

EMUSIC USING SUPPORT VECTOR MACHINE LEARNING ALGORITHM

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ABSTRACT

The emotion or mood of a user can be detected by their facial expressions. Those expressions can be extracted from the live feed through the system's camera. Machine learning provides various techniques, one of which is detection of facial expression. It connects us across markets, aeons, backgrounds, dialects, political views, and financial status. Nowadays, music applications and other streaming services are of high demand and are sought by many people not restricted to ages as there are a remarkable and rapid evolution of multimedia, digital music, and cellular networks. Most of the people use music for their mood regulation, increase energy level, and more specifically to change their unpleasant mood or reduce tension. In addition to it, by tuning in to the right type of music at the apparent time may refine your mental health. Thus, human emotions or mood have a intense bond with music. Here, in this project, we propose an efficient solution to meet the people needs in music by live feed and Support Vector Machine learning algorithms.

Keywords: Facial expression, Live feed, Support vector machine learning.

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INTRODUCTION

Music is a universal language. It connects us across nations, culture, and religion. It is the pulse of every individual. Everybody use music as a tool to express their emotion, mental state, and to express themselves in which words cannot. Music is being a great influence and plays an integral part in everyone's life. Facts show that music has a great influence on one's mental and physical well-being. There are many music applications which enable users to select songs from a list categorized by genres such as happy, sad, calm, and party, by dialects, by the artist who sang the song, the music composers, or the actors. One of the problems of conventional music applications is that it enables the users to select songs through text search or voice search and sometimes suggests random songs that are not present in the users' desired list.

With the technological advance in every field, especially the involvement of AI and machine learning in the field of multimedia has brought about rejuvenating revolution.

We propose an application that provides a seamless use and suggests songs to the users form the playlist containing the users' desired songs. The process of playing the songs to the user is carried out by capturing the user's emotion or mood as an input and comparing it with the genre of music. The songs are filtered out in the playlist for every emotion and played.

EXISTING SYSTEM

In the present age, with the leading-edge technologies and ever-growing technologies in the field of multimedia, numerous music applications or players possess the features such as music categorization, browsing, streaming options, music collections, conventional play, pause and stop options, and genre classification. The system was easy to use with the detection of mixed emotions with some accuracy; it contains a separate playlist for each emotion that a human is expressing [1].

Even though these features appease the user's fundamental requirements and even if the song can be downloaded from the playlist, it is only available for the android users with the version of 7 and more and for

the user with windows 7 and above [2] (Fig. 1). The application may not work under bad light area and with a bad camera resolution [3] (Fig. 2).

Hence, a user occasionally suffers through the need and desire of running through his/her playlist, in accord with his emotions and mood which may lead to more time-consumption.

PROPOSED SYSTEM

In the proposed system, the emotions are perceived using a machine learning method support vector machine (SVM) algorithm-supervised learning model. The training dataset utilized here is Olivetti faces that contain 400 faces with its fitting values or parameters. The camera that captures the image of the user or obtained from pre-captured image procures the facial features of the user. The training process involves initializing some random values and adjusting it until the predicted output values match the model's prediction. A model which is not used for training is provided as a model for testing to evaluate the performance and to check its efficiency of how it would perform when used in real. Based on the emotion, the music will be played from the playlist.

ARCHITECTURE

In this proposed system, the user opens the browser and the web camera captures the face emotion of the user. From the captured images, features are extracted, the emotion is recognized and it will be sent to the system where the model is trained using the training set using SVM and Fisher face Algorithm. The desired songs are then played by comparing the user's emotion with the genre of music stored in the databases.

MODULES

There are four modules

- Capture image
- Analyze image
- Extract features and emotion detection
- Songs based on emotion.

Capture image

In this part, the web camera captures the image to analyze the emotions. Hence, if it is success, it is taken to the further process.

