

**DETECTING STUDENTS' STATE OF MIND THROUGH FACIAL
EXPRESSION IN REAL TIME EDUCATIONAL ENVIRONMENT**

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APPROVAL

This Project titled “**Detecting students’ state of mind through facial expression in real time educational environment**”, submitted by Sazzad Ahmed ID: 143-15-4623, S.M. Shabriar Hossain ID: 143-15-4302 And MD Saiful Islam ID: 143-15-4296 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 16th September.

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We hereby declare that, this project has been done by us under the supervision of **Md. Sadekur Rahman, Assistant Professor, Department of CSE**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree.

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ABSTRACT

Monitoring a student is tough when you only have one hour and thirty hour of class time. So this project can help a teacher or the varsity authority to monitor a student individually. Here we tried to find out the state mind of a student. When a student is in the classroom it's very tough to find out and understand, if a student is happy or confused in the class. It's also can give an indication that student is attentive or not.

With our system which will detect Students state of mind through facial expression it will be easy to find out those who need counseling. So this system can create a new diminution to this educational environment.

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CHAPTER 1

Introduction

1.1 Introduction

Facial expression is a way to understand a human's mental state. This is also like a mirror of mind. This is the point we are holding to find out a student's mental state through facial expressions.

We are considering some very basic expression like happy sad confused and so on. We are going to relate them with the classroom expression like attentive or inattentive or confusing students

We are going to use this in the real time environment of our class room with a web cam so that we can monitor our students and can find out their mental state with facial expressions.

The project about we are going to describe that will provide user a quick output about students' facial expression. From this part one can understand for which function they need to use this system.

In this project we focus on the emotion detection strategy observed to extract affective information from the facial expressions and physique movements recorded in the aforementioned observational study.

This project is going to solve a great issue that is how a teacher or authority can understand a students' mental ability or facial expression without asking him or them any question. In other way it's a process to understand or monitor student mental health as they are attentive or not, as well as, are they understanding the lectures well.

By separating the positive and negative expression from the face it will give the application user a smooth result from where the user will be able to understand about the mental state of the students. And for making it more appropriate we are going to find out the actual expression that those students are holding in particular period of time.

1.2 Motivation

Facial expression of the students is a tool for the lecturer to interpret comprehension stage of college students in actual time classroom and additionally to discover the influence of facial expressions in the course of lecture and the stage of comprehension proven with the aid of these expressions. Our purpose is to perceive physical deformation of the face that are linked to emotional states, and then to become aware of how these emotional states are linked to student's comprehension. So that every student can be monitored through a machine. As it's not always possible for a teacher to monitor all the students are attentive or not. To fill the gap, we can take machine help. So, we want to make intelligent monitoring system.

We are living in the age of modern science. We are using technology in every steps of our life. This is a blessing of modern science. There are no steps of human life and science that are not using this blessing. So, we are here to use technology in our study environment. "Detecting students state of mind through facial expression and body movements in real time educational environment". This is the title of our project so detecting human mind using technology and AI we are going to build a new dimension of technology.

We are going to show some sectors that are using this technology:

- Automobile
- Communication
- Mechanics
- Industrial Production
- Astronomy
- Biochemistry
- Biology
- Geography
- Weather
- Defense System
- Structural Architecture

And the main part is artificial intelligence. All the sectors are using AI now. And we are happy to say so that our project is also based on artificial intelligence. We are going to use AI in this sector to find out the students state of mind through facial expression

which is going to create a new era in this sector. And we are going to use some library of python so that the system works well.

1.3 Rationale of the Study

We are using the classroom. So it's an obvious question why we are doing this in educational environment. We are doing this so that we can create a new way of monitoring. We are also trying to help out teacher so that they can easily find out the weak students. Also this system can help to give a prediction to our authorities about the mental state of our students so this can help them to find out the students those who need help.

Everybody is not same. Some need different approach to understand study. If this system can be integrated in the classroom teacher can monitor those students whose are not understanding the lectures. And can help them directly.

Our parents is the main authority. So this system can give them hope. They can also analysis their sons.

1.4 Research Questions

We are going to analysis the facial expression of a student so that we can understand his mental state of that particular moment. There are some questions that we are going through. This are the questions that motivate us to do the work.

Can our teacher monitor each student?

Do all the students understand the lectures?

Is it possible to understand a student's mental state with facial expression?

1.5 Expected Output

The genuine goal of this project is to find out the facial expression or mode of human. So, the question is how a system can do it? The framework will analysis the facial expression of a human and by doing so it's going to find out his students' mood on a particular moment. In three way the sentiment analysis happens, facial recognition, voice and from the text. Here we are going to use facial expression.

So, it can be called as facial expression analyzer. The main goal or object was mentioned above, still there are another objective to be satisfied:

- To monitor the students individually.
- To find out if the students enjoying a teacher's lecture or not
- To review of teachers' lectures in the class.
- To identify who need counseling.
- To find out the attentive and inattentive students

1.6 Report Layout

The full layout of the project is given in here for understanding where which part has been portrayed. The layouts are:

- Chapter 1 – It is the introduction area. It covers the underlying data of the project how it going to begin. The thought process and the goal are described here. This part will give an explicit perspective of the full project.
- Chapter 2 – In the section we added the back ground of the project. We showed related works. We also mentioned the scope of the projects as well as the challenges we faced to complete the project.
- Chapter 3 –we mentioned all the research methodology. We added how we collected all the data also we added the process of development. Mentioned some analysis also. For the purpose of the project we have integrated image data analysis and Facial Expression Processing techniques along with Artificial Intelligence.
- Chapter 4 –we tried to show the experimental results so that we can compare this with real time data. We mentioned the summary of the project here.
- Chapter 5 –we added the summary and the conclusion of the project here.

CHAPTER 2

Background

2.1 Introduction

This project is based on AI and image processing. We are going to take image data from a class and all the students are actually real time object. With AI and image processing we are going to find out the facial expression of students so that a teacher can identify a student is understanding his lecture or not also this project will give a clear overview about a student expression like he is attentive or inattentive also its going to give a clear answer if he is confused or not.

In this chapter we discuss about all the topics of the projects, here we are going to elaborate about all the topics we are using in the project. And we all try to explain them as easy as possible. Let's start about AI- artificial intelligence

2.2 Related Works

We are working with facial expressions. Many others worked on this previously. They made quite a good progress regarding facial expressions.

Automatic Facial Expression Analysis: A Survey showed nowadays automated facial expression analysis has been very energetic research problem that finds viable functions in human-computer interfaces, speech, and Human emotion analysis. Facial expression doesn't solely replicate human emotions but it also replicates other mental activities, social interaction. In a survey they introduce the most outstanding automatic facial expression evaluation techniques and systems. Facial expression dynamics, face normalization and facial expression intensity are also discussed. [1]

Facial expression recognition based on Local Binary Patterns: A comprehensive learning about proposed that computerized facial expression analysis is a fascinating task that affects in data-driven animation and human-computer interaction. It shows that a vital step for facial expression recognition is fantastic facial representation from original face images. In that paper they evaluate facial illustration based on statistical neighborhood features, Local Binary Patterns, for person-independent facial expression recognition.

