Mood Predictor an IoT Based Robot

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This Report Presented in Partial Fulfillment of the Requirements for the

Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled "**Mood Predictor an IoT Based Robot**", submitted by **Hamidul Hasan, Fatematuz Johra, Partho Sharothi Das and Shafiqul Islam** 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 B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 30th November.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of Tajim Md. Niamat Ullah Akhund, Lecturer, 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 or diploma.

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ABSTRACT

'Mood Predictor IoT Based Robot' is an IoT based project in which a webcam will capture a video. Then it will compare that image with the database. Here we've used the deep face database. We've got this idea from Facebook. In the earlier days, the number of data in the deep face was not very big but nowadays it is increasing day by day because Facebook users are uploading images more and more. It's a kind of facial expression system. We've stored the data by getting the idea from the deep face. Like the deep face, we've stored pictures with some expressions. In our database, we have stored some data like happy, sad, neutral expressions. From the taken image it'll compare whether the image is happy, sad, or neutral. Firstly, it'll compare it with a happy expression if it's true then the system will show the output. If not, it'll compare with sad and again it fails then lastly, it'll compare with neutral. And play song on YouTube depends on mood. We can capture all the information and compare it with all possibilities of human emotion which is stored in our dataset. If no data is matched then it'll show a message like EXIT. Our project is not complicated. There is no contradiction in this project. Corresponding to the expressions it'll show the output.

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CHAPTER 1

Introduction

1.1 Introduction

Facial expression plays a vital role to recognize a person's mood. Its known by all that facial patterns can give us information about the emotional states of a human. People get connected emotionally with others by knowing the state of mind. So, it is very important to detect the mood or emotion of others for our humanity.

On the other hand, we are currently technology dependent. Our technology is growing rapidly. We depend on technology almost every second. Nowadays technology is getting involved with robotics. So, the robots also need to detect the mood for the betterment of the technology area. Many researchers are currently working on mood detection for robots. It can bring a lot of positive changes in IoT. It is very hard to detect emotion. Although they are working on it for the past decades, the result is not sufficient. As facial expressions can express the mood of a person, we're using it as the main tool in our system. So many researchers failed to get an accurate result of mood detection. It is very challenging to detect a mood based on facial expression. As we know that mood can express the emotion of a person, here we'll create an interaction between human and computer.

In this paper, we're attempting to grow such a framework that can identify the temperament of a person. We will create it by utilizing numerous sensors. Here we'll utilize a camera to decide the outward appearance of an individual. From this camera, by identifying face structure, this framework can recognize whether the individual is dismal, cheerful, or typical.

1.2 Motivation

In this world, every person feels depression, pain, anger, happiness. If anything, or any robots can detect this kind of mood by seeing them then this will help us to take our world to the next stage. We can use this mood detecting technology anywhere we want.

We can use this in medical science and other science and non-science department. Mood detection is a completely new thing that can tell us which person is in which mood. We know every person changes their mood depending on the situation. So, we can tell everyone going to take benefits from this project.

1.3 Objective

- To analysis human emotion.
- To upgrade the quality of a robot.
- For making any decision more effective.
- Play music depends on mood.

1.4 Feature

- Can recognize facial temperament demeanor.
- User inviting and dependable application.
- We take 30 second video with camera and then compare it with dataset to detect mood and play music on YouTube depending on the mood.
- It will give a robot an extra feature.

1.5 Social Impact

Mood or emotion whatever we say is always an important thing for humankind. Detecting someone's mood is always a tricky thing for a human to catch. There are many ways that mood detecting makes an impact on our society. We can use the mood detecting robot in the Medical sector, in the Engineering sector and also in the Military sector too. In the medical sector, we can use the mood detecting robot to detect a patient's mood, because sometimes some patients go to depression then we can use this to find out and try to solve the cause of the depression. In a Military sector where all kind of things or information we collect or gather depends on a simple line. Like if we catch a spy in our country and then we are interrogation him then, we can say find out if he is telling truth or false, yeah, we know there is lie detector machine they use but also using the mood detecting robot can simply improve the interrogation. In the event that one

acknowledges the thought that passionate articulations can impact social communications by giving data about what is on the expresser's brain, it follows that feelings can have such impacts paying little mind to how they are communicated, as long as the articulations pass on the significant data. Thus, EASI hypothesis sets that outflows of the very feeling that are transmitted by means of various expressive modalities have practically identical impacts, given that the enthusiastic articulations can be seen by others. Such clear limit conditions aside, EASI hypothesis proposes that the social-flagging estimation of feelings is practically comparable across expressive modalities that the way of the relational impacts of passionate articulations is a similar independent of the expressive channel through which they are produced, as long as the enthusiastic articulation is precisely seen. However other examination included self-reports of feelings or potentially recognitions or coding of enthusiastic articulations as they emerged with regards to continuous social associations.

At last, some distributed reports contain a mix of studies that elaborately composed feeling messages, emojis, pictures of facial showcases, film cuts containing facial, vocal, and postural looks, as well as enthusiastic demeanors, appeared in up close and personal cooperation. At long last, research has indicated that devotees deduce from their chief's appearances of outrage versus bliss that their exhibition is unacceptable versus acceptable, individually. Once more, these impacts were seen across contemplates that zeroed in on various expressive modalities, and no deliberate impacts of expressive methodology arose. As to the «tangible» social results of passionate articulations, research bolsters the thought progressed in EASI hypothesis that conduct reactions to enthusiastic articulations rely upon the general noticeable quality of full of feeling and inferential cycles set off by the enthusiastic articulation. The general prescient estimation of full of feeling and inferential cycles in forming social reactions to passionate articulations is thus molded by the eyewitness' data handling inspiration and capacity and by the apparent suitability of the enthusiastic presentation.

With regards to this thought, concentrates on the social impacts of passionate articulations in the arrangement, cooperative choice creation, administration, and

influence demonstrate that inferential reactions to enthusiastic articulations take on uplifted significance in anticipating conduct reactions to passionate articulations to the extent that spectators are more spurred and ready to take part in intensive data handling, and these impacts sum up across expressive channels. Different examinations demonstrate that full of feeling reactions to enthusiastic articulations become more prescient of social reactions in the arrangement and administration settings to the extent that onlookers are less spurred or ready to take part in careful data handling and additionally see the passionate articulations as more improper. The current writing gives no signs that data preparing or saw propriety vary contingent upon the expressive channel through which a feeling is imparted. To put it plainly, there is no proof of differential impacts of feelings communicated through various expressive modalities.

With regards to their relational impacts, apparently, various channels of enthusiastic correspondence are practically the same, in any event to the extent the heading of their belongings is concerned. It is not necessarily the case that passionate articulations consistently have similar impacts across circumstances. In any case, differential reactions to passionate articulations across social circumstances are better perceived as far as the overall conspicuousness of full of feeling and inferential cycles set off by the articulations than by the expressive channel through which the feeling is radiated. The way to understanding the social impacts of enthusiastic articulations, at that point, lies not in looking at their belongings across expressive modalities yet rather in considering the directing part of data handling and saw propriety.

1.6 Expected Outcome

The outcome of face mood detection project is given bellow: -

- Can detect facial mood expression.

- It suggests music depends on mood.

- User friendly and reliable application.

