

Mood Swings Reader

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Table of Contents

1. Summary.....	8
2. Introduction.....	10
3. Needs/Problems.....	12
3.1 Proposed solution.....	13
3.2 Importance of FR.....	15
3.3 Expressions and Emotions.....	15
3.4 Evolutionary Reasons.....	16
4. Goals/Objectives.....	18
5. Procedures/ Scope of Work.....	21
5.1 System Study.....	22
5.1.1 Overall System Description.....	22
5.1.2 Operating Environment.....	23
5.1.2a System Constraints.....	23
5.2 External Interface.....	24
5.2.1 Software Interface.....	24
5.2.2 Hardware interface.....	24
5.3 Functional Requirement.....	25
5.4 Non-Functional Requirement.....	25
5.5 Performance Requirement.....	30
5.6 Protection Requirements.....	31
5.7 Security.....	31

Mood Swings Reader

5.8 Scope.....	32
5.9 Project Design.....	33
5.9.1 Flowchart.....	34
5.9.2 Use case Diagram.....	35
5.10 Implementation.....	40
6. Time Table.....	48
7. Key Personnel.....	57
7.1 Diagram of our Venture.....	58
7.2 Venture Group.....	59
7.3 Partners.....	60
8. Evaluation.....	60
9. Appendix.....	61
9.1 Appendix A.....	62
9.2 Appendix B.....	63
9.3 Appendix C.....	64
10. Plagiarism Report.....	65

LIST OF TABLES:-

Table 5.1.2 Operating Environment.....	9
Table 5.4.7 Integration Testing.....	13
Table 9.5 Budget.....	61

LIST OF FIGURES:

Figure 5.9.1 Flow Chart Diagram.....	17
Figure 5.9.2 Use Case Diagram.....	18
Figure 5.10.1 facial expression recognition (start the application).....	19
Figure 5.10.2 facial expression recognition (open image).....	20
Figure 5.10.3 facial expression recognition (emotion detection).....	21
Figure 5.12.1 skin color segmentation.....	22
Figure 5.12.1a skin color segmentation (figure connected).....	22
Figure 5.12.2 face detection.....	23
Figure 5.12.2a face detection (cut the face).....	23
Figure 5.12.2b face detection (calculation).....	24
Figure 5.12.3 eye detection (middle position).....	24
Figure 5.12.3a eye detection (detected).....	25
Figure 5.12.4 lip detection.....	25
Figure 5.12.4a detection of lip and eye.....	26
Figure 5.12.5 apply bezier curve on lip (skin color).....	26
Figure 5.12.5a apply Bezier curve on lip (skin color).....	27

Mood Swings Reader

Figure 5.12.5b apply Bezier curve on lip.....	27
Figure 5.12.6 Apply Bezier on Eye.....	28
Figure 5.12.6a Apply Bezier curve on eye (skin color).....	28
Figure 5.12.7 Emotion Detection.....	29
Figure 5.12.8 Emotion Detection Continuous.....	30
Figure 5.12.8a Emotion Detected.....	30

Certificate

It is certified that Abdulrehman (BSSE-14311), Qasim Ali (BSSE-14363), Kashif Ali (BSSE-14294) and Baber Ali(BSSE-14328) and Hafiz Waqar Tayyab (BSSE- 14297) has carried out all the work related to this project under my supervision at the Faculty of Computer Science and Information Technology, Superior University Lahore, and the work fulfills the requirements for award of Bachelors of Software Engineering degree.

Supervisor

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Project Registration and Approval

Project ID (for office use)						
Type (Nature of project)		<input type="checkbox"/> Development		<input type="checkbox"/> Research		<input type="checkbox"/> R&D
Project Group Members						
Sr.#	Roll #	Student Name	CGPA	Email ID	Phone #	Signature
(i)						
(ii)						
(iii)						
(iv)						
(v)						
Name & Signature of Advisor (If students are eligible for FYP)						

Plagiarism Free Certificate

This is to certify that, I am _____ S/D/o
_____, group leader of FYP under registration no
_____ at Computer Science Department & Information Technology,
Superior University, Lahore. I declare that my FYP proposal is checked by my supervisor
and the similarity index is _____% that is less than 20%, an acceptable limit by HEC.
Report is attached herewith as Appendix A.

Signature: _____

I _____ show my consent to supervise the project
titled _____
which consists of above listed students as group members

Date & Signature: _____ Designation: _____

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Approval of FYP Committee

Committee Member 1: Name: _____ Designation: _____

Accepted * Deferred *Rejected **Signature:** _____

*Remarks: _____

Committee Member 2: Name: _____ Designation: _____

Accepted * Deferred *Rejected **Signature:** _____

*Remarks: _____

FYP Manager: Fahad Sabah

Accepted *Deferred *Rejected **Signature:** _____

*Remarks: _____

Abstract

This paper presents a facial expression recognition system employing Bezier curves approximation technique. The system is based on facial features extraction using the knowledge of the face geometry and approximated by 3rd order Bezier curves representing the relationship between the motion of features and changes of expressions. For face detection, color segmentation based on the novel idea of fuzzy classification has been employed that manipulates ambiguity in colors. Experimental results demonstrate that this method can recognize the facial expressions with an accuracy of more than 90 cases. Finally the system has been implemented using a manipulator robot and issuing facial expression commands. From human face structure, we divide in 3 regions such as right eye, left eye and mouth areas from the face image. First of all the face is detected and then detection of the skin region. We crop the facial skin region and connect the largest skin region to detect the skin surface of the human face.



CHAPTER 1

1. SUMMARY

“Facial expressions” Sensitive concerns about the behavior of persons all through interviews and interrogations have stimulated efforts to expand "non-intrusive" technology for rapidly assessing the credibility of statements by way of individuals in a variety of touchy environments.

In these days the generation makes human existence less difficult. It is revolutionizing each area of existence. The facial expression reputation records starts lengthy ago. Digi cam recording make this artwork available and people used to read humans facial expressions. These thoughts reading facial technology allows many people to deal with daily duties find it irresistible allows psychiatrists to correctly cope with their sufferers extra over proposed machine facilitates searching on search engines like Google less complicated on the idea of a person mood. They show the search results on the idea of consumer moods. This generation also allows in taking surveys by means of playing some video or content and recording customers response with the help of webcam. The final year students increase an application facial expression popularity which can also construct as plug-in or impartial modules and may plug in with engines like google. This software program helps searching simpler. [4]



CHAPTER 2

2. INTRODUCTION

The proposed last year venture Facial Expression Recognition used to distinguish people outward appearances, record those demeanor and utilize it for number of research, therapeutic field and so on. The application identifies is the people grinning, miserable or stunned. [12]

The android form of this application encourages clients from numerous points of view. It can be utilized as advanced cell locking which can just open if the approved individual endeavor to get to the PDA. Likewise, the effect and potential utilization of programmed FER have been developing in an extensive variety of uses, including human-PC collaboration, robot control and driver state reconnaissance. Be that as it may, to date, vigorous acknowledgment of outward appearances from pictures and recordings is as yet a testing assignment because of the trouble in precisely separating the valuable enthusiastic highlights. Facial development highlights, which incorporate element position and shape changes, are for the most part caused by the developments of facial components and muscles throughout enthusiastic demeanor. The facial components, particularly key components, will always show signs of change their positions when subjects are communicating feelings. As a result, a similar component in various pictures more often than not has diverse positions. Now and again, the state of the element may likewise be twisted because of the unpretentious facial muscle developments. For instance, the mouth in the initial two pictures presents distinctive shapes from that in the third picture. Along these lines for any element speaking to a specific feeling, the geometric-based position and appearance-based shape regularly change starting with one picture then onto the next picture in picture databases, and additionally in the recordings. This sort of development highlights speaks to a rich pool of both static and dynamic qualities of articulations, which assume a basic part for FER.[17]



CHAPTER 3

3. Needs/Problems

Mood Swings reading through facial feelings was an item of hobby for the reason that time of Aristotle. This topic came after 1960, when a listing of well-known feelings turned into Set up and numerous parameterized systems were proposed, or asses them. Easier via advances in system mastering and laptop vision, the idea of constructing computerized popularity structures has acquired a whole lot of interest in the computer technology vicinity. One of the pioneers of information comm. unique, Prof. Albert Mehrabin, has concluded in his observe that during face-to-face verbal exchange, emotions are conveyed in share of fifty five% via facial expressions. That means that if the laptop could detention and apprehend the emotions of its “interlocutor”, communication could be greater natural and suitable, particularly if we consider situations wherein a computer might play the role of a show. Growing such facial features popularity gadget (additionally referred to as a FER machine) isn't always trivial mission, due to the excessive inconsistency of records. Pics are signified below numerous conditions inclusive of resolution, satisfactory, illumination or length. All these constraints must be taken into deliberation for selecting appropriate methods, on the way to deliver a device that is strong, creature self-determining and that ideally works in real time situations. [19]

3.1 Proposed solution

Our proposed final year project Facial Expression Recognition used to detect persons facial expressions, it will record those expression and use it for number of research, medical field etc. The application detects is the persons smiling, sad, happy or shocked. [8]

The android version of this application facilitates users in many ways. It can be used as smart phone locking which can only unlock if the authorized individual try to access the smart phone. Consequently, the impression and possible usage of automatic FER are growing in a very wide selection of submissions, it includes human-computer interaction, automaton management and driver state observation. But strong recognition of facial expressions from videos and pictures continues to be a difficult task attributable to the problem in accurately extracting the helpful emotional options. The specialty of Facial movement which includes shape changes and feature position are generally caused by the movements of facial elements and muscles during the course

of emotional expression. The facial elements, especially key elements, will constantly change their positions when subjects are expressing emotions. As a consequence, the same feature in different images usually has different positions. In some cases, the shape of the feature may also be distorted due to the subtle facial muscle movements. For example, the mouth in the first two images presents different shapes from that in the third image. Therefore, for any feature representing a certain emotion, the geometric-based position and appearance-based shape normally changes from one image to another image in image databases, as well as in videos. This kind of movement features represents a rich pool of both static and dynamic characteristics of expressions, which play a critical role for FER.

