VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

CSE3013-ARTIFICIAL INTELLIGENCE

Winter Semester 2021-22

EMOUSIC:

"FACIAL EMOTION BASED MUSIC PLAYER"

PROF:- ARUN KUMAR G

TEAM:-

ANSH GUPTA (19BIT0220)

JONNALAGADDA HARSHA VARDHAN (18BCB0052)

MAHANKALI SAI SHARATH (19BCE0316)

ABSTRACT:

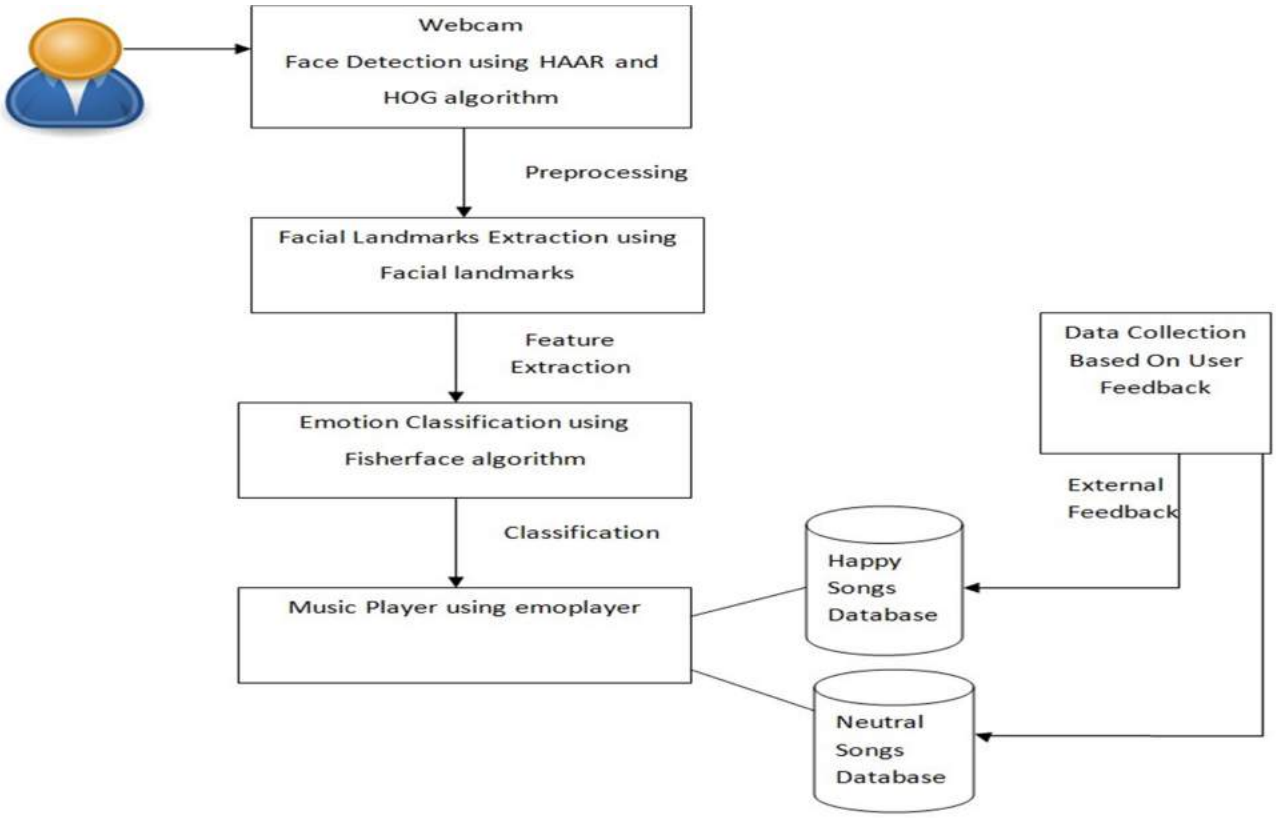
Artificial Intelligence has many significant fields of work and in that one of them is expression/ emotion detection. In order to detect a facial emotion, the system should analyse various variations of human faces like colour, posture, expression, orientation; lighting etc. Most importantly detecting facial features is a prerequisite to facial emotion recognition. One of the applications of this input can be for extracting the information to relax the mood of an individual. This data can then be used to get a list of songs with different-different mood that comply with the "mood" derived from the input provided earlier. This eliminates the time- consuming and difficult task of manually separation or grouping songs into different lists and helps in generating an appropriate playlist based on an individual's emotional features. Facial Expression/ emotion base music system aims at scanning and interpreting the data and accordingly creating a playlist based on the parameters provided. Thus our proposed system focuses on detecting human emotions for developing emotion based music player, which are the approaches used by available music players to detect emotions, which approach our music player follows to detect human emotions and how it is better to use our system for emotion detection. A brief idea about our systems working, playlist generation and emotion classification is given. This is achieved by observing the parts of the face, like eyes, lips movement etc. These are then classified and compared to trained sets of data. The capability of the human visual system with respect to these problems is also analysed. It is meant to serve as an ultimate goal and a guide for determining recommendations for development of an automatic facial expression analyser. We mainly use convolution neural networks and deep learning techniques of artificial intelligence in this project.

OBJECTIVE

The main objective of our project is to design an efficient and accurate algorithm that would generate a playlist based on current emotional state and behaviour of the user. Face detection and facial feature extraction from image is the first step in emotion base music player.

PROPOSED ARCHITECTURE:

The proposed system can detect the facial expressions of the user and based on his/her facial expressions extract the facial landmarks, which would then be classified to get a particular emotion of the user. Once the emotion has been classified the songs matching the user's emotions would be shown to the user.



PROPOSED METHODOLOGY:
Our proposed work includes three major objectives as: -

- Face Detection
- Gathering the dataset
- Face Recognition
- Emotion Recognition

In addition to this deep learning technique, Keras (python programming interface) is also involved. In order to prove real time efficiency, an experiment was conducted for multiple students to identify their inner emotions and find physiological changes for each face.

METHODOLOGY DESCRIPTION
1)Emotion Extraction Module -The image of the user is captured with the help of a camera/webcam. Once the picture captured, the frame of the captured image from webcam feed is converted to a grayscale image to improve the performance of the classifier, which is used to identify the face present in the picture. Once the conversion is complete, the image is sent to the classifier algorithm which, with the help of feature extraction techniques can extract the face from the frame of the web camera feed. From the extracted face, individual features are obtained and are sent to the trained network to detect the emotion expressed by the user. These images will be used to train the classifier so that when a completely new and unknown set of images is presented to the classifier, it is able to extract the position of facial landmarks from those images based on the knowledge that it had already acquired from the training set and return the coordinates of the new facial landmarks that it detected. The network is trained with the help of CK extensive data set. This is used to identify the emotion being voiced by the user
2)Audio Extraction Module - After the emotion of the user is extracted the music/audio based on the emotion voiced by the user is displayed to the user, a list of songs based on the emotion is displayed, and the user can listen to any song he/she would like to. Based on the regularity that the user would listen to the songs are displayed in that order. This module is developed using web technologies like PHP, MySQL, HTML, CSS, JAVASCRIPT.
3)Emotion - Audio Integration Module - The emotions which are extracted for the songs are stored, and the songs based on the emotion are displayed on the web page built using PHP and MySQL. For example, if the emotion or the facial feature is categorized under happy, then songs from the happy database are displayed to the user.

LITERATURE REVIEW:

1- 2017 Smart music player integrating facial emotion and music mood recommendation https://ieeexplore.ieee.org/document/8299738

A multi-layered convolutional neural network is programmed to evaluate the features of the user image. The convolutional neural network contains an input layer, some convolutional layers, ReLU layers, pooling layers, and some dense layers (fully-connected layers), and an output layer.
We will describe the procedure that will be used to identify the mapping of each song with its mood. We'll extract the acoustic features of the songs using LibROSA, aubiopitch and other state- of-the art audio extraction algorithms. Based on these features, we'll train an artificial neural network which will successfully classify the songs in 4 classes with an accuracy of 97.69%

2 -2017 An Intelligent Music Player Based on Emotion Recognition https://ieeexplore.ieee.org/document/8447743

The system uses a video capture object in order to access the web camera of the computer being used. Multiple images are captured from a web camera. To predict the emotion accurately, we might want to have more than one facial image. Blurred images can be an error source (especially in low light conditions) and hence, the multiple

images are averaged to get an image devoid of any blur. Histogram equalization is an image processing technique used to enhance the contrast of the image by normalizing the image throughout its range. This image is then cropped and converted to grey scale so that only the foreground of the image remains, thereby reducing any ambiguity.

3 - 2019 Facial Expression Based Music Player https://ieeexplore.ieee.org/document/7732105

The expressions of a person are detected by extracting the facial features using the PCA algorithm and Euclidean Distance classifier. An inbuilt camera is used to capture the facial expressions of a person which reduces the designing cost of the system as compared to other methods. The results show that the proposed system achieves up to 84.82% of accuracy level in recognizing the expressions.
To recognize and classify the expressions of a person Euclidean distance classifier is used. It gets the nearest match for the test data from the training data set and hence gives a better match for the current expression detected. Euclidean distance is basically the distance between two points and is given by "(3.1)". It is calculated from the mean of the Eigen faces of the training dataset. The training images that correspond to various distances from the mean image are labeled with expressions like happy, sad, fear, surprise, anger, disgust and neutral, and named as per the labeled trained images. Smaller the distance value obtained, the closest match will be found. If the distance value is large enough for an image then the system has to be trained for that individual. The equation to measure Euclidean distance between two points, say p and q is given as:
$d(p,q) = d(q,p) = \sqrt{\sum n} \ \ (qi - pi)2$

4 -2011 UKSim 5th European Symposium on Computer Modeling and Simulation https://ieeexplore.ieee.org/document/6131215

Emotion recognition from facial expressions is a very powerful means for human-machine- interaction application due to the fact that the use of the camera allows non-intrusive application. In this paper, we present our controller of music players based on the emotion of the computer user. The person is in front of the embedded camera of the computer, recognition of emotions in real time is performed with our approach based on the variation of distance and SVM classifier. The aim of this application is to change the music depending on the change of the user's emotion.

5 -2015 2nd International Conference on Signal Processing and Integrated Networks (SPIN) https://ieeexplore.ieee.org/document/7095376

In the present work the emotions are detected using Electroencephalography (EEG) signals. EEG records the electrical activity within the neurons of the brain. The main advantage of using EEG signals is that it detects real emotions arising straight from our mind and ignores external features like facial expressions or gestures. Hence EEG can act as a real indicator of the emotion depicted by the subject. We are able to recognize seven emotions using the two algorithms, SVM and LDA with an average overall accuracy of 74.13% and 66.50% respectively.

6 -S. Deebika, K. A. Indira and Jesline, "A Machine Learning Based Music Player by Detecting Emotions," 2019 Fifth International Conference on Science Technology Engineering and Mathematics (ICONSTEM), Chennai, India, 2019, pp. 196-200, doi: 10.1109/ICONSTEM.2019.8918890.

This paper includes the implementation of Convolutional neural network for the emotion detection and thereby playing a song accordingly. In order to obtain minimal processing, multilayer perceptron's are implemented by CNNs. In comparison to various algorithms for image classification, CNNs observed to have little-processing. We use the training procedure of back- propagation to activate the filters for better visualization. Depending on the emotion detected, the mapping of emotion to the list of songs in accordance to the mood is done and thereby song is played. In this project, we use the PyCharm tool for analysis.