1.7 Project layout

Pictorial introduction of the undertaking in a straightforward manner with a figure that portrays the entire task, substance, and the sky is the limit from there. The undertaking report contains 5 Chapter. Blueprint of the relative multitude of sections with a short summary is examined beneath through segment portrayal:
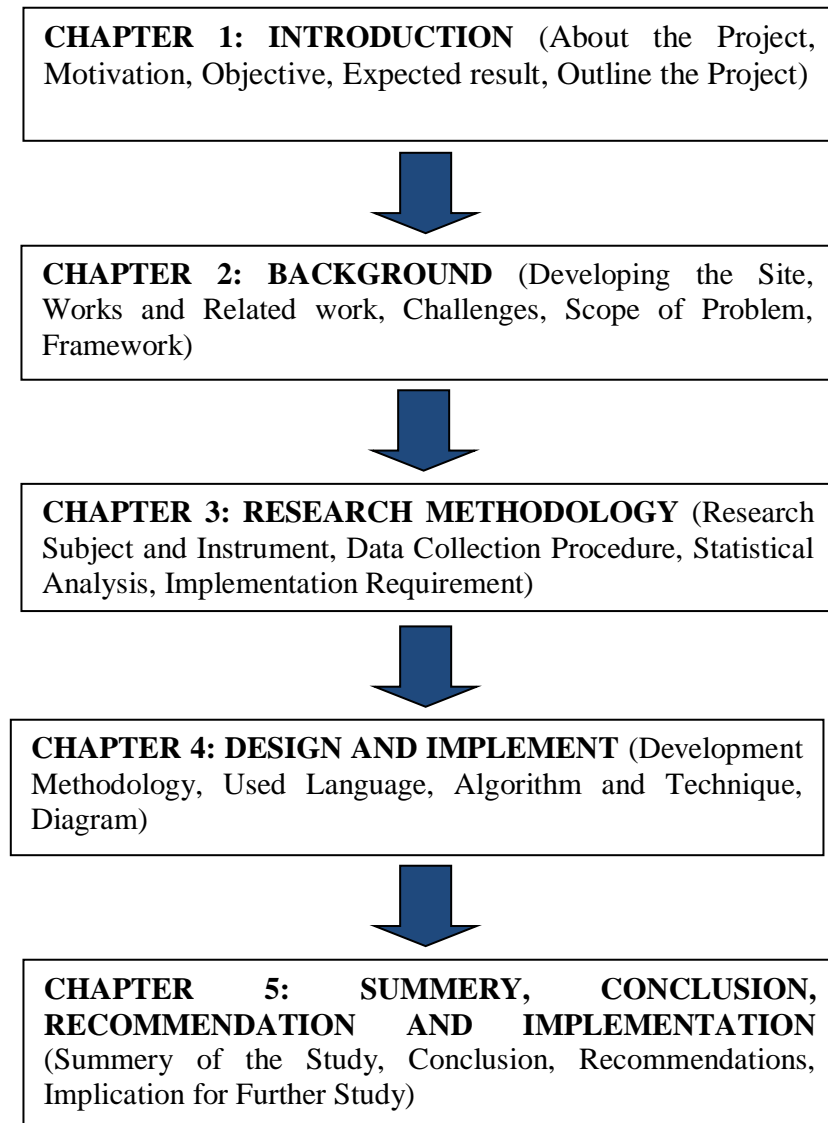
CHAPTER 1: INTRODUCTION (About the Project, Motivation, Objective, Expected result, Outline the Project)

CHAPTER 2: BACKGROUND (Developing the Site, Works and Related work, Challenges, Scope of Problem, Framework)

CHAPTER 3: RESEARCH METHODOLOGY (Research Subject and Instrument, Data Collection Procedure, Statistical Analysis, Implementation Requirement)

CHAPTER 4: DESIGN AND IMPLEMENT (Development Methodology, Used Language, Algorithm and Technique, Diagram)

CHAPTER 5: SUMMERY, CONCLUSION, RECOMMENDATION AND IMPLEMENTATION (Summery of the Study, Conclusion, Recommendations, Implication for Further Study)

Fig 1.1: Outline the project

Chapter 2
Background

2.1 Introduction

Human emotion recognition plays an important role in interpersonal relationships. Emotion says a lot of things that they don't say from the mouth. Emotions are reflected from speech, gestures of the body, and through facial expressions

As we know that today's world is directly or indirectly depends on the computer. But computers don't have any emotion. They can't read the humans mind which is very important. If the computer or robots can understand the feeling of a human mind, it can bring a lot of positive changes in the field of IoT. Nowadays Mood detection is creating big chaos in the technology field. As many researchers and scientists are working on it for act decades. But there is no that level of satisfaction output found till now. If we can successfully develop it, it can bring a big revolution. From this paper, in the end, we can introduce ourselves to some new technologies. In the end, we'll also highlight some survey of our work according to this paper.

As facial expressions are a form of emotion, we can use it to detect the mood. we can use algorithms to identify the structure of the face, for example, the area of eyes, nose, eyebrows, etc. Then we can combine all the parts and detect whether the person is sad, happy, tensed, or normal. And play song on YouTube depends on mood. We can capture all the information and compare it with all possibilities of human emotion which is stored in our dataset.

This mood detection technology can help many sectors like medical, mental health, automation sector, detecting criminals, education. Mood detection is also beneficial for ensuring privacy.

2.2 Related Work

In Mood detection IoT robot, we work with detect the mood of a person. In this project, our robot detects mood and tells us anyone's mood, who are happy, who are sad, and

who are natural. But we saw some mood detect projects such as:

- Automatic mood detection and tracking of music audio signals,

- Automatic mood detection from acoustic music data, etc.

In those projects they work some existing points, these are music, audio signals, but in our project, we work with a human face. We work with image processing, which tells us sadness, the happiness of a person. This paper tells us that the main goal of our project is to detect the mood of the human face using image processing. Our project is also time swallowing according to other projects those are already working in this area. Our project is also not much expensive as we're not using any expensive instruments for the output. We're keeping it as simple as we can do.

2.3 Scope of the Problem

This problem we are finding out:

> Very difficult for face detection in dark mode.
> Camera Sensor works in limited distance for face detection.
> Difficult to mood detection without clear image.
> Difficult to mood detection in multiple people together.
> Sometimes this doesn't match the expectation level.
> Sometimes it gets confused to detect the emotion when the facial expressions aren't properly expressed.

2.4 Challenges

Choosing a hardware-based project and their hardware is very important for developers. At this present time creating a hardware-based project is very difficult for everyone if they don't have any knowledge about programming language. For making a Mood Detection IOT Robot we need to know about the structure and how they work and also, we need proper knowledge in Arduino programming. In this project, we also need to know about machine learning programming because we can't work without it. This project is mainly made for all kind of people but the most suitable place for this is in

medical science. In this paper here include information about the Mood Detection IOT Robot. With this project, we will get the information about the human being emotion and how they work under harsh and another situation.

Chapter 3

Requirement Specification and Methodology

3.1 Introduction

For completing our proposed project successfully, we need to fulfil some requirements which are compulsory to run this project. Here, we'll represent some basic requirements.

3.2 Project research Subject and Instrument

Methodology:

In this section of this paper we are discussing how we use all those needed components and made the "Mood Predictors IOT Robot" project possible to work. We can do this project in many ways. We did this in two ways. In the First way, we use the required hardware and made a perfect hardware system. In the Hardware Part, Raspberry PI and ESP32-Cam Wi-Fi + Bluetooth camera module are the main components to complete the project. But we also need Rechargeable Lithium Battery, Breadboard, and Jumper Wire. In the Hardware section, we are going to take 30 second of video with the ESP32-Cam Wi-Fi + Bluetooth camera module and then we are going to send the video to the Server to compare the face seen in the video with the given face into the dataset. Then after comparing the face or image we will find out the result. After getting the result from the 30 second video we use frequency to know which mood is detected most and with the most detected we are going to show it in our page and then it will automatically open the music player to play a song depend on which mood is detected most, which will be saved in the robot database. Similarly, in the Second way, in which we are making a normal Desktop application for which we don't we need any kind of hardware because we are using the webcam of the Desktop or Laptop. In this desktop application section, we will take the 30 second video with the webcam and compare the face in the video with the dataset. Then after comparing the video's face with the dataset the system will give us the result that if the person or the photo is happy, sad or staying neutral. After getting the result from the 30 second video we use frequency to know which mood is detected most

and with the most detected we are going to show it in our page and then it will automatically open the browser to play a song depend on which mood is detected most. So this is how the system is going to work.