Machine gaining knowledge of strategies of specific types examined on several databases. [2]

A New Pan-Cultural Facial Expression of emotion said that they have found the first evidence of a facial expression unique to contempt. This facial emotion was not cultured-specific but was known by people in Germany, Greece, Hong Kong, Japan, Italy. [3]

Comprehensive Database for Facial Expression Analysis suggested that in last passing years many hard work has been done to make facial feature tracking and analysis methods. Search has been done both in facial movement and awareness of expression. Due to most of the researcher used constrained data sets facial expression evaluation remain unknown. They confirmed the issues for facial expression evaluation which consists of transitions amongst expression, eliciting conditions, reliability, picture characteristics. Then they presented the CMU-Pittsburgh Au-coded face expression database. [4]

The Face Reader: Online facial expression recognition showed that they made a face reader system that can classify face, find face and modeled face. Their system is highly trained detect any facial expression with almost high precision. [5]

Expert machine for automatic evaluation of facial expressions proposed a gadget that performs recognition and emotion expression of human face from a photograph. [6]

Affective computing: challenges said that around the world a large of researchers trying to built or already belted system that respond to human emotion. [7]

Measuring facial action proposed that in today's world facial expression is a huge field of research. Many types of approaches can be taken to observe facial expression like judgment based and sign based. In sign based facial expression can be detected through face movement. [8]

Analysis of Emotion Recognition using Facial Expressions, Speech and Multimodal Information proposed that the interplay between human and pc will be more correct if they communicate via feelings. [9]

Emotional state and the detection of change in facial expression of emotion in that they conducted an experiment in which a method was used that only shoe three emotion

happy, sad and neutral. But in the experiment in first 100 images only show one emotion happy. [10]

2.3 Research Summary

After researching many papers we can see now a day's image processing and facial expression is a hot topic for research. It can be done using many methods. System can be made with which human and computer system can interact with each other. System can be made which can classify face, detect face. Facial expression can be detected through two approaches judgment based approach and sign based approach. With human facial expression a system can detect human emotion like happy, sad, neutral, anger, surprise, disgust etc.

2.4 Scope of the Problem

Actually we are going to find out the opportunities that was imagination once. We can find our student's facial expression so we can monitor them without disturbing them.

We also can classify the students that who are attentive who are not. We can also create counseling for the week students.

We can categorize the students of a particular class with the automatic system. So we are creating an automated system that can identify students of different expressions.

We still have some limitations:

1. Accuracy is a big issue here.
2. We have very low amount of data initially.
3. Size of the room.
4. Number of candidates.
5. Increasing the dependency of Artificial Intelligence.

2.5 Challenges

1. Main challenge is to complete the project that can detect all the facial expressions. And simulate them with the educational environment

2. Accuracy is a big issue.
3. Web cam. We need good quality camera for this project. Without this it's totally impossible. And arranging quality web cam is another issue here
4. Picture quality is so important. Good image can produce huge data set. And that's easy to calculate and process. So we have to maintain quality image data.

CHAPTER 3

Research Methodology

3.1 Introduction

Methodology is the systematic, theoretical analysis of the strategies applied to a discipline of study. It contains the theoretical analysis of the physique of strategies and concepts associated with a department of knowledge. Typically, it encompasses standards such as paradigm, theoretical model, phases and quantitative or qualitative techniques. Here in software research methodology we are going to encounter our knowledge about this research and project. We will get going through subject and instrumentation, data collection, analysis and implementation.

3.2 Research Subject and Instrumentation

3.2.1 Artificial Intelligence

We are human being. We have our brain so we can think and take decision on different situations. We learn from experience. AI work like that fact is we need to know that is intelligence. So intelligence is the ability to acquire knowledge. So that it can use this knowledge in appropriate situation. We can easily do so as we have intelligence. But when a machine does so it's called Artificial Intelligence.

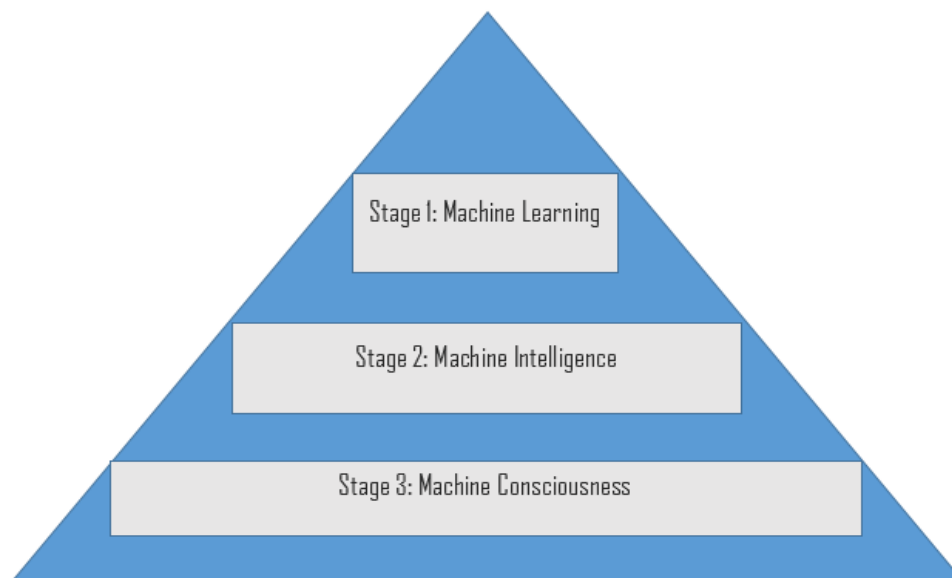


Figure: 3.1 stages of AI

We learn from situations and save memory so that we can use this data in the same situation in near future. So more situation we face more we learn. And with the help of AI machines are learning from situations. They are using memory or other way we can say this data base, so that they can take appropriate decision on proper situations and the ability of doing or taking decision of a machine without outside help is widely known as Artificial Intelligence. With the help of programming languages machines are taking decisions and these is an amazing way of Artificial Intelligence. These languages are: LISP Java Haskell AIML Prolog C++ python

Fact is both hardware and software can use Artificial Intelligence. This languages have their own libraries and they act like a single data. We use these libraries and do our job rest of the work depends on this coding accuracy .There are also may sectors in this world that cannot run for a single moments without Artificial Intelligence. They

- Prolog
- Siri (assistant of apple/Mac)
- Cortana (assistant of windows)
- Intelligent Traffic System
- Blue Brain Project etc.
- Sophia (Robot)
- AlphaGo (Game)

3.2.2 Facial Expression Processing

There are many ways we describe our emotions through our face. In the same face with the same organs we create different facial expression. We can easily detect that as we are human being. And fact is out machine also can detect them with various scan like ERP. In the figure we can see the image pf an ERP scan. This is giving a clear idea on our facial expressions. When we are angry we have a particular face and signal. As well as with different expression we generate different signals. So, we can identify them with proper action. An example of ERP scan is given below.