The purpose of this attempt is to increase new algorithms for a sturdy pose-invariant face reputation that triumph over some of the obstacles observed in present facial recognition systems. Specially, we are inquisitive about addressing the trouble of detecting faces in color pix within the presence of numerous lights conditions and complicated backgrounds as well as recognizing faces beneath variations in pose, lights, and expression.

Seeking to infer a person's expressive nation in a nonverbal shape, typically calls for interpreting his/her facial appearance. Frequently, body languages and in particular facial expressions, tell us extra than words approximately one state of mind / thoughts.

For this project I have performed an experiment which serves multiple purposes:

1. Discover out, as soon as and for all, who "reads" facial moods higher men or girls, and if so, signifying an answer for the question- why do those variations exist?
2. Illuminating superior functions for spotting classically described facial expressions and responding the query- which facial cues assist us the most decipher mood expressions?

This paper proposes a device capable of appearing computerized recognition of six emotions, considered to be generic across cultures: disgust, anger, fear, happiness, disappointment marvel. Such system might examine the image of a face and bring a calculated prediction of the expression. The approach integrates a module for computerized face detection, by using one of the most popular algorithms for such project, referred to as Viola-Jones. Given the extracted face, the system extracts discriminated features with a technique called nearby Binary styles, chosen for its robustness to illumination adjustments and speed of computation. Finally, the solution plays

expression classification by using incorporating the widely used system mastering model known as guide Vector Machines that is trained on a well-known data set of examples [21]

3.2 Importance of Facial Recognition

Understanding the human facial expressions and the study of expressions has many aspects, from laptop evaluation, emotion popularity, lie detectors, airport security, nonverbal verbal exchange and even the function of expressions in art. Enhancing the talents of analyzing expressions is an essential step towards successful relations.

3.3 Expressions and Emotions

A mood expression is a sign completed with the face muscle groups, which send the emotional nation of the difficulty to sightseer. An expression sends a message approximately someone's inner feeling. The word for "face" is identical literatures because the word signifies "within" or "internal". That likeness suggests about the facial appearance maximum essential position- being a channel of nonverbal statement.

Facial expressions are a prime approach of handover nonverbal info amongst people, even though many animal species display facial expressions too.

Even though human established a totally huge choice and authoritative of verbal languages, facial expression function in connections remains important, and now and again even vital. Expressions and emotions move hand in hand, i.e. special mixtures of face powerful actions replicate a certain emotion. For positive emotions, it's miles very tough, and maybe even not possible, to keep away from it's appropriate facial features.

For instance, someone who is attempting to disregard his boss's irritating aggressive comment via retaining a neutral expression would possibly however show a short expression of anger. This marvel of a transitory, unintentional face expression proven on the face of human beings consistent with feelings skilled is called 'micro expression'. [13]

Micro expressions specific the three commonplace emotions: happiness, sadness, anger. But, Paul Ekman, a Jewish American psychologist who turned into an inventor within the study of emotions and their relation to facial expressions, improved the listing of classical emotions. Ekman

has brought to the listing of emotions nine greater: entertainment, disgrace, discomfiture, excitement, delight, fault, alleviation, delight & delight.

3.4 Facial Expressions Evolutionary Reasons

A commonplace supposition is that facial expressions to start with assisted a useful role and not a talkative one. We are able to attempt to defend each one of the four traditional expressions with its useful to start with role.



CHAPTER 4

4. Goals/Objectives

The project mainly aims to come up with a solution to the facial expression recognition problem by Sub issues dividing it into sub-problems of classifications of some specific Action Units. The scope includes not only the two class problems which tell about whether an Action Unit is on or off, however conjointly the multi-class problems that can inform the user regarding multi occurrences of a lot of than one Action Unit at an equivalent time. For this, completely different methodologies and techniques for feature extraction, normalization, choice and classifications. Solutions to those issues still as taking the machine quality and temporal order problems into thought. The project objective is to implement face recognition in AN optimum manner in terms of run time onto the embedded system. Numerous algorithms and methodologies are studied and hardware resources designing are going to be done to realize the goal. This kind of face recognition embedded system may be wide employed in our standard of living in numerous sectors. We tend to hope that human life may be greatly helped with this technology. [30]

The basic goal of this challenge is researching current strategies for appearing computerized Facial features reputation. That is enforced via growing a gadget that's capable of classifying a photo into one of the four fundamental feelings. The task need to supply a face recognition apparatus, a structure for feature extraction, a Skilled classifier and a Graphical person Interface that gives consumer entrance to the devices capability.



CHAPTER 5

5. Procedures/ Scope of Work

The proposed final year project gadget works as follows:

1. The webcam is used to take individuals image.
2. The system detects grey scale, height of eye and lips and facial factor places stored at picture with man or woman's name in the database.
4. There may be already default photo (either of person or not) saved in the database.
5. The software fits consumer image by default and on the basis of person's mood.

5.1 SYSTEM STUDY

5.1.1 Overall System Description

The challenge mainly aims to provide you with a solution to the facial features popularity trouble through Sub troubles dividing it into sub-troubles of classifications of a few specific movement devices. The tasks scope includes not handiest the two class problems which inform about whether an movement Unit is on or off, however additionally the multi-class troubles to be able to tell the person about multi occurrences of a couple of motion Unit at the same time. For these unique methodologies, strategies, characteristic extraction, normalization, selection and class, answer all these troubles as well as taking the computational complexity and timing problems into attention. [27]

The task objective is to implement face recognition in a top-quality way in terms of run time onto the embedded system. Various algorithms and methodologies are studied and hardware sources making plans may be achieved to achieve the purpose. This sort of face popularity embedded machine can be widely utilized in our everyday lifestyles in distinct sectors. We hope that human lifestyles may be greatly helped with this technology. Some common programs are indexed as follows:-

- Commercial enterprise assembly, collecting.
- Training coaching assistant.
- Audio-visual speech reputation (visible lip studying to decorate acoustic speech recognition).

5.1.2 Operating environment

The Operating Environment of the Project should be:

SRS	Software Requirements Specification
EmguCV	Is a cross platform .Net wrapper to the OpenCV image processing library. Allowing OpenCV functions to be called from .NET compatible languages such as C#
OpenCV	(Open Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel's research center in Nizhny Novgorod (Russia), it was later supported by Willow Garage and is now maintained by Itseez.
Windows	The Microsoft Windows should at least be Windows 7 and above
CPU	1.3Ghz Quad Core and above
GPU	Minimum Intel HD-R Graphics family and above

Table 5.1.2 operating environment

5.1.2a System constraints

Be aware of the constraints or obstacles in the system. Constraints may additionally include the following:

- Due to the fact that we need person profile statistics while growing the product, to find real time and sufficient facts may be a problem for developer because of regulatory guidelines.

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- Millions of statistics may be needed to test the software program. At this stage builders will want large quantity of disk area and clusters.
- We are not able to layout any particular interfaces for the product. It is going to be appropriate for the utility that human beings pay attention tune from. So, developers need to keep in mind common components of those programs so that the software program may be integrated to any of this software without difficulty.
- The application gathers actual time consumer profile facts from person accounts. Consequently, it has to be dependable and keep the ones records in safe.

Safety of this ensuing records need to be furnished by the software program additionally.

- Maximum crucial challenge of the gadget is generating accurate tips. To offer anticipated accuracy and to handle with sparse and huge records at the same time is crucial. [22]

5.2 External Interface Requirements

5.2.1 Hardware Interfaces

The recommendation system can work on any internet related device. Those gadgets need to have a few restrict requirements to make the utility run correctly. We anticipate that the processor speed and the GPU speeds are high.

5.2.2 Software Interfaces

Initially the systems will paintings on any platform. Furthermore, most of the utility might be coded In C#. C# database control equipment's include of ADO. Internet that is a standalone workbench utility to have interaction with Emgu CV library. [31]

5.3 Functional Requirements

Activate the utility.

- Insertion of image.
- Scanning of photo.
- Deduction of Emotion.
- Showing of Moods.
- Forward an e-mail.

