EMOTIONS BASED MUSIC PLAYER USING ML

ABSTRACT

Human expression plays a vital role in determining the current state and mood of an individual, it helps in extracting and understanding the emotion that an individual has based on various features of the face such as eyes, cheeks, forehead or even through the curve of the smile. Music is basically an art form that soothes and calms human brain and body. Taking these two aspects and blending them together our project deals with detecting emotion of an individual through facial expression and playing music according to the mood detected that will alleviate the mood or simply calm the individual and can also get quicker song according to the mood, saving time from looking up different songs and parallel developing a software that can be used anywhere with the help of providing the functionality of playing music according to the emotion detected. By developing a recommendation system, it could assist a user to make a decision regarding which music one should listen to helping the user to reduce his/her stress levels. The user would not have to waste any time in searching or to look up for songs and the best track matching the user's mood is detected, and songs would be shown to the user according to his/her mood. The image of the user is captured with the help of a webcam. The user's picture is taken and then as per the mood/emotion of the user an appropriate song from the playlist of the user is shown matching the user's requirement.

INTRODUCTION

When using conventional music players, the user had to manually browse the playlist and choose songs that would lift his or her spirits and emotional state. The work required a lot of labour, and coming up with a suitable list of tunes was frequently difficult. The development of Music Information Retrieval (MIR) and Audio Emotion Recognition (AER) provided the traditional systems with a function that automatically parsed the playlist based on various emotional classifications. The goal of Audio Emotion Recognition (AER) is to classify audio signals according to distinct emotional categories using certain audio properties. An important aspect of the study of music information recognition (MIR) is the extraction of distinct audio aspects from an audio stream. By eliminating the need for manual playlist segmentation and song annotation based on user emotion, AER and MIR improved the functionality of conventional music players. However, these systems lacked the necessary mechanisms to allow a music player to be controlled by a user's emotions. Information retrieval methods are less efficient since the current algorithms produce unpredictable returns and frequently increase the system's overall memory overheads. They are unable to quickly extract useful information from an auditory source. Current audio emotion recognition algorithms use mood models that are slackly connected to a user's perception. The state-of-the- art lacks designs that can create a personalized playlist by deducing human emotions from a facial image without using additional resources. The current designs either use extra hardware or human voice. The project suggests an approach designed to reduce the downsides and flaws of the current technology. The project's main goal is to create a precise algorithm that will produce a playlist of songs from a user's playlist in accordance with that user's emotional state. The algorithm is less computationally intensive, uses less storage, and costs less to use more hardware. It classifies face images into one of four categories: sad, angry, neutral, or happy.

PROBLEM STATEMENT

One's life is significantly impacted by music. It serves as a significant form of entertainment and is frequently used therapeutically. The development of technology and ongoing breakthroughs in multimedia have led to the creation of sophisticated music players that are rich in features like volume modulation, genre classification, and more. Although these capabilities effectively met each person's needs, a user occasionally felt the need and desire to browse through his playlist in accordance with his mood and emotions. The work required a lot of labour, and finding the right song list was frequently difficult. Therefore, an emotion-based music player will employ face feature tracking and facial scanning to identify the user's mood and then create a customised playlist for them, making the procedure simple for them. It will give music lovers and connoisseurs a better experience

OBJECTIVES

The primary objective of an emotion-based music player is to improve the existing music player. In given approach it helps the user to automatically play songs based on the emotions of the user.

- Characteristics of facial expressions are captured using an inbuilt camera.
- The captured image is filtered to grayscale image.
- The Extraction of facial features
- The emotion of the user's image will be mapped.
- Generating songs based on user preference.

PROPOSED SYSTEM ARCHITECTURE (IN DETAIL)

The objective of this work is to detect emotion and select music to be played based on the detected emotion. Human emotions can be describe through music, We are trying to build and application which will detect the user emotion and play the song according to the mood and also helps to search song based on song name.

