Deccan Education Society's

Fergusson College (Autonomous)
Pune 411004

M.Sc. Computer Science
Department of Computer Science

A
Project report
On

EMOTIONAL AND MENTAL ANALYST - EMA

by:

Gayatri Patil (226206)
Purva Kale (226217)
Revati Jadhav(226218)

[2022 – 2023]

Deccan Education Society's
FERGUSSON COLLEGE(AUTONOMOUS), PUNE-4
Department of Computer Science

A
Project Report
On

EMOTIONAL AND MENTAL ANALYST - EMA

In partial fulfilment of requirements of the completion of F.Y.M.Sc (C.S)
Semester-II
Master Of Science Computer Science

SUBMITTED BY:

Gayatri Patil (226206)
Purva Kale (226217)
Revati Jadhav (226218)

Under the Guidance of

Prof. Aparna Vaidyanathan

[2022-2023]

(CSC5313) Computer Science Project-III

CERTIFICATE

This is to certify that the project entitled online attendance system is Completed by

1. Gayatri Patil (226206)
2. Purva Kale (226217)
3. Revati Jadhav (226218)

in partial fulfilment of the requirement of the completion of M.Sc. (C.S) Semester-II has been carried out by team under my guidance satisfactory during the academic year 2022-2023.

Place: Pune
Date: /   /2022

(Prof. Aparna V)   (Dr.Kavita A. Khobragade)
Project Guide   **Head, Computer Science Department**

Internal Examiner: **External Examiner:**

Acknowledgement

Index

1. Introduction

Värnik claims India's adjusted annual suicide rate is 10.5 per 100,000, while the suicide rate for the world as a whole is 11.6 per 100,000.Every hour, one student commits suicide in India. This present catastrophe of the pandemic has struck us with many disturbing events. Every soul on earth is terrified to go out in the vicinity. There is no other option but to clutch ourselves in the house and deal with the situation as deliberately as possible. In such situations, our mental health has been greatly neglected and has resulted in depression and psychological disorders. To relieve such distressed mind sets, one need to share his thoughts instead of clamming it inside. But in such introvert situations, one is hesitant and reserved to open up to somebody resulting in shyness and humiliation. To overcome this dilemma, we are introducing a human like A.I. chatbot which recognises the emotions of the user by interacting with simple conversation and analyse what abrupt thoughts might lay in the user's mind. The user may name the bot anything he likes and shares his emotions, his thoughts, his psychological dilemmas with it and seek for solution. The bot will analyse what the user is dealing with and provide the user with comforting words, fun games, jokes, mind-soothing exercises, daily diary logs, daily mood tracker and much more stuff that will ease the user's nerves. This will allow users to share their thoughts and worries without hesitation and shyness. The user's data will be secure enough and can be manipulated by the user as per his liking. Interpersonal interaction is often times intricate and nuanced, and its success is often predicated upon a variety of factors. These factors range widely and can include the context, mood, and timing of the interaction, as well as the expectations of the participants. For one to be a successful participant, one must perceive a counterpart's disposition as the interaction progresses and adjust accordingly. Fortunately for humans this ability is largely innate, with varying levels of proficiency. Humans can quickly and even subconsciously assess a multitude of indicators such as word choices, voice inflections, and body language to discern the sentiments of others. This analytical ability likely stems from the fact that humans share a universal set of fundamental emotions. Significantly, these emotions are exhibited through facial expressions that are consistently correspondent. This means that regardless of language and cultural barriers, there will always be a set of fundamental facial expressions that people assess and communicate with.

DOMAIN: ARTIFICIAL INTELLIGENCE/MACHINE LEARNING

Artificial intelligence is a field of computer science, which makes a computer system that can mimic human intelligence. It is comprised of two words "Artificial" and "intelligence", which means "a human-made thinking power." Hence, we can define it as, Artificial intelligence is a technology using which we can create intelligent systems that can simulate human intelligence.

The Artificial intelligence system does not require to be pre-programmed, instead of that, they use such algorithms which can work with their own intelligence. It involves machine-learning algorithms such as Reinforcement learning algorithm and deep learning neural networks. AI is being used in multiple places such as Siri, Google's AlphaGo, AI in Chess playing, etc.

Machine learning is about extracting knowledge from the data. It can be defined as, Machine learning is a subfield of artificial intelligence, which enables machines to learn from past data or experiences without being explicitly programmed.

Machine learning enables a computer system to make predictions or take some decisions using historical data without being explicitly programmed. Machine learning uses a massive amount of structured and semi-structured data so that a machine learning model can generate accurate result or give predictions based on that data.

AI/ML IN EMOTIONAL AND MENTAL ANALYST

You can use AI/ML algorithms to train the system as per our requirements:
- Detecting emotions
- Extracting features from scanning objects
- Performing user programmed functions

MOTIVATION

- To understand the users' complex and conflicting thoughts.
- To analyse the users' state of mind.
- To provide a confidential trustworthy medium for the users to organize their thoughts with life like interaction.
- To provide remedial exercises and routines to eliminate disputing thoughts form users mind and avoiding any self-harm causing intentions of the user

1.1 Existing System

This involves observing individuals behaviours to infer their emotional or mental states. For example, facial expressions, body language, and vocal tone can all provide clues about an individual's emotional state. These are measures of physiological activity that are believed to be associated with emotional or mental states.

1.2 Need of the System

Objective analysis: An automated system can provide more objective analysis of emotional and mental states compared to subjective analysis done by humans. This is because the system can use algorithms and machine learning techniques to identify patterns and make predictions based on data. Consistency: An automated system can ensure consistency in the analysis of emotions and mental states. This is because the system uses standardized procedures to analyze data, whereas human analysts may interpret data differently or be influenced by their own biases.

1.3 Overview of the Project

An Emotional Mental Analysis project involves analyse emotions and mental states to gain insights into human behaviour, cognition, and well-being. The project may involve collecting and analyse data from various sources, including self-report measures, behavioural observation, physiological measures, and social media. The goal of an Emotional Mental Analysis project is to gain a better understanding of emotions and mental states and their impact on individuals' well-being

and behaviour. This information can be used to develop interventions, improve mental health treatments, and inform public policy.

2 Analysis

2.1 Feasibility study

A feasibility study for an Emotional Mental Analysis project would assess the viability of the project, including its technical, economic, operational, legal, and scheduling feasibility. Here are some key factors to consider.

