [4].

Pantic and Rothkrantz chose a set of facial points from frontal and profile face pictures.. The expression is calculated using the distance between the positions of those spots in the starting image (neutral face) and the peak image (affected face) [Cohn et al. developed a geometric feature-based system that uses the optical flow approach only on 13x13 pixel zones around facial landmarks. Shan et al. investigated the use of a Local Binary Pattern for texture encoding in the description of facial expressions. There were two approaches for extracting features proposed. The first method pulls attributes from a specified set of patches, while the second method chooses the most likely patches via boosting. Machine learning theory is used to do the classification job, which is the final phase of the FER system.

A set of features taken from the face region in the previous stage is sent into the classifier. Because classification needs supervised learning, labeled data should be included in the training set. Some of the machine learning approaches used for classification tasks include K-Nearest Neighbors, Artificial Neural Networks, Support Vector Machines, Hidden Markov Models, Expert Systems using rule-based classifiers, Bayesian Networks, or Boosting Approaches. To recognize emotional states from facial expressions, models and automated methods have been developed. [11]. In the levels above, different sizes and facial orientations are key issues. They're usually triggered by changes in camera distance or subject movement. Significant body movements can cause large changes in the position of the face in consecutive frames, complicating tracking. Tracking can be difficult due to the variety of lighting scenarios and the richness of the background.

When there are numerous faces in an image, the system should be able to determine which one is being watched.

METHODOLOGY

The proposed algorithm in this example involves a music selection system based on emotion, which allows for the production of a tailored playlist based on the user's emotional state. The suggested technique includes the following modules.

1. Upload an image
2. Image Validation

3. Face Recognition
4. Extraction of a Landmark Point
5. Information on the training
6. SVM Training & Trained SVM
7. Music Player

IMAGE INPUTS: According to the architecture diagram, the first step is to take a picture. To capture the user's image, we will use a webcam. Certain requirements must be followed when capturing an image, such as the user being close to the camera when there are numerous users, and the user's face not being tilted

.IMAGE: A training image is provided by the database. The database that was used was JAFFE. [14] The database contains 213 photos of 10 Japanese female models posing in six different facial expressions (anger, disgust, fear, joyful, sad, and surprise) as well as one neutral face.

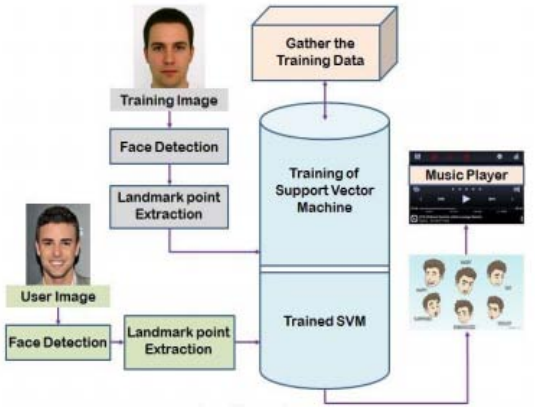
FACE DETECTION: Only the face is recognized from the complete image using particular approaches. The Viola-Jones approach is used to detect faces. Moods are recognized. Moods have an impact on behavior, but they do not necessarily regulate it [12].

LANDMARK POINT EXTRATION: This module recognizes 68 landmarks and passes them along to SVM for training and testing. [7] Each musical component corresponds to one of the traditional musical dimensions outlined in music theory.

TRAINING DATA: The data for training SVM, as well as the labels that go with it, are saved in a file. The training data consists of 68 landmark points extracted from photographs in the JAFFE database.

SVM TRAINING & TRAINED SVM: The data for training SVM is collected and provided in this section. The labels are also given manually for SVM training. This data and label are used to train the SVM.

MUSIC PLAYER: This is a real music player in which all of the tracks are sorted according on the emotions of the user.



PROBLEM STATEMENT

It is tough for music listeners to manually generate and divide the play-list when there are hundreds of tracks. It's also difficult to keep track of all the songs: some are added but never played, wasting a lot of device memory and forcing the user to find and delete songs manually. Each time, users must actively choose songs based on their interests and mood. It's also difficult to reorganize and play music as users' play styles vary. Playlists are currently used to organize music in existing apps, and playlist tracks cannot be modified or changed in a single click. A user must manually change or update a song in their playlist every time they want to do so. Songs in a play-order list's may alter over time, and songs that a user wants to hear on a regular basis may not be given priority or may be removed entirely.

RESULT AND DISCUSSION

SIGN UP SCREEN

When a user initially opens the app, they must sign up for the request, as indicated in the diagram below. A valid email address, user name, and password must be provided by the user. If a user forgets his password, an email is sent to the registered email address with a password reset link. All of the data is operational, and the account creation procedure is inished. The same email address cannot be used to create multiple accounts [3].

LOGIN SCREEN

The user must provide their registration email address and password to access the program, and the information will be stored in the cloud. The application saves the user's credentials by default. The application can be uninstalled at any time by the user.

COMPARATIVE ANALYSIS ON FACIAL RECOGNITION ALGORITHMS

Face recognition algorithms are primarily divided into two types. One approach is algorithmic in nature (PCA, LDA, ICA, and so on), whereas the other is AI-centric (e.g. Supervised and unsupervised learning methods such as SVM, Neural Networks etc.). Selecting any two of these algorithms and running them on some example data is one method to get a rough grasp of these two techniques. For these objectives, there are numerous databases that are publicly available online. After looking over some of the available approaches and tools, it became clear that some of them would take too much time to go over in detail. In this regard, MATLAB seems to be a good choice. This is a fourth-generation programming language and numerical computing environment that is widely utilized by educational and research institutions all over the world. Despite the fact that it is a Math Works proprietary product, it has a sizable user base all over the world. Many times, experienced researchers and users apply the methods that are commonly offered for use in facial recognition. Other users are occasionally given access to the real implementation. Two of these were chosen to be implemented in this study in order to save time. The latest version of MATLAB R2011b was used as the implementation tool.. Along with the core Matlab environment, two toolboxes are required to carry out the experiments: image processing toolbox and neural network toolbox. The first toolbox is required to create the first portion, which is Eigenfaces-based face recognition, and the neural network toolbox is required to test the neural network-based face recognition technique [6].

CONCLUSION AND DISCUSSION

This project was intended to aid us in making substantial advancements in the field of machine learning. This music player performs flawlessly. It improves music processing by

recognizing the user's emotions, such as joy or sorrow. As a result, my efforts are exclusively focused on creating a user-based player that may help us relax when we have free time or leisure time and want to listen to music that is relevant to our current condition. The Audio Player is utilized to provide a better experience for the end user. The app satisfies music listeners' basic needs without bothering them in the way that other programs do: it employs technology to improve the program's relationship with the user in a variety of ways. It minimizes the end user's functioning, determines their mood, and personalizes it by capturing the image with a camera.

The next part of the program will develop a potentially beneficial approach to music therapy treatment and provide the music. People with mental illnesses such as sorrow, anxiety, serious depression, and trauma can be treated with the help of a counselor. In addition, the proposed method reduces the likelihood of unfavorable outcomes induced by low camera resolution and harsh illumination. To improve the app's functionality, changes and additions can be introduced.

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