7 -Arora, A. Kaul and V. Mittal, "Mood Based Music Player," 2019 International Conference on Signal Processing and Communication (ICSC), NOIDA, India, 2019, pp. 333-337, doi:

This paper will study various algorithms based on classification to provide a clear methodology to i) classify songs into 4 mood categories and ii) detect users mood through his facial expressions and then combine the two to generate user customized music playlist. Songs have been classified by two approaches; by directly training the models namely KNN, Support Vector Machines (SVM), Random Forest and MLP using selected audio features and by predicting a songs arousal and valence values using these audio features. The first approach attains a maximum accuracy of 70% using MLP while the latter achieves accuracy of 81.6% using SVM regression. The face mood classifier using HAAR classifier and fisher face algorithm attains precision of 92%.

8 -Alrihaili, A. Alsaedi, K. Albalawi and L. Syed, "Music Recommender System for Users Based on Emotion Detection through Facial Features," 2019 12th International Conference on Developments in eSystems Engineering (DeSE), Kazan, Russia, 2019, pp. 1014-1019, doi: 10.1109/DeSE.2019.00188.

The proposed system detects the emotions, if the subject has a negative emotion then a specific playlist will be presented and on the other hand, if the detected emotion is positive, a suitable playlist will be provided which includes different types of music that will enhance the positive emotions. Implementation of the proposed recommender system is performed using Viola-Jonze algorithm and Principal Component Analysis (PCA) techniques, we were able to implement the proposed system successfully in MATLAB (R2018a).

9 -A. Altieri et al., "An Adaptive System to Manage Playlists and Lighting Scenarios Based on the User's Emotions," 2019 IEEE International Conference on Consumer Electronics (ICCE), Las Vegas, NV, USA, 2019, pp. 1-2, doi: 10.1109/ICCE.2019.8662061.

This paper introduces a new system capable of adaptively managing multimedia contents (e.g. music, video clips, etc.) and lighting scenarios based on the detected user's emotional state. The system captures the emotion from the user's face expression mapping it into a 2D valence-arousal space where the multimedia content is mapped and matches them with lighting color. Results of preliminary tests suggest that the proposed system is able to detect the user's emotional state and manage proper music and light colors in a symbiotic way.

10 -IEEE Computer Graphics and Applications (Volume: 31 , Issue: 3 , May-June 2011) https://ieeexplore.ieee.org/document/5754299

First, we used a leave-one-out method, constructing a new model F' from a set of samples from which we had excluded one song. Then we obtained AV values for the excluded song from the model. We repeated this procedure for all the samples and compared the results with those from the listening test. The average difference between arousal values was 0.063 and between valence values was 0.034. The second experiment compared the participants' ratings with AV values estimated using F across the whole set of songs. The average error was 0.064 for arousal and 0.119 for valence. These results suggest that the model is self- consistent.

11 -2013 1st International Conference on Orange Technologies (ICOT) https://ieeexplore.ieee.org/document/6521181

This study aims to research the relationship between electroencephalography (EEG) at the prefrontal cortex (PFC) and emotion in the condition of different preference levels of music by applying a support vector machine (SVM). To achieve this, this study presents an EEG-based brain computer interface (BCI) music player, which can simultaneously analyze brain activities in real time and objectively provide therapists with physiological data for emotion detection in the experiment. The SVM result shows that more than 80% accuracy of elicited emotion based on 28 participants was analyzed under the two factors of the frontal midline theta and alpha relation ratio.

12 -2017 An Efficient Real-Time Emotion Detection Using Camera and Facial Landmarks https://ieeexplore.ieee.org/document/7926765

For detecting facial landmarks in face images, one can apply two traditional approaches, namely regression-based approach and template fitting approach. For the regression based method, one iteratively refines the first

initialization of landmark locations and then uses image features to predict them explicitly by regression. Meanwhile, for the template fitting approach, one does not need any initial guess of facial landmarks but establishes face templates to fit input images.

13 -2016 Automatic emotion detection model from facial expression https://ieeexplore.ieee.org/document/7831605

Emotion recognition is a two steps procedure which involves extraction of significant features and classification. Feature extraction determines a set of independent attributes, which together can portray an expression of facial emotion. For classification in emotion recognition the features are mapped into either of various emotion classes like anger, happy, sad, disgust, surprise, etc. For the effectiveness calculation of a facial expression identification model both the group of feature attributes which have been taken for feature extraction and the classifier that is responsible classification are equivalently significant. For a badly picked collection of feature attributes, in some cases, even a smart classification mechanism is not able to produce an ideal outcome. Thus, for getting the high classification accuracy and qualitative outcome, picking of superior features will play a major role.

14 -2017 Image-based Face Detection and Recognition: "State of the Art" https://arxiv.org/ftp/arxiv/papers/1302/1302.6379.pdf

The goal of this paper is to evaluate various face detection and recognition methods, provide complete solutions for image based face detection and recognition with higher accuracy, better response rate as an initial step for video surveillance. Solution is proposed based on performed tests on various face rich databases in terms of subjects, pose, emotions, race and light.

15 -2020 An improved face recognition algorithm and its application in attendance management system https://www.sciencedirect.com/science/article/pii/S2590005619300141

Although lot of progress has been made in the domain of face detection and recognition for security, identification and attendance purposes, there are still issues hindering the progress to reach or surpass human level accuracy. These issues are variations in human facial appearance such as; varying lighting condition, noise in face images, scale, pose etc. This research paper presents a new method using Local Binary Pattern (LBP) algorithm combined with advanced image processing techniques such as Contrast Adjustment, Bilateral Filter, Histogram Equalization and Image Blending to address some of the issues hampering face recognition accuracy so as to improve the LBP codes, thus improve the accuracy of the overall face recognition system.

16 -2018 Study of Face Recognition Techniques: A Survey https://thesai.org/Downloads/Volume9No6/Paper_6- Study_of_Face_Recognition_Techniques.pdf

This survey paper has tried to address most endeavoring face features such as pose invariance, aging, illuminations and partial occlusion. They are considered to be indispensable factors in face recognition systems when realized over facial images. Computers are being used in pyramids of applications, which range from simple to complex problem solving methods. Among such contributions face recognition technology has emerged as a useful tool to recognize features of faces through their inherent traits. And it has been one of the most researched areas in the field of pattern recognition and computer vision.

17 -2013 International Journal of Pattern Recognition and Artificial Intelligence https://www.researchgate.net/publication/274521637_A_Review_Of_Face_Recognition_Metho ds

The objective of this paper is to provide a survey of face recognition papers that appeared in the literature over the past decade under all severe conditions that were not discussed in the previous survey and to categorize them into meaningful approaches, viz. appearance based, feature based and soft computing based. A comparative study of merits and demerits of these approaches have been presented.

18 -2000 Comprehension database for facial expression analysis https://ieeexplore.ieee.org/abstract/document/840611

Because most investigators have used relatively limited data sets, the generalizability of these various methods remains unknown. We describe the problem space for facial expression analysis, which includes level of description, transitions among expressions, eliciting conditions, reliability and validity of training and test data, individual differences in subjects, head orientation and scene complexity image characteristics, and relation to non-verbal behavior.

19 -2012 Real-time facial feature detection using conditional regression forests https://ieeexplore.ieee.org/abstract/document/6247976

Here we propose conditional regression forest for this task. While regression forest learns the relations between facial image patches and the location of feature points from the entire set of faces, conditional regression forest learns the relations conditional to global face properties. In our experiments, we use the head pose as a global property and demonstrate that conditional regression forests outperform regression forests for facial feature detection.

20 -Authentic Gate Entry System (AuthGES) by Using LBPH for Smart Home Security: https://ieeexplore.ieee.org/document/8648705

A smart home security system by using local binary pattern histograms (LBPH) face detection algorithm is proposed to enhance the security level of entry-system. Face recognition is an interesting but challenging in machine learning field and impacts important applications in many areas such as remote sensing, machine/robot vision, pattern recognition, medical field, banking and security system access, and authentication in personal electronics gadget. Face representation represents how to model a face with LBPH algorithms of detection and recognition. The most useful and unique features of the face image are extracted in the feature extraction phase. In the identification of face the new face image is compared with the images which are already extracted and saved on database. Face detection and recognition method was applied to allow the authorized dwellers and the guest and prevent unwanted person to enter inside the house.

21 -Face Recognition based Attendance System using Haar Cascade and Local Binary Pattern Histogram Algorithm: https://ieeexplore.ieee.org/document/9143046

Face recognition based attendance system is more secure and time-saving. There are several research papers focusing on only the recognition rate of students. This research focusing on face recognition based attendance system with getting a less false-positive rate using a threshold to confidence i.e. Euclidean distance value while detecting unknown persons and save their images. Compare to other Euclidean distance-based algorithms like Eigen faces and Fisher faces, Local Binary Pattern Histogram (LBPH) algorithm is better. We used Haar cascade for face detection because of their robustness and LBPH algorithm for face recognition. It is robust against monotonic gray scale transformations. Scenarios such as face recognition rate, false- positive rate for that and false-positive rate with and without using a threshold in detecting unknown persons are considered to evaluate our system. We got face recognition rate of students is 77% and its false-positive rate is 28%. This system is recognizing students even when students are wearing glasses or grown a beard. Face Recognition of unknown persons is nearly 60% for both with and without applying threshold value. Its false- positive rate is 14% and 30% with and without applying threshold respectively.

22 -Real Time Face Recognition Using LBP Features: https://ieeexplore.ieee.org/document/8463886

Biometric systems for pattern recognition are in demand. Face Recognition becomes subject of interest for researchers for years .In past few years, computational model development is difficult, but computing systems got help from advanced technology to carry out face recognition. The computer applications emerged from semi-automated models to accurate mathematical model. Analyzing geometry of faces attained in representation

of faces. The implementation of this in these area, with widen use in industry solutions indicates the importance of the topic and its evolution. So, the standard of face recognition technologies raised regularly, with implementation of more accurate and faster systems. In this method, the face recognition is carried out by using real time database which consists of various expressions and illumination conditions. LBPH is utilized for the features extraction of the test image and KNN used for the training.

23 -Blur and Motion Blur Influence on Face Recognition Performance: https://ieeexplore.ieee.org/document/8587028

FACE recognition, beside fingerprint recognition, is one of the most popular biometric recognition techniques. It is non-invasive, relatively easy to implement from the system point of view, and very useful both in online applications (real-time face recognition) and offline applications (for example, search engines for recognizing persons from images). Nowadays it is widely used in social networks, like Facebook, Snapchat, Instagram, etc. The algorithms for face recognition, the heart of every face recognition system, are a well-studied topic in the research community. A face image captured and processed both in real-time and in offline applications suffers from common disturbances – blur and motion blur. These issues represent a big challenge for scientists today. This paper explores the influence of such disturbances on the face recognition performance. The research described in this paper compares the performance of the face recognition algorithm (based on Haar features for face detection and LBPH - Local Binary Patterns Histograms algorithm for face recognition), when it uses face images of good quality (original images), images with added noise (Gaussian blur and motion blur) and DE blurred images (blur and motion blur enhancement).

24 -A Static Hand Gesture and Face Recognition System for Blind People: https://ieeexplore.ieee.org/document/8711706

This paper presents a recognition system, which can be helpful for a blind person. Hand gesture recognition system and face recognition system has been implemented in this paper using which various tasks can be performed. Dynamic images are being taken from a dynamic video and are being processed according to certain algorithms. In the Hand gesture system Skin color detection has been done in YCbCr color space and to discover hand convex defect character point of hand is used where different features like fingertips, angle between fingers are being extracted. According to gesture Recognized, various tasks can be performed like turning on the fan or lights. While in face recognition, Haar Cascade Classifiers and LBPH recognizer are being used for face detection and recognition respectively. With the help of OpenCV, The research has been implemented. Various hand gestures and human faces have been detected and identified using this system. The hand gesture was recognized with an accuracy of 95.2% was achieved and facial recognition was done with an accuracy of 92%.

