Music Emotion Recognition

Vedanti Patne, Chetan Garje, Saurabh Khobragade, Radha Mankar, Prof. Ranjana Shende

Computer Science Engineering, G. H. Raisoni Institute of Engineering and Technology, Nagpur, Maharashtra, India

ABSTRACT

Music Emotion Recognition (MER) is an interesting research topic in artificial intelligence field for recognizing the emotions from the music. The recognition methods and tools for the music signals are growing fast recently. With recent development of the signal processing, machine learning and algorithm optimization, the recognition accuracy is approaching perfection. In this research we are focused on three different significant parts of MER, that are features, learning methods and music emotion theory, to explain and illustrate how to effectively build MER systems.

 Numerous music players have been created with capabilities like fast forward, backward, variable playback speed (seek and time compression), local playback, and streaming playback with multicast broadcasts in the modern world due to the rapid improvements in multimedia and technology. Although these capabilities serve the user's fundamental needs, the user is still required to actively browse through the music playlist and choose songs depending on his present state of mind and behavior. Here we are using tensoflow, mediapipe, cv2 library for training data using the face expressions. After training, model would be able to recognize face and by streamlit library from the expressions by the user it will suggest songs playlist and user would be able to play the song by his/her choice.

Keywords: Music Emotion Recognition, COVID-19

I. INTRODUCTION

Music emotion recognition (MER) is a subfield of music information retrieval (MIR) that aims to determine the affective content of music applying machine learning and signal processing techniques. Music emotion recognition systems have many application areas such as music suggestion systems (Spotify), automatic playlist generation, music therapy, and so forth. However, determination of the emotional category of addressed such as emotion labeling of music excerpts, feature extraction and choose of the classification algorithm.

1. Human face detection plays a vital role in applications such as video surveillance, human-computer interface, face recognition, and face image database management.
2. Facial expressions are important cues for nonverbal communication among human beings. It is only

possible because humans can recognize emotions quite accurately and efficiently. Automatic facial emotion recognition has many commercial uses and can be used as a biological model for cognitive processing and analysis of the human brain.

3. Collectively, they can enhance their applications like monitoring and surveillance analysis, biomedical image, bright rooms, intelligent robots, human-computer interfaces, and driver's alertness systems and play a vital role in security and crime investigations.

II. METHODOLOGY

Image Acquisition:

As a first step in the proposed system, we begin by acquiring the image of the user's face using a built-in laptop webcam (or any external camera that can be employed). To be correctly processed in the proposed system, the face image must contain one face in the frontal position in a uniformly illuminated background. Also, it should not be on the user's face, anything that could impede the detection process, such as glasses.
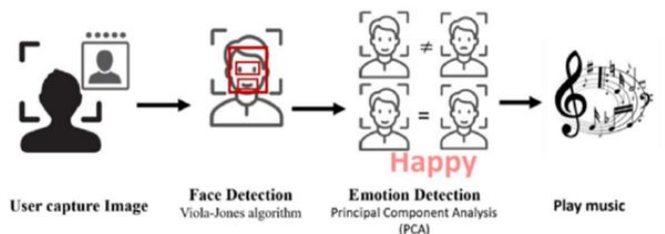
Face Detection:

After acquiring the image, the system will start to detect the face by applying the Viola-Jones algorithm. This algorithm is considered one of the first frameworks that recognize objects in real-time. Viola-Jones scan the images using a sub-window to detect the features of the face in the picture. When the face is determined, the image is cropped to contain the face only to enhance the proposed system's performance. Also, the Viola-Jones is reused to identify and crop the left and right eyes and mouth separately. The outcome of this step is four images, face, right eye, left eye, and mouth.

Emotion Detection:

Next, we must detect user sentiment. We use the Fisher Face method. A well-known approach is often used to detect facial emotions. It will construct the face space, and the eigenvectors with the highest eigenvalues will be selected. Also, we will project the acquired image over the face space. After that, the emotion is detected by computing for the user image the scores for each emotion. The feeling of the image is determined by getting the maximum score of the calculated emotion scores.

