



Music Recommendation System Using Facial Emotion

Prof. Mr. P. V. Kothawale, Alfiya Samirahmad Kazi, Aakanksha Popat Patil, Samruddhi Prashant Patil, Mahima Mahavir Choudhary

Dr. J. J. Magdum College of Engineering, Jaysingpur

ABSTRACT:

It can be difficult to choose which music to listen to from a vast array of available selections. Depending on the user's mood, there have been numerous suggestion frameworks accessible for music, dining, and shopping. Our music recommendation system's primary goal is to give customers with recommendations that are tailored to their tastes. Analysis of the user's facial expressions/emotions may lead to a better understanding of the user's present emotional or mental state.

Music and videos are one area where there is a considerable opportunity to provide clients with a wide range of options based on their preferences and collected data. Humans are well-known for using facial expressions to indicate what they want to say and the environment in which they intend to say it. More than 60% of users believe that at some point in the future, the number of songs in their music collection will be so enormous that they will be unable to find the song they need to play.

By building a suggestion system, it may be possible to aid a user in deciding which music to listen to, hence lowering the user's stress levels. The user would not have to waste time searching or looking up songs since the best track matching the user's mood would be detected and songs would be displayed to the user based on his or her mood. With the use of a webcam, the user's image is captured. The user's photo is taken, and then an appropriate music from the user's playlist is shown that matches the user's requirements, based on the user's mood/emotion.

1.Introduction

People's emotions are mostly expressed through their facial expressions. Music has always been recognised to change a person's mood. Capturing and identifying a person's emotion and showing appropriate tunes that match the person's mood can help to soothe the user's mind and provide a pleasing overall impression. The goal of the project is to capture a person's feelings through their facial expressions.

Through the web camera interface available on computing systems, a music player is meant to record human expression. The software captures the user's image and then extracts features from the face of a target human being using image segmentation and image processing techniques in order to discern the emotion that the person is attempting to express. The project seeks to brighten the user's mood by playing tunes that match the user's criteria by collecting the user's photograph.

Facial expression recognition has been the best type of expression analysis known to humanity since ancient times. People's facial expressions are the finest feasible approach to interpret or deduce the emotion, feeling, or thoughts that another person is attempting to express. Mood alteration may also aid in the treatment of depression and sorrow in some cases. Many health concerns can be prevented with the help of expression analysis, and efforts can also be made to improve a user's mood.

Literature review

Emotion-based music players are in high demand and will benefit industries such as Emotion Intelligence, Medical Science, and Psychology. Techniques such as Neural Networks (NN) and Support Vector Machines (SVM) have been used in recent years. We investigate these strategies in relation to our application.

The field of recommender systems is ripe for investigation. It has a wide range of practical uses, including systems that promote the recommendation of individuals (often perceived as service providers) as well as products/services. Recommender Systems are software that deliver individualised advice to users about products or services they might be interested in [9]. They first appeared in computers in the 1990s.

[3] Dr. R. K. Kulkarni and Anagha S. Dhavalikar proposed an Automatic Facial Expression Recognition System. There were three phases or steps in this strategy of theirs. [4] Detection of faces. • Extraction of features and recognition of facial expressions[4].

The first phase, Face Detection, entails a YCbCr Color Model analysis that incorporates ISO illumination processing for obtaining a face and operations for keeping the required face, including the eyes and lips. The Active Appearance Model (AAM) is also used in the suggested algorithm. [2]This is a

technique for extracting facial characteristics. Several points and features on the face (also known as Action Units) are used in this method.

AU, such as eyes, brows, mouths, and lips, are identified, and a file is created with properties about the action points found. Face emotions are fed into the AAM Model, which alters depending on the expression. [3]

Gonzalez [8], who uses Emotional Intelligence to improve on-line course recommendations, published a first model based on psychological characteristics in 2005.

Recommender System based on Personality Qualities [10] was published in 2008, and it was an experiment on a recommender system based on personality traits. In a vote scenario, the basic tried to suggest a person. Candidates' psychological characteristics were used to make recommendations, as well as an imaginary person who they imagined to be the ideal candidate. As psychological measures of the users, the system used 30 facets of the Big 5 personality traits and just the Big 5 personality traits.

Improving the Music Recommender System in 2014. What can we learn about music preferences from studies? [5] was written, which discusses music tastes from a psychological perspective and use music psychology to determine the correlates of music interests as well as to comprehend how music tastes are created and evolve over time. It demonstrates the impact of social influences on music preferences and offers a basic design recommendation for a music recommender system.

Enhancing Music Recommender System with Personality Information and Emotional States [6] was also released in 2014, and it investigates how to improve music recommendations by incorporating personality and emotional states. The idea provides excellent insight into how, through a number of phases, a recommendation engine might be improved with personality.

A Comparative Analysis of Personality Based Music Recommendation System [7] was released in 2016, and it offers an early study on using personality information in music recommendation systems. For the personality-based music recommendation system, it provides five possible models[11].

A system based on Bezier curve fitting was proposed by Yong-Hwan Lee, Woori Han, and Young Kim. For face expression and emotions, this algorithm employs a multi-phase process[11]. The first is the detection and processing of the facial area in the original image as input. The verification of emotion in the area of interest is the second phase.