Instrument:

This research venture tells the best way to detect Mood from human face. To make our project we used:

1) ESP32-Cam Wi-Fi + Bluetooth camera module
2) Raspberry Pi 2 Model B – Retired
3) Breadboard
4) Rechargeable Lithium Battery
5) Jumper Wire

3.2.1 ESP32-Cam Wi-Fi + Bluetooth camera module

Fig 3.1: ESP32-Cam Wi-Fi + Bluetooth camera module

Description of ESP32-Cam Wi-Fi + Bluetooth camera module:

The ESP32 CAM Wi-Fi Module Bluetooth with OV2640 Camera Module 2MP For

Face Recognition has an extremely serious little estimated camera module that can work autonomously as a base framework with an impression of just 40 x 27 mm; a profound rest current of up to 6mA and is generally utilized in different IoT applications.

Specifications of ESP32-Cam Wi-Fi + Bluetooth camera module:

The model of the camera module we use for our venture is ESP32-Cam. The Package of this module is DIP-16 and size is 27*40.5*4.5(($\pm$0.2) mm. The SPI Flash of this module is 32Mbit and it additionally has an outside 4M PSRAM and Internal 520KB RAM (Random Access Memory). The module likewise has a 5V Power Supply Range. The Operating Temperature that we get in this module is about - 20 ℃ ~ 85 ℃ and the Storage Environment is - 40 ℃ ~ 90 ℃, < 90%RH. The Bluetooth adaptation for this module is Bluetooth4.2 BR/EDR and furthermore BLE Standards. The Wi-Fi version is 802.11 b/g/n/e/I. The Support TF Cards are UART, SPI, I2C, PWM and there are likewise 9 IO Port for utilizing. The Serial Port Rate is about default 115200 bps and the main thing of this module is the picture and the Image Output Format that we get from this module are JPEG, BMP and GRAYSCALE.

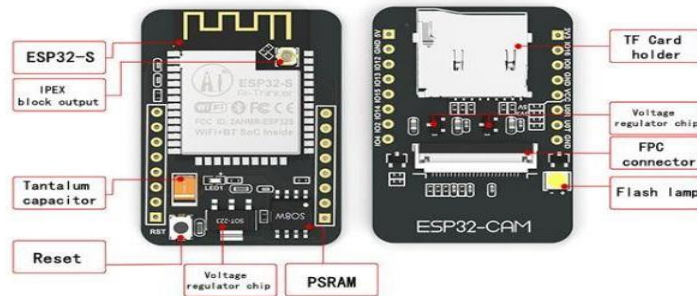## Feature of ESP32-Cam Wi-Fi + Bluetooth camera module:

- Onboard ESP32-S module, upholds Wi-Fi + Bluetooth
- OV2640 camera with streak
- Onboard TF card opening, underpins up to 4G TF card for information stockpiling
- Supports Wi-Fi video checking and Wi-Fi picture transfer
- Supports multi rest modes, profound rest current as low as 6mA
- Control interface is open by means of pin header, simple to be coordinated and inserted into client items.

Application of ESP32-Cam Wi-Fi + Bluetooth camera module:
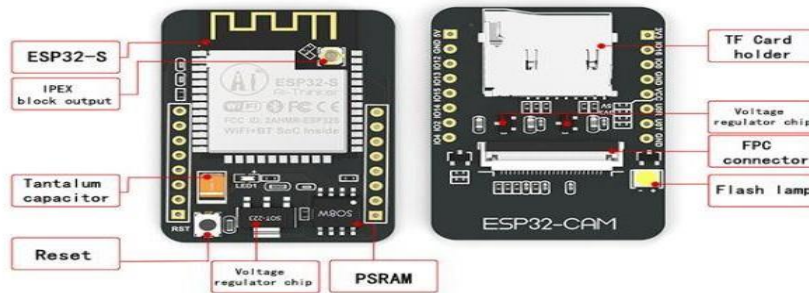
The ESP32-CAM suit for IOT applications such as:

- Smart home gadgets picture transfer
- Wireless observing
- Intelligent farming
- QR remote distinguishing proof
- Facial acknowledgement

Board of ESP32-Cam Wi-Fi + Bluetooth camera module:

Pinouts of ESP32-Cam Wi-Fi + Bluetooth camera module:

3.2.2 Raspberry Pi 2 Model B

Fig 3.2 Raspberry Pi 2 Model B

Description:

The Raspberry Pi is a MasterCard assessed PC. The Raspberry Pi 2 Model B is the second time of Raspberry Pi. The Raspberry Pi was arranged by the Raspberry Pi Foundation to give a sensible stage to experimentation and tutoring in PC programming. The Raspberry Pi can be used for an enormous number of the things that a commonplace work zone PC does, including word-taking care of, accounting pages, first rate video, games, and programming. The Raspberry Pi 2 Model B has a comparable structure factor and connector zones as the more settled Raspberry Pi Model B+ and the more current Raspberry Pi 3 Model B. It has an ARMv7 processor, which surmises it can run the full degree of ARM GNU/Linux scatterings, including Snappy Ubuntu Core, comparatively as Microsoft Windows 10.

Features:

The Features of the Raspberry Pi 2 Model B is given below:

- Broadcom BCM2837Arm7 Quad-Core Processor fueled Single Board Computer running at 900MHz.
- 1GB RAM so you would now be able to run greater and all the more remarkable applications.
- Indistinguishable board format and impression as the Model B+, so all cases and outsider extra sheets intended for the Model B+ will be completely viable.
- Completely HAT viable.
- 40pin stretched out GPIO to improve your "genuine world" ventures. GPIO is 100% viable with the Model B+ and A+ sheets. Initial 26 pins are indistinguishable from the Model an and Model B sheets to give full in reverse similarity over all sheets.
- Associate a Raspberry Pi camera and contact screen show (each sold independently).
- Transfer and watch Hi-definition video yield at 1080P.
- Miniature SD space for putting away data and stacking your working frameworks.
- Progressed power the board.
- You would now be able to give up to 1.2 AMP to the USB port – empowering you to associate more eager for power USB gadgets straightforwardly to the Raspberry Pi. (This component requires a 2Amp miniature USB Power Supply).
- 10/100 Ethernet Port to rapidly interface the Raspberry Pi to the Internet.
- Consolidated 4-post jack for interfacing your sound system sound out and composite video out.

Specification:

Three years after the dispatch of the primary Raspberry Pi, second-age equipment will go discounted today at the equivalent $35 cost while offering significantly more force.

The philanthropic Raspberry Pi Foundation has sold 4.5 million of the little PCs. «It's a couple of more than we expected, » Raspberry Pi maker Eben Upton told Ars.

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Raspberry Pi 2 acquires its «2» with moves up to the CPU and memory. The GPU is unaltered.

The new Pi has a quad-center processor that runs at 900MHz, contrasted with a solitary center CPU that ran at 700MHz in the original. The new Pi will have 1GB of RAM, twofold the past form. You'll have the option to discover connections to merchants selling the new Pi at the Raspberry Pi site.

