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Facial Expression Based Music Recommendation System

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Abstract- Facial expression is a non-verbal communication gizmo which helps to understand the overall presence of the user.

The cues which are observed by cognizance of facial expression of the individual are based upon capturing the image in real time. Therefore, facial expression recognition, since it excerpt and analyzes information from an image or video, it is capable to deliver unfiltered and unbiased data as its responses.

Facial expression recognisation is a vital instrument used in distinct fields for improving the product by enhancing the performance through monitoring user's behavior.

This technology is made by using machine learning (ML) concept. It first captures an image then detects the face from the captured image. It then uses biometric markers and landmarks of the face from captured image with the help of haarsascade classifier. More precisely, this technology automatically detects the six fundamental and universal expressions i.e. happy, fear, anger, sad, surprise, neutral and then it will show the playlist of music on youtube accordingly.

Keywords- Facial expression, Unbiased data, Playlist, Haar sascade classifier, Music, Landmarks, Biometric.

1. INTRODUCTION

Music has the vibrations which revamps the mind of an individual. Music has melody which directly impacts the overall development of the mind.

Some specialized music is utilized in increasing consciousness and focus. Music is classified in a vast variety of spectrum which are pop music with high tone, folk music, calming music for meditation and focus.

There are basically 7 genres of music. Some kinds of music have a direct impact on our mind by connecting it to the individual. So, we have tried to implement the connectivity of music and mind or

brain in real life which will be useful in the hundred of our life.

In this project we have used machine learning conceptualization which is good for demonstration of pattern recognisastion. This project is used to reduce time and complexity of the user by recommendation and it also improves accuracy and reduce computational time.

ADVANTAGES AND DISADVANTAGES

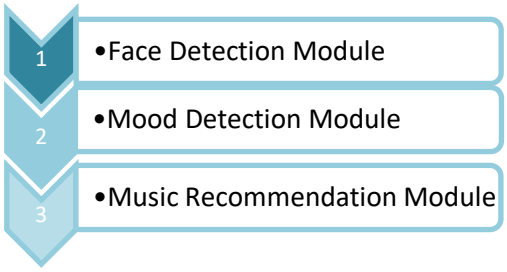
Advantages

- Reduces time and complexity of the user by recommendation.
- Improved accuracy.
- Reduced computational time.
- By using Facial Emotion Recognition, businesses can process images, and videos in real-time for monitoring video feeds or automating video analytics, thus saving costs and making life better for their users.

Disadvantages

- Randomly played/shuffled songs may not match the mood of the user.
- Detector is effective only on frontal images of faces.
- The system still is not able to record all the emotions correctly.

2. Proposed Methodology



- *Face Detection Module*
- The ability to detect the location of face in any input image or frame. For this task OpenCV and Numpy librararies are used.
- OpenCV(Open source Computer Vision library):
- This is a cross-platform and free for use library of programming functions.
- It has more than 2500 algorithms which are used to detect and recognize faces identify objects, classify human actions in videos, track camera movements, follow eye movements, etc.
- Numpy(Numerical Python):
- Numpy was created in 2005 by travis oliphant. It is an open source python library used for working with arrays.
- It convert the images into some form of array so that we can store the trained model.
- *Mood Detection Module*
- Classification of the emotion on the face as happy, angry, sad, neutral, surprise, or fear. For this task, Keras module is used whose backend is TensorFlow in Python.
- *Keras*:
- keras is a deep learning API of tensorflow written in python

It is used in the project to train and test our model for six classes – happy, angry, neutral, sad, surprise and fear.

It minimizes the number of user actions and provides clear error messages.

Tensorflow:

Tensorflow is an end to end open source software library for machine learning and was developed by Google Brain.

It is a Python library for fast numerical computing.

It is a foundation library that can be used to create Deep Learning models.

Music Recommendation Module

In this stage, the predicted mood of the user is used to classify songs and to create a playlist for the particular mood. The classification of songs are happenning on the basis of genre of the songs. For this purpose webbrowser module is used.

Webbrowser:

It is a module that provides a high level interface that allows displaying web-based documents to users.

It accepts a URL, as the argument and this URL having the information regarding user's mood and selected singer directs the user to youtube.

Haar cascade Algorithm

This is the main algorithm used in the program, it is used to identify faces in an image or real time video.

It was developed in 2001 by Paul Viola and Michael Jones thus also known as Viola-jones algorithm.

