



“Emotify 2.0: Real Time Facial Expression Based Smart Music Player”

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Abstract—The vast majority concur that music is expressive and its expressivity can be effortlessly connected with individuals' feelings, practically a wide range of human feelings straightforwardly connected with the particular music class. Human's feelings like satisfaction, outrage, trouble, dread, despondency and delicacy can not entirely set in stone through their looks. Music could change human's feelings, could impact their temperament, lastly could influence their wellbeing. Melodic Therapy is one among the most seasoned techniques utilized for treating a portion of the mental infections. The mix of Musical treatment and facial feeling identification brings about a keen framework that sorts a music assortment in light of the class conveyed by every music and afterward prescribes an appropriate music playlist to the therapist for the patients in view of their present mind-set. The picture is exposed to facial location and feeling perceiving the procedures of the patients. The music that best matches this feeling is then suggested playlist that gives the best outcomes to unwind and quiet patients.

Keywords/Catchphrases: Music idea, Facial Recognition, Open CV, Python.

I. INTRODUCTION

A. Motivation

Brilliant contraptions individuals convey ordinarily with them can get parcel of information. Information from wellness band, feeling discovery from face caught by Smartphone, exercises distinguished by the sensors, further can be utilized for different applications. One of the exceptionally exact and straight way to deal with recognize temperament is utilizing human looks.

More often than not, feeling is uncovered by face itself. Businesses have their prepared model for the feeling extraction and are currently conveying client administrations as structures furnishing API with assistance of cloud based administrations. We utilized Microsoft's mental administrations and Google's own action acknowledgment API in our methodology for quicker execution. AI can be utilized for ordering music into set of specific feelings. Once, this data is available, client can be known to his/her inclinations and tendency for tuning in by time, state of mind, action, and so on Preparing on this data can come up with better music list for future tuning in.

B. Background

In this undertaking, we will assemble a feeling based Music Player named as "Emotify 2.0" utilizing Python, A Web App which utilizes a depiction taken of the client to distinguish feeling and utilizing this, create a reasonable music playlist.

With the expansion ahead of time innovation, the quantity of craftsmen, their music, and music audience members all are expanding and here comes the issue of physically perusing and picking the music as indicated by their temperament or decision.

This is the place where our task comes into the job, as we as a whole know to confront an organ of the human body which assumes a fundamental part in separating human ways of behaving and their perspective.

Our venture recognizes the mind-set of the client and plays a melody or playlist as indicated by his temperament. The undertaking utilizes a web camera to catch the picture of the client; it then, at that point, orders the look as cheerful, miserable, non-partisan, or furious and afterward gives a playlists to play the melody as indicated by the information picture.

Alongside music, it will likewise give different web recordings according to distinguished disposition of client!!!

II. WRITING SURVEY

The following are exploration papers which are related with current framework which incorporates the portrayal of the separate framework.

1] PAPER I: In this paper[1.], the proposed framework centres around feeling acknowledgment utilizing looks which are caught by utilizing Intel's Real Sense SR300 camera. This camera recognizes tourist spots on the profundity picture of a face consequently utilizing Software Development Kit (SDK) of Real Sense camera. Mathematical component based approach is utilized for include extraction. The distance between milestones is utilized as highlights and for choosing an ideal arrangement of elements savage power strategy is utilized. Proposed framework is utilized Multilayer Perceptron (MLP) brain network calculation utilizing back spread strategy for grouping. The test dataset is caught utilizing Real Sense SR300 camera. The proposed framework perceives three looks specifically impartial, cheerful, and shocked. The acknowledgment rate accomplished is 93.33%.

2] PAPER II: In this paper[2.], Olga Sourina and other co-creators proposed Real-time EEG-based feeling acknowledgment for music treatment in which they utilized two principle calculations, the first is Information obtaining calculation and second is Music treatment calculation . Here creators recognized different kind of treatment, the first arrangements with torment related issues: the music pieces focusing on a blissful inclination are played to the patient to destruct his/her consideration from the aggravation. The second technique of treatment manages sadness: here the Melody focusing on the arrangement of miserable, wonderful and fulfilled feelings are played to client. The third sort of treatment is utilized to diminish tension level of the patients.