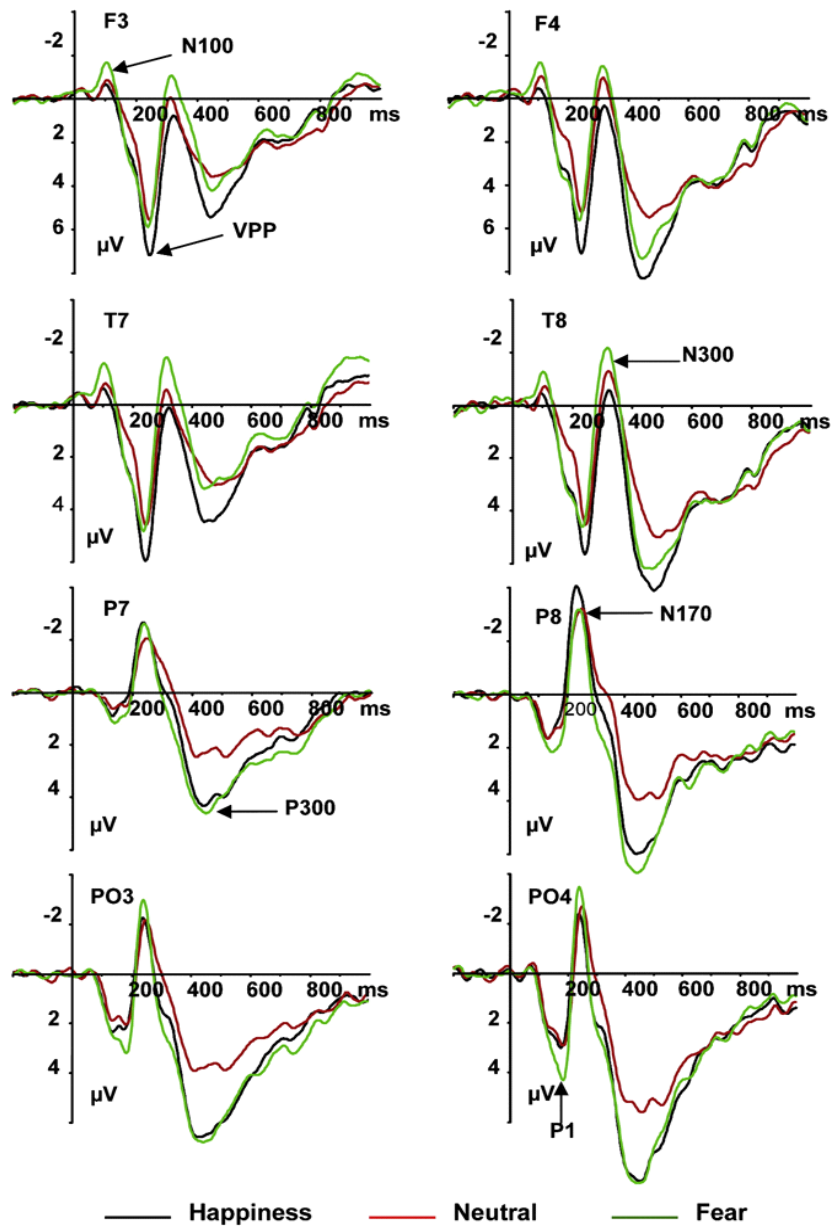


Fig: 3.2 ERP scan and signals on different expressions

Some techniques for facial expression recognition

- image acquisition
- raw data
- pre processing
- Feature extraction
- Classification
- Post processing

- Class label

3.2.3 Image data analysis

Image is full of data. An image defined in the "real world" is regarded to be a function of two real variables, for example, $a(x, y)$ with a as the amplitude (e.g. brightness) of the image at the actual coordinate role (x, y) . A digital image $a[m, n]$ described in a 2D discrete space is derived from an analog image $a(x, y)$ in a 2D non-stop space through a sampling system that is frequently referred to as digitization. We are going to take image form a class. Then we are going to identify student's faces randomly. Then from the faces we are going to check their eyes and other organs. Also we are detecting other objects like hand (if they are on the face).

For example:

