JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Machine Learning-Based Music Player Using Face Recognition

[1]Harshada Kavathekar, [2]Rutuja Shiradwade, [3]Sanket Patil, [4]D. O. Shirsath

[1]BTech Electronics and Telecommunication Engineering, [2]BTech Electronics and Telecommunication Engineering, [3]BTech Electronics and Telecommunication Engineering
[1]Electronics and Telecommunication Engineering,
[1]Padmabhooshan Vasantraodada Patil Institute of Technology, Sangli, India

Abstract : Music is an essential part of daily life. In today's world, Music plays an important role to lower stress and improving health. Even as people get older, music has the power to improve their health and well-being. Playing music has been reported to improve social cohesiveness, enjoyment, personal growth, and empowerment. It has also been found to help people recover from depression and maintain their wellbeing in their later years of adulthood. Music listening may improve the lives of older and paralyze people in an environment where life expectancy at 65 years of age is rising quickly and yet an increasing proportion of older individuals are reported to be living alone or suffering from despair. As technology develops, these old and paralyzed people feel more challenged while using manually operated music players. They are dependent on others to play their music playlist. To overcome this problem, the proposed system will play the music automatically by face identification. This system allows them to capture their faces and recognize them and then play the songs according to their playlist.

IndexTerms **– Machine learning,open CV.**

I. INTRODUCTION

Every existent has to deal with a lot of difficulties every day, and music helps to reduce stress. Music is a significant recreation medium. Face recognition technology has extensively attracted attention due to its enormous operation value and request eventuality. It is being enforced in colorful fields like security systems, digital videotape processing, and numerous similar technological advances. There are colorful music players available in the market moment, which contain features similar as fast forward, backward, changeable playback speed, , streaming playback with multicast aqueducts, and volume modulation, among others, with the adding advancements in the field of multimedia and technology. These capabilities fulfill the users introductory requirements, but the stoner will still have to laboriously search the song library and elect songs. A machine literacy- grounded music player that uses face recognition technology is an innovative conception that leverages the power of artificial intelligence to deliver a substantiated music experience. The idea behind this technology is to use facial recognition algorithms to identify the stoner's face and play the music that matches the particular face. Due to the progression of technology, the optimization of physical trouble has gained an multifariousness of consideration. Presently, there are a lot of traditional music players that bear songs to be physically named. druggies, have to make and revise the playlist, which is time inviting. Several music players have advanced characteristics like furnishing lyrics and recommending analogous songs grounded on different conditions. Indeed if some of these features are enjoyable for druggies, there's always a chance for enhancement in the field of robotization in music players grounded on feelings. opting songs without mortal intervention and ordering them according to their choice gives a superior experience. This can be made through the system that's equipped with a camera that captures the stoner's face and feeds it into the machine learning algorithm. As technology develops, these old people feel healthier and dived while using players- operated music players. They're dependent on their music playlist. To overcome this problem, the proposed system will play the music automatically by face identification. This system allows them to capture their faces and fete them and plays the songs according to their playlist. This technology would be particularly useful for aged people who have trouble operating the homemade music player. It could also be a delightful way for particular well- being in their after times of majority. In this case, the design involves using facial recognition technology to control the music player. The facial recognition technology used in this design is generally grounded on machine literacy algorithms that can identify unique features of a person's face, similar as the shape of their eyes, nose, and mouth. These algorithms are trained on large datasets of labelled images, which allows them to learn to fete faces with a high degree of accuracy. However, the stoner's name is If the confidence of the vaticination is high enough. displayed on the screen and their preferred music is played using the vlc library. Overall, this music player that uses facial recognition technology has the implicit to give a largely individualized music experience for druggies.

It can fete a stoner's face and play music grounded on their preferences. The software factors of the system would involve a programming language to use face recognition algorithms to identify druggies and their music preferences, and to play the applicable music lines. This could be fulfilled using a combination of programming languages similar as Python, Open CV, and colourful audio libraries. Overall, a music player using face recognition technology could offer a unique and individualized listening experience for druggies and would be delightful and enthusiastic for aged people.