5.4 Non-functional Requirements

Advice gadget relies upon on information come from web sites customers and enterprise items. This application has specific kind of customers, so there are capability differences between users in order to occur with appreciate to item records. The advice systems used by businesses have differences for efficiency. Our recommendation system must paintings correctly according to test out the moods. So, there exists a consumer interface this is suitable for mood suggestions. Our device may be operating in heritage. As soon as the advice gadget unearths a correct end result, it will likely be proven at the interface.

In terms of hardware, advice gadget could be embedded in windows. To apply or benefit from recommendations in machine

In phrases of software, our advice machine will run on non-public computers. The device will work on home windows systems. Furthermore, it'll be applied utilizing database management gear.[7]

This feature presents customer profile statistics and statistics to supplier of the complete system. Without a doubt, this characteristic presents the entire statistics had to make a recommendation.

5.4.1 Test Cases, Test plan

The test plan approach that has been used in our project consists of the following:

Layout verification or Compliance check: these levels of trying out had been executed throughout the improvement or approval stage of the product, normally on a small sample of units.

5.4.2 Test Coverage

The layout verification exams had been achieved at the factor of achieving every milestone. test regions blanketed trying out of various capabilities along with contrast Stretching, skin color Conversion, largest associated region, Binary image Conversion, Eyes and Mouth Detection, Drawing Bezier Curves, Detecting feelings ,and many others.

5.4.3 Test Methods

Trying out of numerous capabilities has been accomplished in facial expression recognition machine. For each module, corresponding outputs have been checked. For testing every module, the output produced from running the code became checked withcheck data set.

5.4.4 Test obligation

The crew participants running on their respective features carried out the testing of these features. Test duties also protected, the information gathered, and how that records turned into used and suggested.

5.4.5 Methods used for testing

We used the following approaches for testing:

5.4.6 Unit Testing

Unit checking out is a way through which man or woman units of source code, units of one or extra software modules collectively with related manage statistics, utilization procedures, and running tactics, are tested to discourage- mine if they're healthy to be used. In our device, we taken into consideration every module as one unit and examined these units with assist of check instances and take a look at plan advanced. Unit checking out became performed on each module and on each feature in the module. Output of each unit changed into assessed for accuracy and if located wrong, appropriate corrections have been made. [26]

5.4.7 Integration Testing

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Integration testing is the section in software testing in which specific product models are blended and examined as a set. The modules of our device have been integrated collectively to be able to verify that they provide the required functionalities as it should be. The numerous modules have been examined collectively to check for his or her accuracy and compatibility.

				Pass/Fail
1	User captures the image to be uploaded	Image not taken Properly or Wrong image	Recapture image	Pass
2	User selects a image	The selected image should be opened	The selected document is opened	Pass
3	User selects image of very high resolution or Noisy image.	Prompt the user to enter another image of smaller resolution	Message displaying this is not a Human Face or this image is not proper to find an emotion	Pass
4	User selects image of person with mixed emotions	Best Case Scenario is taken	Selects single Emotions which is the closest	Pass
5	User selects image displaying correct emotion of the person	Correct Emotion is Displayed	Display the Emotion Box message with the correct gesture.	Pass

Table 5.4.7 Integration testing

5.4.8 Job Distribution

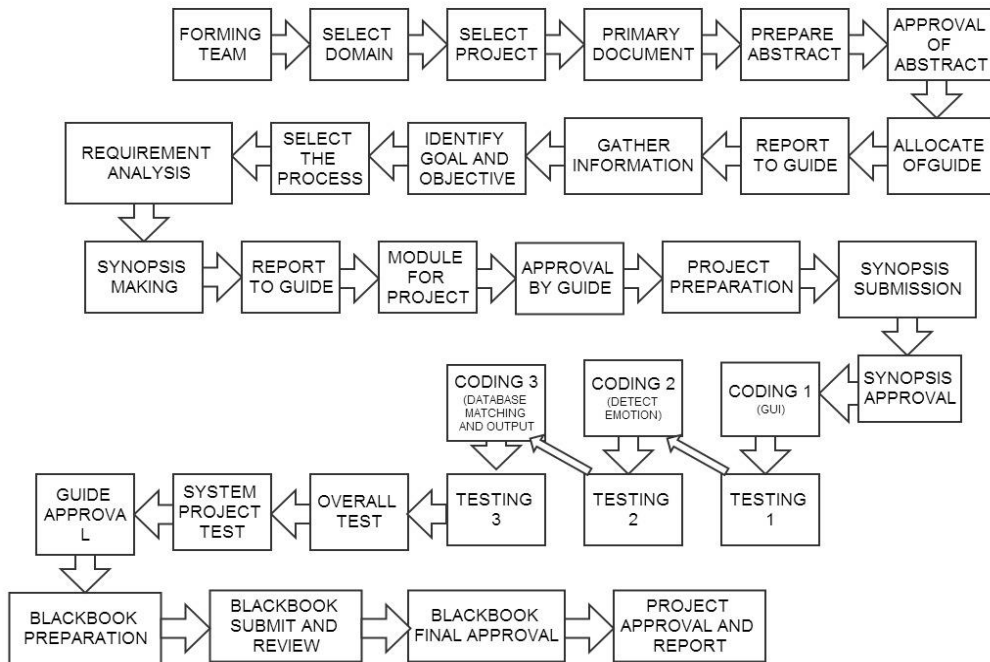


Figure 5.4.8 Job Distribution

5.4.9 Gantt Chart

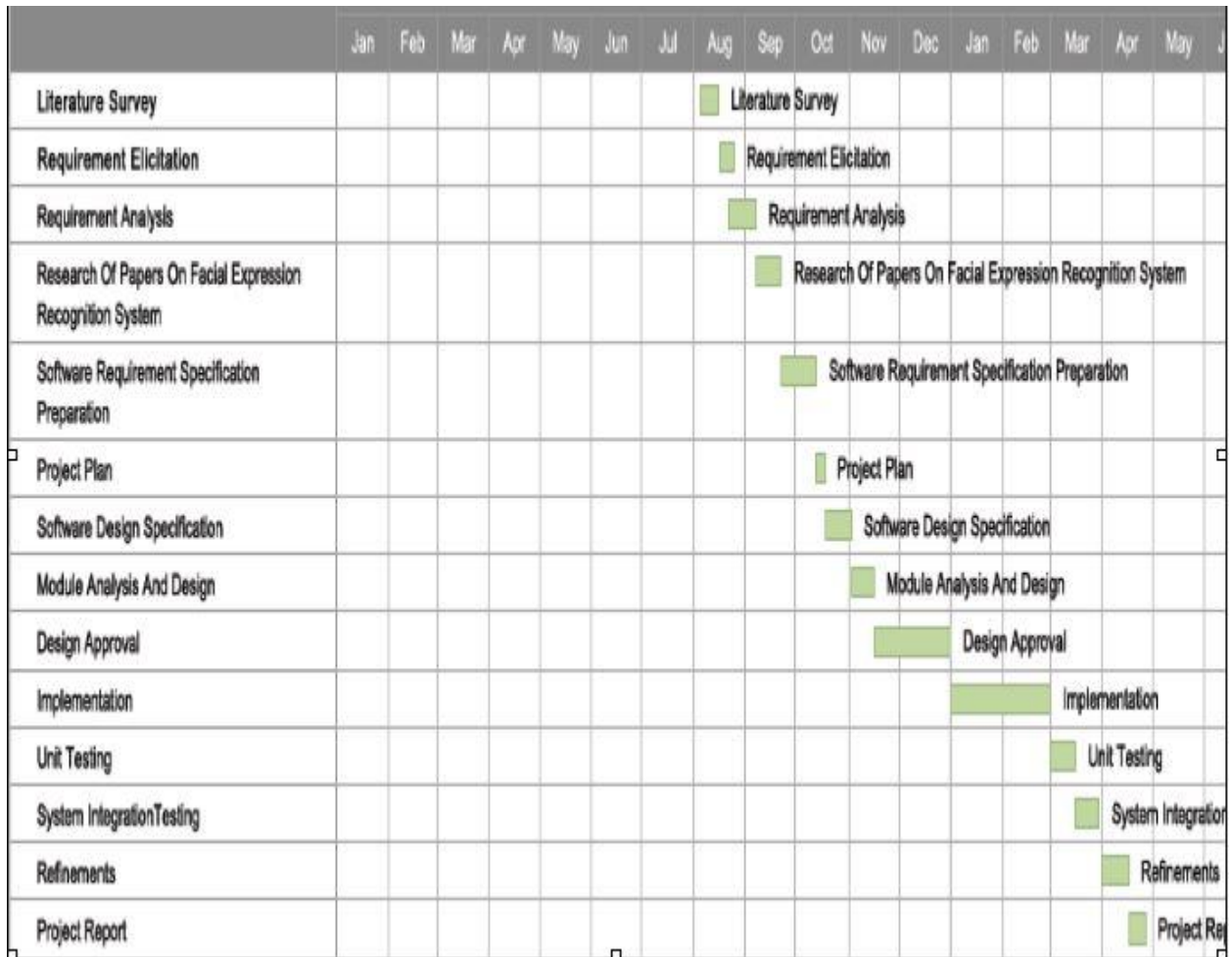


Figure 5.4.9 Gantt chart

5.5 Performance Requirements

● Accuracy

Considering that we will provide the priority to the accuracy of the software, the overall performance of the “Moods swing reader” might be primarily based on its accuracy on Moods.