Enabling the correspondent Emotion playlist:

The proposed system will present the correspondent music playlist depending on the detected emotion. Since we have four emotions, we also have four playlists that offer music clips that are carefully chosen. The classical music playlist will be activated for happy emotions, while the new age music playlist is dedicated to the natural emotion. For the negative and sad feelings, we will enable the designer music playlist to enhance the user's mood to a better mood.

User capture Image | Face Detection Viola-Jones algorithm | Emotion Detection Principal Component Analysis (PCA) | Play music

For Training of datasets

We test the proposed system on datasets comprising a wide range of face images with different expressions, poses, illumination conditions. We used cv2 and mediapipe library to train the emotion detection system. For face recognition, we have used a webcam to capture faces. The implemented algorithm is capable of recognizing different persons in a single window. The recognition rate will be high if the recognition environment is under proper lighting conditions and has fewer background noises.

III. PROPOSED SYSTEM
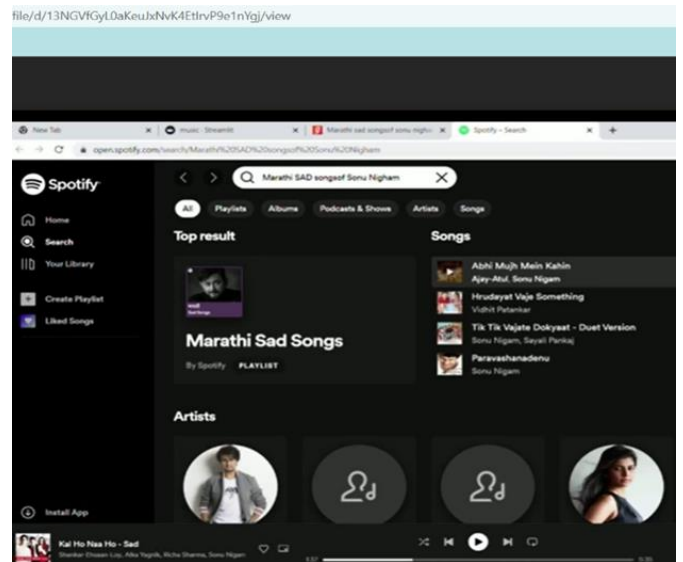
We will input our image and feed it into our CNN model. And from the trained datasets, user will be able to look into webcam and model will be able to recognize expression and we will output the expression of the face expressed in it.Then we will use that expression to select the songs which satisfy the user's mood.We will classify the expressions into these many classes: Happiness, Sadness, Anger, Surprise, etc.
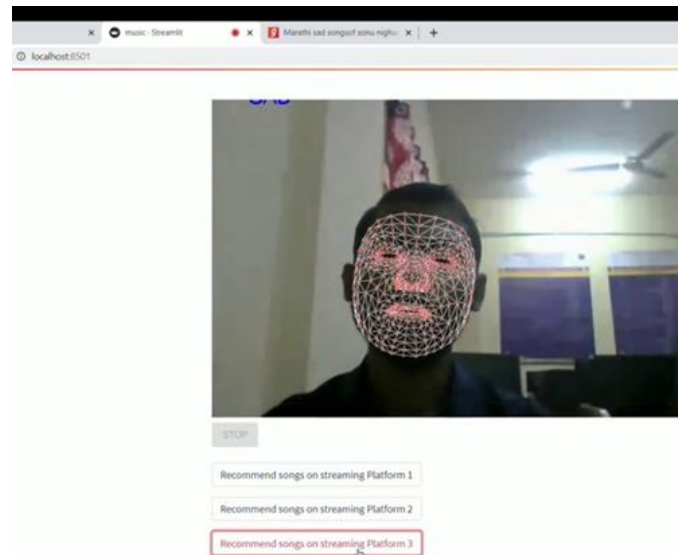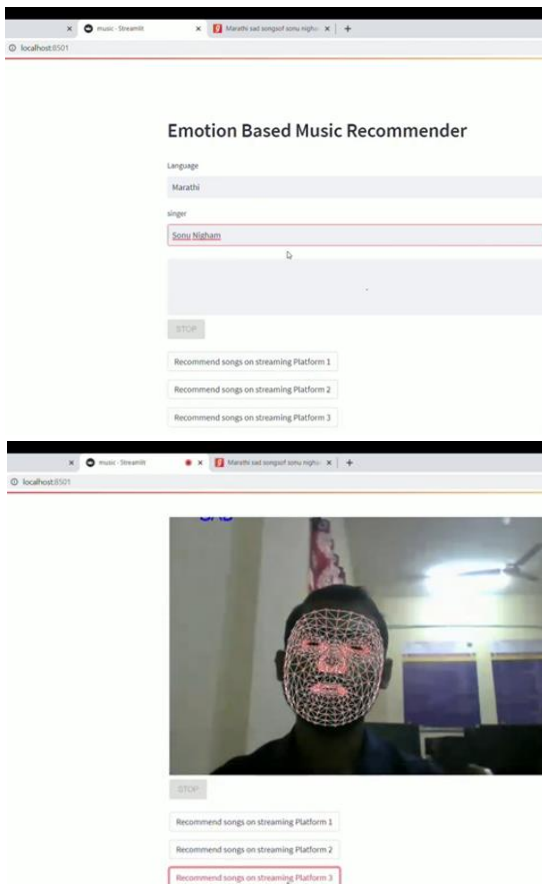
IV. CONCLUSION