2.1.1 Technical feasibility

The project should be technically feasible, meaning that the necessary technology, software, and tools are available to collect and analyse data on emotions and mental states. Additionally, the project should have access to sufficient data that can be used for analysis

2.1.2 Economic feasibility

The project should be economically feasible, meaning that the costs of the project are within the budget and that the benefits of the project justify the costs. The project should also have a clear plan for generating revenue or obtaining funding.

2.1.3 Operational feasibility

The project should be operationally feasible, meaning that it is possible to implement and maintain the system for analyse emotions and mental states. This includes having the necessary resources and expertise to manage the project. Operational feasibility is one of the key factors that should be considered in a feasibility study for an Emotional Mental Analysis project. It refers to the project's ability to be successfully implemented and maintained within the existing organizational structure and resources.

2.2 SYSTEM REQUIREMENTS

SOFTWARE REQUIREMENTS

- Operating System : Windows
- Front End : Python
- IDE : Jupyter Notebook
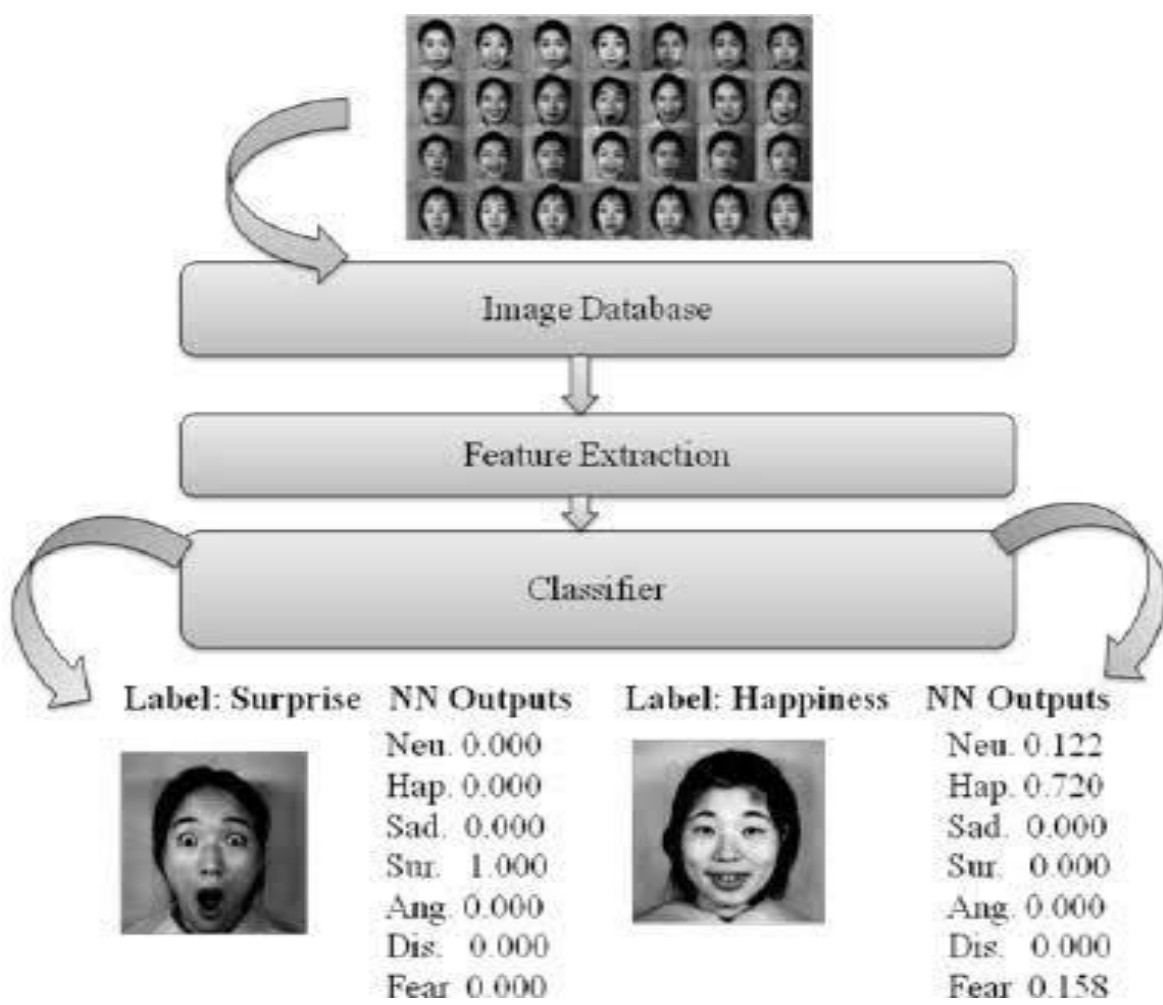- Database : MySQL, MS Excel