● Failure handling

Machine components may fail independently of others. Consequently, gadget additives should be constructed so that it will cope with failure of different additives they rely upon.

● Openness

The device have to be extensible to guarantee that it's miles useful for an inexpensive time period.

● Security

Touchy records must be stored in safe.

5.6. Protection Requirements

The principal security coverage that need to be kept in remark is that the person need to now not be able to adjust (delete) the information within the Database (emails need to save in privateness).

5.7. Security Requirements

The consumer should be capable of manipulate all the manipulative details of the software program on the ‘the front give up’ however the server end need to not provide any permission to access or toy with the programming of the software program. [25]

5.8 Scope

The purpose is to layout a facial expression gadget. The device will be composed of server aspect components and customer side components. The server-facet component will manage the database operations and algorithms that produce advice outcomes. The patron-aspect components may be graphical interfaces which can be incorporated into corresponding larger structures.

Typically, a facial expression machine consists of three key additives: users, items and person-object matching algorithms. So, the history of our product is turning into greater crucial than foreground thing. On the historical past, the gadget will acquire statistics from both users and items.

5.9 Project Design

5.9.1 Flowchart

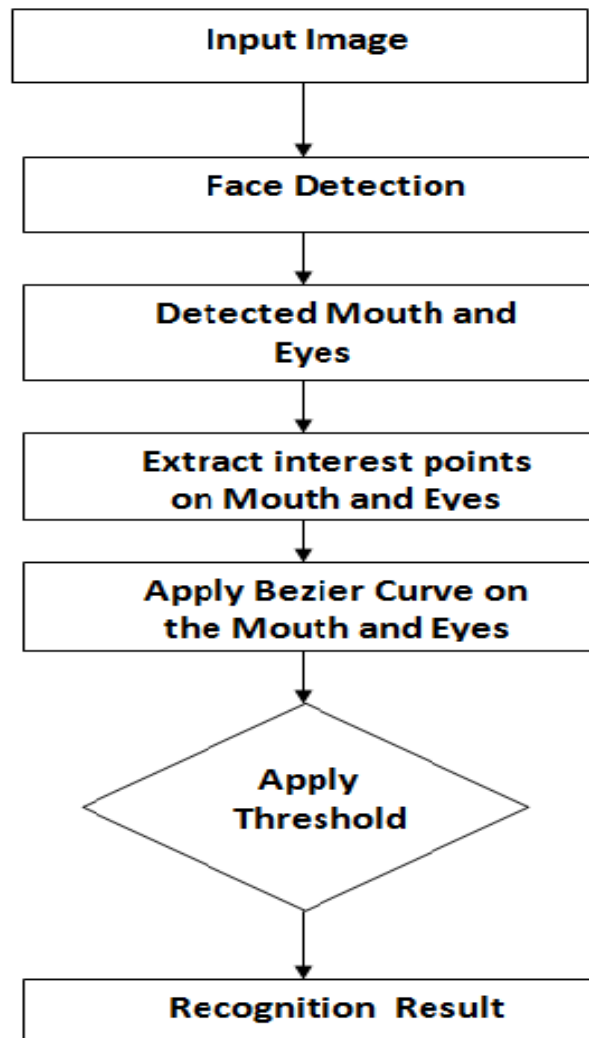


Figure 5.9.1 flow chart diagram

5.9.2 Use case Diagram

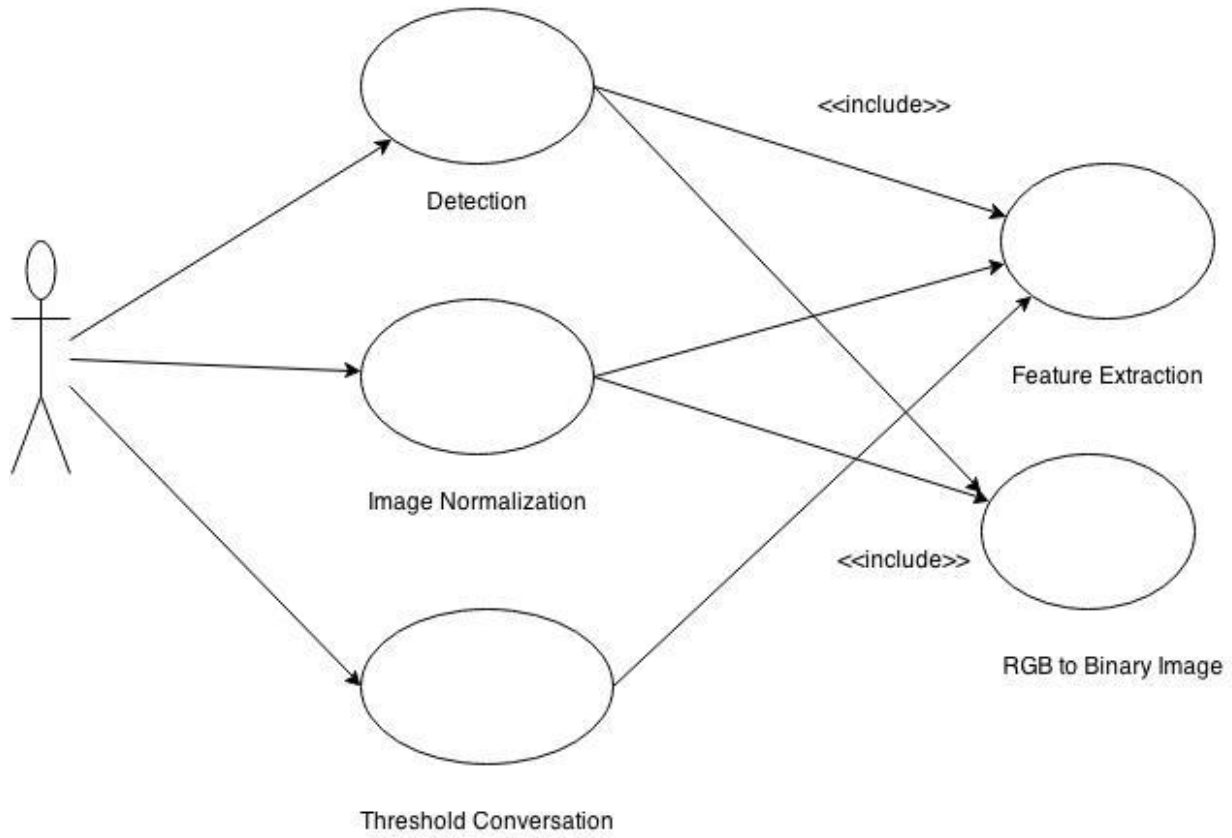


Figure 5.9.2 use case Diagram

5.10 Implementation

5.10.1 Begin Application:



Figure 5.10.1 facial expression recognition (begin the software)

Implementation is the level of the assignment whilst the theoretical design is turned out right into a working system. As a consequence it may be taken into consideration to be the maximum critical stage in achieving a success new device and in giving the user, self-belief that the brand new device will work and be effective.[2]

The implementation level includes cautious making plans, investigation of the existing machine and its constraints on implementation, designing of techniques to obtain changeover and evaluation of changeover strategies.[1][3]