The Specification of Raspberry Pi 2 Model B is given below:

The 2nd Gen Raspberry model B use the Broadcom BCM2836 Arm7 Quad Core Processor controlled Single Board Computer running at 900MHz and also have a 1GB RAM so it would now have the option to run more prominent and even more amazing applications. The Indistinguishable board arrangement and impression as the Model B+, so all cases and untouchable additional sheets planned for the Model B+ will be totally suitable. The Raspberry Pi 2 Model B is completely HAT practical. It's associated a Raspberry Pi camera and contact screen show. We can Transfer and watch Hi-definition video yield at 1080P in the Raspberry Pi 2 Model B. The Raspberry Pi 2 has a miniature SD opening for taking care of information and stacking in working structures and progressed power the heads. The 10/100 Ethernet Port to quickly relate the Raspberry Pi to the Internet. There are Joined 4-post jack for interfacing sound framework sound out and composite video out.

The flexibly chain has improved, with the capacity to fabricate a large number seven days, generally at a Sony plant in Wales, Upton told Ars. Upton hopes for something else than 100,000 to be prepared for the present at a bargain date. The more prominent CPU force and memory in Raspberry Pi 2 will definitely fuel more imaginative activities. Upton thinks the freshest Pi will be quick enough to use as an essential personal computer.

Microsoft will have substantially more to share over the coming months, Upton composed today. The Raspberry Pi 2-viable form of Windows 10 will be accessible gratis to makers. The rendition of Ubuntu accessible for the Pi is Snappy Ubuntu Core. This rendition focused at engineers and cloud organizations doesn't have a work area interface.

3.2.3 Rechargeable Lithium Battery:

Fig 3.3: Rechargeable Lithium Battery

Specifications of Rechargeable Lithium Battery:

It is a 14500-model battery-powered Lithium battery. The limit of this battery is 1200mah and the Nominal Voltage is 3.7v. There are numerous shades of this battery however we pick the blue one. The Weight of this battery is about 17g. It is additionally a battery-powered battery and the time it takes to battery-powered is up to multiple times. The Size of this one is about 50mm x 14mm in width and it's delivered in the Mainland of China.

Description about Rechargeable Lithium Battery:

A lithium-particle battery is such a battery-filled battery. Lithium-atom batteries are ordinarily utilized for adaptable hardware and electric vehicles and are filling in standing for military and flight applications. Investigation domains for lithium-molecule batteries consolidate widening lifetime, extending energy thickness, improving prosperity, decreasing expense, and accelerating, among others. The assessment has been in advancement in the region of non-ignitable electrolytes as a pathway to extended prosperity subject to the instability and unsteadiness of the characteristic solvents utilized in the regular electrolyte.

Most of the Li-Ion batteries share a same comparative plan comprising of a metal oxide positive terminal (cathode) covered onto an aluminum current gatherer, a negative cathode (anode) produced using carbon/graphite covered on a copper current authority, a

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separator and electrolyte made of lithium salt in a natural dissolvable. While the battery is releasing and giving an electric flow, the electrolyte conveys decidedly charged lithium particles from the anode to the cathode and the other way around through the separator. The development of the lithium particles makes free electrons in the anode which makes a charge at the positive current gatherer. The electrical flow at that point streams from the flow authority through a gadget being fueled to the negative flow gatherer. During charging, an outer electrical force source applies an over-voltage, driving a charging flow to stream inside the battery from the positive to the negative anode, and also the opposite way of a release current under typical conditions. On the other hand, optional sorts can be revived utilizing an outer electric charger. Today, most consideration is given to auxiliary sorts, especially Li-particle batteries, in light of their inescapable application in mobile phones and electric vehicles. Antacid is the most well-known essential battery science, while lithium-metal is utilized for heavier burdens.

The basic battery unit, as portrayed in 'How does a lithium-particle battery work?' above, is known as a battery cell. Taking everything into account, battery cells are related in game plan and equivalent, into an alleged battery pack, to achieve the ideal voltage and energy limit. The pack contains battery cells, programming and regularly a cooling and warming system, dependent upon where and how the battery pack is to be used.

3.2.4 Bread board

A Breadboard is a rectangular plastic board with a lot of little openings in it. These openings let you effectively embed electronic segments to model an electronic circuit, similar to this one with a battery, switch, resistor, and a LED. Plastic Body for diminished static, suitable for CMOS contraptions. Pins are planned for various incorporations and will withstand generous use. All pins are conspicuous.

Features:

The Bread-Board is used for quick circuit testing and modeling. It has 840 Contact Points and also for suitable for most IC's and standard 0.1" Spacing. W We can understand the Positive and Negative Power Rails on Top and Bottom. Here the Bread-Board we are

using is the medium-sized breadboard with around 320 tie focuses. It's 2.2″ x 3.4″ (5.5 cm x 8.5 cm) with two force rails on the two sides.
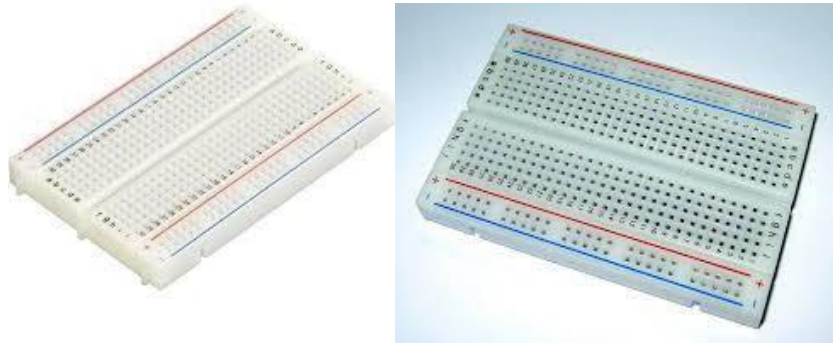

Fig 3.4: Bread board

A modest plastic board used to hold electronic parts (semiconductors, resistors, chips, etc.) that are wired together. Used to make models of electronic circuits, breadboards can be reused for future positions.

3.2.5 Jumper Wire

Jumper wires are basically wiring that has connector pins at each end, allowing them to be used to relate two concentrations to each other without affixing Jumper wires are consistently used with breadboards and other prototyping instruments to make it easy to change a circuit fluctuating.

Fig 3.5: Jumper Wire

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Jumper wires typically come in three versions:

- Male-to-Male.
- Male-to-Female.
- Female-to-Female.

The differentiation between each is in the endpoint of the wire. Male completions have a pin anticipating and can plug into things, while female terminations don't and are used to plug things into. Male-to-male jumper wires are the most broadly perceived and what you presumably will use routinely. While partner two ports on a breadboard, a male-to-male wire is what you'll require.