HARDWARE REQUIREMENTS

- Webcam
- Speaker
- Microphone

3 Design

3.1 DIAGRAMS

3.1.1 EXISTING SYSTEM

Image Database

Feature Extraction

Classifier

Label: Surprise   NN Outputs

Neu. 0.000
Hap. 0.000
Sad. 0.000
Sur. 1.000
Ang. 0.000
Dis. 0.000
Fear 0.000

Label: Happiness   NN Outputs

Neu. 0.122
Hap. 0.720
Sad. 0.000
Sur. 0.000
Ang. 0.000
Dis. 0.000
Fear 0.158

3.1.2 PROPOSED SYSTEM
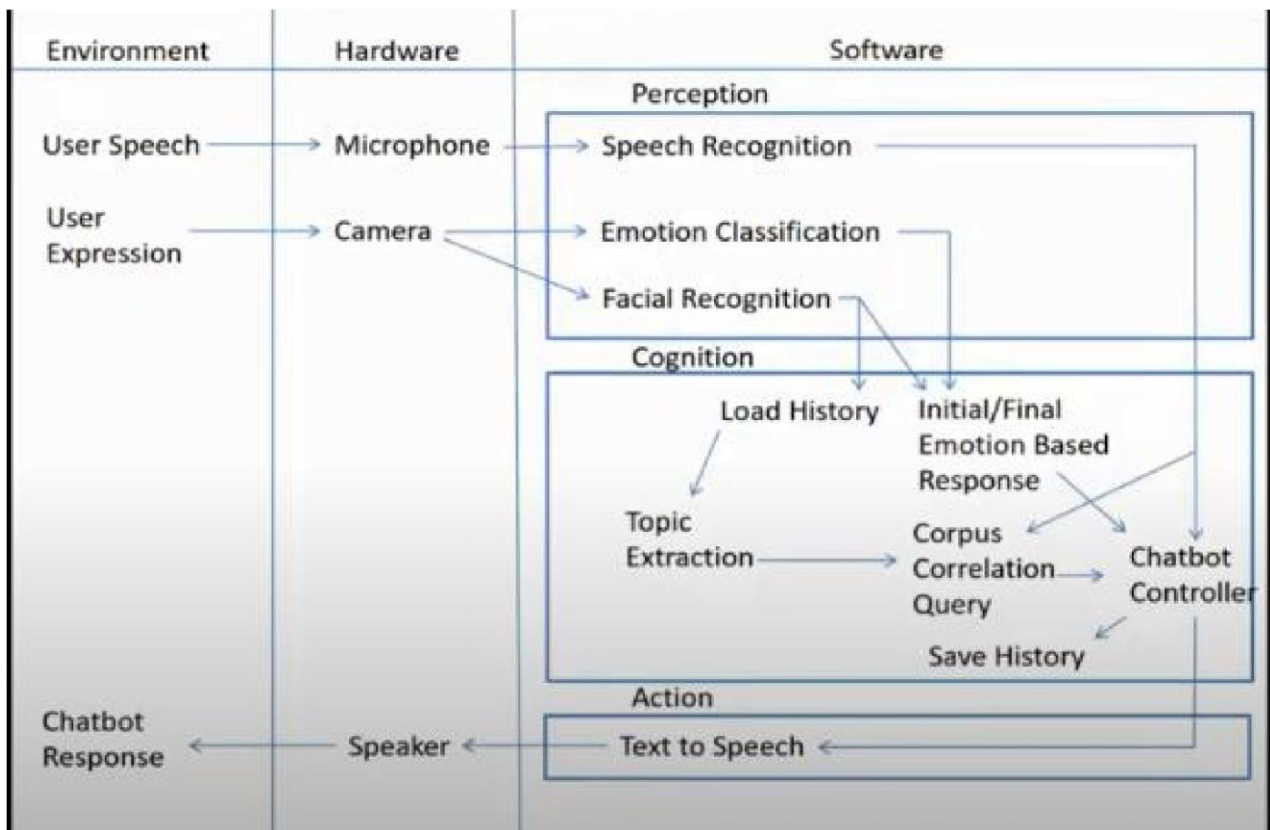
SYSTEM COMPONENTS

PYTHON

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently whereas the other languages use punctuations. It has fewer syntactical constructions than other languages.

 Python is Interpreted − Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.

 Python is Interactive − You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.

- **Python is Object-Oriented** − Python supports Object-Oriented style or technique of programming that encapsulates code within objects.

- **Python is a Beginner's Language** − Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

OpenCV

OpenCV is a cross-platform library using which we can develop real-time **computer vision applications**. It mainly focuses on image processing, video capture and analysis including features like face detection and object detection.

Viola Jones Cascade

Viola Jones algorithm is named after two computer vision researchers who proposed the method in 2001, Paul Viola and Michael Jones in their paper, "Rapid Object Detection using a Boosted Cascade of Simple Features". Despite being an outdated framework, Viola-Jones is quite powerful, and its application has proven to be exceptionally notable in real-time face detection. This algorithm is painfully slow to train but can detect faces in real-time with impressive speed.

Haar Cascade

Haar-like features are digital image features used in object recognition. All human faces share some universal properties of the human face like the eyes region is darker than its neighbour pixels, and the nose region is brighter than the eye region.
A simple way to find out which region is lighter or darker is to sum up the pixel values of both regions and compare them. The sum of pixel values in the darker region will be smaller than the sum of pixels in the lighter region. If one side is lighter than the other, it may be an edge of an eyebrow or sometimes the middle portion may be shinier than the surrounding boxes, which can be interpreted as a nose This can be accomplished using Haar-like features and with the help of them, we can interpret the different parts of a face.

Pyttsx3:

Pyttsx3 is a text-to-speech conversion library in Python. Unlike alternative libraries, it works offline and is compatible with both Python 2 and 3.

Text2emotion text2emotion is the python package which will help you to extract the emotions from the content.
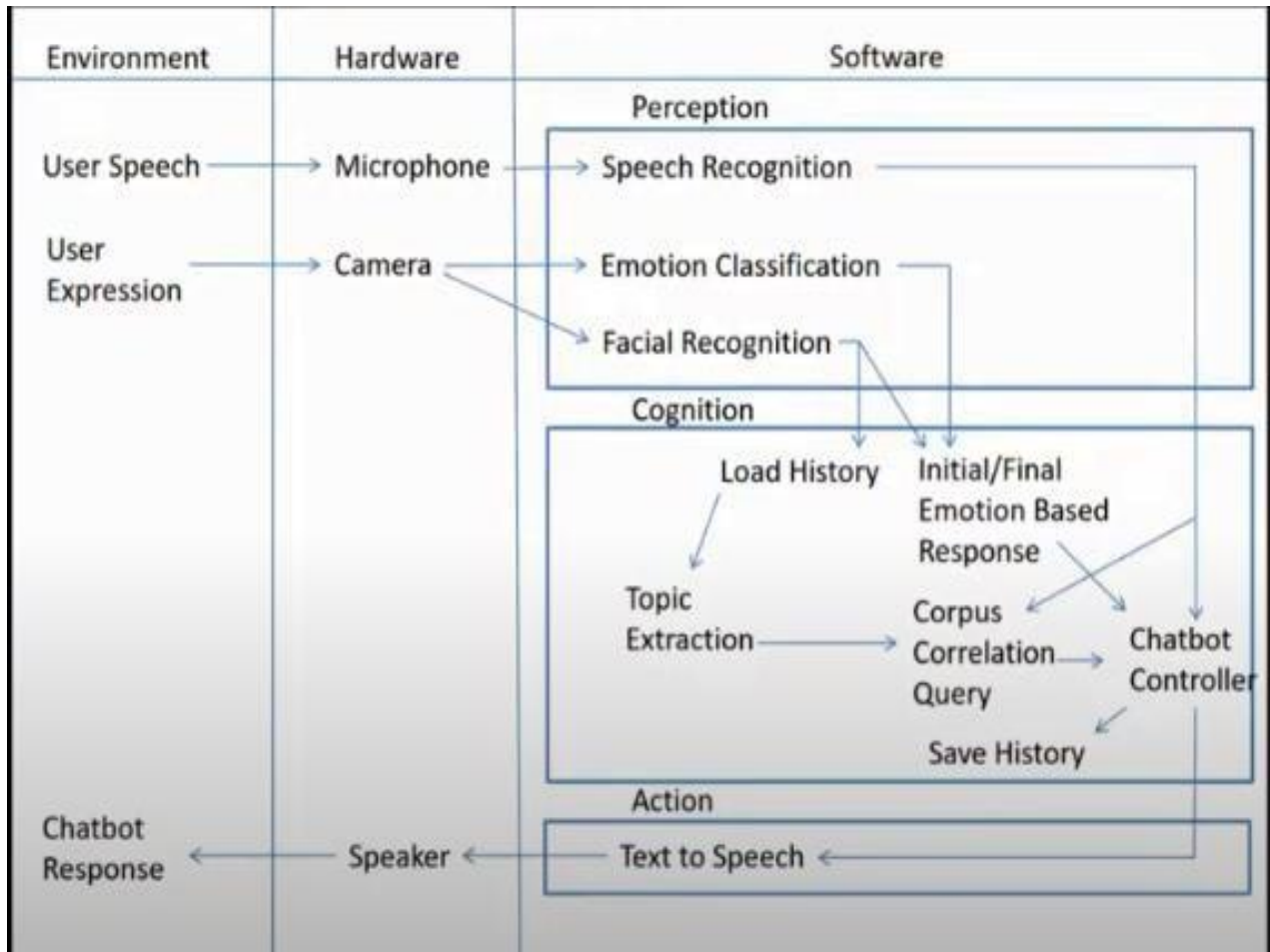
Processes any textual message and recognize the emotions embedded in it.