Electroencephalography (EEG) signals are utilized to recognize the human feelings. Fractal aspect (FD) upsides of EEG could uncover mathematical intricacy of the signs. It has been demonstrated that FD could be applied progressively EEG signal handling to recognize different cerebrum states.

3] PAPER III: In this paper[3], Renuka s. Deshmukh and other co-creators proposed facial feeling recognition utilizing AI approach, the AI algorithmic program will be utilized for the point of arrangement of the feelings. The enthusiastic articulation API will be additionally evolved which will give us a result inside the sort of feeling that are arranged upheld the given contribution to the framework. The paper incorporates just the incomplete consequences of execution; the more execution is continued. The exhibition measures will be utilized relying on the further execution that is in strategy . A framework for human appearance acknowledgment by investigating key facial locales utilizing PCA and brain organizations. Feeling acknowledgment during this paper depends on perception of shapes, especially of look showed in still film. Looks utilized are acquired by edge location and gaining practical experience in explicit facial locales of eyes and the mouth. Accordingly, order and feeling acknowledgment is performed through those two facial districts. The decision of these two areas, as the reason for feeling acknowledgment is natural since the most visual sign of feelings is apparent in those regions.

TABLE I. A DETAIL LOOK-OVER OF STANDARD STRATEGY

Paper. no	Paper Title	Authors	Year of publication	Outcome
1.	Real time facial expression recognition using Real Sense camera and ANN	Jayashree. V.Patil. Preeti.Bailke.	2016	recognize s image of a face automatically with help of (SDK) of Real Sense camera
2.	Music Therapy using Facial Expressions.	Olga Sourina and other co-authors	2020	(EEG) signals are used to recognize the human emotions. Fractal dimension (FD) values of EEG can show geometric complexity of the signals.
3.	Facial emotion recognition system through machine learning approach	Renuka s. Deshmukh	2017	A system for human expression recognition by analyzing key facial regions with help of PCA and neural networks.

III. EXTENT OF PROJECT

Contrasted and the customary music treatment, our proposed Facial appearance based music treatment needn't bother with an advisor to do every single exorbitant perception, and the treatment is a versatile one it tends to be customized to every individual patient. There is a decision of various treatments focusing on torment the board, gloom, stroke recovery, stress the executives, and so on Clinical consideration providers can offer better help by using additional data about patients' energetic state during treatment.

A. Existing System

Existing proposal frameworks, for example, Spotify, Musixmatch and so on

B. Problems of Existing Systems

- These frameworks just permit you to carry on with a static client experience as the framework will give proposal in light of the set of experiences regardless of different boundaries that could affect the forecast like inclination or feeling.
- These proposal frameworks will here and there neglect to give the right result on the grounds that their ideas depend on obsolete info.
- Along these lines, the client can't be happy with the result as it doesn't fulfil his inclination

C. Solving Approach / Brief See

In this undertaking, we will fabricate a feeling based Music Player named as "Emotify 2.0" utilizing Python, A Web App which utilizes a preview taken of the client to recognize feeling and utilizing this, produce an appropriate music playlist. With the expansion ahead of time innovation, the quantity of specialists, their music, and music audience members all are expanding and here comes the issue of physically perusing and picking the music as indicated by their temperament or decision. This is the place where our venture comes into the job, as we as a whole know to confront an organ of the human body which assumes a crucial part in extricating human ways of behaving and their perspective. Our venture recognizes the state of mind of the client and plays a melody or playlist as indicated by his mind-set. The venture utilizes a web camera to catch the picture of the client; it then, at that point, arranges the look as cheerful, miserable, unbiased, or irate and afterward gives a playlists to play the tune as per the information picture. Alongside music, it can likewise give different web recordings according to distinguished temperament of client in future.