3.3 Implementation Requirements for Application:
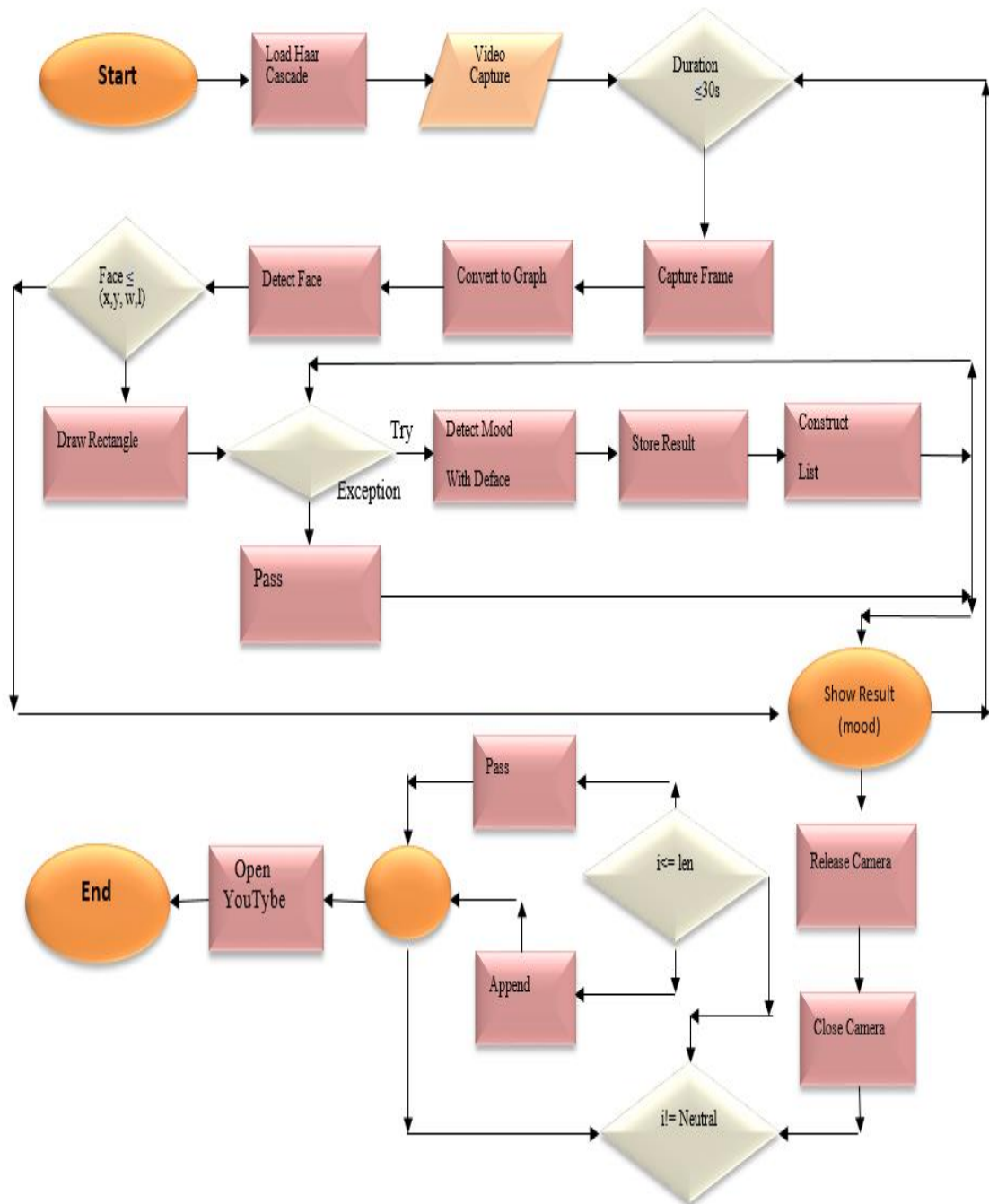
Fig 3.6: Flow Chart Diagram for Desktop Application
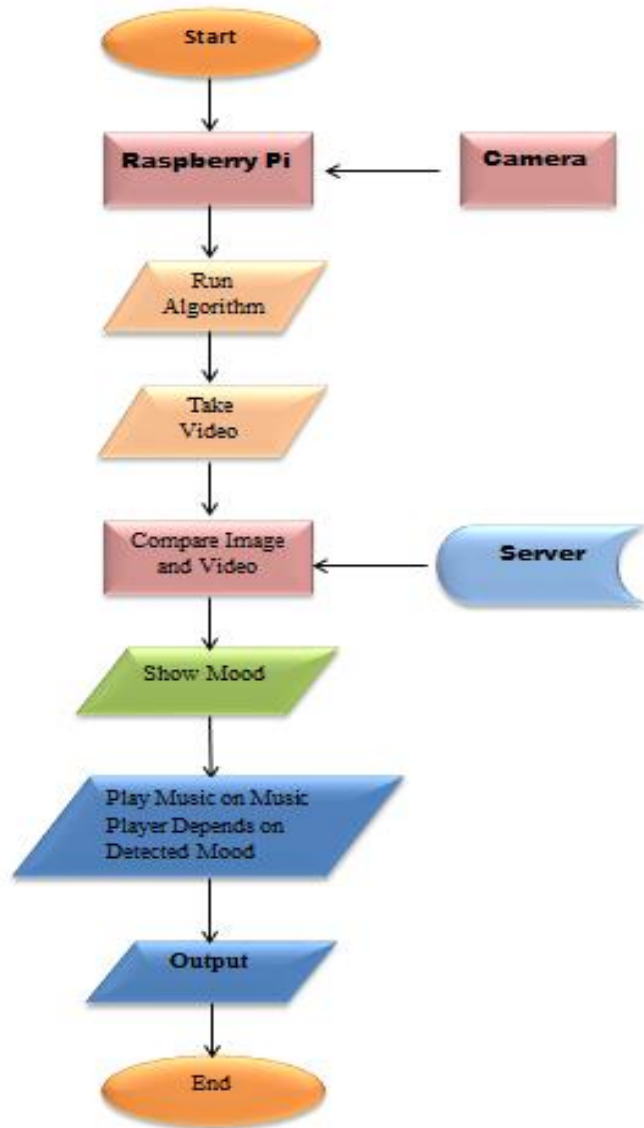
Fig 3.7: Flow Chart Diagram for Hardware

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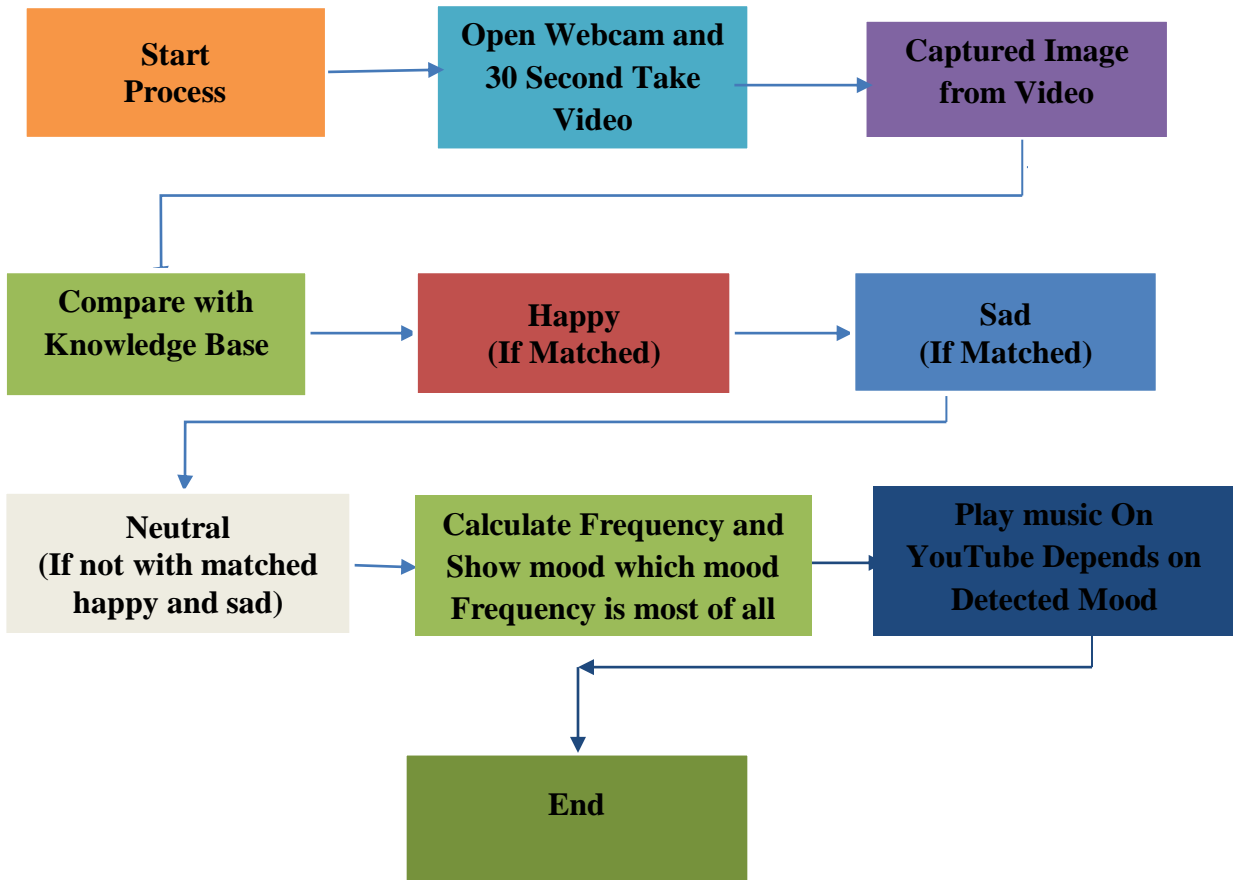
Fig 3.8: Block Diagram