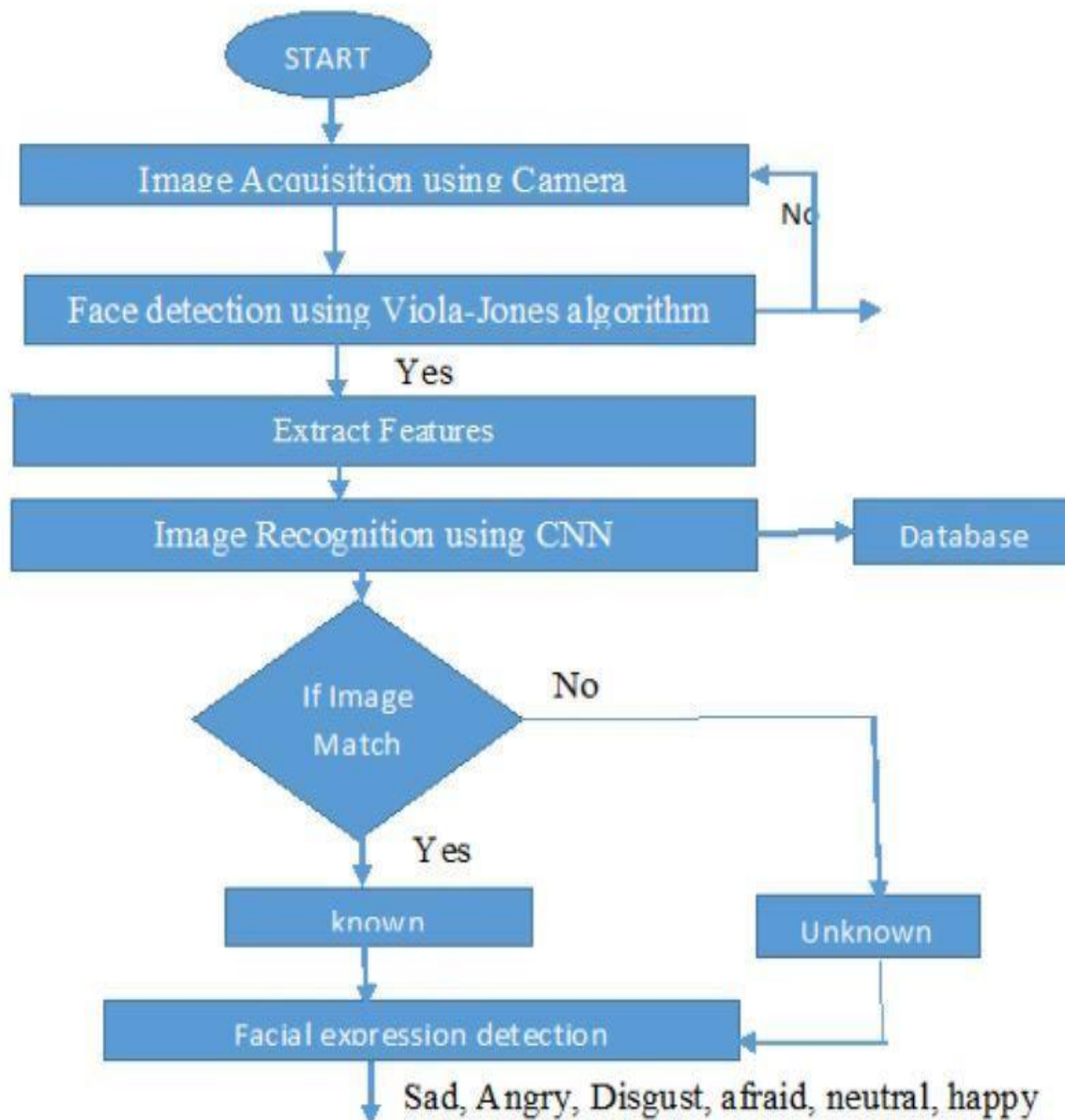• Compatible with 5 different emotion categories as Happy, Angry, Sad, Surprise and Fear.

CNN:

A **Convolutional Neural Network (ConvNet/CNN)** is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics.
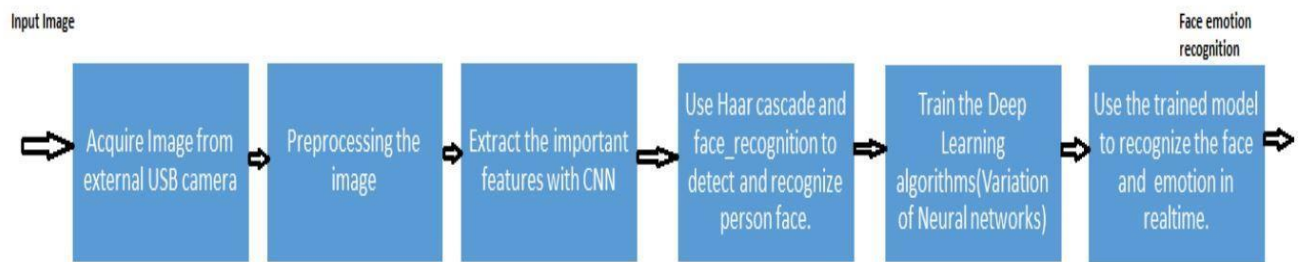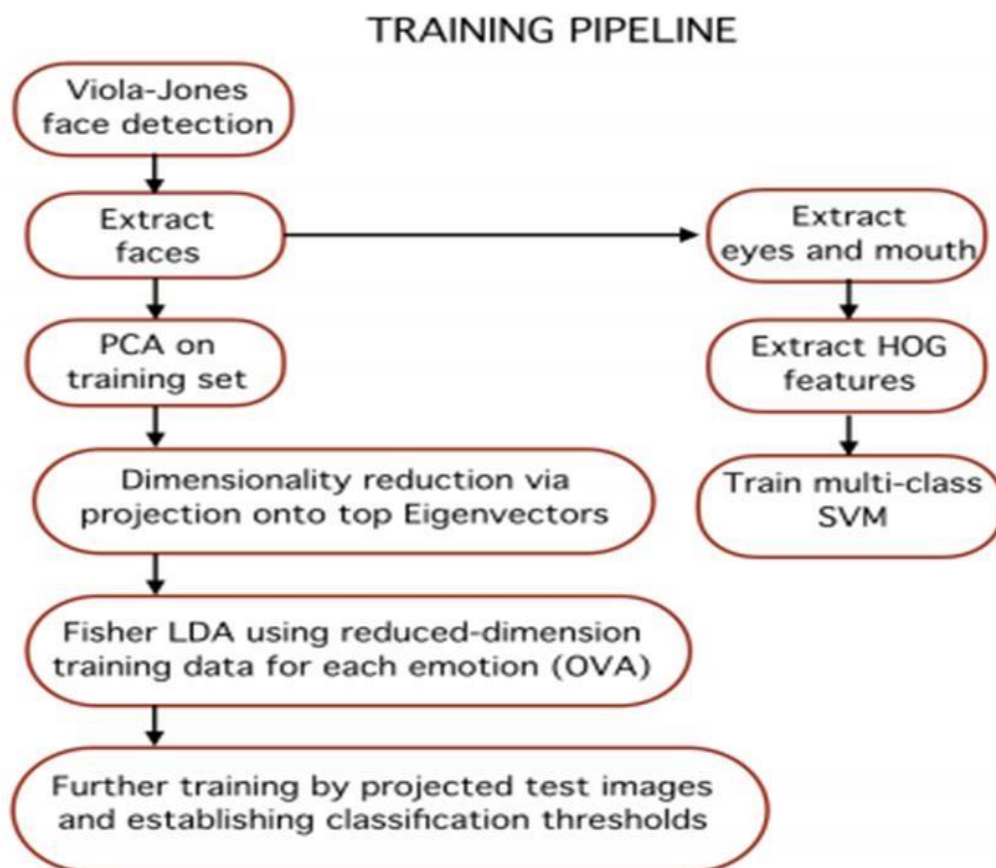
3.1.3 SYSTEM DESIGN

3.1.4 FLOWCHART:

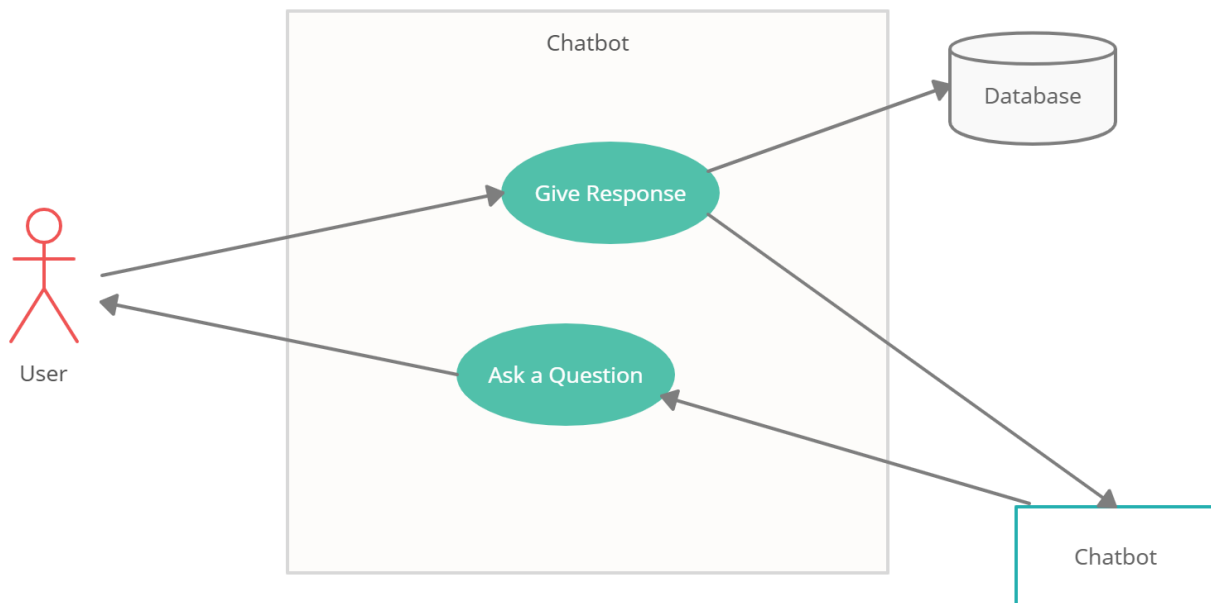Face detection and recognition flow chart

3.1.5 BLOCK DIAGRAM

Input Image

Face emotion recognition

Acquire Image from external USB camera → Preprocessing the image → Extract the important features with CNN → Use Haar cascade and face_recognition to detect and recognize person face. → Train the Deep Learning algorithms(Variation of Neural networks) → Use the trained model to recognize the face and emotion in realtime.