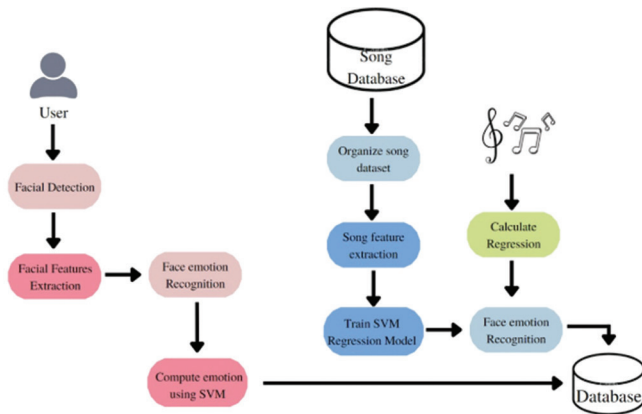


Fig. 1: Architecture diagram

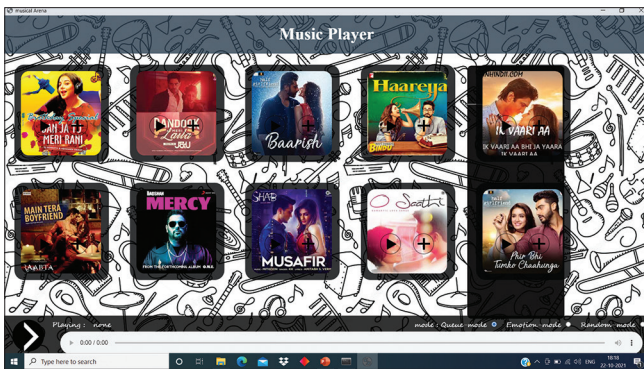


Fig. 2: Playlist image

Analyze image

Here in this portion, the image that was captured in the above process will be analyzed. If capturing the image is a failure, the image will be recaptured until the sufficient quality of the image is captured Figs. 1 and 2.

Extract features and emotion detection

This process does the calculation using the bounding box calculations to know the emotion of the face of the user. The bounding box calculation particularly does the calculation of the mouth and the nose to detect the movement and expressions. After the calculation process, the emotion detection of the user is detected, which can be happy, sad, angry, or neutral by extracting the features from the image [5].

Songs based on emotion

So as of now, the detection of emotion happens using the fisher face algorithm based on the datasets and the trained models. Finding the song based on the mood is the next and final process.

ALGORITHM FISHERFACE ALGORITHM

Fisherface algorithm is one of the most popular and which is widely used for facial recognition and is said to be the master for other techniques, such as eigenface considering the training process efforts. Using Fisherface in this study, it is to facilitate the development of a face recognition program using a Papuan facial image created using GUI applications and databases. Image recognition takes place to obtain characteristics of an image using fisher's linear discriminant method

or linear discriminant analysis to reduce the dimension of the face. Although for image or face recognition, Fisherface algorithm is while for the process of matching or identification of images, minimum Euclidean is utilized. Commonly, there are two types of image recognition system: Feature-based system and image-based system.

In the feature-based system, first, the features get deduced from the image of eyes, nose, and mouth, which are then geometrically modeled to define the relationship between them.

When it comes to image-based systems, for example, Principal Component Analysis, and wavelet transformations, the pixels in images are represented by certain types of methods that are then used for image identification, classification, and training.

SVM ALGORITHM

The most recognized machine learning – supervised learning algorithm is SVM. SVM is used for regression as well as for classification problems in machine learning. However, predominantly, it is used for the classification problems.

On the basis of Facial Landmark Detection algorithm, facial expression is detected after the facial extraction from the face of the user and it is further classified using SVM. The classifier's two techniques are as follows: Supervised and unsupervised classifying methods are used to categorise the user's extracted feature.

Under certain researches, both supervised clustering and unsupervised classification are combined together for event detection [6].

Now that, the images are classified using SVM, a playlist is generated containing different songs based on the expression or mood that has been detected so that the person will play and listen to the desired songs.

CONCLUSION

This project technologically advanced to give us great exposure in the field of machine learning technology. This project fulfills the need of the user to sort music or songs on the basis of the user's emotions, be it happy, sad, or angry. Hence, totally, our work aims to help the need of the user; music can be played in free time or leisure time to provide us with some relief from unpleasant moods or to regulate our mood in leisure time.

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