3.3 Algorithm:

```python
from tkinter import *
import tkinter.font as tkFont
import cv2
from deepface import DeepFace
import time
FUNCTION emoDecider(st1):
    frequency=[]
    for j in st1:
        count=0
        for i in st1:
            IF i==j:
                count=count+1
            ENDIF
        ENDFOR
        frequency.append(count)
    ENDFOR
    OUTPUT frequency
    for l in range(0,len(frequency)):
        IF frequency[l]==max(frequency):
            emoIndex=l
        ENDIF
    ENDFOR
    RETURN emoIndex
ENDFUNCTION

FUNCTION run():
    face_cascade=
cv2.CascadeClassifier('haarcascade_frontalface_default.xml')
                                ENDIF

ENDFUNCTION

    t_end=time.time()+(60*0.5)
    emotionList=[]
    cap <- cv2.VideoCapture(0)
    while time.time()<=t_end:
        _,img=cap.read()
        gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
        faces=face_cascade.detectMultiScale(gray,1.1,4)
        for(x,y,w,h) in faces:
            cv2.rectangle(img,(x,y),(x+w,y+h),(255,0,0),2)
            try:
                result=DeepFace.analyze(img, actions = ['emotion'])
                text2=result['dominant_emotion'].upper()
                emotionList.append(str(text2))
            except:
                pass
            font <- cv2.FONT_HERSHEY_SIMPLEX
            cv2.putText(img,text2,
                        (40,180),
                        font,1,
                        (255,255,255),
```

```
                          2,cv2.LINE_4);
        ENDFOR
        cv2.imshow('img',img)
        k=cv2.waitKey(30) & 0xff
        IF k==27:
            break
        ENDIF
    ENDWHILE
    cap.release()
    cv2.destroyAllWindows ()
    finalLI=[]
    for i in emotionList:
        IF i !='NEUTRAL':
            finalLI.append(i)
        ENDIF
    ENDFOR
    OUTPUT finalLI
    msg1=f"The Person is {finalLI[emoDecider(finalLI)]}"
    test_h_text5= Label(text = msg1,font=fontStyle1)
    test_h_text5.place(x=290,y=350)
    msg2="Opening Youtube............."
    test_h_text6= Label(text = msg2,font=fontStyle1)
    test_h_text6.place(x=290,y=450)
    import pywhatkit
    pywhatkit.playonyt(finalLI[emoDecider(finalLI)])
ENDFUNCTION

screen <- Tk()
screen.title("Face Emotion Detection with WebCam ")
screen.geometry("800x550")
fontStyle <- tkFont.Font(family="Lucida Grande", size=30)
fontStyle_result <- tkFont.Font(family="Lucida Grande", size=30)
welcome_text <- Label(text <- "Mood Detector", fg <- "white", bg <-
"black", font=fontStyle)
welcome_text.pack()
fontStyle1=tkFont.Font(family="Lucida Grande", size=16)
test_h_text= Label(text = "After The Click Wait for a while to Initiate
the camera",font=fontStyle1)
                                                ENDWHILE
                                        ENDFOR
test_h_text.place(x=120,y=80)
msg="Note that before click You must keep your camera open\n IF you use
an external camera,if it's built in camera. Don't worry that "
                                                ENDIF
                ENDFOR
test_h_text1= Label(text = msg,font=fontStyle1)
test_h_text1.place(x=120,y=150)
click <- Button(text <- "Click Here", fg <- "blue", bg <-
"grey",font=fontStyle1, command = run,)
click.place(x=350, y=260)
mainloop(
```

3.5 About Library Function:

Our project has been developed by python. Regarding mood detection we use some library function these are:

1. Tensor flow.
2. Open cv
3. Face case cade (Single Person).
4. Deep face.
5. matplotlib.
6. PiL
7. pywhatkit

OpenCV:

OpenCV is an open-source PC vision and AI programming library. OpenCV was attempted to give a commonplace establishment to PC vision applications and to revive the use of machine wisdom in business things. These counts are frequently used to perceive and get faces, see objects, group human exercises in accounts, track camera improvements, track moving articles, loosen up 3D models of things, divert out 3D clarification clouds from sound framework cameras, append photographs along to shape a tremendous standard picture of a whole scene, notice near photographs from a picture information base, dispose of red eyes from photographs taken using streak, follow eye degrees of progress, get examined and make markers to overlay it with swollen reality, by then forward OpenCV has in the path more than 47 thousand individuals of purchaser affiliation and evaluated the degree of downloads defeating eighteen million. The library is utilized broadly in affiliations, evaluation get-togethers, and by conclusive bodies. It has C++, Python, Java, and MATLAB interfaces and supports Windows, Linux, humanoid and waterproof OS. OpenCV slants generally towards predictable vision applications and encounters MMX and compass point direction once available. A full-included CUDA and OpenCL interfaces zone unit by and huge successfully developed as of now.

DeepFace:

DeepFace is a lightweight face affirmation and facial property assessment (age, sexual direction, feeling, and race) framework for python. It is a crossbreed face affirmation structure enclosing best by class models: VGG-Face, Google Face Net, OpenFace, Facebook DeepFace, DeepID, and Dlib. DeepFace is a significant learning facial affirmation system made by an assessment pack on Facebook. It perceives human appearances in cutting edge pictures. It uses a nine-layer neural association with in excess of 120 million affiliation stacks and was set up on 4,000,000 pictures moved by Facebook customers.

PiL:

Python Imaging Library (abridged as PIL) (in fresher renditions known as Pillow) is a free and open-source extra library for the Python programming language that adds uphold for opening, controlling, and sparing a wide range of picture record designs. Pad is a picture handling library that has been forked from PIL (Python Image Library) that improvement has been halted. Albeit progressed picture handling (face acknowledgment, optical stream, and so forth) like OpenCV cannot be performed, straightforward picture preparing, for example, resizing (scaling), pivot, and managing (halfway pattern) can be performed

Matplotlib:

Matplotlib is an exhaustive library for making static, empowered, and smart portrayals in Python.Matplotlib makes straightforward things basic and hard things possible.
Matplotlib is a plotting library for the Python programming language and its numerical number juggling extension NumPy. It gives an article arranged API to embedding's plots into applications using an all-around valuable GUI tool compartment.
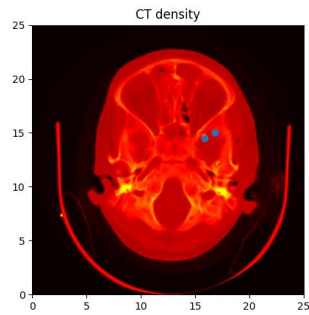
Example of using imshow() to display a CT scan