Block diagram of Face detection and recognition classification

3.1.6 TRAINING DIAGRAM

TRAINING PIPELINE

Viola-Jones face detection

Extract faces → Extract eyes and mouth

PCA on training set → Extract HOG features

Dimensionality reduction via projection onto top Eigenvectors → Train multi-class SVM

Fisher LDA using reduced-dimension training data for each emotion (OVA)

Further training by projected test images and establishing classification thresholds
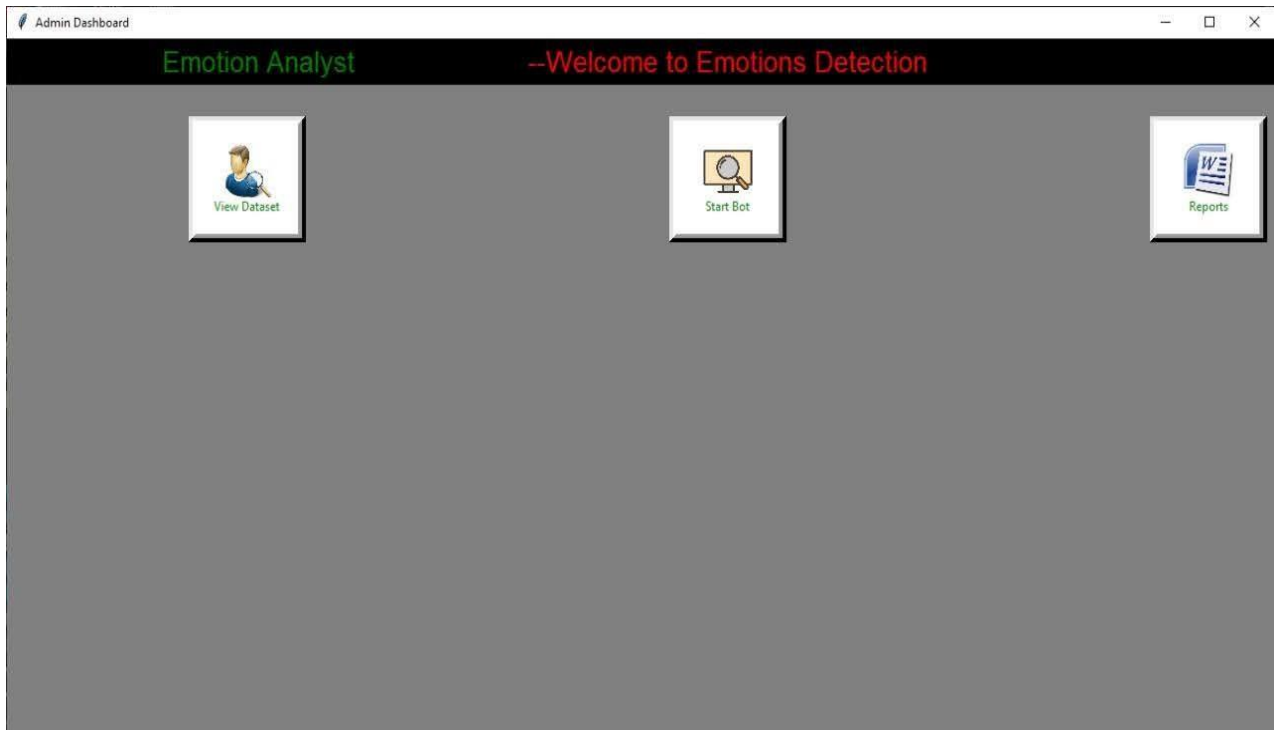
3.1.7 USERCASE DIAGRAM