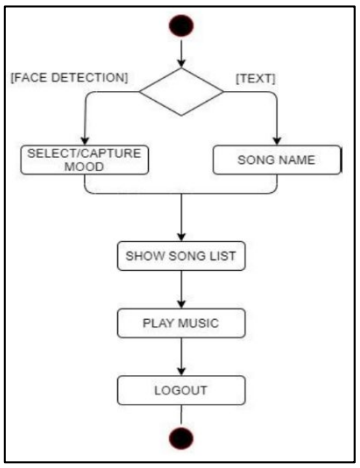


Fig. Activity Diagram

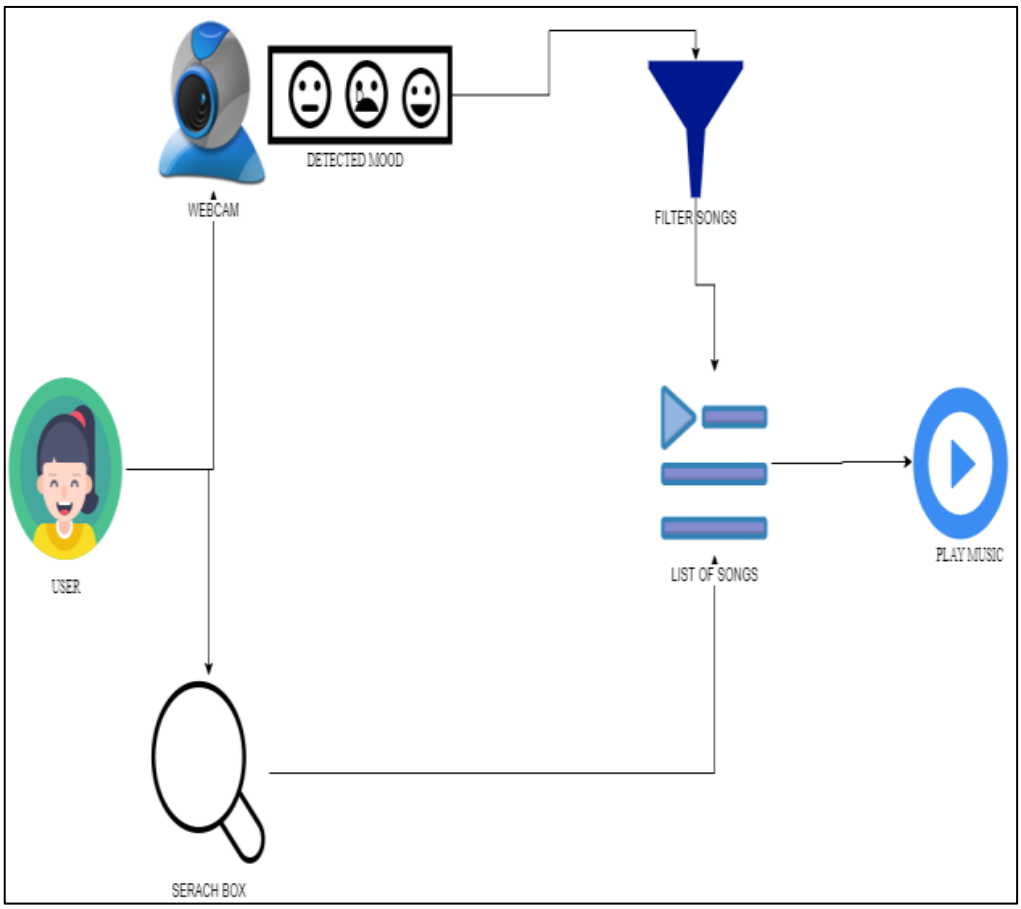


Fig. Architecture diagram

MODULES (IN DETAILS)

Face Detection

OpenCV – It uses machine learning algorithms to detect and recognize face, identify objects, classify human actions in videos, from camera to find similar images from an image database. OpenCV uses Haar Cascade classifier. Haar cascade classifier is a machine learning concept where a cascade function is trained from images both positive and negative. Based on the training it is then used to detect the objects in the other images. The algorithms break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to solve. These tasks are also called classifier this is what the initial dataset looks like. The dataset has various fields which need to be cleaned and all the category types have been converted to numeric.

Steps for OpenCV Algorithm

• Detect face using Haar cascade classifier.

• Load the image and convert it into grayscale.

• Once the image is converted from RGB to grey, the system will locate the features in face using "detect Multiscale" function.