25 -Design and Implementation of a Hybrid Face Recognition Technique: https://ieeexplore.ieee.org/document/8666587

Due to the increasing popularity of face recognition algorithms, it is important to have a deeper understanding of how these algorithms work. This paper will outline the process of creating a facial recognition algorithm. There are many 0384 popular algorithms that currently exist. The purpose of this paper is to explore current algorithms and contribute a new hybrid algorithm to improve the overall performance and provide better experimental results. The focus of this study will be on three algorithms and these algorithms will be compared and analyzed. A new hybrid algorithm is proposed that is based on the combination of these specific algorithms to provide better experimental results. The contribution of this algorithm will add another option for the face recognition technology. There are three objectives that will help achieve this task:

- Implementing three facial recognition algorithms: Eigen faces, Fisher faces, and Local Binary Patterns Histograms
- Testing and analyzing the experimental results of these three algorithms
- The creation of a new hybrid facial recognition algorithm that combines three algorithms

26 -Fusion of several preprocessing approaches for improving the accuracy of face recognition systems in poor lighting conditions: https://ieeexplore.ieee.org/document/8324887

There are several methods for feature extraction which some of the most popular ones include Eigen faces, Fisher faces and LBPH. However Eigen faces and Fisher faces take a somewhat holistic approach to face recognition. They treat the data as a vector in a high-dimensional image space. Using high dimensional vectors is computationally expensive, so a lower dimensional subspace is identified, where useful information is preserved. The local binary patterns histogram (LBPH) is an algorithm used for face recognition which is based on the local binary operator. The LBP operation compares the intensity value of each pixel to the 8 closest neighbor pixels values. If the value of a neighbor pixel is greater than the value of centered pixel, it assigns 1 to that neighbor pixel; otherwise it assigns 0 to it. This operation produces an 8-bit string for each pixel. A decimal value can be calculated from the 8- bit string which is called the LBP value. After applying the operation, the input image is divided into small sub-images and, the histograms of LBP value of each sub images are extracted, and then all histograms are concatenated to generate a feature vector used to represent the image. Then the images, labels, and histograms are stored in a data structure. When a new image is captured, first extract its histogram then compare it to the histograms stored in the data structure and return the label and distance (e.g. using Euclidean distance metric) corresponding to the closest histogram.

27 -Fusion of several preprocessing approaches for improving the accuracy of face recognition systems in poor lighting conditions: https://ieeexplore.ieee.org/document/8324887

Nowadays, face recognition is one of the most interesting and promising research area in the image processing field. At the moment, most of public places such as airports, stores, pilgrimage sites, etc. have regulatory equipment that good performance of them can affect the efficiency of controlling and providing security in those places. Although face recognition is one of the most popular biometric techniques for identifying a person from a digital image, there are challenges in the robust implementation of face recognition algorithm in poor illumination condition. In this paper a new preprocessing algorithm is proposed which enhances the quality of poor illuminated image and increases recognition rate in the face recognition systems. Appropriate preprocessing of image affects the accuracy of face recognition system. By using an appropriate preprocessing technique, we can eliminate undesirable factors that inadvertently arising from environment such as environment noise, light balance and inherent factors like not calibrated camera lens, lower image contrast, etc. most face recognition systems contain a very important stage called feature extraction. If we cannot provide an appropriate image to its input by using an efficient preprocessing algorithm, we confront a serious problem in recognition and feature extraction that results in wrong recognition of faces. There are various preprocessing algorithms for enhancing image in poor lighting environments that we will try to compare these algorithms and investigate their effects in the accuracy of our proposed face recognition system.

28 -A study on facial components detection method for face-based emotion recognition: https://ieeexplore.ieee.org/document/7009796

In the field of human interface technology development, the interactions between the human and the machine are important; research on emotion recognition helps to develop these interactions. Emotion recognition is one of the most important factors in the human-centric human-to-machine interfaces. In most state-of-the-art technologies for emotion recognition, features are extracted from the image, speech, and bio signals and are then classified into specific emotional categories based on pre-trained recognition models. Especially, emotion recognition using facial images is being widely studied because human emotions are expressed in the face. For emotion recognition using the facial image, an algorithm detecting the accurate features of the face needs to be developed in order to analyze the facial image. However, in existing studies on the features of the face and the extracted facial elements, the evaluation of the reliability of the extracted features has seldom been studied. Therefore, this paper presents a face and facial component detection method and an evaluation method of the detected features for facial-based emotion recognition. This paper presents a proposed

face and facial component detection method and an evaluation method of the detected features for face-based emotion recognition. In the facial component extraction algorithm, the histogram method, the blob labeling method, and the MMGC image are used to give information for high accuracy analysis. Experimental results show the proposed approach is more robust than the Ada boost algorithm and is more rapid by reducing the search space to face candidate regions.

29 -The Application Study of Learner's Face Detection and Location in the Teaching Network System Based on Emotion Recognition: https://ieeexplore.ieee.org/document/5480962

With the rapid development of computer technology and the increasing popularity of the Internet, the e-learning system ushered a new development opportunities, and worldwide to be extensively adopted. While the traditional E-learning can be achieved self-learning function of distance, but in the learning process, the learner's emotional information can't be extracted effectively and application, so that the study results are not ideal. How to add an effective treatment for emotional information in E-learning system, the E-learning system based on emotional recognition will play a greater role in E-learning system, which has become an important research topic. The development of artificial emotional, laid the foundation for the theoretical and technical to solve the problems of emotional identification in the E-learning systems. Facial expression recognition model is new part compared to traditional E-learning, at the same time, it is the key to achieve teaching emotional in E-learning system, Facial expression recognition use computers to extract feature and analysis the information of the expression on the human face, in accordance with people's ways of understanding and thinking to be classified and understood, then information from the human face to analyze and understand people's emotions, such as happiness, surprise, anger, fear, disgust, sadness, etc.
Now, there are three main facial expression methods used:

1. Geometric feature-based recognition, this method through the significant features for facial expression recognition, such as eyes, nose, eyebrows, mouth, etc. To locate the position change, measure, determine its size, distance, shape, and the relative proportions of the characteristics.
2. Based on the overall identification method, this method is through the whole face images or the special area in face images transformed to obtain a variety of expressive facial features to identify.
3. The model-based on identification method, this method is mainly to establish the precise physical model, based on anatomical knowledge and to identify key features of the change by comparing these characteristics to identify facial expression. In order to realize learner facial expression recognition in the emotional perception Network Teaching System, we must first detect the human face and the position of organ. In this paper, for the emotions in network teaching system, According to the needs to analysis of expression of learners, this paper uses Ada boost algorithm that based on SVM classifier to detect and locate human face. Experiments found that the method achieved good detection results, and provide more reliable feature information to analysis the learner in Network Teaching System.

Convolutional neural networks (CNNs) have accomplished astonishing achievements across a variety of domains, including medical research, and an increasing interest has emerged in radiology. Although deep learning has become a dominant method in a variety of complex tasks such as image classification and object detection, it is not a panacea. Being familiar with key concepts and advantages of CNN as well as limitations of deep learning is essential in order to leverage it in radiology research with the goal of improving radiologist performance and, eventually, patient care.

30 -An Introduction to Convolutional Neural Networks https://www.researchgate.net/publication/285164623_An_Introduction_to_Convolutional_Neural_Networks

This paper has outlined the basic concepts of Convolutional Neural Networks, explaining the layers required to build one and detailing how best to structure the network in most image analysis tasks. Research in the field of image analysis using neural networks has somewhat slowed in recent times. This is partly due to the incorrect belief

surrounding the level of complexity and knowledge required to begin modeling these superbly powerful machine learning algorithms. The authors hope that this paper has in some way reduced this confusion, and made the field more accessible to beginners.

31 -Recent Advances in Convolutional Neural Networks https://arxiv.org/pdf/1512.07108.pdf

Current CNN model works very well for various applications. However, we do not even know why and how it works essentially. It is desirable to make more efforts on investigating the fundamental principles of CNNs. Meanwhile, it is also worth exploring how to leverage natural visual perception mechanism to further improve the design of CNN. We hope that this paper not only provides a better understanding of CNNs but also facilitates future research activities and application developments in the field of CNNs.

32 -Conceptual Understanding of Convolutional Neural Network- A Deep Learning Approach https://www.sciencedirect.com/science/article/pii/S1877050918308019

Major advantage of deep learning over conventional machine learning technique is that it can independently detect relevant features in high dimensional data as compared to shallow networks. There exists sufficient literature on different deep learning techniques such as recurrent neural network, deep belief networks and CNN. This study has thrown light upon the basic understanding of CNN, which is a deep learning approach to solve many complex problems. This study has described the general model, various architectures, and two important learning algorithms of the CNN. CNN has emerged as a prominent technique used for classification based on contextual information. It has immense ability to learn contextual features and thereby has overcome the issues involved in pixel wise classification. It reduces number of parameters required to a great extent. CNN is extensively being used for classification in remote sensing [21], ocean front recognition task [18], high-resolution data, traffic sign recognition [10], audio scene [28], segmentation of MR brain images [23]. This study will provide broad understanding to researchers who want to venture in this field. It will act as a means to learners, researchers and to those who are interested in this field.

33 -A Convolutional Neural Network Classifier for Recognition and Detection of Traffic Signs

In this paper, a Convolutional Neural Network based classifier is implemented to recognize and classify traffic or road sign mages initially, the images chosen are coloured. They are converted to grey scale and normalized by applying simple computations using python language. And then the manipulated traffic sign images are sent to CNN classifier with fixed and learnable layers like convolutional layer, pooling layer, flattening laver and fully connected dense layer for detection and categorization In between sets of convolutional and pooling layers, dropout regularization technique is added to the network. This technique minimizes number of neurons in hidden Layers of neural network and leads to increase in performance of network.

34 -Face Recognition Using Fisher face Method https://iopscience.iop.org/article/10.1088/1742-6596/1028/1/012119/pdf

Face recognition system using fisher face methods able to recognize the image of face testing correctly with 100% percentage for the test image the same as the training image and able to recognize the image of face testing correctly with 93% when the test image different from the training image. Face recognition with fisher face method not only capable of performing an introduction to the test face images with different color components of the training image and a sketch of the original image. This method is also immune to noise-induced images and the blurring effect on the image. As for most of the images that fail in recognition are caused by two factors, namely scaling factors and poses. To overcome the first factor, can be done by using better image scaling, while for the pose problem can be overcome by giving more training images with various poses.

35 -Face recognition using a fuzzy fisher face classifier https://www.researchgate.net/publication/223325889_Face_recognition_using_a_fuzzy_fisherface_classifier

In this study, we are concerned with face recognition using fuzzy fisher face approach and its fuzzy set based augmentation. The well-known fisher face method is relatively insensitive to substantial variations in light direction, face pose, and facial expression. This is accomplished by using both principal component analysis and Fisher's linear discriminant analysis. What makes most of the methods of face recognition (including the fisher face approach) similar is an assumption about the same level of typicality (relevance) of each face to the corresponding class (category). We propose to incorporate a gradual level of assignment to class being regarded as a membership grade with anticipation that such discrimination helps improve classification results.

36 -Eigenfaces vs. Fisherfaces: Recognition Using Class Specific Linear Projection https://cseweb.ucsd.edu/classes/wi14/cse152-a/fisherface-pami97.pdf

Finally, when shadowing dominates, performance degrades for all of the presented recognition methods, and techniques that either model or mask the shadowed regions may be needed. We are currently investigating models for representing the set of images of an object under all possible illumination conditions, and have shownthatthesetofn-pixelimagesofanobjectofanyshapeandwithanarbitraryreflectancefunction,seen under all possible illumination conditions, forms a convex cone. Furthermore, and most relevant to this paper, it appears that this convex illumination cone lies close to a low-dimensional linear subspace.