5.10.2 Open Photo:

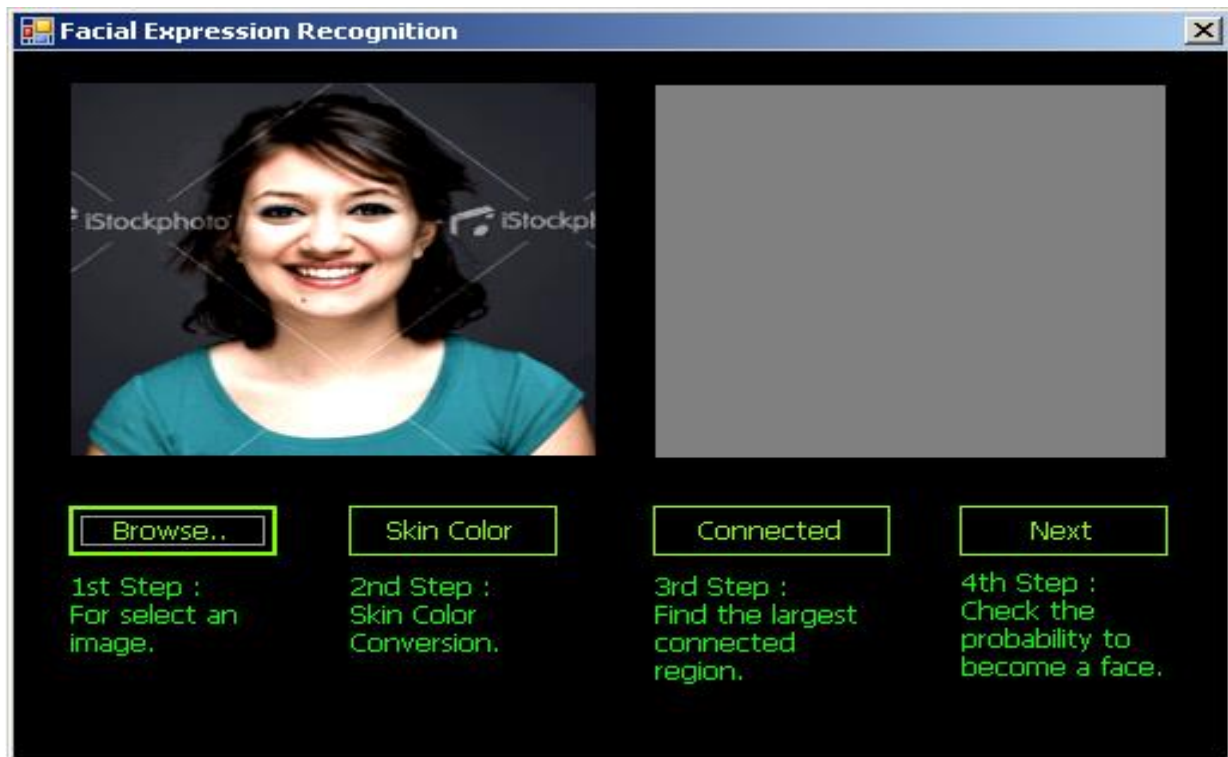


Figure 5.10.2 facial expression recognition (open picture)

3. Emotion Detection:

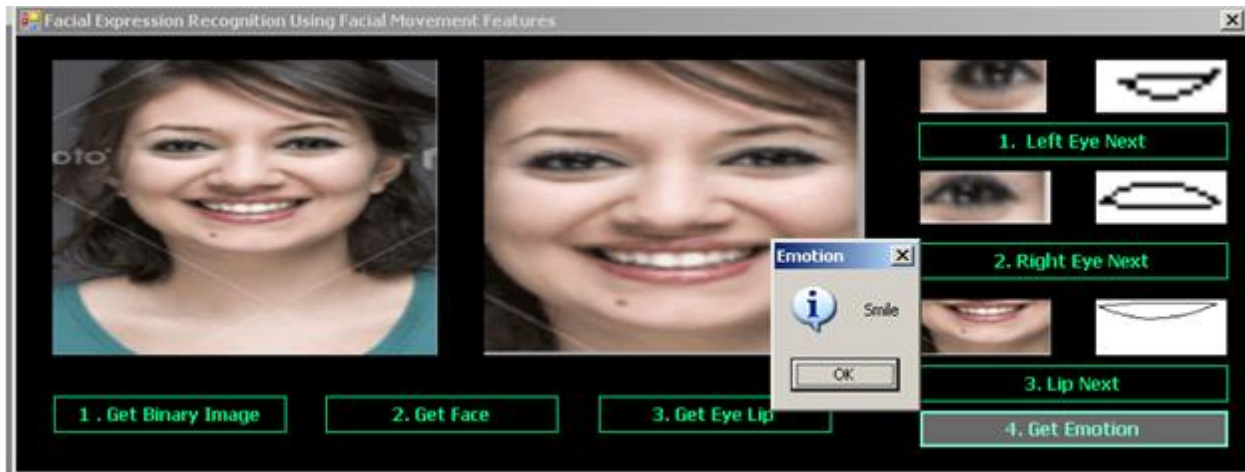


Figure 5.10.3 facial expression recognition (emotion detection)

5.11 Main Modules

- Pores and skin Coloration Separation
- Face Detection
- Eyes Detection
- Lips Detection
- Apply Bezier Curve on Lip
- Apply Bezier Curve on Eye
- Database and Training
- Emotion Detection

5.12 Modules Description

5.12.1 Pores and Skin Colour Segmentation:

For pores and skin shade segmentation, first we assessment the image.

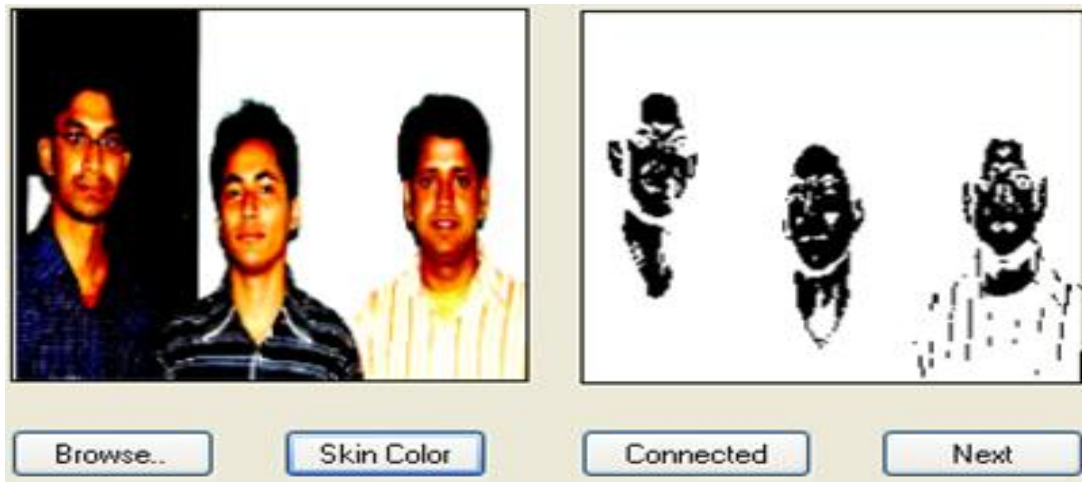


Figure 5.12.1 skin color separation

Now, we should find the most important related location. we have to test a opportunity to end up a appearance of the most important related place. If the major related place has the chance to end up a face, then it opens in a new form with the biggest associated area. If the biggest related areas peak & breadth is greater or same than fifty and the ratio of height and width is amongst one to two, then it could be face.



Figure 5.12.1a skin color segmentation (figure connected)

5.12.2 Face detection:

In face recognition, we alter binary image from RGB photo. For altering binary picture, we analyze the common cost of RGB for each pixel and if the normal value is less than one hundred then, we swap it by means of dark pixel in any other case we update it with the aid of snowy pixel. by means of this approach, we develop a binary image from RGB photo.



Figure 5.12.2 face detection

Now, we strive to find brow the binary picture. We start test from the center of the picture, we need to discover a non-stop snowy pixels afterward a non-stop dark pixel. Then we need to discover the extreme breadth of the snowy pixel with the aid of looking vertical each left and proper website. If the new width is lesser $1/2$ of the former most breadth, then we smash the experiment due to the fact if we aims to reach the eyebrow then the example will get up. Then we reduce the face from the beginning location of the brow and its high might be one point five enlarge of its breadth.



Figure 5.12.2a face detection (reduce the face)



Figure 5.12.2b face detection (calculation)

in the this image it can be identical to the most breadth of the face. Then we can have an image so that you can contain handiest eyes, nostril and lip. Then we will reduce the RGB photograph in step with the binary picture.

5.12.3 Eyes detection:

For eyes recognition, we alter the RGB face to the binary forehed. And, we don't forget the face width with the aid of W. We test from the W/four to (W-W/four) to discover the middle role of the 2 eyes. the very best white constant pixel alongside the height among the levels is the midplace of 2 eyes. [16]



Figure 5.12.3 eye detection (middle position)

Then we discover the beginning excessive or top position of the 2 eyebrows by way of looking vertical. The left eye is the initialbreadth of the photograph and the proper surface of the right eye islastbreadth of picture. Now we cut the higher role, decrease function.

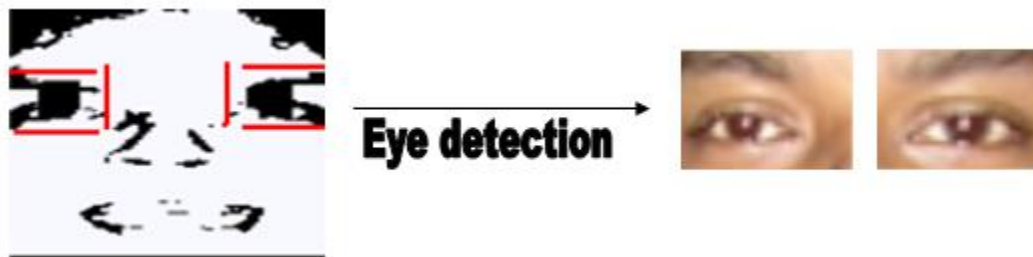


Figure 5.12.3a eye detection (detected)

5.12.4 Lip detection:

For lip recognition, we decide the lip packet. Now we take into account the lip need to be intimate the lip container. First we decide the gap among the brow and eyes. Then we upload the space with the decrease peak of the eye to define the top height of the box to be able to include the lip. The starting point of the box could be the $\frac{1}{4}$ function of the left eye box and ending point could be the $\frac{3}{4}$ function of the proper eye container. And the ending peak of the field might be the decrease cease of the face picture. So, this container will contain best lip and roughly part of the nostril. Then we are able to cut the RGB photograph permitting the box.