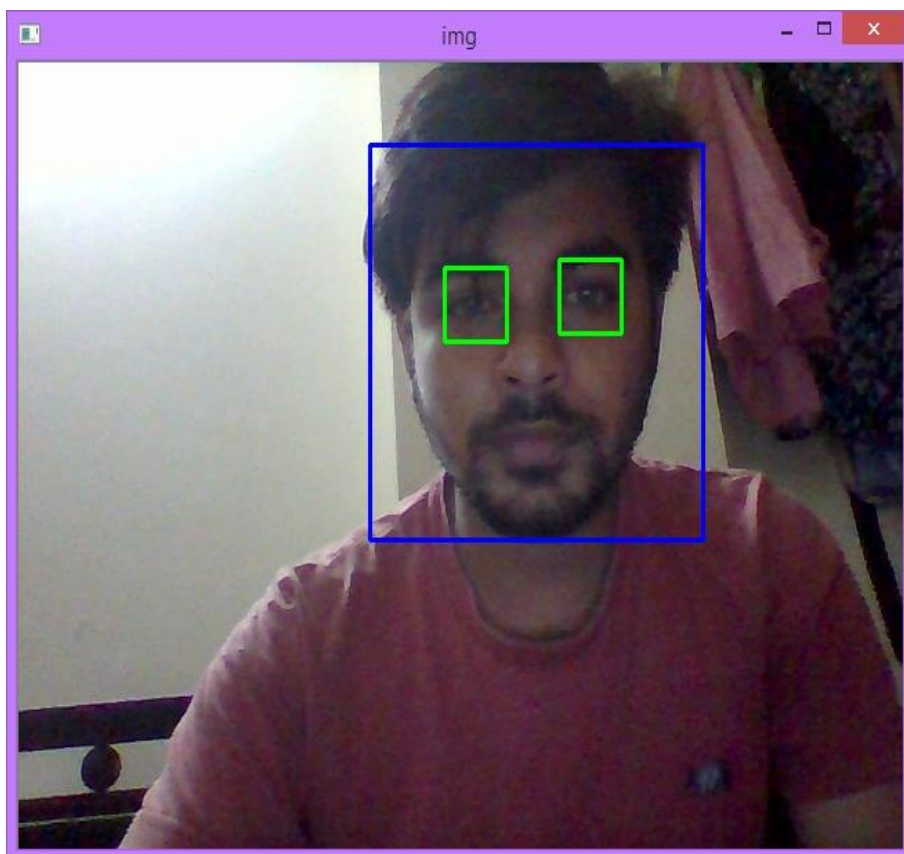


Figure: 3.3 Detecting Face and Eyes

Numerous data of different expression of the students will be collected. Then sort them into two categories so that we can identify any face by comparing whether a student is attentive or not in the classroom. Teacher ought to be very gifted in comprehension the feelings with a unique end intention to apprehend the cognizance of the understudies from their outward appearances itself. If the Lecturers are no longer in a position to become aware of the value in the facial expressions it will undermine the grasp of the students, thereby, create terrible impact on student's learning. Transitory expressions that flag emotions comprise muscle movements, for example, elevating the eyebrows, wrinkling the forehead, rolling the eyes or twisting the lip (Resmana Lim and Reinders 2000). At the factor when students are feeling uncomfortable, they can also have diminished brow, drawn collectively brow, horizontal or vertical forehead wrinkles, and have a tough time in retaining eye contact. To be a respectable receiver of understudy messages, a trainer must be familiar to many of the subtle nonverbal cues that their students send.

3.3 Data collection procedure

The procedure we are following is little complex to describe. For training our system we have used a third party data set from.

We have 2 different data set here

- containing images
- txt files with emotions encoded

We are going to explain all the process step by step. To make it as easy as possible we are going to make a DFD (data flow diagram) here

3.3.1 Organizing the dataset

To create a dataset, first of all we have to arrange the dataset. In the index we're working, make two organizers known as "source_emotion" and "source_images". Concentrate the dataset and put all envelopes containing the txt documents (S005, S010, and so on.) in an organizer known as "source_emotion". Put the organizers containing the snap

shots in an envelope referred to as "source_images". Additionally make an organizer named "sorted_set", to house our arranged feeling pictures. Inside this organizer, make envelopes for the feeling marks ("unbiased", "outrage", and so forth).

3.3.2 Extracting faces

The classifier will work first-rate if the practise and characterization pix are the majority of a similar measurement and have (nearly) just a face on them (no messiness). We have to find out the face on every photo and alternate over to grayscale, edit it and spare the photo to the dataset. We can make use of a HAAR channel from Open CV to computerize confront finding. In reality, Open CV gives four pre-prepared classifiers, so to make sure we identify alternatively many faces as should be predicted below the instances how about we utilize each one of them in grouping, and prematurely give up the face searching for once we have observed one.

3.3.3 Optimizing Dataset

Let's appear seriously at the dataset. The first aspect to note is that we have very few examples for "contempt", "fear" and "sadness". I noted it's now not fair to predict the equal dataset as the classifier has been trained on, and in a similar way it's also not honest to supply the classifier solely a handful of examples and assume it to generalize. Change the .00 so that "contempt", "fear" and "sadness" are no longer in it, because we really don't have enough examples for it:

Change from:

```
emotions = ["neutral", "anger", "contempt", "disgust", "fear", "happy", "sadness", "surprise"]
```

To:

```
Emotions = ["neutral", "anger", "disgust", "happy", "surprise"]
```

3.4 Statistical Analysis

		Predicted Result	
		Result = Yes	Result = No
Actual Result	Result = Yes	True Positive	True Negative
	Result = No	False Positive	False Negative

Table 3.1: confusion matrix law table

Precision (P) = $TP / (TP + FP)$

Sensitivity(R) = $TP / (TP + FN)$

Specificity = $TN / (TN + FP)$

Accuracy = $(TP + TN) / (TP + FP + TN + FN)$

F-measure = $2PR / (P + R)$

3.5 Implementation Requirements

We have to work on our demand. We used python as programming language. We also used Open CV as our platform. We used some library functions also.

We used python 2.4.7

Open CV used as a platform where we run our codes, we used harracascade library function.

Open CV which is an Open Source Computer Vision Library discharged underneath a BSD allow and for this reason it is free for both scholarly and commercial enterprise utilize. It has C++, Python and Java interfaces and backings Windows, Linux, Mac OS, iOS and Android. OpenCV was once meant for computational productivity and with a stable highlight on ongoing applications. Written in advanced C/C++, the library can exploit multi-center handling. Empowered with Open CL, it can exploit the equipment increasing speed of the fundamental heterogeneous figure stage.

Embraced all around the globe, Open CV has in excess of 47 thousand individuals of client network and assessed number of downloads surpassing 14 million. Use ranges from intelligent craftsmanship, to mines examination, sewing maps on the web or through cutting edge mechanical technology.

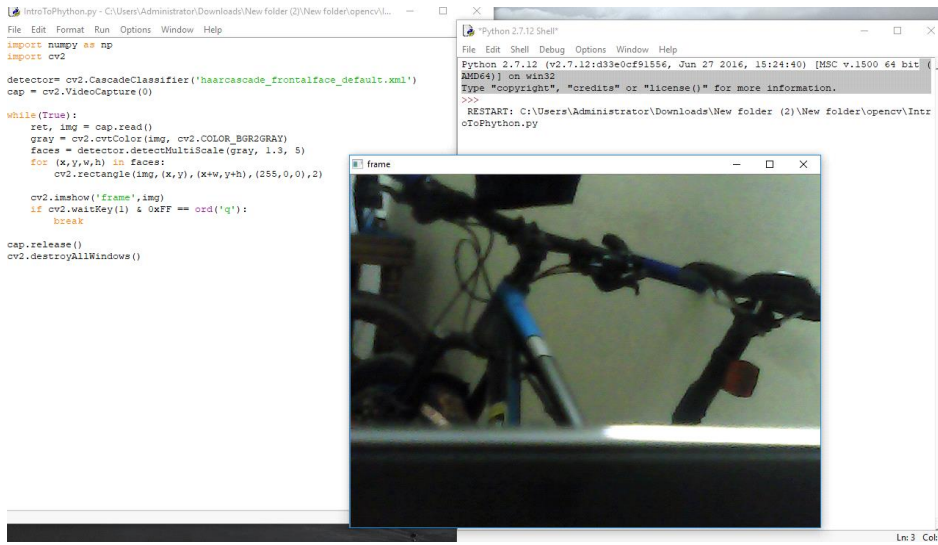


Figure: 3.4 Open CV and python

CHAPTER 4

Experimental Result and Discussion

4.1 Introduction

Here we are going to show the experimental results of our project. Our system can detect faces from an image, detect facial expression from image through emoji. It can also detect emotion in front of webcam. We are already showed the process we followed and also mentioned how the project works. Here we are going to use the experimental data and also we will take the real time data. Together we will compare and show the result and discussion.

4.2 Experimental Result

At first we detect face from image and separate them from the images.

4.2.1 Face Detection:



Figure: 4.1 A Test image for face detection

We input this test image for face detection.