37 -Study on face recognition with combined of fisher algorithm and support vector machine https://ieeexplore.ieee.org/document/5691587

According to the face recognition, the combined algorithm of Fisher faces and one-against-rest classifiers based on support vector machine is proposed in the paper. First the wavelet transform is used to compress the image dimension and shorten the time of training. After reducing the dimension with PCA algorithm, the Fisher linear discriminative rules are adopted to extract the optimal features of face. Then the one-against-rest classifiers of SVM are built with the features of the training sample face, which we can use to recognize the face images. The experiments are implemented on ORL and Yale face databases, and the results show that the accuracy rates are respectively 97.75% and 97.80% and the average recognition time is 9.8ms, which also demonstrates that the fisher faces algorithm is superior to Eigen faces one on feature extraction.

38 -Face Detection and Recognition using Open CV Based on Fisher Faces Algorithm https://www.ijrte.org/wp-content/uploads/papers/v8i5/E5753018520.pdf

According execution for face location and recognition. It additionally implies that with OpenCV, it's smarter to assemble acknowledgment applications for the IOT stage. Note that lone HOG calculation has been investigated while scanning for different calculations, for example, the Haar course, it works longer, yet turns out additional in detail, if there are a lot of photographs later on for some, it is prudent to consider utilizing this strategy. Nonetheless, the structure rationale and the key purposes of making an application acknowledgment were talked about. Haar Cascade Classifier works better which has the best exactness when contrasted with some other calculations like LBP and so on.

Languages: -

- Python 3
- HTML
- CSS
- JAVASCRIPT

L**ibraries included: -**

- Matplotlib
- Pandas
- Keras
- OpenCv

- Mutagen
- Numpy

CODE:
(FOR FRONTEND-HTML,CSS, Javascript)

```
<!DOCTYPE html>
<html>
<head>
	 <meta charset="UTF-8">
	<title>musical Arena</title>
	<script type="text/javascript" src="/eel.js"></script>
	<link rel="stylesheet" type="text/css" href="header.css">
	<link rel="stylesheet" type="text/css" href="background.css">
	<link rel="stylesheet" type="text/css" href="player.css">
	<style>
	body{
		margin: 0;
	}
	</style>
</head>



<body>
	<br><br><br><br><br>
	<div id="first">
		<h1 font-family="verdana" align="center" style="font-size: 40px;color: white;margin:
0;">Music Player<h1>
		</div>
	<!--<div id="second" class="second">

		<button onclick="myFunction()">
	</div>
	-->

	<script src="code.js"></script>

		<div
id="queue"><br>          Queue<input
type="button" id="next" onclick="nextsong()"><hr></div>

	<div id="third">
		<div id="emoji"></div>
		<div id="xyz">
		   Playing :  
		<label id="sname" align="center">none</label></div>
		<div id="mod">mode : Queue-mode <input type="radio" name="mode" checked="checked"
onclick="setmod(this)" value="1">   Emotion-mode <input type="radio" name="mode"
onclick="setmod(this)" value="2">   Random-mode
			<input type="radio" name="mode" onclick="setmod(this)" value="3"></div>
		<audio controls id="main_slider">
		<source id="sel"  type="audio/mpeg">
Your browser does not support the audio element.
```

```
		</audio>

		<script>
	document.getElementById("main_slider").onended=function(){
		if(mod==1)
			next_in_Q();
		else if(mod==2){
			getTime();
		}
		else
			rand_play();

	};


		</script>
		</div>
		</body>
</html>
```

Header.css

```
#first{
	width: 97.1%;
	height: 50px;
	background-color: rgba(44, 62, 80,.8);
	position: fixed;
	padding: 20px;
	top: 0;
	margin-left: 0;
	}
#queue{
	color: white;
	font-size: 20px;
	font-family: "Segoe Script";
	margin-right: 0px;
	margin-top: 27px;
	margin-left: 1100px;
	width: 230px;
	height: 600px;
	background-color: rgba(1,1,1,0.9);
	border-bottom-right-radius: 10px;
	border-top-left-radius: 10px;
	border-bottom-left-radius: 10px;
	border-top-right-radius: 10px;
	position: absolute;
	z-index: -1;
	overflow: hidden;
}

#next{
		border-color: rgba(1,1,1,0.5);
		background:transparent url("next.png");
		/*mix-blend-mode: multiply;*/
		background-size: cover;
```

```
		border-bottom-left-radius: 50%;
		border-top-left-radius: 50%;
		border-bottom-right-radius: 50%;
		border-top-right-radius: 50%;
		height: 40px;
		width: 40px;
		margin-left: 20px;
		margin-top: 0px;
		z-index: 2;
	}
	#next:focus{
		outline: none;
	}
	#next:hover{
		box-shadow: 0px 0px 5px 5px white;
		border-color: black;
		background-color: rgba(1,1,1);
		border-bottom-left-radius: 50%;
		border-top-left-radius: 50%;
		border-bottom-right-radius: 50%;
		border-top-right-radius: 50%;
		z-index: 2;

	}
```

Background.css

```
/*#second{
		padding: 20px;
		width: 97.1%;
		height: 80%;
		float: left;
		margin-top: 90px;
		}

		button{
			background-image: url("E:\\Imagere\\2.jpg");
			background-size: cover;
			height: 200px;
			width: 200px;
			padding: 20px;
			margin: 5px;
			border: solid;
			border-top-left-radius: 10%;
			border-top-right-radius: 10%;
			border-bottom-left-radius: 10%;
			border-bottom-right-radius: 10%;
			border-color: transparent;
			transition: width 2s;
		}
		button:hover{
			border-top-left-radius: 10%;
			border-top-right-radius: 10%;
			border-bottom-left-radius: 10%;
			border-bottom-right-radius: 10%;
```

```
                        border-color: green;
                        width: 400px;
                }

                button:focus{
                        outline: 0;
                        border-top-left-radius: 10%;
                        border-top-right-radius: 10%;
                        border-bottom-left-radius: 10%;
                        border-bottom-right-radius: 10%;
                        border-color: blue;
                }*/
body{
        padding: 0px;
        background-image: url("background.jpg");
        background-attachment: fixed;
        height:100%;
}
        .song{
                margin: 25px;
                float: left;
                width: 194px;
                height: 200px;
                transition: width 1s;
                background-color: rgba(1, 3, 5,0.8);
                padding: 15px;
                border-bottom-right-radius: 10%;
                border-top-left-radius: 10%;
                border-bottom-left-radius: 10%;
                border-top-right-radius: 10%;
                 word-wrap: break-word;
                 overflow: hidden;
                 z-index: 2;

        }
        .song:hover{
                width: 400px;
        }
        #data{
                color: white;
                float: left;
                width: 160px;
                height: 200px;
                margin-top: 0px;
                padding-top: 0px;
                padding-left: 30px;
                z-index: 2;
                font-size: 16px;
                font-family: "Monotype Corsiva Italic";

        }
        #pic{
                float: left;
                background-image: url("E:\\Imagere\\2.jpg");
                        background-size: cover;
```

```
                height: 200px;
                width: 190px;
                border-bottom-right-radius: 10%;
                border-top-left-radius: 10%;
                border-bottom-left-radius: 10%;
                border-top-right-radius: 10%;
                z-index: 2;
        }
.play{
                border-color: rgba(1,1,1,0.5);
                background:transparent url("play.png");
                mix-blend-mode: multiply;
                background-size: cover;
                border-bottom-left-radius: 50%;
                border-top-left-radius: 50%;
                border-bottom-right-radius: 50%;
                border-top-right-radius: 50%;
                height: 50px;
                width: 50px;
                margin-left: 16%;
                margin-top: 55%;
                z-index: 2;
        }
        .play:focus{
                outline: none;
        }
        .play:hover{
                box-shadow: 0px 0px 5px 5px black;
                border-color: black;
                background-color: rgba(1,1,1);
                border-bottom-left-radius: 50%;
                border-top-left-radius: 50%;
                border-bottom-right-radius: 50%;
                border-top-right-radius: 50%;
                z-index: 2;

        }

        .add{
                border-color: rgba(1,1,1,0.5);
                background:transparent url("add.png");
                mix-blend-mode: multiply;
                background-size: cover;
                border-bottom-left-radius: 50%;
                border-top-left-radius: 50%;
                border-bottom-right-radius: 50%;
                border-top-right-radius: 50%;
                height: 50px;
                width: 50px;
                margin-left: 13%;
                margin-top: 55%;
                z-index: 2;
        }
        .add:focus{
                outline: none;
```

```
	}
	.add:hover{
		box-shadow: 0px 0px 5px 5px black;
		border-color: black;
		background-color: rgb(1,1,1);
		border-bottom-left-radius: 50%;
		border-top-left-radius: 50%;
		border-bottom-right-radius: 50%;
		border-top-right-radius: 50%;

	}
```

Player.css

```
#third{
			width: 100%;
			height: 80px;
			padding: 20px;
			padding-bottom: 0px;
			padding-top: 10px;
			float: left;
			position: fixed;
			bottom: 0;
			left:0;
			background-color: rgba(1,1,1,0.8);
			color:rgb(250,250,250);
			font-family: "Segoe Script";
		}
		 #mod{
			display: inline;
			position: absolute;
			right: 50px;
		}
audio{
		position: fixed;
		margin-top: 28px;
		right: 20px;
		width: 90%;
		}
label{

	font-family: "Segoe Script";
	width: 500px;
	height: 10px;
}
#emoji{
	width: 75px;
	height: 75px;
	display: inline-grid;
	border-color: rgba(1,1,1,0.5);
	background:transparent url("next.png");
	/*mix-blend-mode: multiply;*/
	background-size: cover;
	border-bottom-left-radius: 50%;
	border-top-left-radius: 50%;
```

```
        border-bottom-right-radius: 50%;
        border-top-right-radius: 50%;
}
#xyz{
                        display: inline;
                        position: absolute;

                }
```

Code.js

```
var songrun=false;
var count=1;
var mod=1;
var path=["songs\\ban ja rani.mp3"
,"songs\\Banduk meri laila.mp3"
,"songs\\barish.mp3"
,"songs\\haareya.mp3"
,"songs\\ik vari aa.mp3"
,"songs\\main tera.mp3"
,"songs\\mercy.mp3"
,"songs\\musafir.mp3"
,"songs\\o sathi.mp3"
,"songs\\phir bhi.mp3"];

var sname=["Ban Ja tu meri Rani",
"Banduk Meri Laila",
"Barish",
"Haareya",
"Ik vari aa",
"main tera boyfriend",
"mercy",
"musafir",
"o sathi",
"Phir Bhi"
];

var sd=["Artist: Guru Randhawa<br>Movie: Tumhari Sulu<br>Released: 2017",
"Artists: Ash King, Jigar Saraiya<br>Featured artists: Sidharth Malhotra, Raftaar<br>Movie: A Gentleman<br>Released: 2017"
,"Artists: Ash King, Shashaa Tirupati<br>Movie: Half Girlfriend<br>Released: 2017<br>Awards: Zee Cine Award for Song of the Year"
,"Artist: Arijit Singh<br>Movie: Meri Pyaari Bindu<br>Released: 2017<br>Nominations: Mirchi Music Awards for Best Song Producer - Programming & Arranging"
,"Artist: Arijit Singh<br>Movie: Raabta<br>Released: 2017"
,"Artists: Arijit Singh, Neha Kakkar, Meet Bros<br>Movie: Raabta<br>Released: 2017<br>Composer(s): : Sohrabbudin (Original); Sourav Roy (Revamped).<br>Genre: Dance music"
,"Artist: Badshah<br>Released: 2017<br>Nominations: Mirchi Music Awards for Best Song Engineer - Recording and Mixing"
,"Artist: KK<br>Movie: Shab<br>Released: 2017"
,"Artist: Arijit Singh<br>Movie: Shab<br>Released: 2017"
,"Artists: Arijit Singh, Shashaa Tirupati<br>Movie: Half Girlfriend<br>Released: 2017<br>Written: 2001 (lyrics)<br>Lyricist(s): Manoj Muntashir<br>Composer(s): Mithoon"];
```