It is an object-recognition framework that allows the detection of image features in real-time.

It is a machine learning algorithm where a lot of positive and negative images are used to train the classifier.

In this project we have used haarcascade_frontalface_default.xml classifier.

3. FLOW CHART

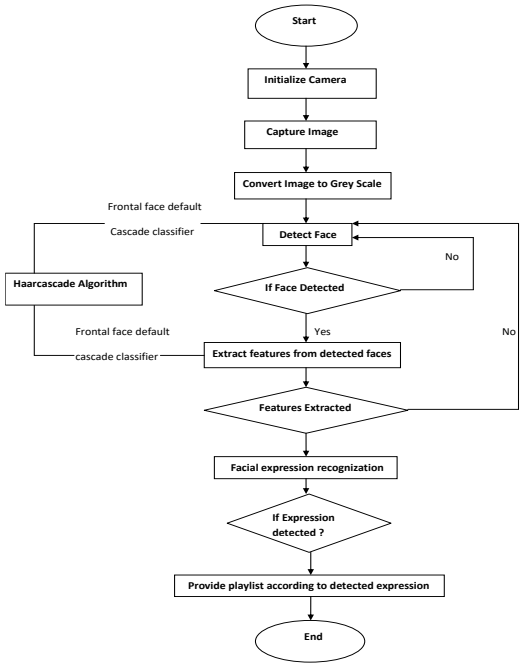


Figure: Flowchart

4. HARWARE AND SOFTWARE REQUIREMENT

Software Requirement

Software requirement deals with defining software resources, requirements and prerequisites that need to be installed on a computer to provide optimal functioning of an application. The software requirements that are required for this project are:

Front-end technologies:

- HTML: displays content on web page
- CSS: creates beautiful styles

Back-end technologies:

- Python 3: programming language
- Visual Studio Code: Editor
- Open CV

Hardware Requirements

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware. The hardware requirements required for this project are:

- Minimum 4 Gigabyte (GB) RAM (used for processing)
- Webcam (for testing on laptop/desktop)
- Minimum 16 Megapixel (MP) Resolution camera (for testing on android device)
- 30 MB Memory space (approximate value)

5. EXPERIMENTAL RESULT

Face is the screen which shows the mood of a person through expressions. As in different situation our expressions are different. There are mainly six expressions which are classified for the music recommendation.

*Step*1: Select the language from list provided on the display. There are 4 languages which are currently added i.e., Punjabi, English, Hindi, and Western. Further, more languages can be added.

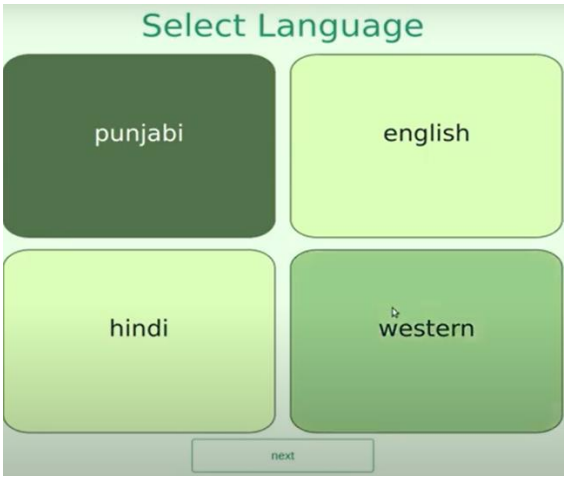


Figure.1

Step2: The working is the reccognization of the expression from the six countenances listed.

- Anger
- Fear
- Sad
- Happy
- Neutral
- Surprise

Step3: The next step is to select the singer of which the song will be played. Presently, most of the singers are catalogued in the index.

Figure.2

Step4: The playlist of the songs from the selected language and singer along with the detected expressions of the individual will be shown.