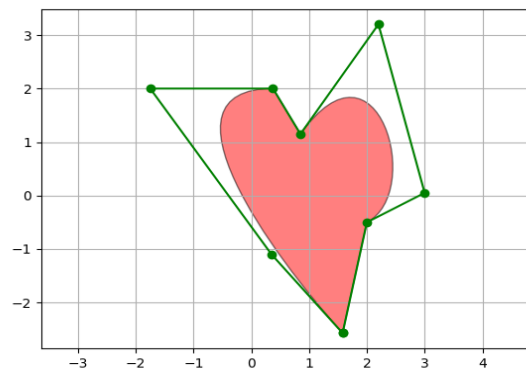**Paths:** You can add arbitrary paths in Matplotlib using the matplotlib.path module:

Fig 3.4.1: Path Patch

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Face cascade:

Article Detection utilizing Haar include-based course classifiers is something weighty ID strategy proposed by Paul Viola and Michael Jones in their paper, Fast Object Detection utilizing a Boosted Cascade of Simple Features» in 2001. Here we will work with the face territory. From the beginning, the assessment needs a ton of positive and negative to set up the classifier. For this, the haar highlights that appeared in the under picture are utilized
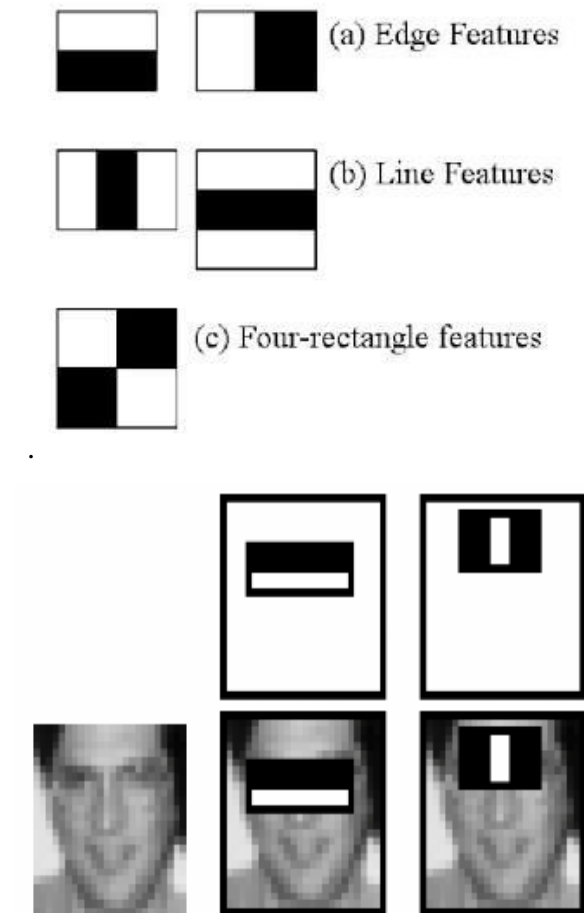
Fig3.4.2: Face Cascade

After using the Face cascade, the results look like the below image.
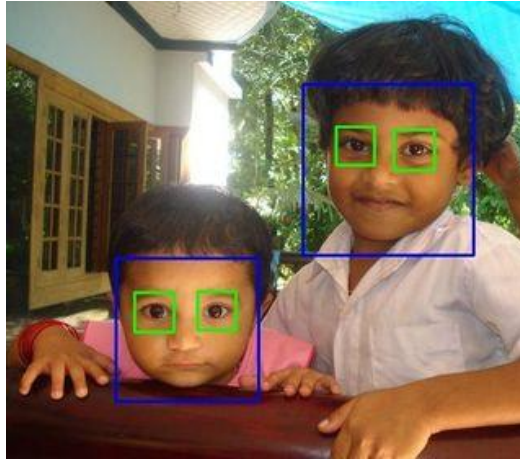
Fig 3.4.3: Face Cascade Result

Tensor Flow:

Tensor Flow is a free and open-source programming library for AI. It will in general be used across an extent of tasks yet has a particular focus on planning and derivation of significant neural associations. Tensorflow is an agent mathematical library subject to dataflow and differentiable programming.

Tensor Flow is Google Brain's second-age system. Structure 1.0.0 was conveyed on February 11, 2017. While the reference execution runs on single contraptions, TensorFlow can run on different CPUs and GPUs (with optional CUDA and SYCL enlargements for all-around valuable enlisting on representations taking care of units). TensorFlow is available on 64-digit Linux, macOS, Windows, and flexible enlisting stages including Android and iOS. Its versatile plan mulls over the basic association of count across an arrangement of stages (CPUs, GPUs, TPUs), and from work regions to lots of laborers to flexible and edge devices. TensorFlow computations are imparted as stateful dataflow outlines. The name TensorFlow gets from the exercises that such neural associations perform on multidimensional data displays, which are insinuated as tensors. During the Google I/O Conference in June 2016, Jeff Dean communicated that 1,500 chronicles on GitHub referred to TensorFlow, of which only 5 were from Google. Kubeflow licenses the action and association of TensorFlow on Kubernetes. In March 2018, Google detailed TensorFlow.js variation 1.0 for AI in JavaScript. In Jan 2019,

Google revealed TensorFlow 2.0. It ended up being definitively available in Sep 2019. In May 2019, Google announced TensorFlow Graphics for significant learning in PC plans.

pywhatkit: Python offers various inbuilt libraries to facilitate our work. Among them pywhatkit is a Python library for sending WhatsApp messages at a specific time, it has a few different highlights as well.

Following are a few highlights of pywhatkit module:

1.Send WhatsApp messages.

2.Play a YouTube video.

3.Play out a Google Search.

4.Get data on a specific subject.

In Python3 pywhatkit module will not come pre-installed, so you can install it by using the command:

pip install image:-

```
pip install pywhatkit
```

1. Send Whatsapp Messages:

Here, we will gain proficiency with the most straightforward method of utilizing pywhatkit module which uses the WhatsApp page to computerize messages shipping off any number on WhatsApp. However, ensure that you have signed into your WhatsApp in your program.

```
try:
 result=DeepFace.analyze(img, actions = ['emotion'])
 text2=result['dominant_emotion'].upper()
```

```
    emotionList.append(str(text2))
  except:
      print("An Unexpected Error!")
```

2. Play a YouTube video:

Function pywhatkit.playonyt(), opens the YouTube in your default program and plays the video you referenced in the capacity. In the event that you pass the theme name as a boundary, it plays an arbitrary video on that point. On passing the URL of the video as the boundary, it opens that definite video

```
# importing the module
import pywhatkit

# using Exception Handling
# to avoid exceptions
try:
  # it plays a random YouTube
  # video of based on Emotion
  pywhatkit.playonyt("Happy Song")
  print("Opening Youtube...")

except:
  # printing the error message
  print("Network Error Occured")
```