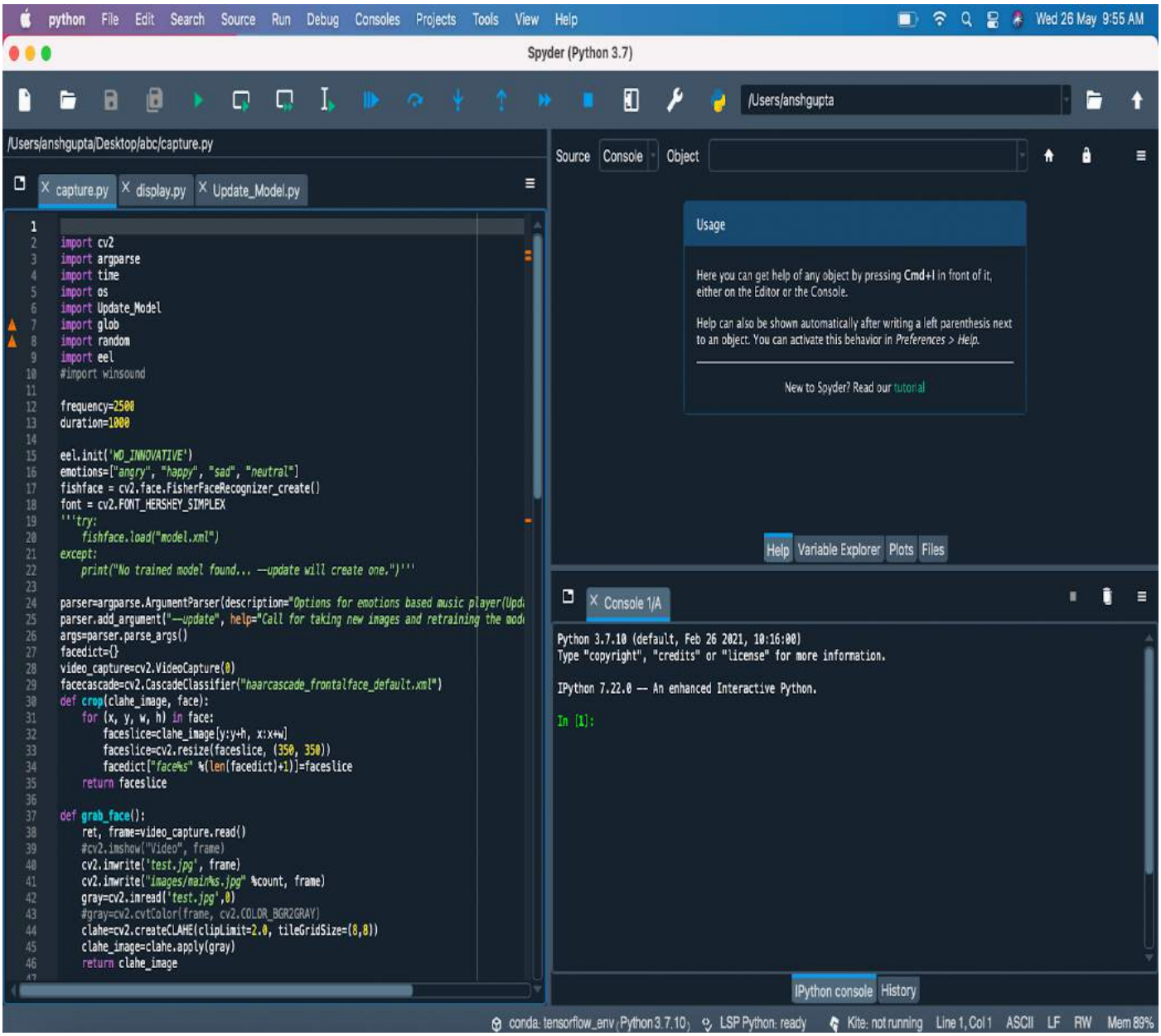
```
var bool=[];
for(var i=0; i<sd.length; i++)
	bool[i]=false;

var icon=["images\\\\1.jpg",
"images\\\\2.jpg",
"images\\\\3.jpg",
"images\\\\4.jpg",
"images\\\\5.jpg",
"images\\\\6.jpg",
"images\\\\7.jpg",
"images\\\\8.jpg",
"images\\\\9.jpg",
"images\\\\10.jpg"];

var mood=[["1","2","3"],["4","5"],["6","7","8"],["9","10"]];
var mmm=["1.png","1.png","1.png","2.png","2.png","3.png","3.png","3.png","4.png","4.png"];

var songs=new Array(icon.length);
for (var i = 0; i<icon.length; i++) {
	songs[i]=new Array(4);
	songs[i][0]=path[i];
	songs[i][1]=sd[i];
	songs[i][2]=icon[i];
	songs[i][3]=mmm[i];
	console.log(songs[i][0]);
	console.log(songs[i][1]);
	console.log(songs[i][2]);
	var ins=document.createElement("div");
	ins.id='b'+i;
	//ins.onclick=function(){
	//next(this);
	//};
	ins.setAttribute("class", "song");
	document.body.appendChild(ins);
	document.getElementById('b'+i).innerHTML='<div id="pic" style=\'background-image:
url(\'"+songs[i][2]+'\");\'>  <input type="button" id="'+"a"+i+'" class="play" > <input type="button"
id="'+"c"+i+'" class="add">  </div><div id="data"><br><br>'+songs[i][1]+'</div>';
	document.getElementById('a'+i).onclick=function(){
		play(this);
	};
	document.getElementById('c'+i).onclick=function(){
		addq(this);
	};
}




function setmod(elem){
	mod=elem.value;
	if(!songrun){
		if(mod==2)
			getTime();
		if(mod==3)
```

```
                rand_play();
        }
}

function play(elem){
        console.log(elem.id);
        var x=elem.id.charAt(1);
        var z=songs[x][0];
        document.getElementById("sname").innerHTML=sname[x];
        document.getElementById("sel").src= z;
        document.getElementById("main_slider").load();
        document.getElementById("main_slider").play();
        document.getElementById("emoji").style.backgroundImage="url('"+songs[x][3]+"')";
        songrun=true;

}

var eqc=1;
var sqc=1;

function addq(elem){
        console.log(elem.id);
        var x=elem.id.charAt(1);
        if(!songrun){
                var z=songs[x][0];
                document.getElementById("sname").innerHTML=sname[x];
                document.getElementById("sel").src= z;
                document.getElementById("main_slider").load();
                document.getElementById("main_slider").play();
                document.getElementById("emoji").style.backgroundImage="url('"+songs[x][3]+"')";
                songrun=true;
                return;
        }
        if(bool[x]==true)
                return;

        bool[x]=true;
        var l=document.createElement("label");
        l.id="e"+eqc;
        l.name=x;
        l.innerHTML=sname[x]+"<br>";
        //var text=document.createTextNode(sname[x]+"<br>");
        //l.appendChild(text);
        document.getElementById("queue").appendChild(l);
        eqc=eqc+1;
}

function nextsong(){
        if(sqc==eqc){
                                alert("Queue is empty.");
                                return;
                }
                var elem=document.getElementById("e"+sqc);
                        var xa=elem.name;
                        var pa=songs[xa][0];
```

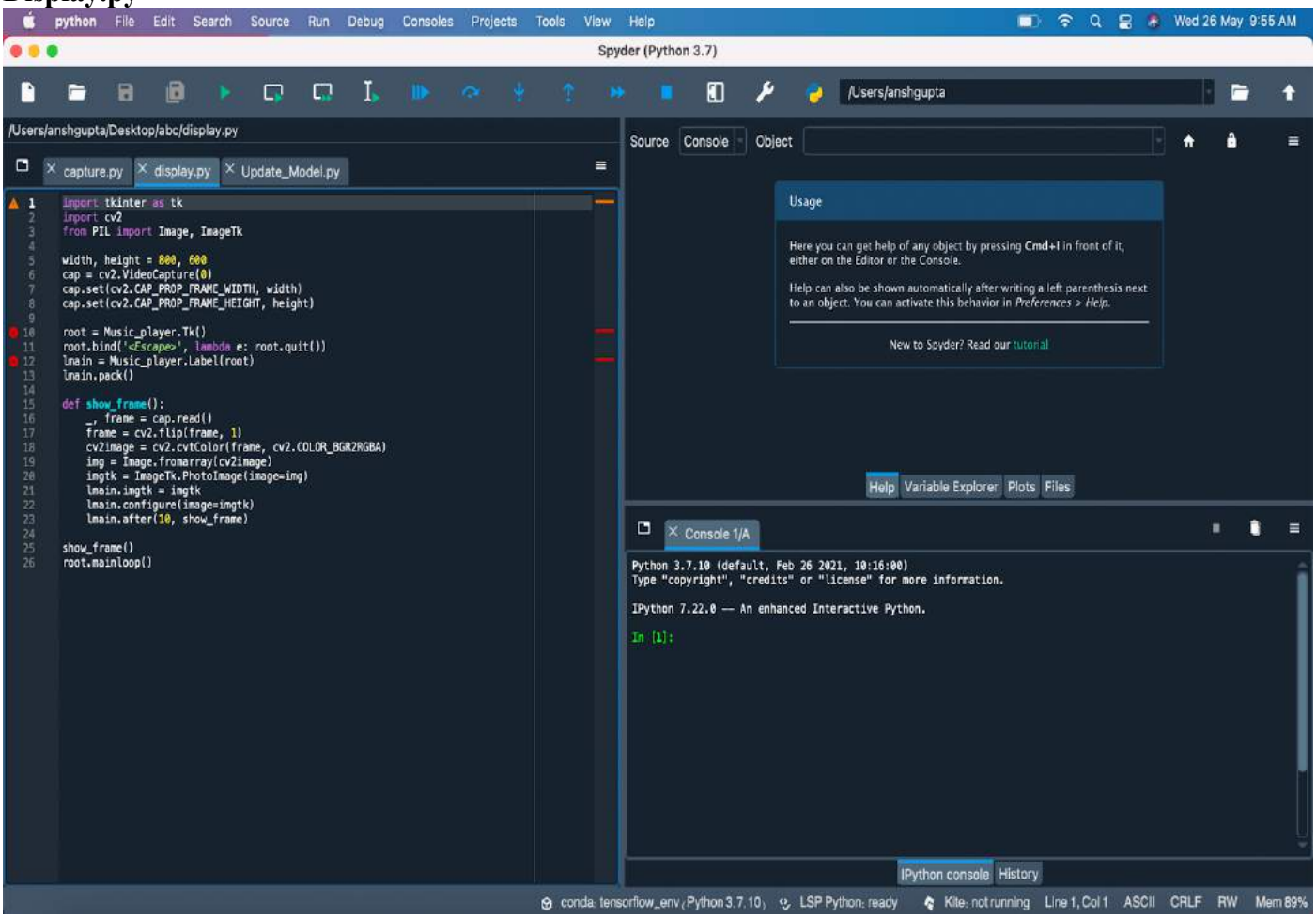
```
                        bool[xa]=false;
                        document.getElementById("sname").innerHTML=sname[xa];
                        document.getElementById("sel").src= pa;
                        document.getElementById("main_slider").load();
                        document.getElementById("main_slider").play();

        document.getElementById("emoji").style.backgroundImage="url('"+songs[xa][3]+"')";

                        songrun=true;
                        document.getElementById("queue").removeChild(elem);
                        sqc=sqc+1;

}

function next_in_Q(){
                        songrun=false;
                        if(sqc==eqc){
                                alert("Queue is empty.");
                                return;
                        }
                        var elem=document.getElementById("e"+sqc);
                        var xa=elem.name;
                        var pa=songs[xa][0];
                        document.getElementById("sname").innerHTML=sname[xa];
                        document.getElementById("sel").src= pa;
                        document.getElementById("main_slider").load();
                        document.getElementById("main_slider").play();

        document.getElementById("emoji").style.backgroundImage="url('"+songs[xa][3]+"')";
                        songrun=true;
                        document.getElementById("queue").removeChild(elem);
                        sqc=sqc+1;
                        }

function rand_play(){
        var index=Math.random()*path.length;
        index=parseInt(index);
        var pa=songs[index][0];
        document.getElementById("sname").innerHTML=sname[index];
        document.getElementById("sel").src= pa;
        document.getElementById("main_slider").load();
        document.getElementById("main_slider").play();
        document.getElementById("emoji").style.backgroundImage="url('"+songs[index][3]+"')";
        songrun=true;

}
function moody(val){
        var index=Math.random()*mood[val].length;
        index=parseInt(index);
        var pa=songs[mood[val][index]-1][0];
        document.getElementById("sname").innerHTML=sname[mood[val][index]-1];
        document.getElementById("sel").src= pa;
        document.getElementById("main_slider").load();
        document.getElementById("main_slider").play();
```

```
        document.getElementById("emoji").style.backgroundImage="url('"+songs[mood[val][index]-
1][3]+"')";
        songrun=true;
}

async function getTime() {
            let value = await eel.getEmotion()();
            if(value=="angry")
                  moody(0);
            else if(value=="happy")
                  moody(1);
            else if(value=="sad")
                  moody(2);
            else
                  moody(3);
        }
```