Figure 5.12.4 lip detection

So, for detection eyes and lip, we handiest want to convert binary picture from RGB photo and a few looking most of the binary photo.

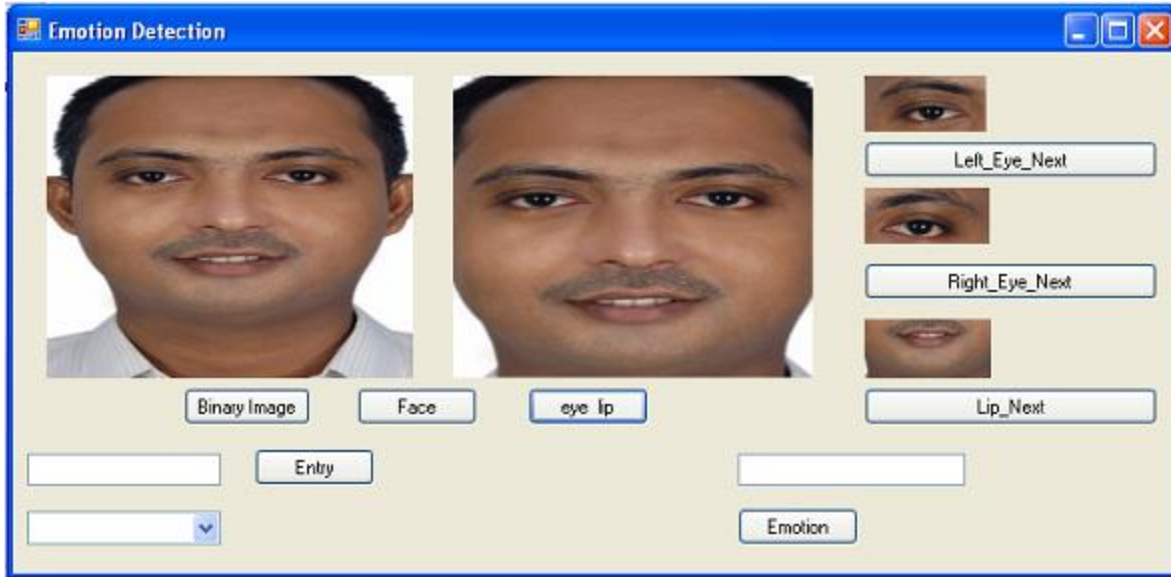


Figure 5.12.4a detection of lip and eye

5.12.5 Apply Bezier Curve on Lip:

In the lip box, there is lip and may be few part of nose. So, around the box there is skin color or the skin. We alter the skin pixel to snowy pixel and other pixel as dark. We additionally find the ones pixels that have same pores and skin pixels and convert it to white pixels. Here, if two pixels RGB values difference is less than or equal ten. we use histogram for finding the distance. If the distance is less than seventy, then we use 7 for discoveryrelated pixel and if the space is greater thanseventy then we use 10 for discoveringrelated pixel. So the value for outcome similar pixel depends on the quality of the image. If the image quality is high, we use 7 for discoveringrelated pixel and if the image quality is low we use ten. [17]



Figure 5.12.5 apply bezier curve on lip (skin color)

We are sure that the big attached region is the lip because in the lip box, lip is the major thing which is different than skin.



Figure 5.12.5a apply bezier curve on lip (skin color)

Then we should apply Bezier curve on the binary lip. To apply Bezier curve we discover the beginning and finishing pixel of the lip in parallel. Then we pull two refractions on higher lip from the beginning and ending pixel and additionally find two points at the tangent which isn't a part of the lip. For the lower lip, we find point similar procedure of the upper lip. We use Cubic Bezier curves for draw the Bezier curve of the lip. We draw Bezier curve for the lip, one for higher lip and one for lower lip.



Figure 5.12.5b apply bezier curve on lip

5.12.6 Apply Bezier Curve on Eye:

For practice Bezier curve on eyes first we must put off eyebrow from eye. For do away with eyebrow we search first continuous dark pixel then non-stop snowy pixel and then constant black pixel from the binary photograph of the attention box. Then we put off the 1st continuous black pixel from the field and then we get the container which only incorporates the attention.



Figure 5.12.6 apply bezier curve on eye (skin color)



Figure 5.12.6a apply bezier curve on eye (skin color)

Now, the eye field which incorporates most effective eye, has a few pores and skin or pores and skin coloration across the container. So, we practice similar pores and skin color like the lip for locating the location of eye. Then we observe massive connect for finding the very best related location and this is the eye due to the fact in the attention box, eye is the largest aspect which isn't just like the pores and skin coloration.



Figure 5.12.6b apply bezier curve on eye (box contain eye)



Figure 5.12.6c apply bezier curve on eye (connected)

Then we follow the Bezier curve on the attention box, similar to the lip. Then we get the shape of the eye.

5.12.7 Database and training:

Our database has two tables. One desk “individual” is for storing the call of people and their index of four varieties of emotion which are stored in other table “position”. within the “role” table, for each index, there are 6 manipulate points for lip Bezier curve, 6 manipulate points for left eye Bezier curve, 6 control factors for proper eye Bezier curve, lip peak and width, left eye peak and width and right eye peak and width. By this method the program studies the emotion of the humans.

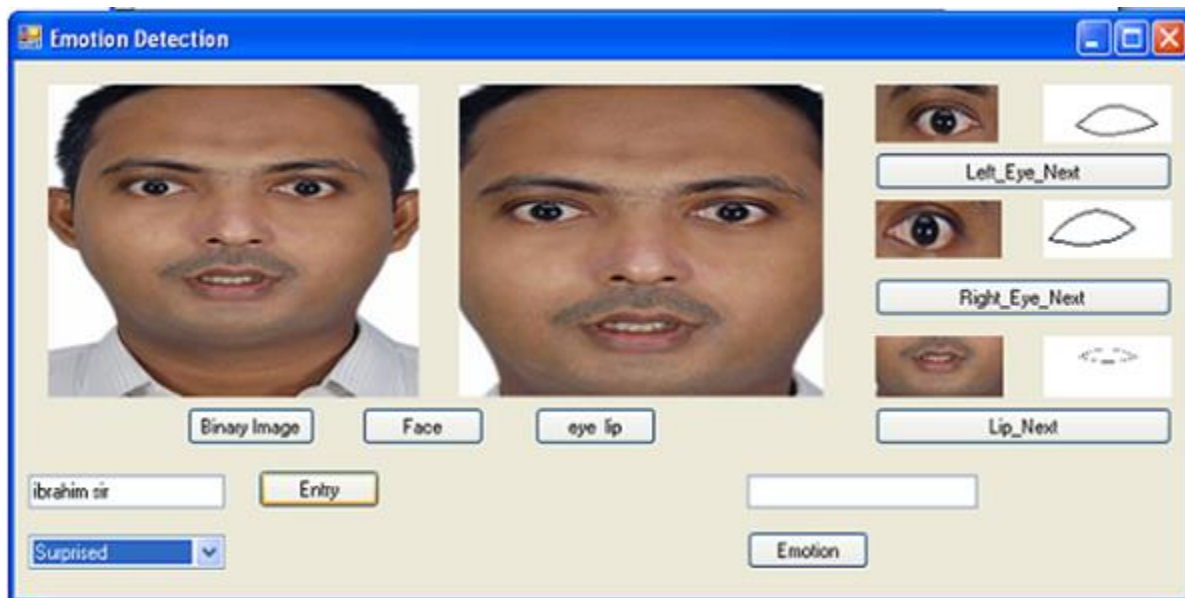


Figure 5.12.7 emotion detection

5.12.8 Emotion Detection:

In Emotion recognition we ought locate the Bezier curve of the lip, left and right eye. We alter every breadth of Bezier curve to hundred and peak in keeping with its breadth. If the man or women’s emotion data is to be had within the database, the program will healthy which emotion’s tallness is near the modern-day height and this system will supply the closest emotion productivity.



Figure 5.12.8 emotion detection continuous

If the individual's emotion records is not available inside the database, then the program computes the common peak for each emotion within the database for every person and then develop a choice in keeping with the average height.