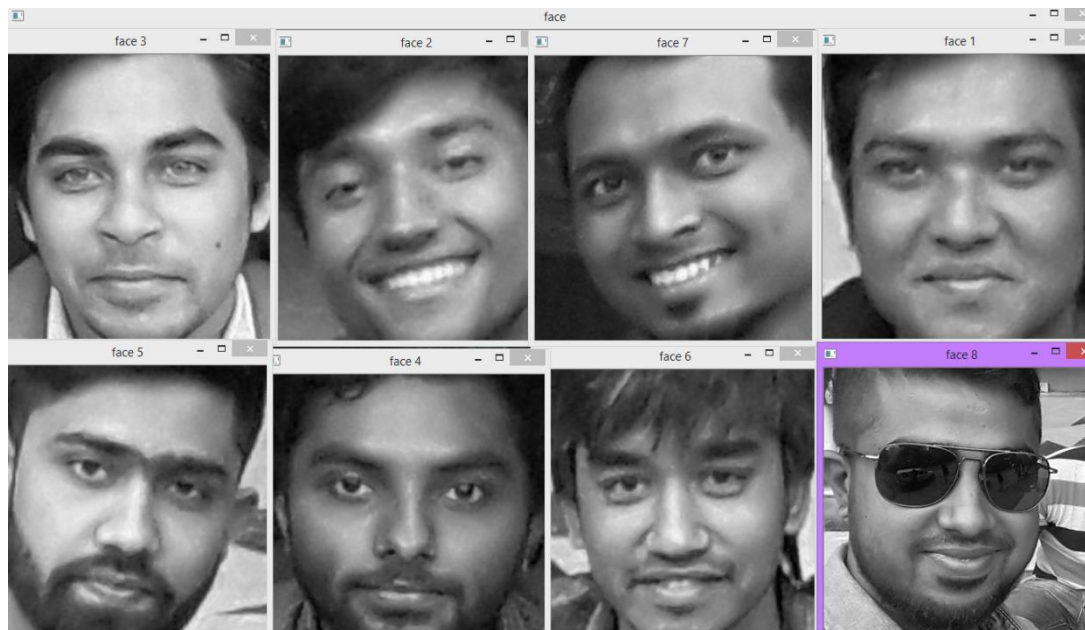


Figure: 4.2 Detected All faces from image

After giving input image we can see our system detected all the faces from input image.

4.2.2 Emotion Detection:

Our system can detect emotions [Anger, disgust, happy, neutral, sadness, surprise] through emoji.

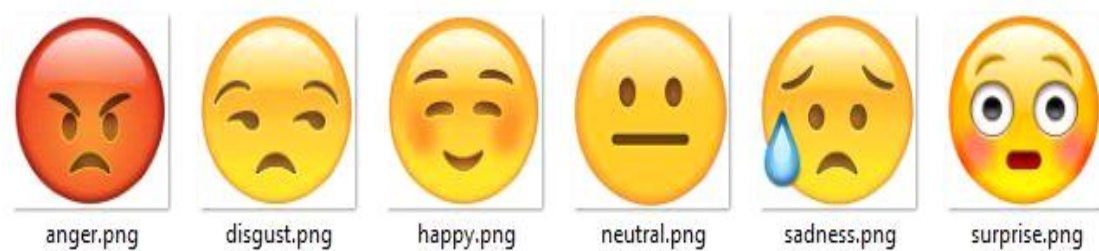


Figure: 4.3 Emotion Emoji's

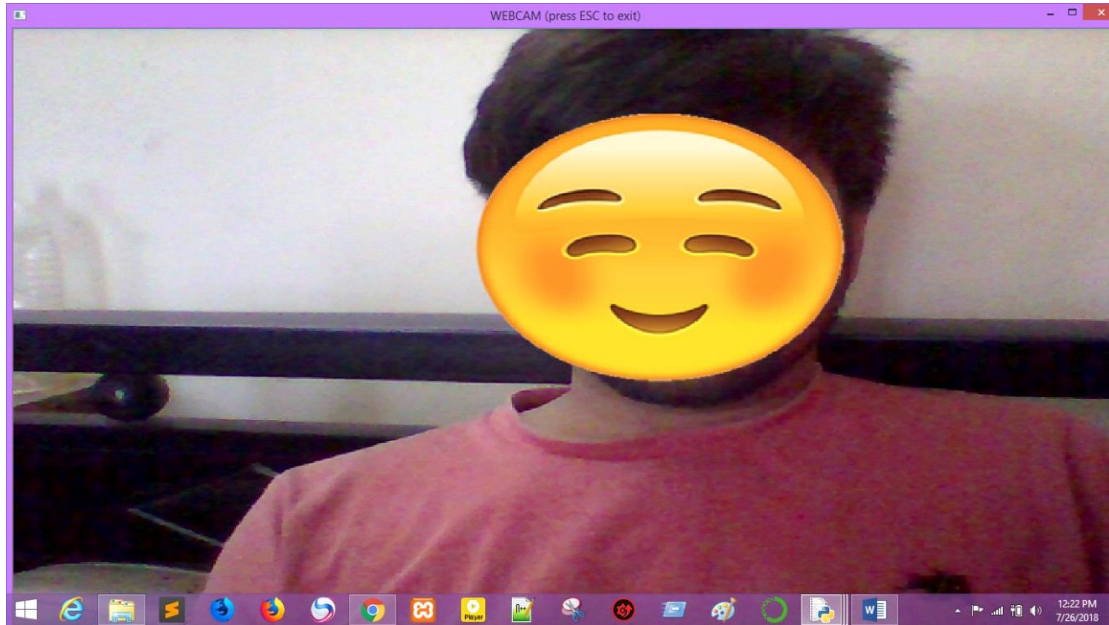


Figure: 4.4 Happy Emotion

Here the system detected happy emotion. The system showing this emotion through smile emoji.