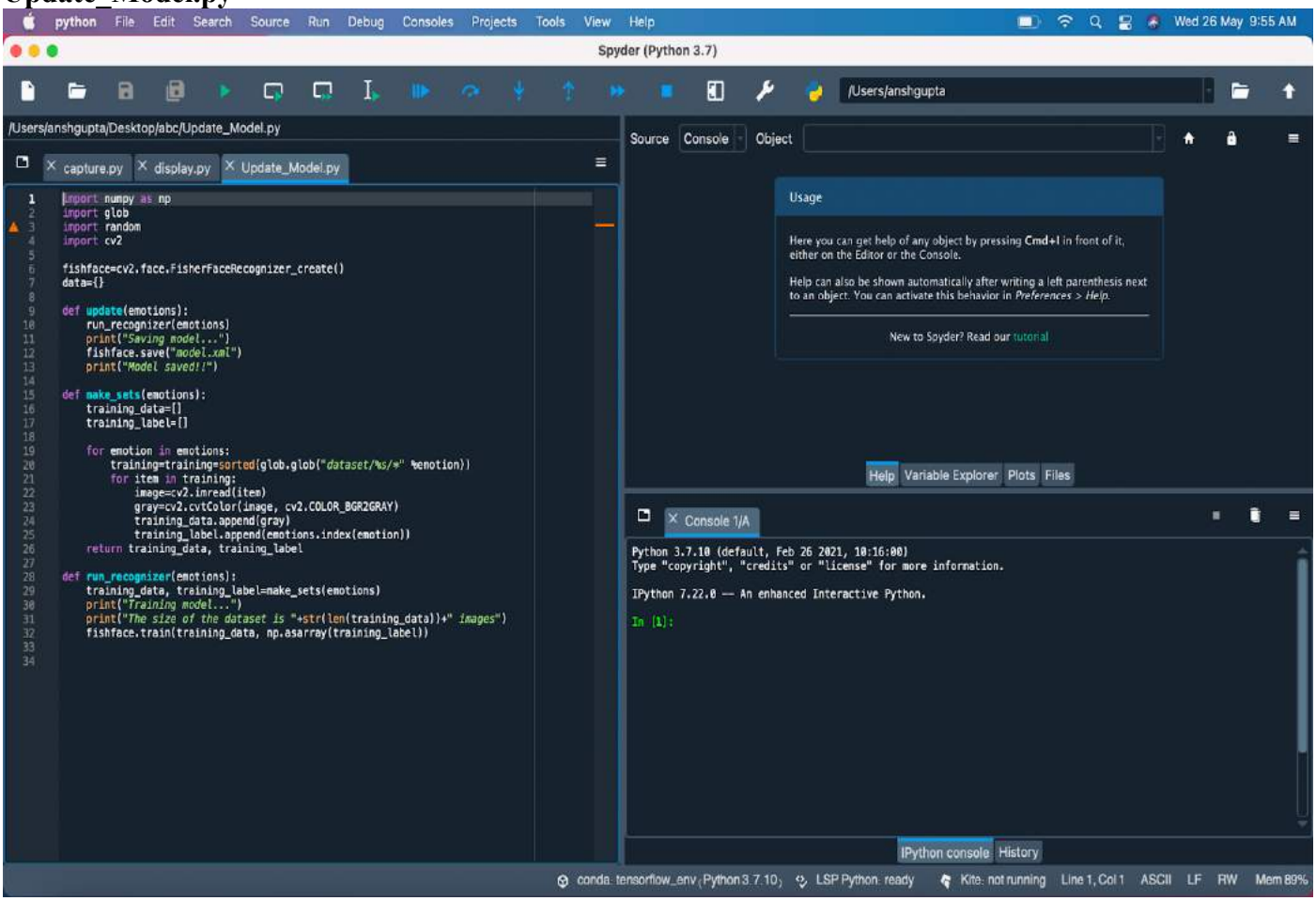
Running the backend file in spyder:
Capture.py