• From the above step, the function detect Multiscale returns 4 values – X-coordinate, Y-coordinate, width(w) and height(h) of the detected features of the face. Based on these

4 values systems will draw a rectangle around the face.

Face Recognition

FisherFace – This algorithm extracts principle components that distinguish one user from another. So, now a user's features can't suppress another user's features. By applying PCA method face spaces are reduce and then obtaining the feature of image by applying LDA method.

Steps for FisherFace Algorithm

• Using webcam or already saved image the similar data gets collected in the form of images.

• Image Processing

Pre-processing stage: The collected images are then converted into greyscale and then divided into two sub parts training data and testing data.

Processing stage: Vector of facial image is generated by applying the facial method and later it is match with the vector of traits of training image with vector characteristic of test image using Euclidean distance formula.

- Feature generation: Features are extracted

In FER-2013 dataset the training dataset consist of 28,000 images, the development set contains 3,500 images, and 3,500 images in the test set. The dataset has seven emotions: happy, sad, angry, afraid, surprise, disgust, and neutral, with happy being the most prevalent emotion, providing a baseline for random guessing of 24.4%. The images in FER-2013 consist of both posed and unposed headshots, which are in grayscale and 48x48 pixels. The FER-2013 dataset was created by gathering the results of a Google image search of each emotion and synonyms of the emotions.

SYSTEM REQUIREMENT

Recommended System Requirements

Processors: Intel® Core™ i5 processor 4300M

RAM: 8 GB of RAM

Disk space: 2 to 3 GB

Operating systems: Windows® 10, macOS*, and Linux*

Minimum System Requirements

Processors: Intel Atom® processor or Intel® Core™ i3 processor

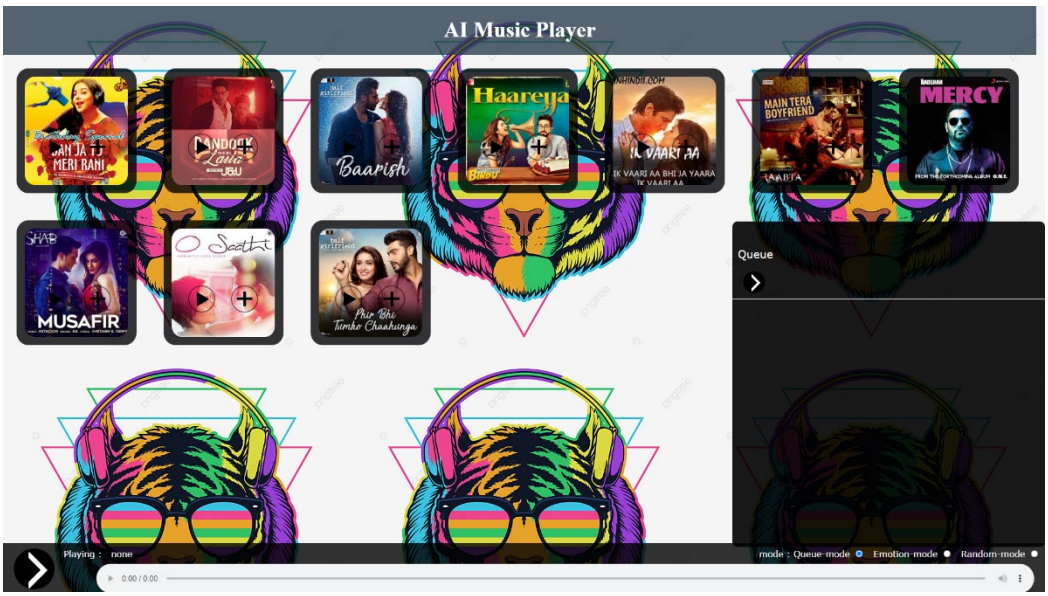
Disk space: 1 GB

Operating systems: Windows* 7 or later, macOS, and Linux

CONCLUSION

Music Player has changed in many different ways since it was first introduced. Now-a-days people like to get more out of different applications, so the designing of applications and the thought process behind it has changed. The users prefer more interactive & sophisticated yet simple to use applications. The proposed system (Facial Expression based Music Player) presents a music player capable of playing the songs based on emotion detected and thereby providing the user with an easy way to play.

Similarly, we have imported the data sets and libraries and needed data for the final implementation of the system.



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