II. RELATED WORK

A system that was completely regarded to overcome the problem that stated, no music player is can upload music files on a cloud was proposed by an author Gopalakrishnan and Venkateswarlu which can automatically backup all the mp3 data from the phone, and the user will get all of his data by just signing in the application in his new phone. This application also helps the user to sync with the other friend and they can also listen to the same music at the same time The purposed application has a feature of syncing music[1]. The face is detected by the Adaboost algorithm,which is used to choose a small number of weak classifiers and to combine them into a strong classifier deciding whether an image is a face or not was proposed by S. Padmapriya and Esther Annlin KalaJames [2]. To recognize faces unattended, they developed a novel image representation method. The main benefit of this system is that it is lightweight and relatively compact in size, making it simple to integrate into wooden or metal doors. The recognition time is less than 0.5 seconds, and it has a good recognition rate of 95 percent accuracy. It is incredibly energy-efficient, operating on just 5 watts[3]. The authors have described how facial recognition technology can be used to alleviate problems with older attendance systems. This method employs a camera to record the employee's images to recognize and detect faces. In the suggested system, the skin classification technique is used to enhance the face detection algorithm and boost detection accuracy[4]. The program for the Android operating system, allowing users to play music effortlessly, quickly, and conveniently was introduced by Nie Chunyan and Xu Dawei. In general, music players are divided into two sections: one section is for users to play their music, and the other section is for mobile phone users[5].

III.METHODOLOGY

The face is the most important portion of a person's body and the one that is most important in getting to recognize person. Device camera can be used for the input removal process. Identifying a person is the goal of the image capture. Using this knowledge, a list of songs was to be appropriately retrieved. Following the facial detection, the music could then be played. After being captured, a face is initially recognized by the extraction of facial features including the mouth, eyebrows, and eyes. The song is played as a result of mapping the face to a selection of songs appropriate for the person based on the face observed. Also, it offers a brief overview of how our system will operate and create the playlist. The main objective is achieved by using the Haars –Cascade face algorithm. The algorithm needs many positive and negative images to train the classifier. Positive images include images of faces which that are to be accepted and negative images are without faces.

The overall process involving feature extraction and segmentation is depicted in Fig. 1

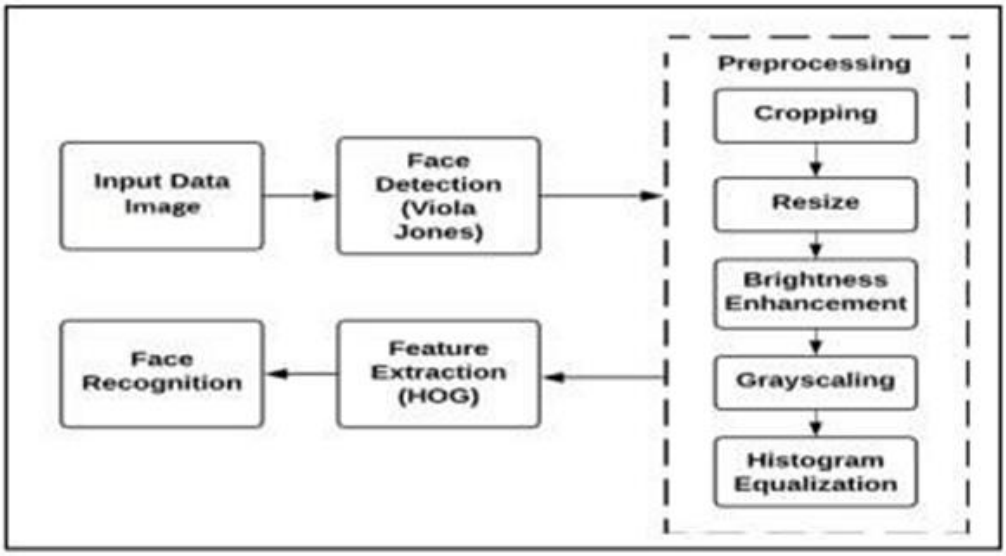

Fig.1:Block Diagram of overall system

A. Face Detection

The objective of face detection is to identify human faces in images. As human eyes, noses, and mouths are the easiest features to locate, the face detection process starts there. This stage involves looking for faces in the input image and then cleaning up the facial image so it can be recognized more easily.