IV. PROPOSED METHODOLOGY

A. System Architecture

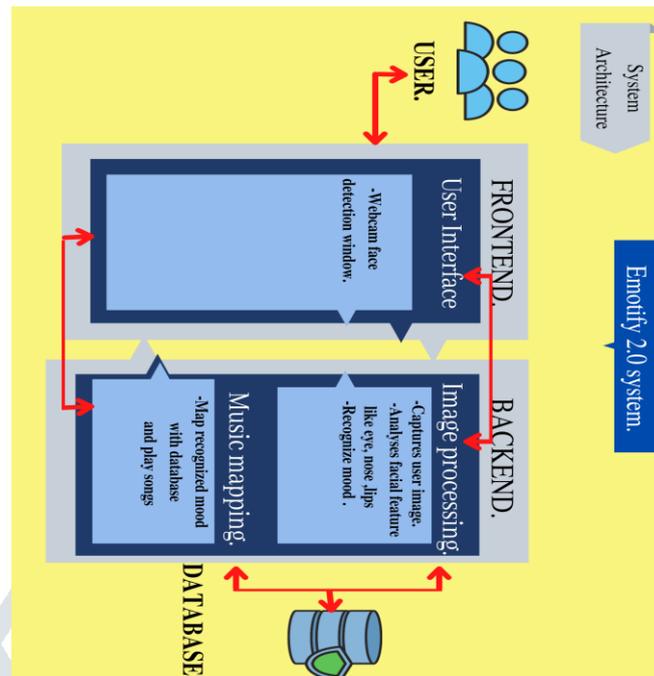


Fig. 1. System Architecture

FER2013 (Facial Expression Recognition 2013) dataset is utilized to recognize people's looks and feelings.

HAAR Cascade Algorithm is utilized to distinguish faces in pictures. It is one of the famous calculations utilized in face identification and is broadly accepted to be better than other strategies.

B. Design

For carrying out this project the plan is separated into three significant part, the initial segment is removing looks from picture subsequent to playing out some significant picture handling strategy and AI approach, the subsequent part is order of music classification and last part is picking/playing legitimate music for treatment which give the best outcome for that individual patient. Numerous pictures are caught from a web camera. To foresee the inclination precisely, we should have more than one facial picture. Obscured pictures can be a mistake source (particularly in low light circumstances) and consequently, the numerous pictures are arrived at the midpoint of to get a picture without any haze. Histogram balance is a picture handling method used to upgrade the differentiation of the picture by normalizing the picture all through its reach. This picture is then edited and changed over to greyscale with the goal that main the closer view of the picture remains, consequently lessening any equivocallness.

C. Facial Feature Extractions

HAAR CASCADE ALGORITHM:

So what is Haar Cascade? Well it is an Object Detection Algorithm needed to recognize faces in a picture or a constant video. The calculation utilizes edge or line identification features proposed by Viola and Jones in their investigation paper "Fast Object Detection utilizing a Boosted Cascade of Simple Features" disseminated in 2001. The calculation is given a ton of positive pictures comprising of countenances, and significant deal of '-ve' pictures not comprising of any face to prepare on them. The model made from this preparing is accessible at the Open CV GitHub vault <https://github.com/opencv/opencv/tree/ace/information/haarcascades>.

The archive has the models put away in XML records, and can be perused with the Open CV strategies. These incorporate models for face identification, eye discovery, chest area and lower body location, tag recognition and so on Beneath we see a portion of the ideas proposed by Viola and Jones in their examination.

FER2013 (FACIAL EXPRESSION RECOGNITION 2013 DATASET):

FER2013 dataset was build by social affair the outcomes of google picture search of feelings. It is a very much examined dataset and has been utilized in ICML rivalries and a few exploration papers.

The data includes 48×48 pixel grayscale pictures of appearances. The appearances have been thusly enrolled therefore face is essentially engaged and includes about a comparable proportion of room in each image. The errand is to order each face in view of the inclination displayed in the look into one of seven classifications (0=Outrage, 1=Disdain, 2=Dread, 3=Blissful, 4=Miserable, 5=Shock, 6=Neutral/calm). The readiness set contains 28,709 models and the public test set involves 3,589 models.

