MUSIC BASED ON ARDENT DISPLAY OF EMOTIONS

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ABSTRACT
Songs have long been a preferred form of expression for expressing and comprehending human emotions. We can greatly benefit from reliable emotion-based categorization systems in helping us decipher their significance. The study of motion-based music categorization has not, however, produced the best outcomes. In this study, we introduce EMP, a cross-platform emotional music player that makes music suggestions depending on the user's current mood. By integrating emotion context reasoning skills into our adaptive music recommendation engine, EMP offers smart mood-based music recommendations. Three modules make up our music player: the queue-based module, the random music player module, and the emotion module. The CNN algorithm is used by the Emotion Module to analyze an image of the user's face and determine their mood with an accuracy of more than 85%. While categorizing songs into 4 different mood classes, the Music Classification Module achieves an impressive result by utilizing auditory characteristics. By matching the user's emotions to the song's mood type, the recommendation module proposes music to them. putting the user's choices into consideration

Keywords- CNN algorithm, EMP.

1.INTRODUCTION
The proportion of Thai individuals who experience stress has increased more rapidly during the last few years. This is due to several factors, including debt, rising product prices, a poor economy, expensive living costs, etc. [1]. According to data gathered in 2017 by the Thai Department of Mental Health from the Telephone Service for Mental Health Counsellors, stress levels among Thais have been on the rise. More than 30,000 calls were made, which is twice as many as in 2014.
There are several techniques to reduce stress, including working out, watching movies, meditating, and listening to music. Numerous studies have shown that listening to music can help people become more focused and relieve stress. Sadly, listening to music may not be beneficial if the music does not match the listener's present emotional state. So, in order to relieve tension, the right type of music should be chosen [4]. Additionally, despite the abundance of music player apps, none of them can choose songs based on the user's emotions.
The three parts that make up the suggested music player are the queue-based Module, the Random Music Player Module, and the Emotion Module. The CNN algorithm is used by the Emotion Module to analyze a photo of the user's face and determine their mood with an accuracy of more than 85%. The Music Classification Module successfully divides music into four different mood groups based on auditory parameters. Users are given music recommendations via the recommendation module by having their emotions compared to the song's mood category. Consider the preferences of the user.

2. RELATED WORK
2.1 Classification of Musical Emotions
The techniques for categorizing emotion in music are presented in this section. Following are some pertinent strategies that are concluded.

- To identify between musical emotions, Robert E. Thayer [2] uses rhythm, pace, intensity, pitch, and timbre. Based on energy and tension, he categorises different emotion kinds. While the tension is somewhere between cheerful and anxious/sad, the music's energy is somewhere between peaceful and lively. According to this study, there are eight different categories of music-related emotions: exuberance, frantic/anxiousness, contentment, depression, calm, energy, cheerful, and anxious/sad.

ISSN: 2278-4632
Vol-13, Issue-01, No.02, January 2023

- In order to classify musical emotions based on tags from the website Last.FM, Y. Song et al. [5] employ an SVM-based technique. The four emotions included in this study are happy, enraged, sad, and calm.
- Mood Cloud [6], a real-time music mood visualisation tool, divides musical emotions into five categories: angry, joyful, party, peaceful, and sad. The emotion dataset is analysed using the SVM library. A Flash player is then used to display the outcome.

2.2 Classification of Human Emotions

M. T. Quazi [3] uses heart rate to classify human emotions. Neutral, happy, sad, and furious are the four primary types of human emotions, according to research. Depending on the sort of happiness, the heart rate of emotions changes most between 60 and 80 beats per minute for the neutral feeling and between 70 and 140 beats per minute for the cheerful emotion. Sadness is the second most unexpected feeling (80-100 bpm). Although it will not go below 100 beats per minute, the heart rate linked with wrath is like the heart rate associated with happiness.

3.EXISTING MUSIC PLAYER

The emotional and behavioral state of the user has been categorized using a variety of techniques.
The songs in the music folder are played at random by the current music player. The human face expressions cannot be traced or identified, and the music cannot be played. Based on the kinds of songs that the user consistently plays, music is suggested. The same King of Pitch tracks are always suggested to the user if they listen to depressing music. Regardless of the user's facial expressions, the user login id is always used to monitor music pitch and propose the same genre of music. The current system features a recommendation system, but it lacks a real-time input-based categorization system.

3.1 Drawbacks

The system's shortcomings usually include the same style of music. This approach is antiquated since the user must actively look for music that matches his or her mood.

3.2 System Requirement

The only actor in the emotion-based music player is the user.
This actor has access to practically all the functionality of the programme, including the ability to create playlists, detect user emotions, and propose songs.

3.3 System Design

Figure 1 displays the proposed application's system overview. The programme will employ face detection to identify the user's emotion and assess the user's current mood before suggesting music from a database that was manually classified while the application was being created.