A Machine learning object detection program is used to identify the objects. The algorithm requires a large number of favorable images to train the classifier, and it also makes use of unfavorable images of both faces and non-faces.Viola and Jones used Haar-like features to detect faces in this algorithm. Here are 3 types of Haar-like features that Viola and Jones identified in their research.

1. Edge features 2. Line-features 3. Four-sided features

Edge features and Line features are useful for detecting edges and lines respectively. The four-sided features are used for finding diagonal features.

B. Pre-processing

Pre-Processing is important to the overall process. By improving the image, the pre-processing stage improves the quality of the input image and identifies data of importance . It takes the image's repetitive elements and removes them.

Pre-processing also includes filtering and normalizing the image, the result of which is an identically sized but skewed image. The preprocessing consists of 5 phases to enhance the quality of the results of image detection. Here is a description of each level.

• Cropping: cropping an image is a crucial step in achieving a high recognition rate. By using existing images as a starting point, cropping allows for the creation of new images. The values from either side of the generated face bounding box are taken to perform the cropping operation.

• Resizing: The nearest neighbor interpolation approach can be used to resize images produced by various face detection techniques. The original bounding box size from the feature detection findings will be used to adjust the face frame's initial size. The dimensions of the input data for the facial features are 130 x 110 pixels, 20 x 65 pixels for each pair of eyes, 35 x 40 pixels for the nose, and 30 x 50 pixels for the mouth. The nearest neighbor method is used during the resizing procedure.

• Brightness Enhancement: It is a technique for enhancing an image's illumination by giving each RGB pixel a contrast value.

• Gray scaling: The process of gray scaling involves changing an image from another color space, such as RGB (red, blue, and green), CMYK (cyan, magenta, yellow, and key (black)), HSV, etc., to a variety of grayscales. There are several shades of black and white. It takes away all color information and simply leaves different shades of gray, with white being the lightest and black be the darkest.

• Histogram Equalization: The CLAHE method (Contrast Limited Adaptive Histogram Equalization) is used to level the histograms of facial images that have successfully undergone gray scaling. The CLAHE method prevents excessive contrast by restricting the image's specified contrast level (clip limit). CLAHE acts in a discrete region of the image known as a tile. Each tile's contrast will be fixed such that it conforms to the desired histogram shape when a histogram is generated from that area. Bilinear interpolation will be used to connect neighboring tiles. This process is used to ensure that the outcomes of the tile inclusion look seamless. Cliplimit and NumTile, both having values of 0.005 and [2 2], are the CLAHE parameters that are utilized

C. Feature Extraction

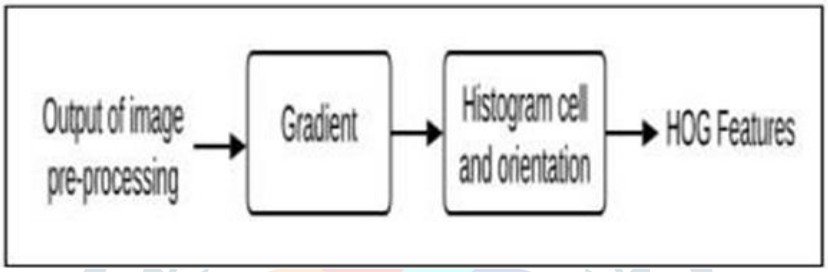

Fig:II

Facial feature extraction is essential for techniques like tracking of face , facial expression detection, and face recognition. The process of erasing facial features from a human face image, including the eyes, nose, mouth, and other features. The feature extraction stage uses the output from the face detection stage as an input. Only the eyes and mouth are taken into consideration for expression recognition to achieve real-time performance and reduce time complexity. Lastly, a point detection method is employed to recognize and separate feature points on a face.