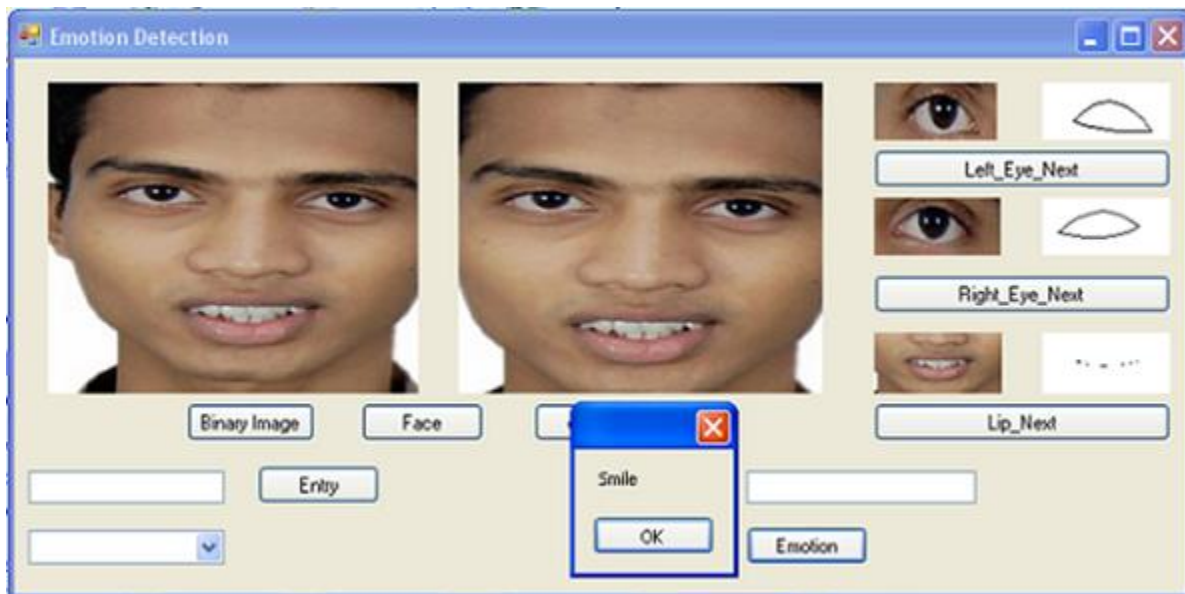


Figure 5.12.8a emotion detected

5.13 SYSTEM REQUIREMENT

5.13.1 Hardware Requirements:

HARDWARE RESOURCES

System Processor: Pentium IV or later.

Bus: 32- Bit

RAM: 512MB DDR RAM

Hard drive: 20GB

Display: SVGA Color

Key board: Windows compatible

Camera: (OPTIONAL)

5.13.2 Software Requirements:

IDE: Microsoft Visual Studio

Operating System: Windows 7/8 or latest

.NET Framework: 4.5

AForge Framework

5.13.3 System Tools:

The application use the following tools

- Visual Studio
- MS access



CHAPTER 6

6. Timetable

Date& Time

April 2nd 2017 12:00 pm to 12:30 pm

Meeting Agenda

Planning of the project

Meeting Facilitator

Sir Khurram Jillani

6.1 Attendees

Qasim Ali Shahzad	e.qasimtaj@gmail.com	0332-0300176
Abdul Rehman	Mr.abdulrehman456@gmail.com	0304-7372837
Kashif Ali	Kashifali223344@gmail.com	0322-9389707
Babar Ali	Babarali7853@gmail.com	0307-0464624
Waqar Tayyab	waqaralitayab@gmail.com	0345-4264612

Action Items(Pre Work/ Preparations)

- Installed Visual Studio
- Installed MS Access

Next Meeting (if applicable)

May, 5th 2017

Date& Time

May, 5th 2017 12:00 pm to 12:30 pm

Meeting Agenda

Email API attachment

Meeting Facilitator

Sir Khurram Jillani

6.2 Attendees

Qasim Ali Shahzad	e.qasimtaj@gmail.com	0332-0300176
Abdul Rehman	Mr.abdulrehman456@gmail.com	0304-7372837
Kashif Ali	Kashifali223344@gmail.com	0322-9389707
Babar Ali	Babarali7853@gmail.com	0307-0464624
Waqar Tayyab	waqaralitayab@gmail.com	0345-4264612

Action Items (Pre Work/ Preparations)

- Email API attachment

Next Meeting (if applicable)

July, 15th 2017

Date& Time

July 15th 2017 12:00 pm to 12:30 pm

Meeting Agenda

Discussion on Sobel filter

Meeting Facilitator

Sir Khurram Jillani

6.3 Attendees

Qasim Ali Shahzad	e.gasimtaj@gmail.com	0332-0300176
Abdul Rehman	Mr.abdulrehman456@gmail.com	0304-7372837
Kashif Ali	Kashifali223344@gmail.com	0322-9389707
Babar Ali	Babarali7853@gmail.com	0307-0464624
Waqar Tayyab	waqaralitayab@gmail.com	0345-4264612

Action Items(Pre Work/ Preparations)

- Sobel Filter

Next Meeting (if applicable)

August, 10th 2017

Date& Time

August, 10th 2017 12:00 pm to 12:30 pm

Meeting Agenda

Sobel Filter discussion

Meeting Facilitator

Sir Khurram Jillani

6.4 Attendees

Qasim Ali Shahzad	e.gasimtaj@gmail.com	0332-0300176
Abdul Rehman	Mr.abdulrehman456@gmail.com	0304-7372837
Kashif Ali	Kashifali223344@gmail.com	0322-9389707
Babar Ali	Babarali7853@gmail.com	0307-0464624
Waqar Tayyab	waqaralitayab@gmail.com	0345-4264612

Action Items(Pre Work/ Preparations)

- Sobel Filter

Next Meeting (if applicable)

September, 3rd 2017

Date& Time

September, 3rd 2017 12:00 pm to 12:30 pm

Meeting Agenda

Documentation

Meeting Facilitator

Sir Khurram Jillani

6.5 Attendees

Qasim Ali Shahzad	e.gasimtaj@gmail.com	0332-0300176
Abdul Rehman	Mr.abdulrehman456@gmail.com	0304-7372837
Kashif Ali	Kashifali223344@gmail.com	0322-9389707
Babar Ali	Babarali7853@gmail.com	0307-0464624
Waqar Tayyab	waqaralitayab@gmail.com	0345-4264612

Action Items(Pre Work/ Preparations)

- Documentation Planning

Next Meeting (if applicable)

On and off meeting in regular weeks



CHAPTER 7

7. Key Personnel

Undertake and manage the strategy of intrigue and perspectives among partners and by and large guarantee the achievement of a venture decent task administration is imperative. It is additionally vital for a task administrator to incorporate certain key work force in the Project.

7.1 Diagram of our venture

Venture Management is a basic piece of our task action that includes arranging and sorting out distributing assets, controlling methods, conventions and so forth to help accomplish the objectives of an undertaking.

Undertaking Definition it is vital for the task director to choose who to incorporate on a venture. Ahead of schedule into the undertaking administration process a formal association structure ought to be distinguished and in a perfect world spoke to as an outline or graphical frame.

[14]

7.2 Venture group

Most ventures ought to incorporate critical, for example, the task chief or organizer ought to be incorporate undertaking colleagues likewise preparing facilitator and bookkeeper or director and others associated with the arranging and execution. The Project Team may likewise incorporate merchants.

7.3 Official Sponsors

The director who is in charge of securing assets and spending specialist for the venture, the official support is in a perfect world the most elevated positioning must be administrator relying upon the size of the venture, who gives the help expected to Project Sponsors our Project. The chief or support is the significant choice make in the task who keeps the venture's advance and the destinations and objectives takes part in abnormal state venture arranging offers help to the Project Manager with real issues or issues and so on. [16]

7.4 Controlling board of trustees

This advisory group deals with all the key associations required and in addition other partner bunches who have an enthusiasm for the tasks result. It might help with financing give assets go about as contacts to patrons and official gatherings or satisfy different parts given to it.

7.5 Clients or customers

The customers or clients who are the specialty units with the requirement for the item or administration being produced ought to likewise be incorporated as having a unique enthusiasm for the task. This gathering may incorporate delegates and chiefs.

7.6 Partners

These gatherings of units, people, gatherings or associations who can influence or are influenced by the task are for the most part at the core of the venture. The Sponsors Project Team Steering Committee Clients and Customers and others are partners of the venture

7.7 Key individuals for progress

Key partners are those whose help is basic for the accomplishment of the undertaking. Were this help to be pulled back, the task could fall flat. These incorporate the task administrator and his or her group who have the most astounding inclusion. However, without the Project Sponsor or Project Director to settles on significant choices and offers support to the Project Manager or a Steering Committee the task may not keep running as easily as could be expected under the circumstances.

7.8 Correspondence concerns

Poor undertaking correspondence can make many activities fizzle. To maintain a strategic distance from poor correspondence, legitimate correspondence channels must be built up to take out a portion of the basic issues with poor correspondence. These issues incorporate contrasts in desires among partners since they are not kept educated about the status of the task and other vital points of interest. It is likewise imperative for the undertaking supervisor to impart proactively well ahead of time with other individuals who have an enthusiasm for the venture or are affected by it. This will anticipate shocking a minute ago demands to partners.

Correspondence is the way to the achievement of an undertaking, and this implies correspondence between every one of those associated with the task.