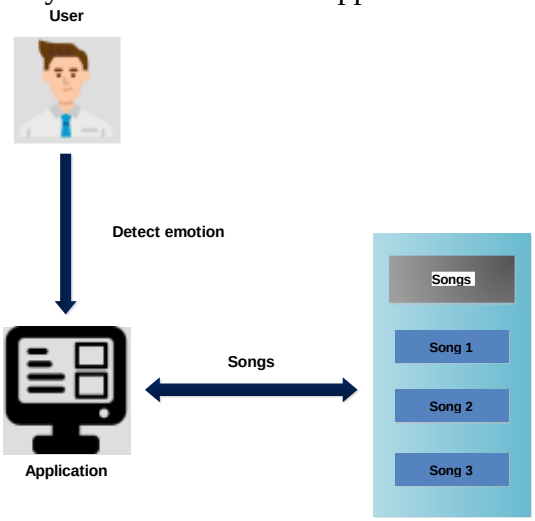


Figure 1

4.PROPOSED SYSTEM

Convolutional neural networks (CNNs) are used in our project on emotion recognition. CNN is used to build a computer model that more accurately divides emotions into the four moods of joyful, sad,

ISSN: 2278-4632
Vol-13, Issue-01, No.02, January 2023

angry, and neutral. We introduce EMP, an emotional cross-platform music player that makes music suggestions depending on the user's current mood. By integrating emotion context reasoning skills into our adaptive music recommendation engine, EMP offers smart mood-based music recommendations. By matching the user's tastes and feelings to the mood type of the music, the recommendation module proposes songs to the user. The user's emotion is determined by the emotion module. The music categorization module extracts pertinent and crucial audio data from a song. The suggested system is less difficult, performs better, and has high accuracy. For real-time input or real-time visuals, the system may be taught and tested**.**

4.1ADVANTAGES

Every time the song is played the system verifies the human facial emotions and the system is less complex, it also enhances with better performance and Superior accuracy compared to the current system.

5.SYSTEM IMPLIMENTATION

For input purposes, a webcam and a picture are needed for this programme. In this study, a camera is attached to a computer to capture the user's facial expression. Using the face detection CNN technique, the programme can assess the user's emotions from their facial pictures after receiving the input image of how they are feeling.

The algorithm will utilize the user's emotion to match and suggest music that have the appropriate mood after categorizing it. The songs will then be selected from a database and a playlist based on emotions will be created. The database currently contains 400 songs. The system administrator divides them into several emotion categories. The music is recommended depending on a user's choice, which might be favorable or unfavorable. For instance, if a user's preference is set to positive and his current feeling is sad, the program will recommend a joyful music that has elements of a cheer up song. On the other side, if a user's choice is set to negative, a sad song—which might be a heavy or pop song will be recommended.

6.USER EMOTION CLASSIFICATION METHOD USING CNN

6.1 Face Detection

The goal of face detection is to locate human face in photographs. Finding human characteristics like the nose, mouth, and eyes which are the simplest to find is one of the initial steps in face detection. utilizing the sophisticated facial detection method, CNN Algorithm, which provides reliable results. The items are recognized using a machine learning-based object detection algorithm. The method needs a lot of positive photos to train the classifier. Additionally, negative pictures of people and objects without faces are used.

6.2 Feature Extraction using CNN method

Convolutional neural networks are a type of deep neural network used most frequently to assess visual vision in deep learning. Based on the shared-weight design of the convolution kernels or filters that slide along input features and give translation equivariant responses known as feature maps, they are also known as shift invariant or space invariant artificial neural networks (SIANN). Contrary to popular belief, most convolutional neural networks only exhibit equivariance rather than invariance to translation. They are used in financial time series, recommender systems, picture classification, image segmentation, medical image analysis, and image and video recognition. Multilayer perceptron’s are modified into CNNs. Typically, multilayer perceptron’s refer to completely linked networks, meaning that every neuron in a layer is connected to every other neuron. in the layer above. These networks are susceptible to overfitting because of their "full connectedness. " Data Regularization or overfitting is frequently achieved by cutting connectivity or punishing parameters during training (such as weight decay) (skipped connections, dropout, etc.) By utilizing the hierarchical structure in the data and assembling patterns of increasing complexity using smaller and simpler patterns imprinted in their filters, CNNs adopt a novel strategy for regularization. CNNs are therefore at the lower end of the connectivity and complexity spectrum.

ISSN: 2278-4632
Vol-13, Issue-01, No.02, January 2023

6.3 User Emotion Recognition

Numerous sites employ face expression recognition as a technique for emotion analysis. Fisher Face is a method built on the principles of principal component analysis and linear discriminate analysis. After categorizing the photographs, reducing the data, and dividing it up into the proper groups, the statistical value is then recorded as values.

6.4 Emotion Mapping

Expressions can be grouped according to basic emotions including rage, contempt, fear, joy, sadness, and surprise. The user-provided expression is compared to the expressions in the dataset. As a result, it shows the mapped expression.