• Eye Extraction: Because of the iris and eye white, the eyes have pronounced vertical edges (horizontal transitions). Vertical edges from the image's horizontal projection are obtained using the Sobel mask to determine the Y coordinate of the eyes.

• Eyebrow Extraction: Two rectangular regions that are right above each of the eye regions in the edge image are chosen to represent the eyebrows. For additional reworking, the edge pictures of these two locations are retrieved. As more pictures may be discovered as compared to Robert's method, the Sobel method was now applied to obtain the edge image. The holes are filled and the resultant edge pictures are then dilated. The resulting edge images are utilized to fine-tune the eye brow areas.

• Mouth Extraction: The centroid of the mouth is determined after the points in the top region, bottom region, right corner, and left corner of the mouth are all extracted. The value of the features that each face will have, such as a set of facial features like a pair of eyes, a nose, and a mouth, are classed as vectors [m x r], where m is the number of faces to be trained.

D. Face Recognition

The Eigen face method is one of the generally used algorithms for face recognition. It is based on the Principal Component Analysis (PCA) technique, which is used to perform dimensionality reduction. Eigenfaces are the principal components that divide the face into feature vectors and are used to quantify the variation between multiple faces. The best M Eigen faces define an M dimensional space, which is called the "face space". Principal Component Analysis is also used by Sirovich and Kirby to efficiently represent pictures of faces. The eigen face is a practical approach to face recognition and is efficient in processing time and storage. However, it is sensitive to lightning conditions and the position of the head.

IV.EXPERIMENTAL RESULT

Firstly, the function of capturing the image and training it for recognition is done. To train, the algorithm is given a large number of positive photos with faces and a large number of negative photos without any faces. Using machine learning, a cascade function is trained using a large number of both positive and negative images. The captured images are stored in the dataset. In dataset, there will be 41 images of users with different angles.

After Capturing and training the images, the system detects the face which is captured previously and stored in the data

set. For face detection, the Haars cascade algorithm is used. It helps to detect human face features like eyes, nose and mouth. The user will be provided with a specific user ID. The system will detect the face of the user and ask for that certain ID number. After giving the correct ID number, the system detects the face of the user and after detection, it displays the name of the user. As soon as the system recognizes the face of the user, it automatically plays the playlist of the songs provided by the user.

V.CONCLUSION

An ML-based music player using face recognition is an innovative and user- friendly solution for elderly people who may struggle with traditional music players or interfaces. The system provides a personalized and intuitive way to access and play music without the need for complex controls or manual searches. The face recognition feature allows for a seamless and hands-free experience, while the stored songs in the device memory system ensure that the user has access to their favorite tunes anytime, anywhere.

Overall, the ML-based music player using face recognition can enhance the quality of life for older adults by providing them with an enjoyable and engaging activity that is easy to use and personalized to their tastes.

REFERENCES

[1]Ausooya and Gopalakrishnan and Venkateswarlu, “Machine Learning Based Cloud Music Application With Facial Recognition Using Android Studio”, Institute of Southern Punjab Multan, 2021.
[2]S. Padmapriya and Esther Annlin KalaJames, “Smart Door Lock using Face Recognition”, International Journal of Computer Sciences and Engineering(JCSE), 2019.
[3]A. P. Pentland, M. A. Turk, Paul Viola, and Michael J. Jones, “Smart Security System Using Face Recognition on Raspberry Pi ”, Daffodil International University Dhaka, Bangladesh, 2019
[4]Chitrakala, Senthamil Selvi, and Antony Jenitha, “Face Recognition based Attendance Management System”, Yenepoya Institute of Technology, 2020.
[5]Nie Chunyan, Xu Dawei, “Based on Android Music Player”, School of Electronic and Information Engineering, Changchun University, Changchun, Jilin, China, 2021.
[6]Banavath Venkatesh Naik, Mr.S.Venu Prasad, M.Tech, “A LowCost Design of Audio Player Using Raspberry PI”, Malla Reddy Institute of Technology and Sciences, 2015.