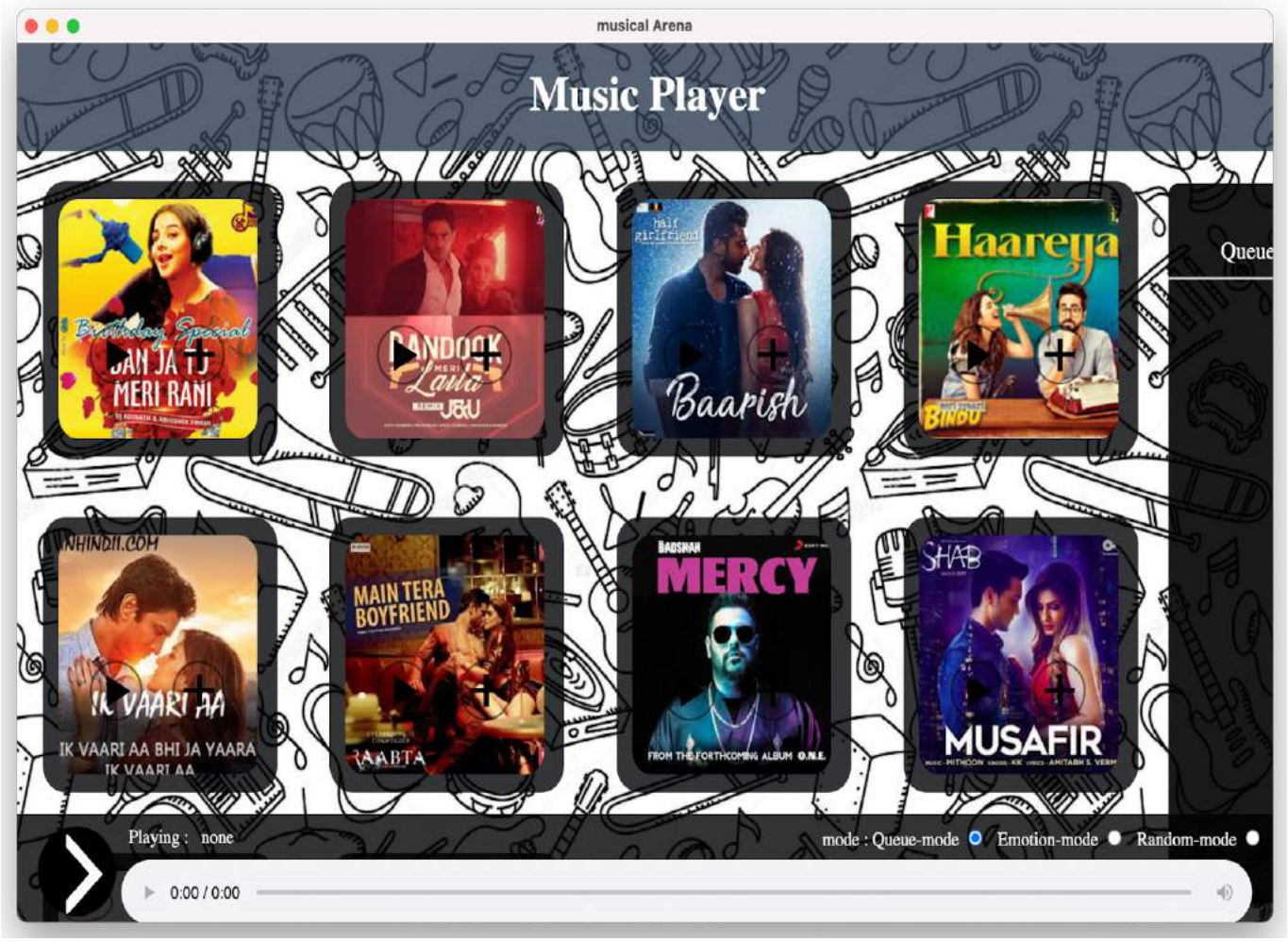
Display.py



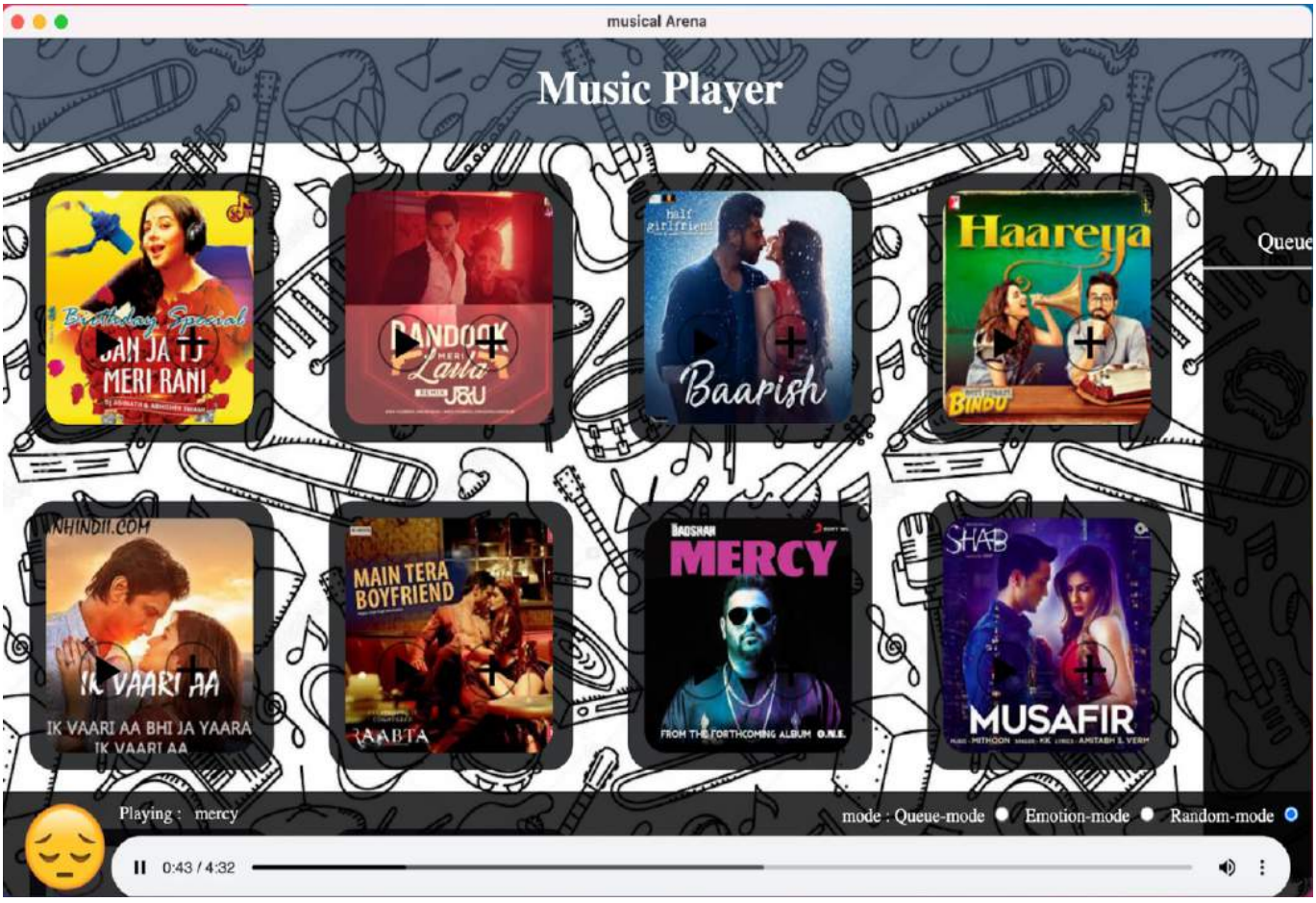
Update_Model.py



RESULT :



AFTER DETECTING THE FACE USING WEBCAM:



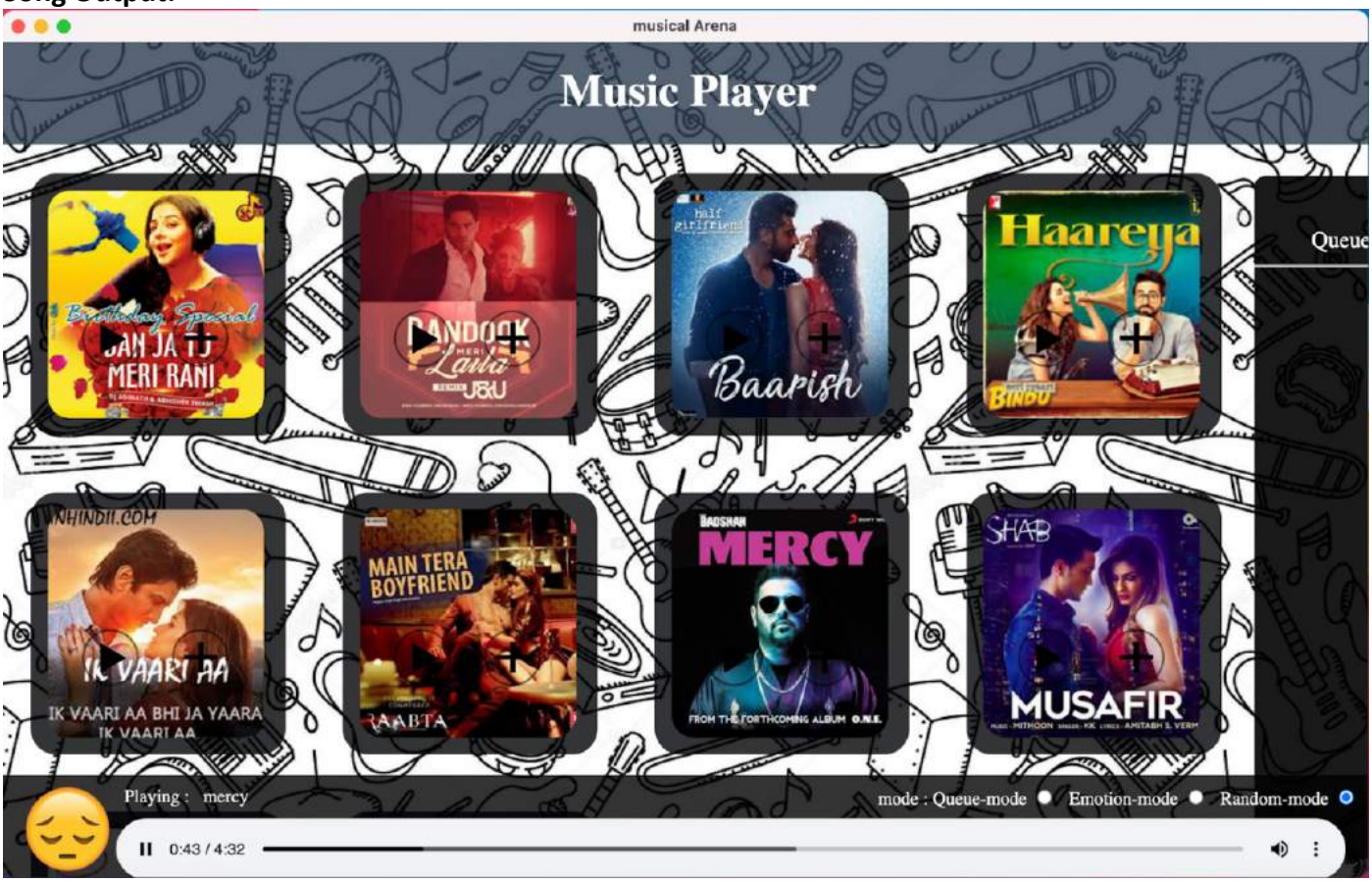
TESTING DATA:

1) **SAD EXPRESSION**

TESTING DATA OUTPUT:

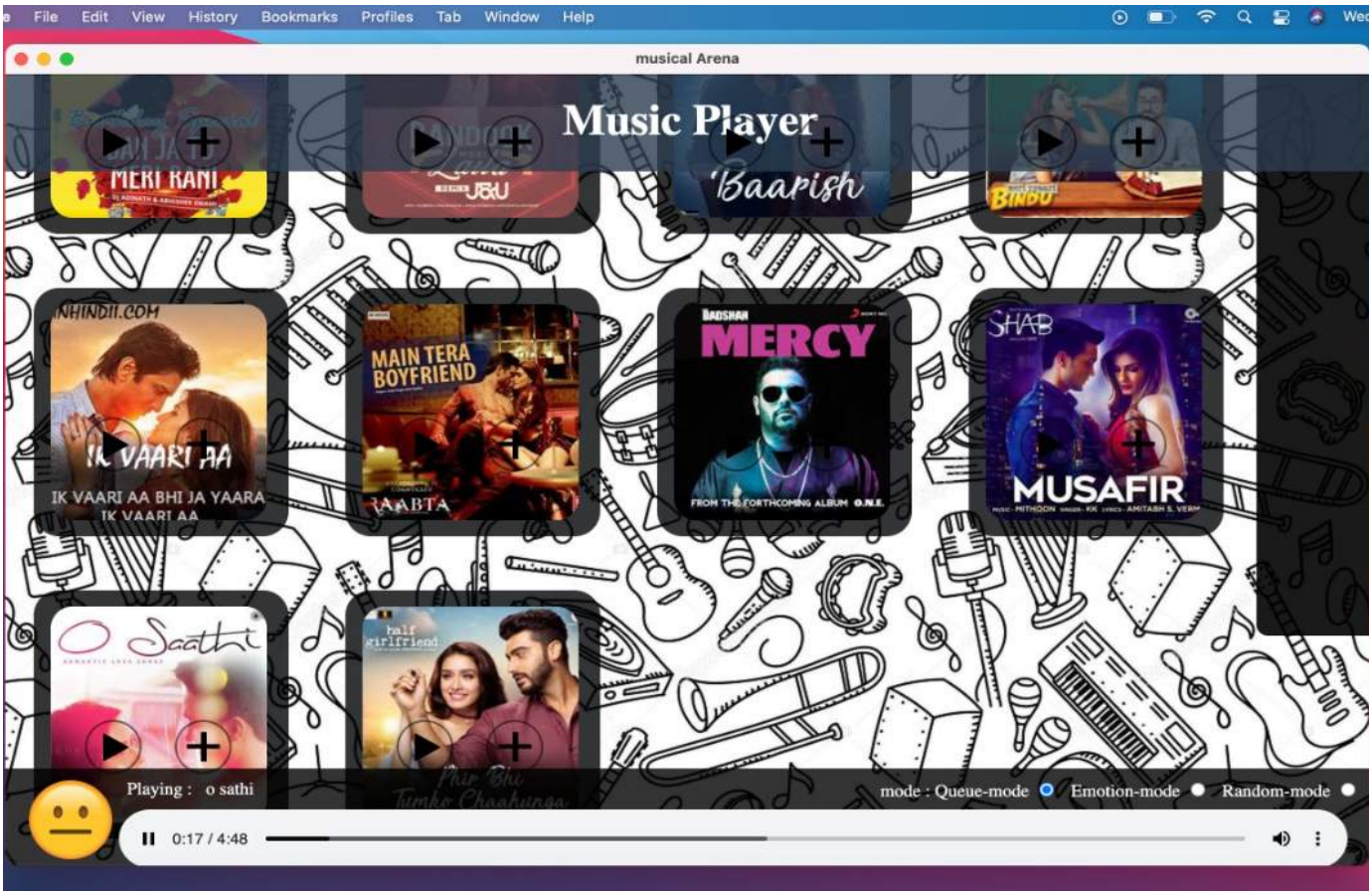
```
abc — -zsh — 80×24
Last login: Wed May 26 09:01:59 on ttys000
(base) anshgupta@ANSHs-MacBook-Air ~ % cd desktop
(base) anshgupta@ANSHs-MacBook-Air desktop % cd abc
(base) anshgupta@ANSHs-MacBook-Air abc % python capture.py
You seem to be sad
(base) anshgupta@ANSHs-MacBook-Air abc %
```

Song Output:

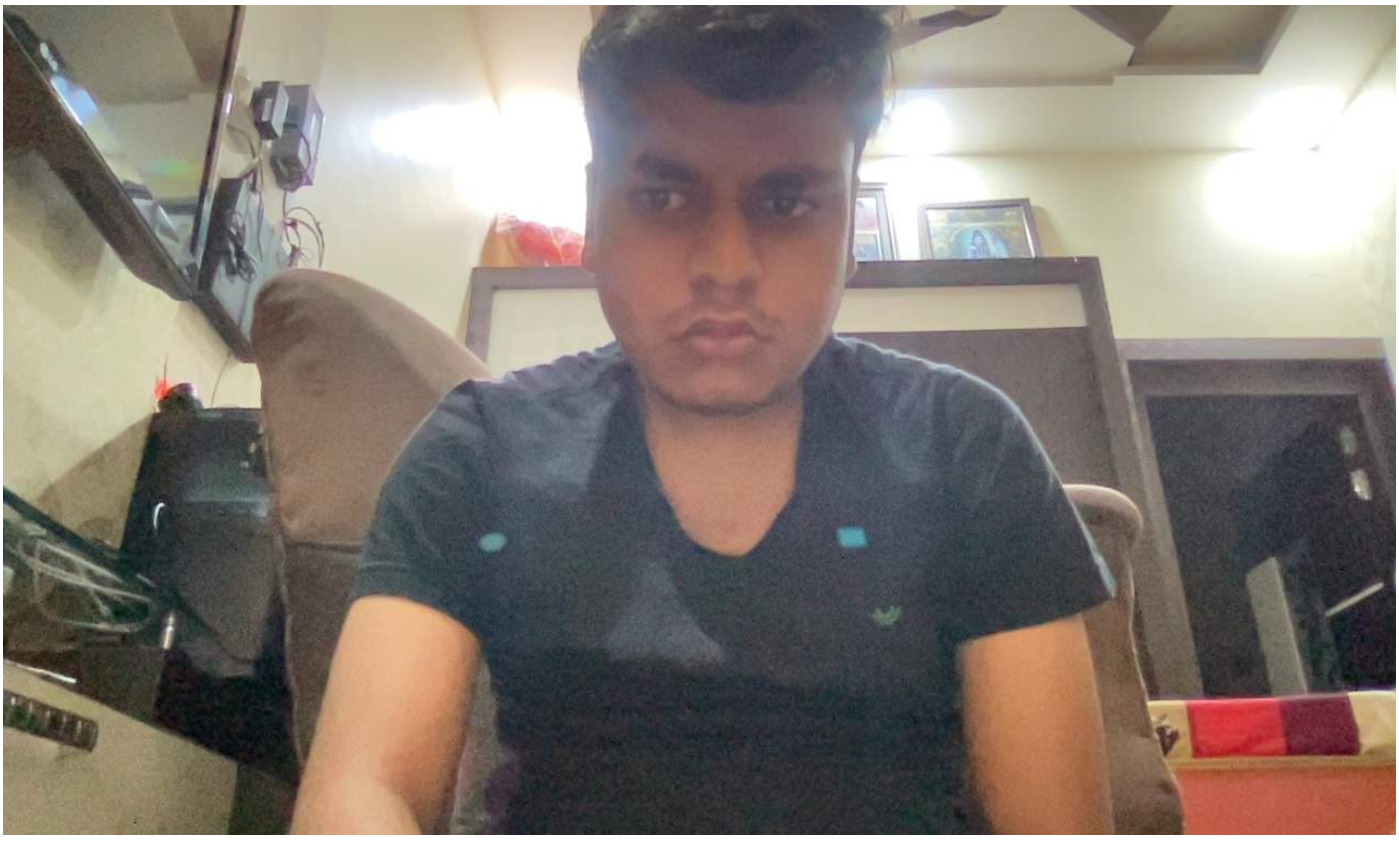


2) NEUTRAL EXPRESSION:

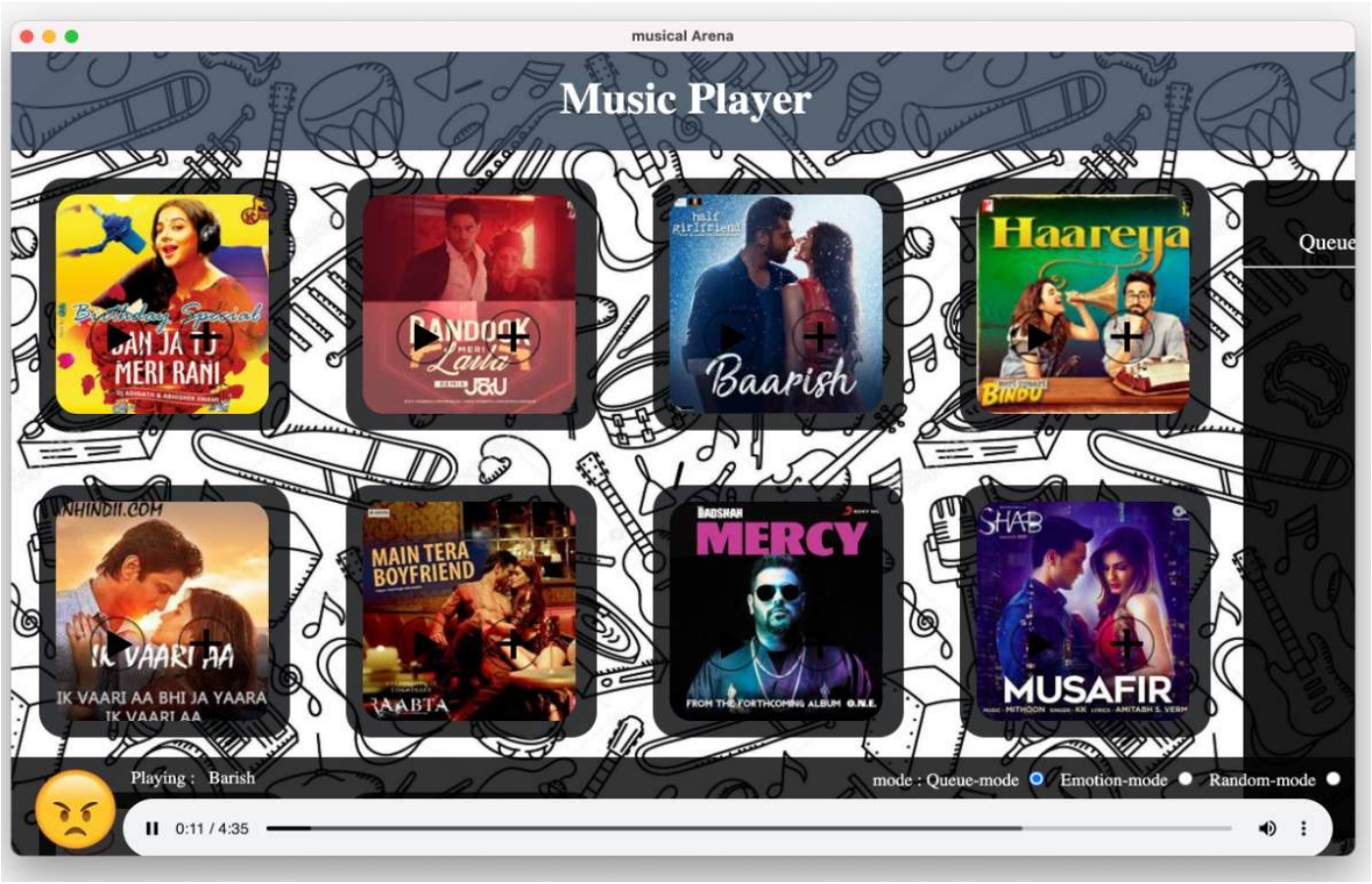
TESTING OUTPUT-2-(LIST OF NEUTRAL SONGS)



3) ANGRY EXPRESSION:

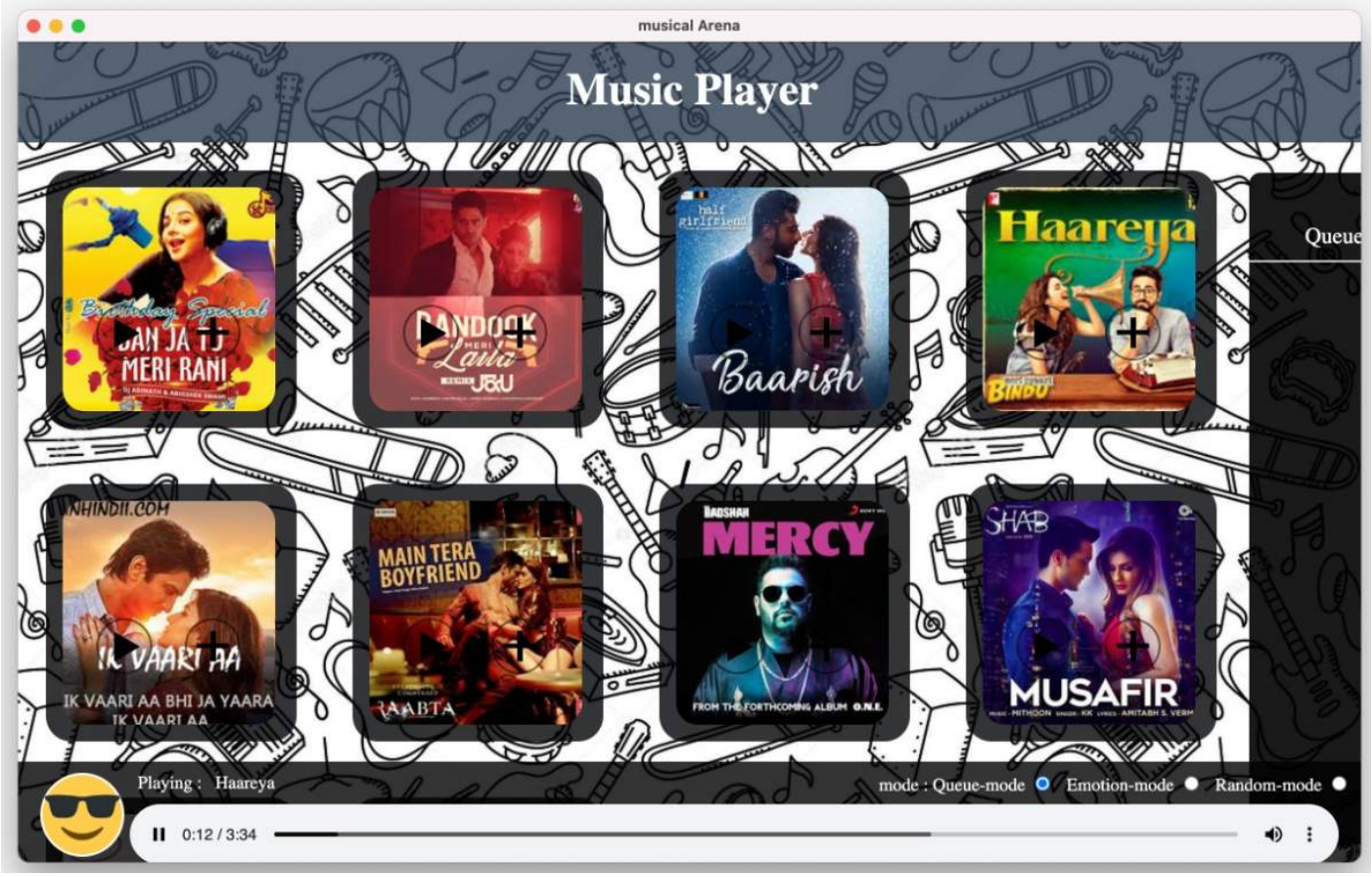


TESTING OUTPUT-3(LIST OF ANGRY SONGS)



4) HAPPY EXPRESSION:

TESTING OUTPUT-4 (LIST OF HAPPY SONGS)



CODE UPLOAD GOOGLE DRIVE LINK:
https://drive.google.com/drive/folders/12RiAO_Hz3650DURrJWlKzlA4tsXqU0St?usp=sharing

CONCLUSION:

Emotion recognition using facial expressions is one of the important topics of research and has gathered much attention in the past. It can be seen that the problem of emotion recognition with the help of image processing algorithms has been increasing day by day. Researchers are continuously working on ways to resolve this by the use of different kinds of features and image processing methods.
Emotion recognition has gained a lot of importance in all aspects of life. The system has successfully been able to capture the emotion of a user. It has been tested in a real-time environment for this predicate. However, it has to be tested in different lighting conditions to determine the robustness of the developed system. The system has also been able to grab the new images of the user and appropriately update its classifier and training dataset. The system was designed using the facial landmarks scheme and was tested under various scenarios for the result that would be obtained.