TABLE II. FACIAL FEATURE DETAILS

Portions of the Face	Feeling
lip corner pulled, open eyes, open mouth, cheeks raised	<i>Blissful/happy</i>
eyebrow/mono-brow pulled down, open eyes, lip fixed	<i>Outrage/anger</i>
External eyebrow/mono-brow down, inward eyebrows raised, eyes shut, lip corner down	<i>Miserable/sad</i>
External eyebrow/mono-brow down, inward eyebrow/mono-brow up, mouth open	<i>Dread/fear</i>
Eyebrow/mono-brow up, open eyes, lower/upper jaw dropped	<i>Shock/surprised</i>
Lip corner depressor, lower lip depressor, eyebrows/mono-brow down, nose badly crumpled	<i>Disdain/Disgust</i>

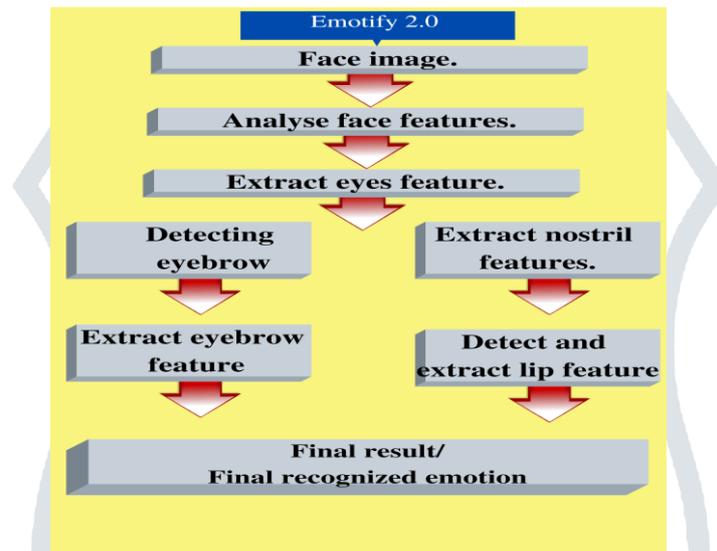


Fig. 2. Feeling and Portion's of the face

D. Music Genre Classification & Mood Recognition

Arrangement of music into temperament to Generate playlist can be done manually. Essentially,/emotion route gets the picture from the cam and stores it in server, on which the state of mind acknowledgment script runs on. The content at first enhances the picture with the goal that identification happens most precisely, essentially trimming it to simply the face and afterward changing over to greyscale. Now that the picture is prepared to chip away at, Open CV investigations the forms and identifies the elements or tourist spots of the face, as portrayed in the image. Utilizing this information, alongside AI, disposition can be recognized. Models are made via preparing on many countenances. Different appearances showing a similar state of mind is taken care of as preparing information thus it can recognize the closest mind-set when it gets another face

V. RESULT AND ANALYSIS

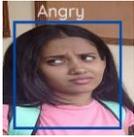
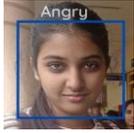
In order to check accuracy of our proposed system, number of users were preferred to test its precision in recognizing the inclination/emotion. Amongst the all preferred users following are the 10 users that were tested for each category of emotions:

TABLE III. RESULT/TESTING ANALYSIS FOR BLISSFUL/HAPPY

User	Testing results	
	1(positive)	0(negative)
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
		□