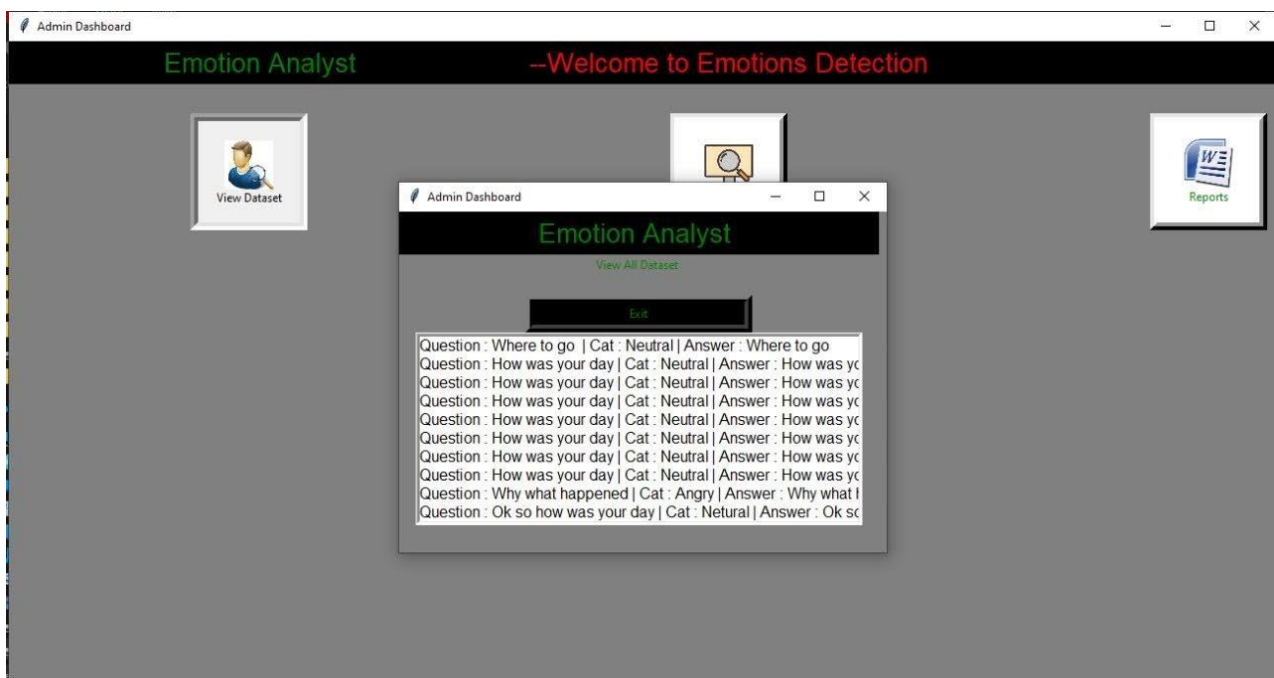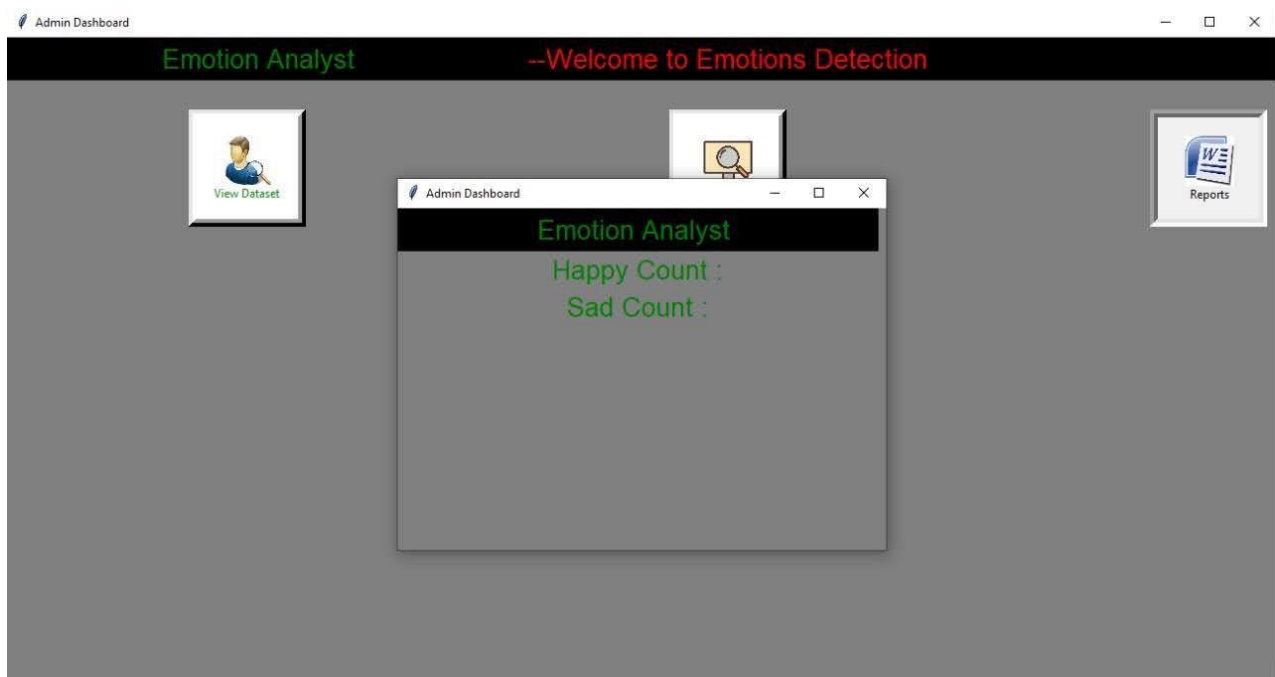### 3.1.8 ACTIVITY DIAGRAM
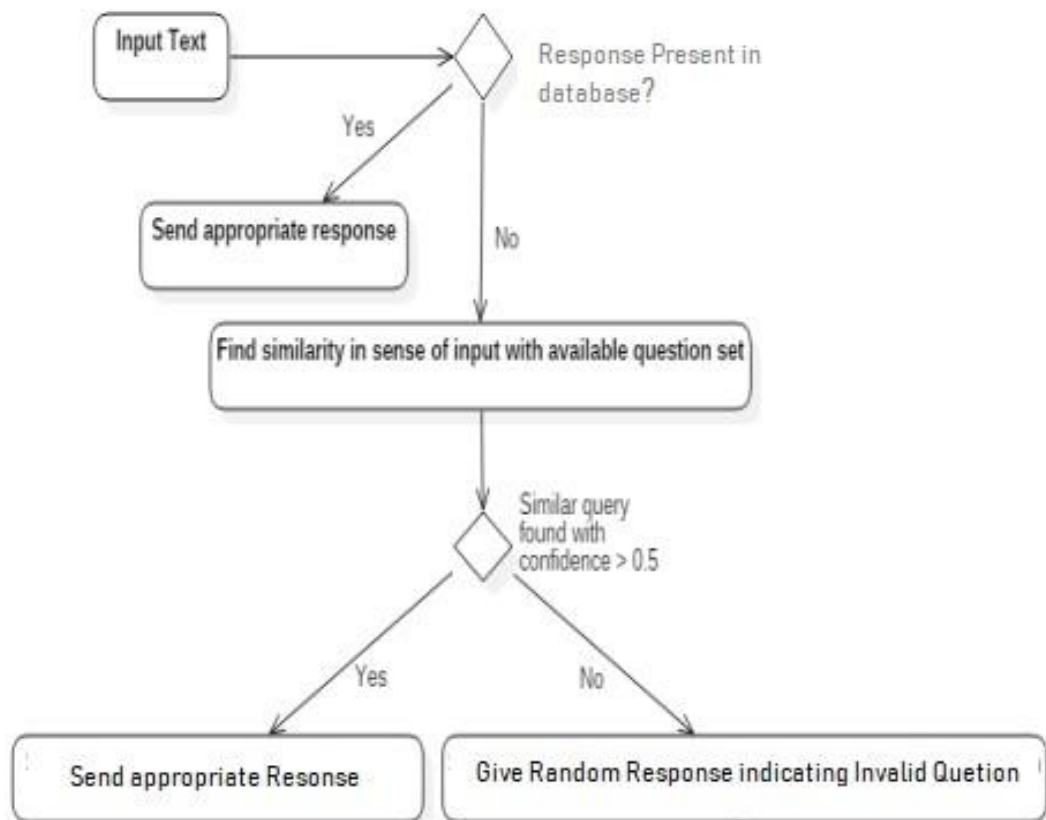
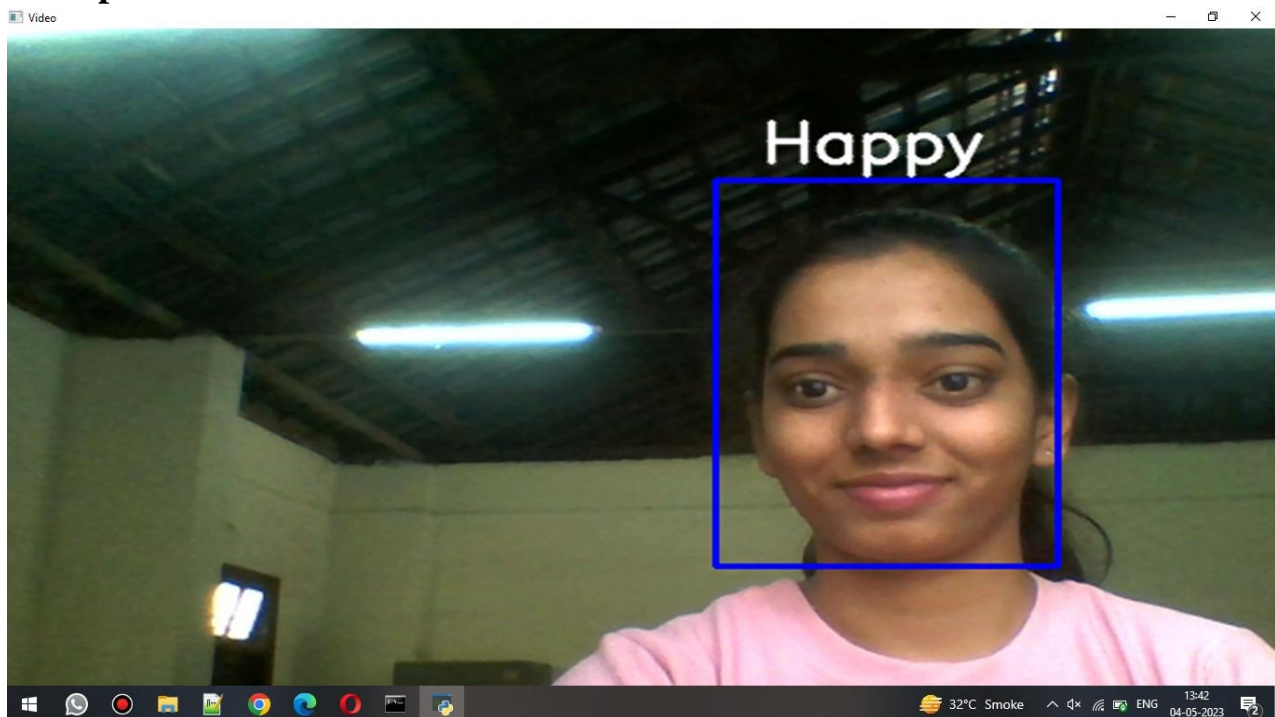## 3.2 OUTPUT SCREEN:

1. DASHBORD

2.Admin Dashboard

3.Output

4.Testing

Software Testing is the process of executing a program or system with the intent of finding errors or it involves any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets its required results.

4.1 Test cases

TEST CASES AND TEST RESULT

Test Case ID	1
Test Case Description	Capturing face emotion
Steps	Open the chatbot and start camera
Test Case Result	Detecting the face emotion
Action Result	Showing emotion sad,happy,etc
Status	Pass

Test Case ID	2
Test Case Description	Asking questions to the user
Steps	Ask random question to the to the user
Test Case Result	Chatbot asks the question
Action Result	Recorded Successfully
Status	Pass

3	
Test Case Description	Getting answer from the user
Steps	User gives the answer
Test Case Description	Chatbot getting the answer
Action Result	Pass
Status	Pass
Test Case ID	4
Test Case Description	Generate report at the end of the conversation
Steps	Chatbot records questions and answers and makes a report
Test Case Result	Report generated successfully
Action Result	Report Generation successful
Status	Pass

5.APPLICATIONS / ADVANTAGES & DI SADVANTAGES

APPLICATIONS:
1. This system is used in commercial and domestic use.
2. For health department to identify the reason of water diseases.

ADVANTAGES:
1   The more the information, the easier it is to make the right decision.
2   The computers keep a track both on the quality and the viability of things
3   Due to automation it will reduce the time to measure the parameter
4   This is economically affordable for common people
5   Low maintenance.

DISADVANTAGES:

1.One potential disadvantage of an emotional mental analysis project is the potential for inaccurate or biased results. Emotions and mental states can be complex and subjective, and there is a risk that the data collected may not accurately reflect the true feelings or experiences of the individuals being studied.

2.Another concern is privacy and confidentiality. Emotional mental analysis projects may require individuals to disclose sensitive information about their mental and emotional health, which could potentially be used against them in some way.

6. CONCLUSION

An image processing and classification method has been implemented in which face images are used to train a dual classifier predictor that predicts the seven basic human emotions given a test image. The predictor is relatively successful at predicting test data from the same dataset used to train the classifiers. We presented our work on text-based emotion classifications using different methods. The advantage of our system is that it is not only based on the single word in the sentence, but it also takes in to the surrounding words and then depicts the result. Moreover it considers users' experiences thanks to the historical data component. Future will consist in comforting the efficiency of the proposed textual emotion deduction modality to existing system. And also to add more emotions other than those features we have used in this paper. The best feature extraction techniques may improve the classification performance.

7. CHALLENGES AND FUTURE SCOPE

Chatbot are not perfect. All automated chatbot systems have limitations that, if not managed, could lead to problems for your business.
One of the major challenges with the use of AI chatbots is security - consumers want to trust that if they share their data with your chatbots, you will only use it to complete their transactions or offer personalized experiences.
chatbot should therefore only ask for relevant data, and it should also have systems in place to protect this data from malicious individuals looking to mishandle or misuse it. These include virus protection, firewalls, and strong passwords.
Another challenge is the ability to make your chatbot likable, or help it understand human emotions - if your chatbot delays or offers unhelpful responses, the customer may leave your website and may never return.
Additionally, if the chatbot fails to understand user emotion, it can lead to horrible customer experiences. But there are also important benefits. To provide more context, check out this infographic, which provides a full overview of the various considerations in developing an effective chatbot, and the pitfalls to avoid.

Challenges:

1.Complexity: There are several opportunities for failure with complex systems.
2. Privacy/Security: Privacy is a big issue with ML. All the data must be encrypted so that data about your status isn't common knowledge at the work place or with your friends.
3. Safety: There is a chance that the software can be hacked and your information misused. The possibilities are endless.
4. Accuracy of the measured value depends on the algorithms used.
5. Required internet connection for real time analyse.

Future Scope:

1. Adding a good looking animated GUI
2. Integrating more advanced features like games, songs, riddles, etc.
3. Scalability to android and website.

8.REFERENCES:

[1] Priya Dwivedi , Face Detection, Recognition and Emotion Detection in 8 lines of code!, towardsdatascience.com, April 3, 2019

[2] Ekman, P. & Keltner, D. (1997). Universal facial expressions of emotion: An old controversy and new findings. In Segerstråle, U. C. & Molnár, P. (Eds.), Nonverbal communication: Where nature meets culture (pp. 27-46). Mahwah, NJ: Lawrence Erlbaum Associates.

[3] Matsumoto, D. & Kupperbusch, C. Idiocentric and allocentric differences in emotional expression, experience, and the coherence between expression and experience. Asian Journal of Social Psychology (4), pp. 113-131 (2001).I.S. Jacobs and C.P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G.T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271-350.

[4] YasminaDouiji and HazarMousanifI-CARE - Intelligent Context Aware system for Recognizing Emotions from text

[5] Agarwal A 2012 Unsupervised Emotion Detection from Text using Semantic and Syntactic Relations IEEE/WIC/ACM International Conference on Web Intelligence and Intelliges