Based on the outcome of lighting compassion[11], the first step of face detection employs a colour still image based on skin colour pixel by initialization spatial filtering[11]. It then uses the Feature Map to determine the placement of the eyes and lips, as well as the contour of the face. This method extracts points from the feature map after identifying regions of interest in order to apply Bezier curve to the eye and mouth procedures to investigate the difference between the Hausdorff distance and the Bezier curve between the image from the database and the face image entered.

Proposed Work

Our approach is to use Deep Learning Model to learn the most appropriate feature abstractions directly from the data taken in an uncontrolled environment and handle the limitations of handcrafted features. It have been a recent successful approach in visual object recognition, human pose estimation, face verification and many more.

Availability of computing power and existing big databases allow Deep Learning Model to extract highly discriminative features from the data samples. This are proven to be very effective in areas such as image recognition and classification. Deep Learning is very effective in reducing the number of parameters without losing on the quality of models.

The proposed system can detect the facial expressions of the user and based on individual's facial expressions using Deep learning Model. Once the emotion has been classified the song matching the users emotions would be played.

Methodologies

- Emotion Extraction Module –

A camera/webcam is used to capture the user's image. The frame of the acquired image from the webcam stream is transformed to a grayscale image to increase the performance of the classifier, which is used to identify the face present in the picture, once the picture is captured. When the conversion is finished, the image is transmitted to the classifier algorithm, which uses feature extraction techniques to extract the face from the web camera stream frame. Individual features are taken from the extracted face and passed to the trained network to detect the user's sentiment. These images will be used to train the classifier so that when it is presented with a completely new and unknown set of images, it will be able to extract the position of facial landmarks from those images using the knowledge it gained from the training set and return the coordinates of the new facial landmarks it detected. The network is trained using the big data set. This is used to identify the user's expressed sentiment. For this Deep Learning model is used.