TABLE IV. RESULT/TESTING ANALYSIS FOR OUTRAGE/ANGER

User	Testing results	
	1(positive)	0(negative)
	□	

	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

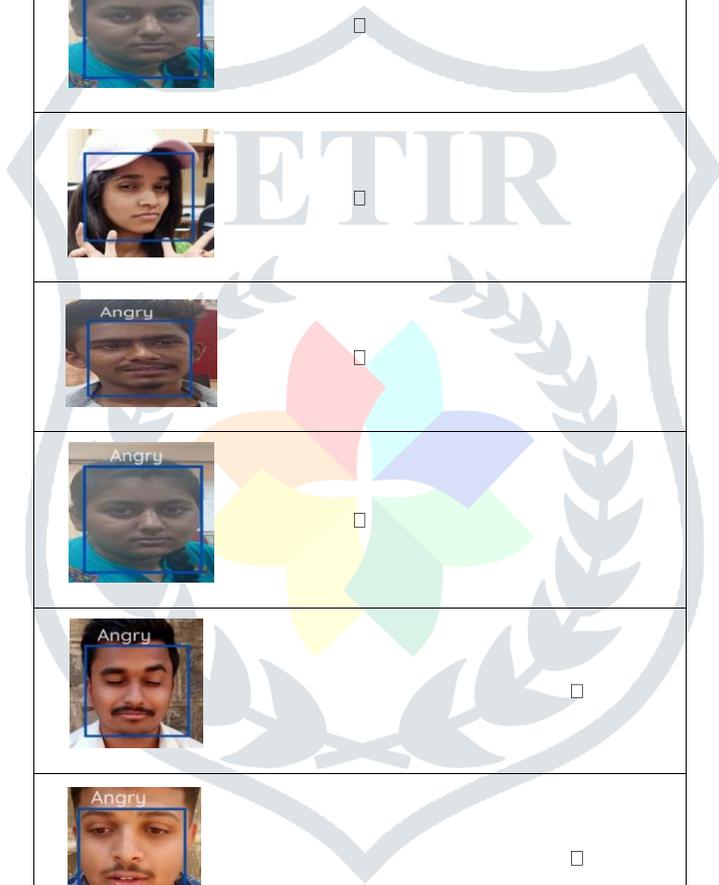


TABLE V. RESULT/TESTING ANALYSIS FOR MISERABLE/SAD

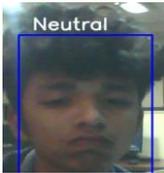
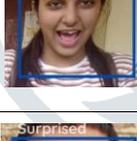
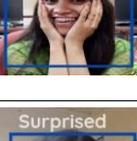
User	Testing results	
	1(positive)	0(negative)
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
		□

TABLE VI. RESULT/TESTING ANALYSIS FOR MISERABLE/SAD

User	Testing results	
	1(positive)	0(negative)
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
		□
		□

TABLE VII. RESULT/TESTING ANALYSIS FOR SHOCK/SURPRISED

User	Testing results	
	1(positive)	0(negative)
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
	□	
		□

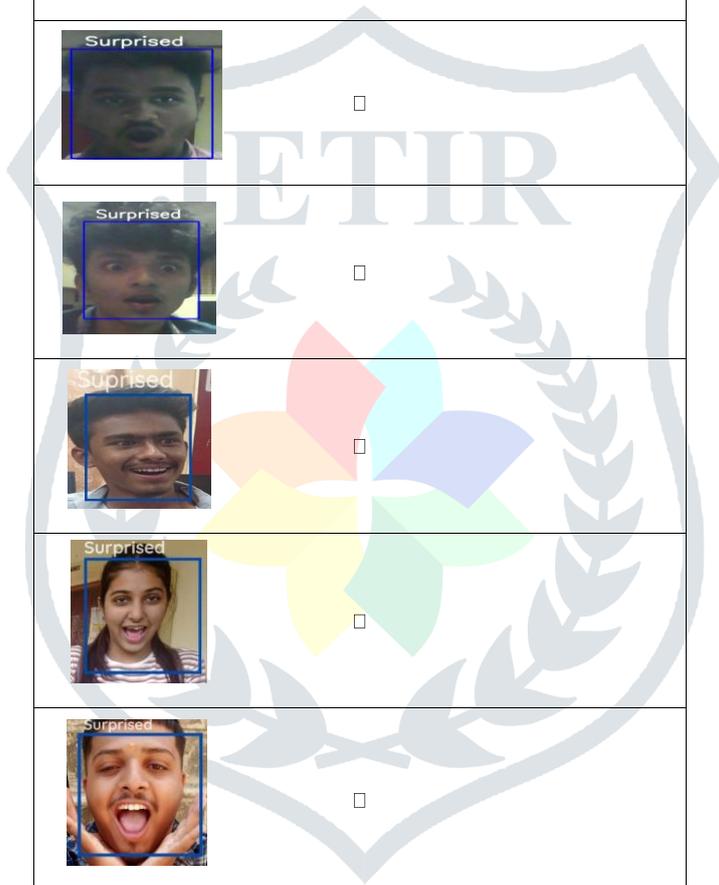


TABLE VIII. RESULT/TESTING ANALYSIS FOR DISDAIN/DISGUST

User	Testing results	
	1(positive)	0(negative)
	□	
	□	
	□	
	□	
	□	
	□	
	□	
		□
		□
		□