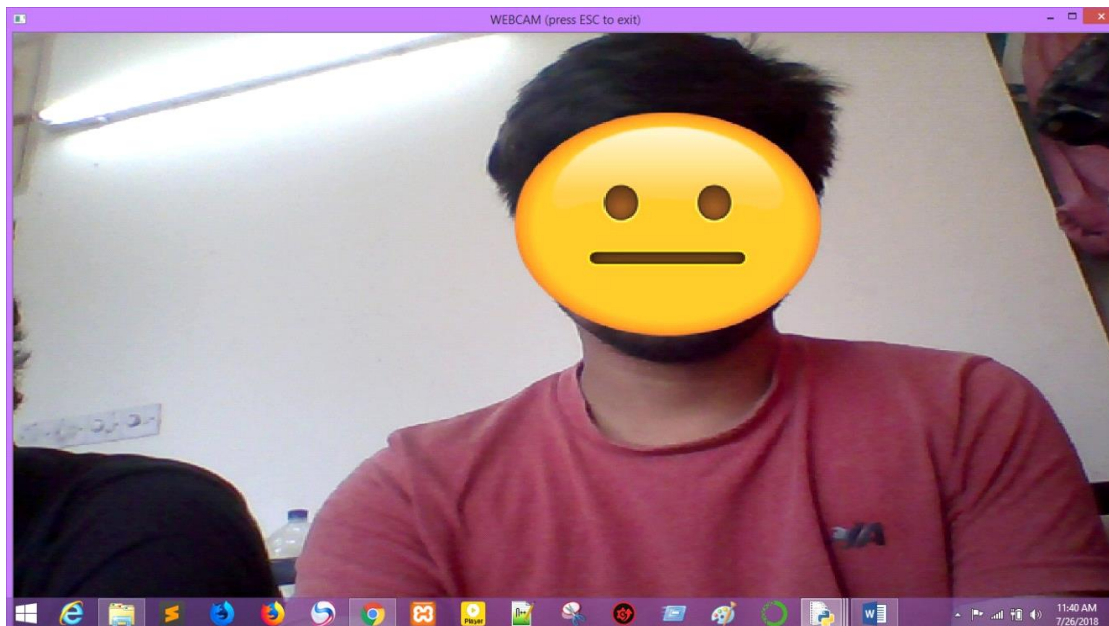


Figure: 4.5 Neutral Emotion

Here the system detected neutral emotion. The system showing this emotion through neutral emoji.



Figure: 4.6 Anger and Surprise Emotion

Here the system detected anger and surprise emotion. The system showing this emotion through anger and surprise emoji.

So far, the image processing and the facial expression as well as all the process and modules are working well. So now we are going to take the real time data so that we can work in the real educational environment.

4.2.3 Real time data collection:

We collected real time data form classroom. We clicked some images during class time. Then we give them a form to write down what was their state of mind during class.

Student No	State of mind
Student 1	Happy
Student 2	Neutral
Student 3	Neutral
Student 4	Surprise
Student 5	Happy
Student 6	Sad
Student 7	Happy
Student 8	Happy

Student 9	Happy
Student 10	Neutral
Student 11	Happy
Student 12	Neutral
Student 13	Neutral
Student 14	Happy
Student 15	Happy
Student 16	Happy
Student 17	Neutral
Student 18	Happy
Student 19	Surprise
Student 20	Happy
Student 21	Neutral
Student 22	Happy
Student 23	Surprise
Student 24	Neutral
Student 25	Happy
Student 26	Happy
Student 27	Neutral
Student 28	Happy
Student 29	Happy
Student 30	Surprise
Student 31	Happy
Student 32	Happy
Student 33	Happy
Student 34	Neutral
Student 35	Sad
Student 36	Neutral
Student 37	Happy
Student 38	Happy
Student 39	Neutral
Student 40	Surprise

Student 41	Surprise
Student 42	Neutral
Student 43	Happy
Student 44	Happy
Student 45	Happy
Student 46	Sad
Student 47	Neutral
Student 48	Happy
Student 49	Happy
Student 50	Neutral
Student 51	Happy
Student 52	Neutral
Student 53	Neutral
Student 54	Happy
Student 55	Happy
Student 56	Happy
Student 57	Neutral
Student 58	Happy
Student 59	Surprise
Student 60	Happy
Student 61	Neutral
Student 62	Happy
Student 63	Surprise
Student 64	Neutral
Student 65	Happy
Student 66	Happy
Student 67	Neutral
Student 68	Happy
Student 69	Happy
Student 70	Surprise
Student 71	Happy
Student 72	Happy

Student 73	Happy
Student 74	Neutral
Student 75	Sad
Student 76	Neutral
Student 77	Happy
Student 78	Happy
Student 79	Neutral
Student 80	Surprise

Table 4.1: Data from students

Data from classroom:

Happy: 42

Surprise: 10

Neutral: 24

Sad: 4

Data from System:

Happy: 26

Surprise: 18

Neutral: 28

Sad: 2

Disgust: 2

Angry: 4

The pictures/ video should be collected by the web cam but unfortunately it's illegal without the permission of the authority. So for less complexity we analysis the expression by the pictures we took by the phone. Here are some examples. Let's check them out.

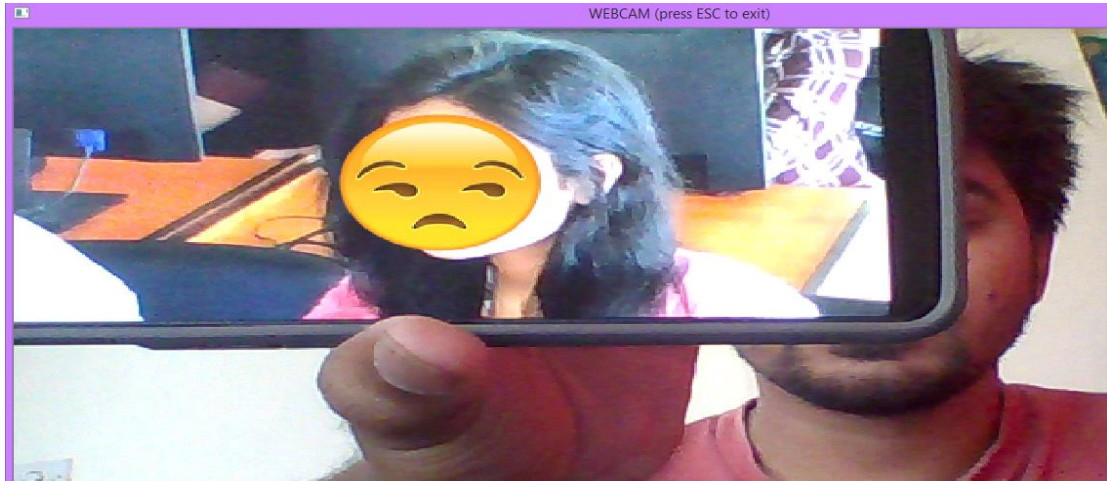


Figure: 4.7 a student's expression about disgusted.

System detected disgust expression.