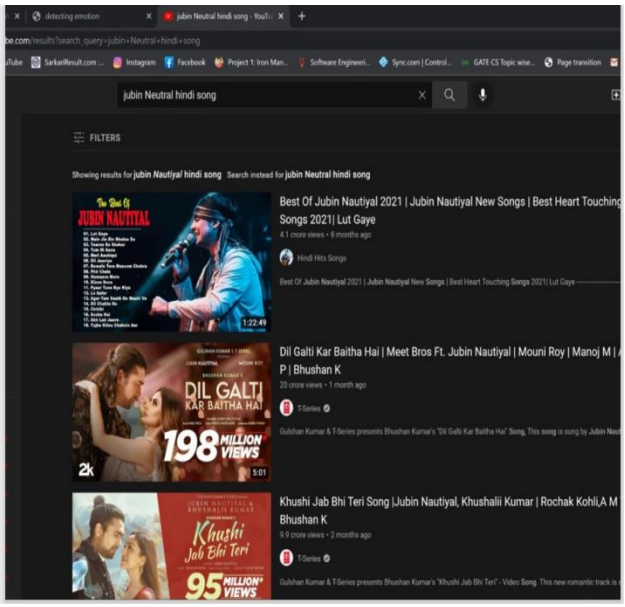


Figure.3

6. CONCLUSION

As stated above, the major focus is to build and create a facial expression based music recommendation system which includes the features of detecting the expression of the user and suggest the music accordingly. By doing so, it improves the recommendation list if the application and hence it is sparing as well as related to what our expressions are shown. It is a system designed by keeping a key point in mind that it is related to our day today life and anything which makes our life easy is used most of the time and the technologies are defined for the reason to make an ease of doing work. The system is on a enhancing mode where more features such as more accuracy should be highlighted by working on it.

The current accuracy rate is around 70 - 75% as some more features are required to be added. Presently it detects the following expressions of the user:

- Anger
- Fear
- Happy
- Sad
- Surprise
- Neutral

It performs real time detection of the expression of the user by capturing the image then it discovers the landmarks point on the face identified. It allocates the feature points by means of Haar cascade algorithm and lastly generates a playlist on you tube accordingly.

7. FUTURE SCOPE

For accurate detection of fear and anger moods, additional parameters such as heart rate or body temperature must also be considered rather than solely depending on facial expressions. In addition to that, finding suitable music to be played on detection of fear or anger mood is also a challenge.

In the current module it is linked with youtube only so in future scope we can add more linked apps such as spotify, jio saavan etc.

Recommendation of movies and TV series on the basis of mood detection can also be considered as a future scope for the project.

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9. REFERENCE

[1] Hemanth P,Adarsh ,Aswani C.B, Ajith P, Veena A Kumar, "EMO PLAYER: Emotion Based Music Player", International Research Journal of Engineering and Technology (IRJET), vol. 5, no. 4, April 2018, pp. 4822-87.

[2] Tim Spittle, lucyd, GitHub, , April 16, 2020. Accessed on: [Online], Available at: https://github.com/timspit/lucyd

[3] Manas Sambare, FER2013 Dataset, Kaggle, July 19, 2020. Accessed on: September 9, 2020. [Online], Avalilable at: https://www.kaggle.com/msambare/fer2013

[4] Dr. Shaik Asif Hussain and Ahlam Salim Abdallah Al Balushi, "A real time face emotion classification and recognition using deep learning model", 2020 Journal. of Phys.: Conf. Ser. 1432 012087

[5] Puri, Raghav & Gupta, Archit & Sikri, Manas & Tiwari, Mohit & Pathak, Nitish & Goel, Shivendra. (2020). Emotion Detection using Image Processing in Python.

[6] D Priya, Face Detection, Recognition and Emotion Detection in 8 lines of code!, towards data science, April 3, 2019. Accessed on: July 12, 2020 [Online], Available at: https://towardsdatascience.com/facedetection-recognition-and-emotion-detection-in-8-lines-of-codeb2ce32d4d5de.

[7] Kaufman Jaime C., University of North Florida, "A Hybrid Approach to Music Recommendation: Exploiting Collaborative Music Tags and Acoustic Features", UNF Digital Commons, 2014.

[8] MahmoudiMA, MMA Facial Expression Dataset, Kaggle, June 6, 2020. Accessed on: September 15, 2020. [Online], Available at: https://www.kaggle.com/mahmoudima/mma-facial-expression.

[9] bluepi, "\Classifying Different Types of Recommender Systems, November 14, 2015. Accessed on: July 7, 2020. [Online], Available on:https://www.bluepiit.com/blog/classifying-recommendersystems/#:~:text=There%20are%20majorly%20six%20types,system%20and%20Hybrid%20recommender%20system.

[10] Manas Sambare, FER2013 Dataset, Kaggle, July 19, 2020. Accessed on: September 9, 2020. [Online], Avalilable at: https://www.kaggle.com/msambare/fer2013.