To find the Accuracy Result (AR) the given formula is applied as follows:

$$AR = \text{Positive detected emotion} / \text{Total no of detected emotions} * 100$$

$$AR = 50 / 60 * 100$$

$$AR = 83.33\%$$

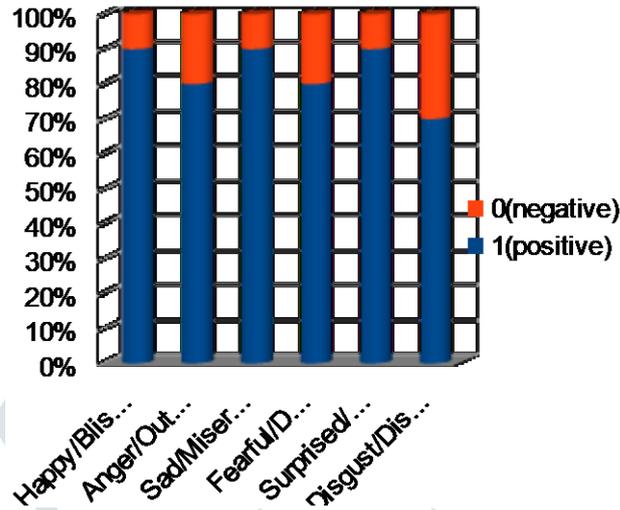
To find the loss Result (LR) the given formula is applied as follows:

$$LR = \text{Negative detected emotion} / \text{Total no of detected emotions} * 100$$

$$LR = 10 / 60 * 100$$

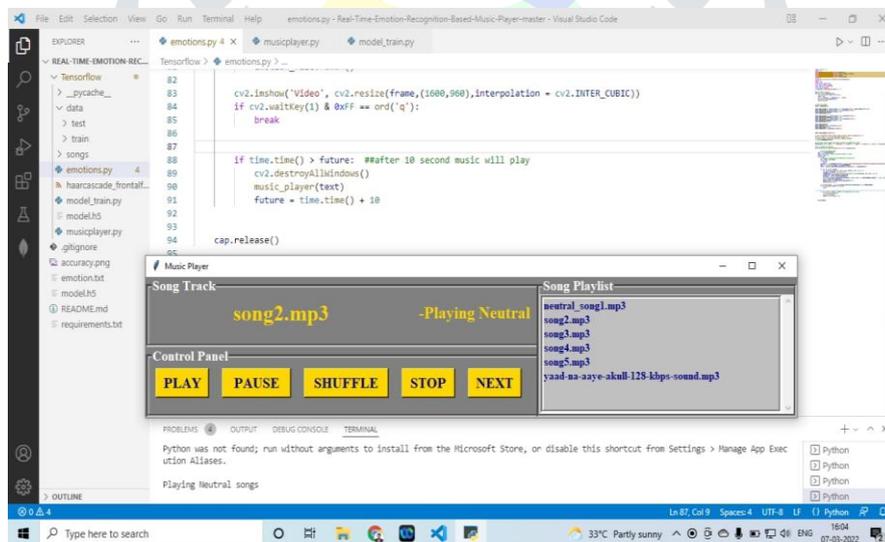
$$LR = 16.66\%$$

VI. GRAPH PLOTTING



Based on above Result and Analysis following graph is plotted

VII. SNIPPETS OF SYSTEM



CONCLUSION

The face discovery and feeling acknowledgment are extremely difficult issues. They require a weighty exertion for improving the exhibition proportion of face location and feeling acknowledgment. This area of feeling acknowledgment is acquiring consideration attributable to its applications in different areas, for example, gaming, computer programming, and training.

We have arranged project named "Emotify 2.0: Facial Expression based music player" having 83.33% accuracy rate. There are 7 classes of look we attempted to perceive such as(happy, miserable, non-partisan, shock, irate, dread, disdain). HAAR Cascade Algorithm and FER2013 (Facial Expression Recognition 2013) dataset used to distinguish face and recognize looks, temperaments and tune is played in like manner.

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