CHAPTER 8

8. Evaluation

This paper presents a facial expression recognition system employing Bezier curves approximation technique. The system is based on facial features extraction using the knowledge of the face geometry and approximated by 3rd order Bezier curves representing the relationship between the motion of features and changes of expressions. For face detection, color segmentation based on the novel idea of fuzzy classification has been employed that manipulates ambiguity in colors. Experimental results demonstrate that this method can recognize the facial expressions with an accuracy of more than 90 cases. Finally the system has been implemented using a manipulator robot and issuing facial expression commands. From human face structure, we divide in 3 regions such as right eye, left eye and mouth areas from the face image. Firstly comes the face detection and then detection of the skin region. We crop the facial skin region and connect the largest skin region to detect the skin surface of the human face. This project can be used in different in schools, colleges, universities for monitoring student's/ teachers emotions especially in police stations for monitoring criminals expression while interrogations and in different organizations to monitor the moods of the employee so that the daily moods would not affect their daily performances. It can be used in courts for monitoring the witnesses. [29]



CHAPTER 9

9. Appendix

Appendix A

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Mood Swings Reader

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Appendix B

9.1 Introduction

The still pictures as a rule catch the peak of the expression, i.e., the moment at which the markers of feeling are generally stamped. In their everyday life, individuals from time to time indicate summit of their outward appearance amid typical correspondence with their partners, unless for certain cases and for exceptionally short periods of time.

The programmed outward appearance acknowledgment framework incorporates:

- Face Detector
- Facial element extractor for mouth, left and right eye
- Facial Characteristic Point - FCP extractor
- Facial appearance recognizer

9.2 Objectives

The task essentially means to think of an answer for the outward appearance acknowledgment issue by Sub Issues partitioning it into sub-issues of orders of some particular Action Units. The tasks scope incorporates not just the two class issues which tell about whether an Action Unit is on or off, however additionally the multi-class issues that will educate the client about multi events of more than one Action Unit in the meantime. For this, diverse systems and methods for highlight extraction, standardization, determination and classification. Solutions to these issues and also taking the computational many-sided quality and timing issues into thought. The venture objective is to execute confront acknowledgment in an ideal path as far as run time onto the installed framework. Different calculations and techniques are examined and equipment assets arranging will be done to accomplish the goal. This sort of face acknowledgment installed framework can be generally utilized as a part of our day by day life in various areas. We trust that human life can be significantly assisted with this innovation. Some commonplace applications are recorded as takes after:-

- Business Meeting, Gathering
- Education, Teaching colleague

-Audio-visual discourse recognition (visual lip perusing to improve acoustic discourse acknowledgment)

9.3 Detection and Recognition of Facial Emotion utilizing Bezier Curves

9.3.1 Summary

This exhibits a way to perceive human outward appearances for human-robot association. For this, the facial highlights, particularly eyes and lip are extricated and approximated utilizing Bzier bends speaking to the connection between the motion of highlights and changes of articulations. For confront discovery, shading division in view of the clever thought of fluffy arrangement has been utilized that controls uncertainty in hues. Exploratory outcomes show that this strategy can vigorously arrange skin locale furthermore, non-skin area. Keeping in mind the end goal to choose whether the skin locale is confront or not, biggest availability investigation has been utilized. This strategy can perceive the outward appearance classification, and also the degree of outward appearance change. At long last, the framework has been executed by issuing outward appearance orders to a controller robot.

9.3.2 Approach Based:

Preferences:

- Lower unpredictability
- Less PC requesting

Disservices:

- Difficult to stretch out with more feelings
- Less exact
- Difficult to sum up to new information.

9.3.3 Coding Based:

Preferences:

- Precise.

- Versatile.

-Extensible.

9.4 Propose Work

9.4.1 Problem Statement

There is a wrong area and following of facial focuses. Likewise Pose, development and turn of the test individual are constrained. Glasses may block characterization, particularly thick and dull edges in distinguishing feelings. Face Reader can investigate one face at any given moment. Face Reader can't arrange outward appearances in test people with a fractional facial loss of motion.

9.4.2 CONTRAST STRETCHING

Complexity extending (regularly called standardization) is a basic picture improvement procedure that endeavors to enhance the complexity in a picture by 'extending' the scope of force esteems it contains to traverse a wanted scope of qualities, e.g. the full scope of pixel esteems that the picture sort concerned permits. It contrasts from the more refined histogram leveling in that it can just apply a direct scaling capacity to the picture pixel esteems. Thus the 'improvement' is less unforgiving.

Complexity extending: do min max differentiate extending of the picture. Locate the base and most extreme estimations of the pixels in a picture, and after that change over pixels from the source to goal like $((\text{pixel}-\text{min}) / (\text{max}-\text{min})) * 255$

9.4.3 SKIN Color CONVERSION

Skin-shading Conversion system is considered as a viable device for confront location since it is invariant to changes in size, introduction and impediment. In this paper, we propose to utilize the YCbCr shading space for two reasons:

-By utilizing YCbCr shading space, we can dispense with however much as could reasonably be expected the variety of luminance segment caused by the lighting condition.

-The YCbCr space is broadly utilized as a part of advanced video coding applications. YCbCr is a shading space that isolates the luminance from the shading data. Luminance is encoded in the Y and the blueness in Cb and the redness in Cr. It is simple too change over from RGB to YCbCr

Examination of YCrCb shading space on human skin shading

Any RGB advanced picture can be changed over into YCrCB shading space utilizing following condition:

$$Y=0.299R + 0.587G + 0.114B \quad Cb = - 0.169R - 0.331G + 0.500B \quad Cr = 0.500R - 0.419G - 0.081B$$

9.4.4 CONNECTED COMPONENT Labeling

Associated segment naming (on the other hand associated segment investigation, blob extraction, district marking, blob disclosure, or district extraction) is an algorithmic use of diagram hypothesis, where subsets of associated segments are interestingly named in view of a given heuristic. Associated segment naming isn't to be mistaken for division.

Associated segment marking is utilized as a part of PC vision to identify associated areas in double advanced pictures, albeit shading pictures and information with higher dimensionality can likewise be prepared. At the point when coordinated into a picture acknowledgment framework or human-PC association interface, associated segment marking can work on an assortment of data.

9.4.5 BINARY CONVERSION OF THE IMAGE

A twofold picture is a computerized picture that has just two conceivable esteems for every pixel. Ordinarily the two hues utilized for a twofold picture are high contrast however any two hues can be utilized. The shading utilized for the object(s) in the picture is the frontal area shading while whatever is left of the picture is the foundation shading.

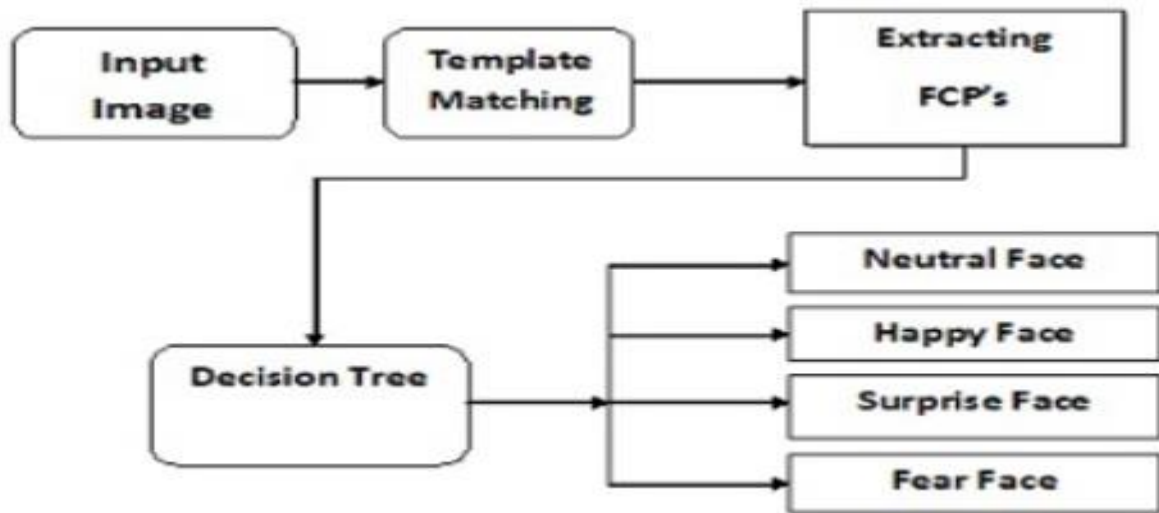


Figure 9.4.5 Genetic Flow

9.5 BUDGET**1. Startup Financing**

Sr. No	Description	Amount (Rs.)
1	Miscellanies	15000
2	Other expenses for 8 months	10000
Total Startup Financing		25000

Table 9.5 Startup Financing

Appendix c

Index

android -----	13, 16	Meeting -----	48, 49, 50, 51, 62
Bezier curve -----	5, 42, 44	Mood Swings -----	1, 15
classification -----	9, 17, 56	multi-class -----	21, 23, 61
complexity -----	23, 63	non-intrusive -----	11
concerns -----	11, 54	OpenCV -----	24
embedded system -----	21, 23	parameterized systems -----	15
Emotion Detection -----	5, 36, 44	Requirements -----	2, 24, 25, 26, 31, 46
facial expression -----	9	RGB -----	38, 39, 40, 41, 64
facial skin -----	9, 56	SKIN Color -----	63
framework -----	61, 62, 64	software program -----	12, 24, 25, 31
gadget -----	16, 21, 22, 25, 26, 31, 32	system -----	9, 15, 17, 21, 26, 34, 44, 56, 64
Graphics -----	24	System constraints -----	24
humans facial expressions -----	11	techniques -----	21, 34, 61
Implementation -----	3, 34		