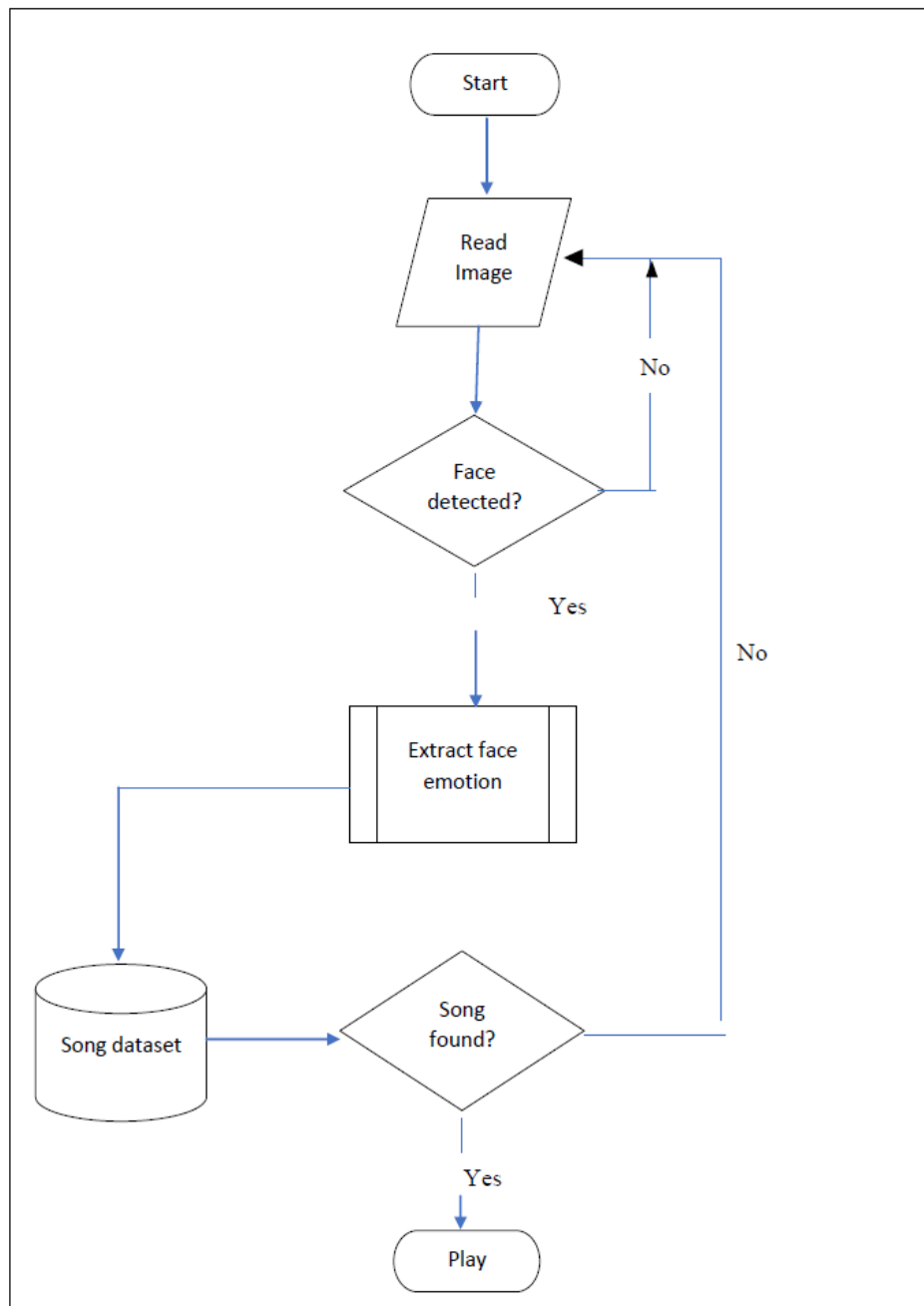
- Audio Extraction Module –

After the user's emotion has been extracted, music/audio based on the emotion voiced by the user is displayed to the user, along with a list of songs based on the emotion, so the user can listen to whichever song he or she wants.

- Emotion - Audio Integration Module –

The extracted emotions for the songs are saved, and the songs based on the emotion are shown on. For example, if the mood or facial characteristic is classed as happy, the user will see music from the cheerful collection.

V.Flow Chart of the Proposed System



Conclusion

Despite the fact that human emotions are complicated and subtle, a machine learning model can be trained to accurately detect a set of emotions that can be distinguished from one another using facial expressions. The expression on a person's face can be used to determine their mood, and after that mood has been established, music appropriate for that mood can be recommended. Our algorithm, which has a 75 percent accuracy rate, can accurately detect seven moods: anger, disgust, fear, joyful, sad, surprise, and neutral; and our Android application can play music that is appropriate for the discovered mood. Additional characteristics such as heart rate or body temperature must be examined in addition to facial expressions for accurate detection of fear and disgust moods.

Furthermore, choosing appropriate music to play when a fear or disgust mood is detected is a challenge. As a result, it might be regarded part of our project's future scope. Our trained model is an overfit model, which can cause swings in detection accuracy. Because the facial features (eyebrows, cheeks) are identical in both, the "disgust" mood is sometimes characterised as "angry." As a result, it must be trained for more photos and epochs in

order to produce more accurate findings. Recommendation of movies and TV shows based on mood recognition is also a potential future application for our approach.

References

1. Ankita Mahadik(2021) "Mood based Music Recommendation System", International Journal of Engineering Research & Technology(IJERT), Vol.10 Issue 06, June-2021
2. AmeyaBadve, AtharvaDeshpande, HiteshKadu, Prof. Mrs. bB. Mahalakshmi(2020) "Music Recommendation Using Facial Emotion Detection and Classification", Journal of Critical Reviews, Vol7, Issue19, 2020.
3. [1] James, H. Immanuel, J. James Anto Arnold, J. Maria MasillaRuban, M. Tamlarasan, and R. Saranya. "EMOTION BASED MUSIC RECOMMENDATION SYSTEM." EMOTION 6, no. 03 (2019).
4. A. S. Dhavalikar and R. K. Kulkarni, "Face detection and facial expression recognition system," 2014 International Conference on Electronics and Communication Systems (ICECS), Coimbatore, 2014, pp. 1-7.[1]
5. L. Audery. (2014). Improving music recommender systems: What can we learn from research on music tastes? ISMIR.
6. B. Ferwerda and S. Markus. (2014). Enhancing Music Recommender Systems with Personality Information and Emotional States: A Propoosal. UMAP Workshops.
7. O. Melissa, A. Micareli and G. Sansonetti. (2016). A Comparative Analysis of Personaility Based Music Recommender Systems. EMPIRE RecSys
8. G. Gonzalez and M. Miquel. (2017). Embedding Emotional Context in Recommendation System. 20th International Florida Artificial Intelligence Research Society Conference FLAIRS.
9. P. Resnick and H. R. Vairan. (1997). Recommender Systems. Communications of the ACM, 40(3):56-58.
10. Nunes, M.A.S.N. (2008) Recommender system based on Personality Traits .
11. Y. Lee, W. Han and Y. Kim, "Emotional Recognition from Facial Expression Analysis Using Bezier Curve Fitting," 2013 16th International Conference on Network-Based Information Systems, Gwangju, 2013, pp. 250-254[1]
12. . 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.
13. Music Recommendation System: "Sound Tree", Dcengo Unchained: Sila KAYA, BSc.; Duygu KABAKCI, BSc.; Işinsu KATIRCIOĞLU, BSc. and Koray KOCAKAYA BSc. Assistant : Dilek Önal Supervisors: Prof. Dr. İsmail Hakkı Toroslu, Prof. Dr. Veysi İşler Sponsor Company: ARGEDOR
14. Tim Spittle, Lucyd, GitHub, , April 16, 2020. Accessed on: [Online], Available at: <https://github.com/timspit/lucyd>
15. A. Abdul, J. Chen, H.-Y. Liao, and S.-H. Chang, "An Emotion-Aware Personalized Music Recommendation System Using a Convolutional Neural Networks Approach," Applied Sciences, vol. 8, no. 7, p. 1103, Jul. 2018.