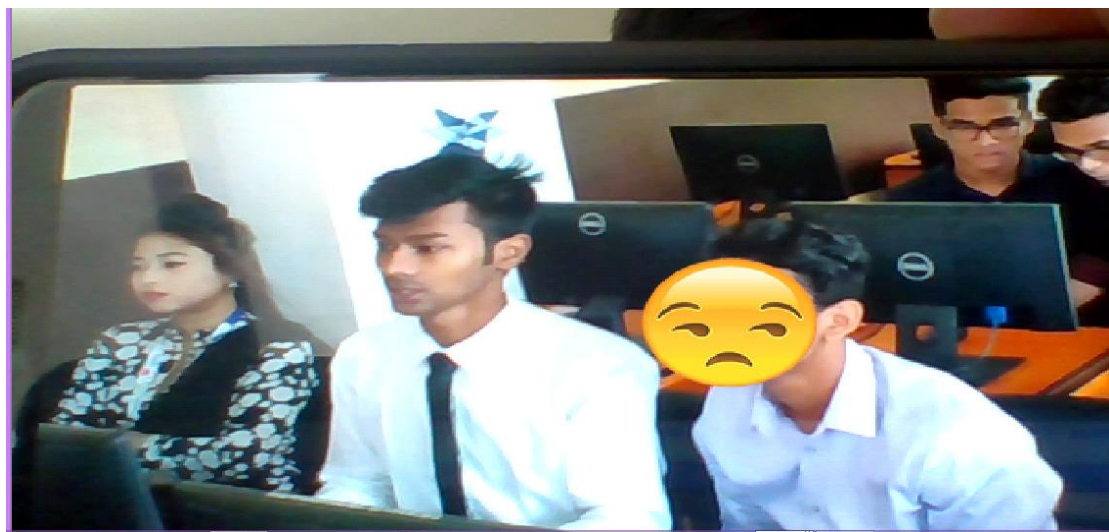


Figure: 4.8 another excremental result

System detected disgust expression.



Figure: 4.9 both are natural.

System detected both expression are neutral.

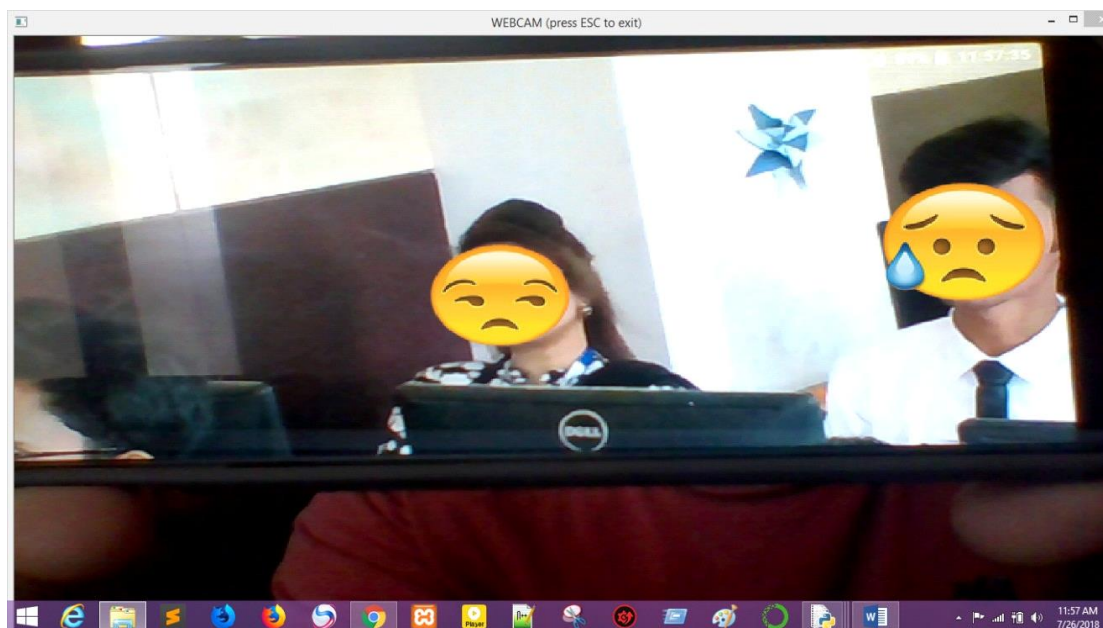


Figure: 4.10 one is disgusted and another is sad

System detected disgust and sad expression.

So by this lengthy process we collected all the data. And in descriptive analysis we will give the description.

4.3 Descriptive Analysis

After collecting all the data we moved for analysis. We created a pie-chart. Based on the data we collected by the class.

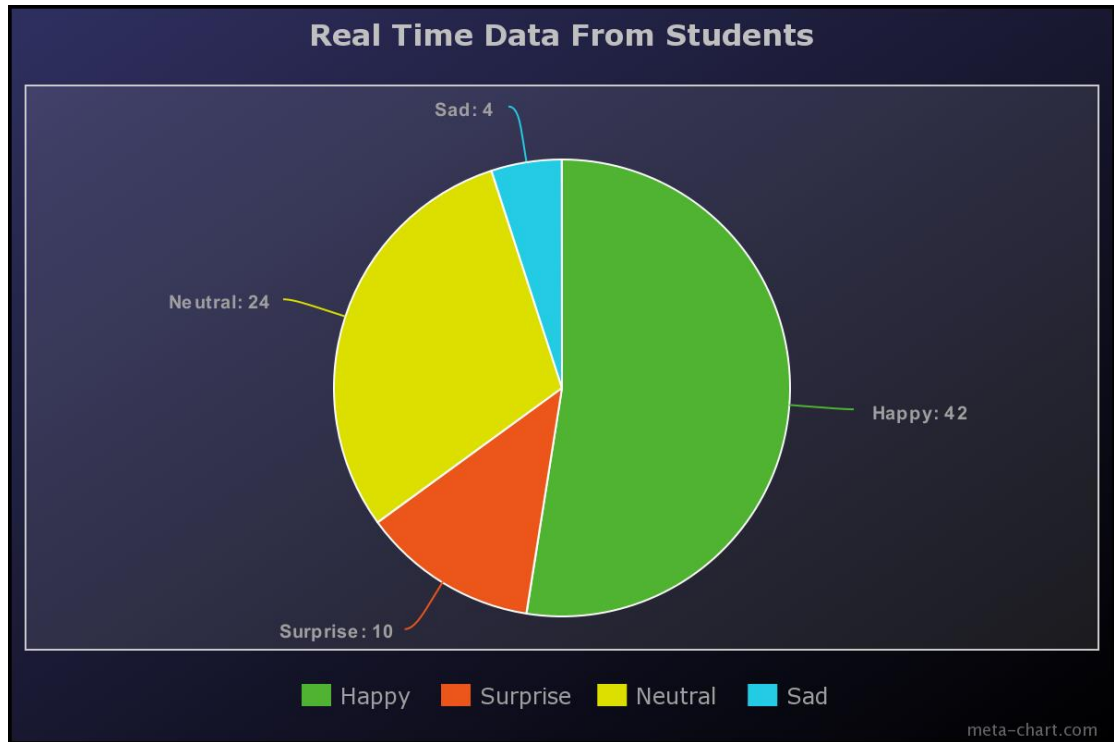


Figure: 4.11 real time data

We can see that 42 students are happy. 4 are sad 10 are surprised. And 24 are neutral. This is the data collected by them manually.

Again we collected facial expression from our system and we also created a chart.