6.5 Music Recommendation

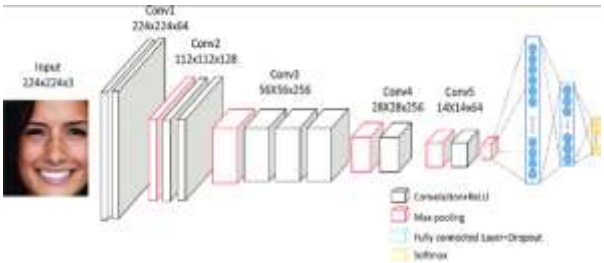
The final phase of the music recommendation system involves offering customers choices that fit their languages. You can tell the user's current emotional state by looking at their expression. The user's input will be considered when recommending a playlist.

7.ALOGORITHM

7.1 CNN

Face detection is a popular topic with many practical applications. In today's smartphones and PCs, face detection software is already built in to help validate the user's identity. In addition to determining the user's age and gender and using some extremely amazing filters, several applications can record, recognize, and process faces in real time. Face detection has several uses in biometrics, surveillance, and security; therefore, the list is not just limited to these mobile applications.

For feature extraction, CNN is utilized. For the emotion recognition module, we must train the system using datasets including images of happy, angry, sad, and neutral emotions. CNN has the special ability to apply automatic learning to extract traits from dataset images for model building. In other words, CNN may choose features on its own. CNN can provide an internal, two-dimensional visual representation. On this matrix, operations in three dimensions are carried out for teaching and testing reasons. Five-Layer Model: As its name implies, this model has five layers. A convolutional and a max-pooling layer, a fully connected layer with 1024 neurons, an output layer with 7 neurons, and a soft-max activation function are the layers that make up each of the first three phases. For the initial convolutional layers, 32, 32, and 64 5*5, 4*4, and 5*5 kernels, respectively, were used. Max-pooling layers come after convolutional layers, and they each employed kernels with 3*3 dimensions, a stride of 2, and the ReLu activation function.



Increasing the number of epochs or photos in the collection can improve accuracy. The neural network's convolution layer will receive the input. Filtering is the procedure that takes place at the convolution layer. In mathematics, matching is dependent on filtering. Aligning the feature and picture patch is the first stage in this process. Add the relevant feature pixel to each picture pixel after that. Divide the sum by the total number of pixels in the feature after adding them all together.

7.2 Music Recommendation Module

One of the four emotion labels happy, angry, sad, or neutral is the output of the neural network classifier. When a user's emotion is recognized by the system, playlists appropriate for that emotion are presented on the screen in HTML pages with user interfaces for each emotion. The first track in the page's playlist will begin to play first. Songs are chosen such that they convey the user's mood.

ISSN: 2278-4632
Vol-13, Issue-01, No.02, January 2023

8.EXPERIMENTS

The experimental findings are presented in this part so that the effectiveness of the suggested application can be assessed.

8.1 Dataset

We have gathered the heart rates from 7 individuals ranging in age from 18 to 50 in order to assess the efficacy of heart rate-based techniques for identifying the user's sentiment. The dataset includes information on the present emotion, song or activity being listened to, heart rate, gender, and age. Table V displays the dataset's samples. The dataset now has 97 entries, which are related to the various emotions we previously described.

8.2 Evaluation Results

Because of the wide heart rate range and other uncontrollable factors like fatigue, consuming an energy drink, smoking cigarettes, etc., the accuracy of the happy mood has the highest percentage. Although less helpful, the approach based on face images is reasonably accurate. Users must snap images of themselves in order to analyze their present feelings, which causes this.

9.CONCLUSION

This study looked at an innovative method of classifying music based on the feelings and facial expressions of the listeners. It was therefore advised to use neural networks and visual processing to categorize the four fundamental universal emotions conveyed by music—happiness, grief, anger, and neutrality. First, the input image is run through a face detection algorithm. A feature point extraction method based on image processing is then used to recover the feature points. Finally, instructions are supplied to a neural network to identify the emotion present in a collection of values obtained by analyzing the acquired feature points. Although the research is still in its early stages, success in the field of emotion identification and playing music from the supplied dataset is anticipated.

10.FUTURE SCOPE

Mobile applications have limited memory; thus, songs may be exported to a cloud database so that clients can download any song they want. It is not realistic to keep a ton of music inside an app when we can only use cloud storage for additional memory requirements. This also broadens the range of music we are working with, improving the outcomes. Complex and mixed emotion recognition There may be other emotions that a facial expression may transmit; for now, only four significant emotions are being studied. In order to maximize efficiency and avoid inaccurate emotion categorization, the user can add mixed emotions to the classifications. examining the song's lyrics to determine its emotional content and fusing it with that content. Voice input should be used for quicker emotion identification.

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