We have discussed how we can make a music recommender system that can detect the user's facial expression and then recommend songs according to the user's mood using CNN model. In the current era,

there is a huge need for a recommendation system. It helps users to get personalized recommendations. It also improves sales, browsing experience, retention of customers, and many more. Famous online streaming websites like gana.com and spotify.com uses very complex recommendation algorithms to recommend users' favourite songs so that they can spend more time on their platform. There are some keys mentioned:

1. Firstly, we have discussed the complete methodology recommendation systems. In this, we have talked about image acquisition (how the image is taken from the dataset), face detection (how can we detect a face from the image), and emotion detection (how can we identify the emotion from the detected face).

2. Then, we have discussed about how the after detecting users face model would be able to suggest music by using streamlit library.

V. REFERENCES

[1]. Jianlong Zhou, Yang Shuiqiao, Xiao Chun, Chen Fang. Examination of community sentiment dynamics due to COVID-19 pandemic: a case study from a state in Australia. SN Comput Sci 2021;2(3):1–11.

[2]. Ewen Callaway, Ledford Heidi. How bad is omicron? What scientists know so far. Nature 2021;600(7888):197–9.

[3]. Women's Aid, UK. The Impact of COVID-19 on Women and Children Experiencing Domestic Abuse, and the Life-Saving Services that Support Them. Women's Aid UK; 2020.

[4]. Livingston E, Bucher K. Coronavirus disease 2019 (COVID-19) in Italy. JAMA. (2020) 323:1335–5. doi: 10.1001/jama.2020.4344

[5]. Iwendi C, Bashir AK, Peshkar A, Sujatha R, Chatterjee JM, Pasupuleti S, et al. COVID-19 patient health prediction using boosted random forest algorithm. Front Public Health. (2020) 8:357. doi: 10.3389/fpubh.2020.00357

[6]. Srivastava G. The Impact of the COVID-19 Pandemic on Mental Health of Children and Adolescents. (2020). Available online at: http://urn.kb.se/resolve? urn=urn:nbn:se:uu:diva-414191

[7]. Jiahua Du, Michalska Sandra, Subramani Sudha, Wang Hua, Zhang Yanchun. Neural attention with character embeddings for hay fever detection from twitter. Health Inf Sci Syst 2019;7(1):1–7.

[8]. Rubina Sarki, Ahmed Khandakar, Wang Hua, Zhang Yanchun. Automated detection of mild and multi-class diabetic eye diseases using deep learning. Health Inf Sci Syst 2020;8(1):1–9.

[9]. Wang Xinjue, Deng Ke, Li Jianxin, Yu Jeffery Xu, Jensen Christian S, Yang Xiaochun. Efficient targeted influence minimization in big social networks. World Wide Web 2020;23(4):2323–40.

[10]. Qiao Tian, Li Jianxin, Chen Lu, Deng Ke, Li Rong-hua, Reynolds Mark, et al. Evidence-driven dubious decision making in online shopping. World Wide Web 2019;22(6):2883–99