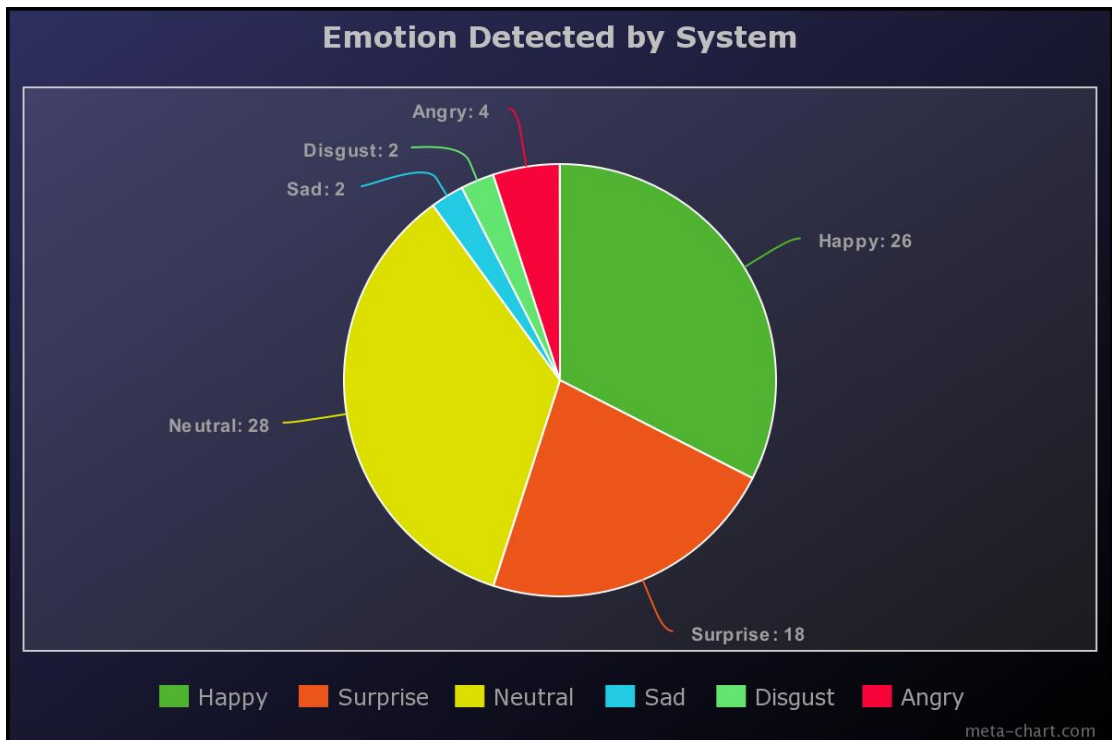


Figure: 4.12 emotion detected by the system

Then we took their pictures. We analysed them and found results that surprised us. Our system is saying that 26 are happy, 2 are disgust, 4 are angry, 2 are sad, 18 are surprised, 28 neutrals.

So mainly we are comparing the real-time data with the system experimental data.

Main problem is the similarities of the expression.

With some pictures we are going to show the limitations.

We can see some difference between these two pie charts. Reason is some expression is too confusing to understand some times like,



Figure: 4.13 some limitations

4.4 Summary

Expected outcome	S2						Total
	Happy	Neutral	Sad	Surprised	Disgust	Angry	
Happy	26	0	0	0	0	0	26
Neutral	4	24	0	0	0	0	28
Sad	0	0	2	0	0	0	2
Surprised	8	0	0	10	0	0	18
Disgust	0	0	2	0	0	0	2
Angry	4	0	0	0	0	0	4
Total	42	24	4	10	0	0	80

Table 4.2: Data from students for accuracy

Accuracy for happy $26\%42=0.6190$

Accuracy for Neutral $24\%24=1.0$

Accuracy for Sad $2\%4=0.5$

Accuracy for Surprised $10\%10=1.0$

So total accuracy for this experiment is: $(0.6190 + 1 + 0.5 + 1) \div 4 = 0.77975$

CHAPTER 5

Conclusion

5.1 Summary

Here we are going to elaborate the summary and the challenges we faced about this project and research. It's better to go to the points directly

- Our inspiration was the student's frustrations about the classes. We saw our friends and juniors frustrations and also saw the effects of that on the exams also in their lives. So this forced us to make a solution so that teachers and higher authorities can automatically detect a student's mental state by facial expression.
- The title of our project is "Detecting Students state of mind through facial expression and body movements in real time educational environment" so by reading the title one can easily understand why the system is made and what its purposes are. This system will identify the actual facial expression of a student by his face through web cam by the help of an AI that we trained to do so.
- In the time of developing the system I faced some problem like managing the work, making sequence of code, indentation problem etc.
- Also less for less amount of data we are getting minimum amount of accuracy if we could open a professional developer Microsoft account we could buy an API by which we can detect all the facial expressions that exist in a human face with proper accuracy. They are using large number of image data so accuracy would be that level.

5.2 Conclusions

This system takes live image data (video) and analysis people's facial expressions. It was a great expression to develop such system. Authority can easily monitor a student now with the help of this system. Developing this system was a great experience. There are many works with this sector. But still our project is unique as we have used raw coding. People open a developer account of Microsoft. And then buy the API of facial expression with 200\$ and implement it on the system but we tried to make the codes

by our own. We made our code for each different expression. So it should be appreciate as the code is identifying the expression without any API only with the help of build in functions of python and open CV.

This work represents the simple methods and the simple logics. The generated result of the system is not fully correct. May corrections will need for this system.

5.3 Future Study

In future students can understand Artificial Intelligence by this work. And matter of fact is anyone can get a clear idea about AI without the help of any AI built in library function, only raw coding is done by us .we used some library of python.

As technology is spreading rapidly then in the nearest future a beginner can understand the facial expression's basic functions with this project work.

And also as it is knowledge based functional project, a beginner can also learn some logic in this study.

This facial expression analyzer can be used in other sectors. Mentioned bellow:

- For analyzing the output of an important meeting
- It can find out the actual time a meeting holder is attentive in the meeting
- It also can solve sentimental issue in critical situations
- Anyone can personally use this system to find out his friend's mental state
- New AI can develop accuracy up to a standard percentages
- We have ideas to develop its other versions on android, on IOS, on mac, on web
- With the help of Microsoft API, it can give outstanding accuracy and performance

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APPENDIX

Appendix A: Work Reflection

This system has a positive and negative reflection about the work. Some expression represent positive view and some represent negative view of the person. Also some expression is identical to the system

This system can be used as identifier of movie review. If the review contains words with negative, positive and cross meaning then it could be identify by the system.

- If can reflect the thought of a man by analyzing the opinion about a topic.
- If a student continuously express sad or unhappy then it can create a negative view with his /her personality.
- If a student continuously express happy then it can create a positive view with his /her personality.
- If the system can identify his/her positive point of view then it can be beneficial to his/her future work. It can increase his/her personality to others.
- Open work by this can be frictional, the motive of the system was not any frictional reason. If anyone use it in his/her personal interest then he/she should take full responsibility.
- This work can be used for business reason but the data and the result should kept in private.