Ou

tput:
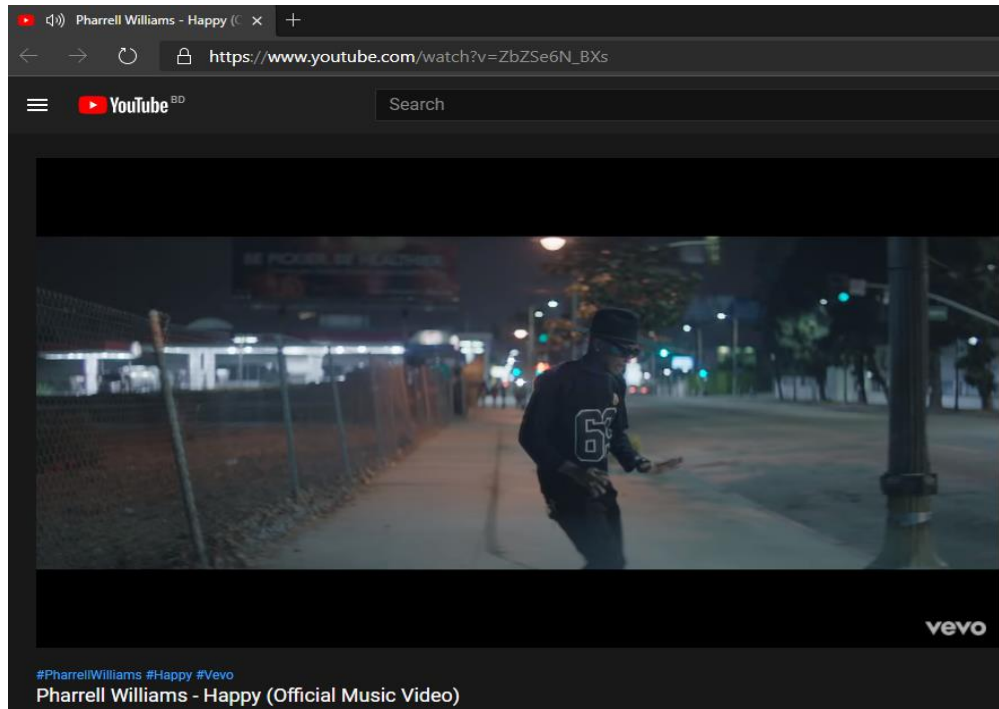
3. Perform Google Search:

You can play out a Google search utilizing the accompanying basic order. It opens your program and looks for the subject you have given in your code.

```
# importing the module
import pywhatkit
# use Try Except to
# handle the Exceptions
try:
  # it will perform the Google search
  pywhatkit.search("Mood Detection")
  print("Searching...")
except:
```

Printing Error Message

print("An unknown error occured")

Output:
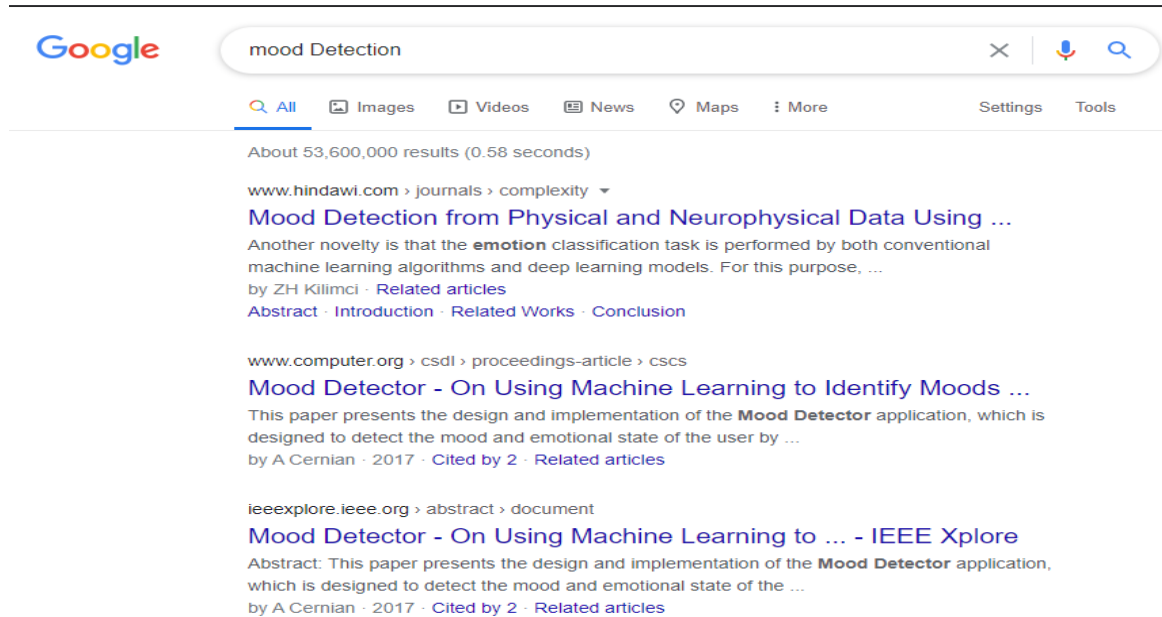
4. Get information on particular topic:

We can get brief data on a specific theme. We can likewise restrict the quantity of lines to be printed. Likewise, ensure that you are looking for the subjects that are accessible on Wikipedia.

Chapter 4
Result and Output

4.1 Introduction

In this section, we will portray the plan particular and Output. For an application, front-end configuration is the main thing, in light of the fact that from the outset, a large portion of the client gets pulled in by watching the front-finish of an application. Front-end configuration is fundamental for better client administration for our application and we center around it. Back-end configuration is likewise the main thing for putting away information or data.

4.2 Front-end Design

Some front-end designs of the project are given bellow.

4.2.1 Home Page

Figure 4.2.1 shows the home page.
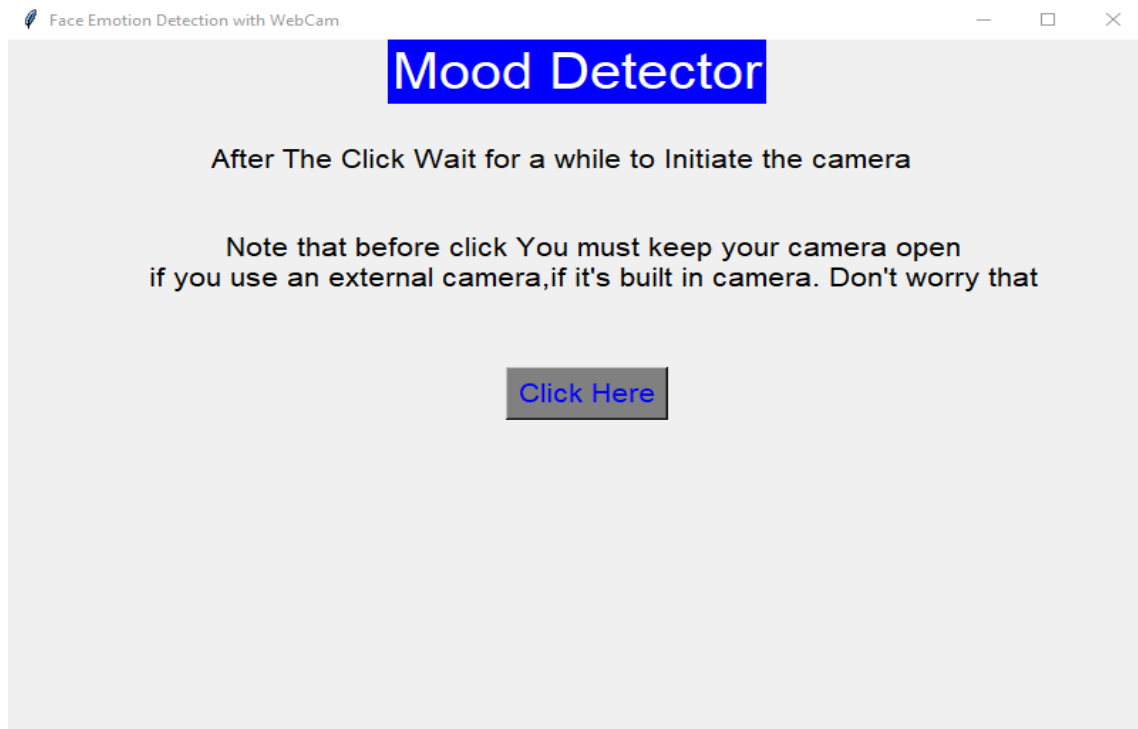
Fig 4.2.1: Home Page

At the point when the client opens the application, the client can see the landing page of the application. In the base piece of the landing, the page client can see a "Click Here" button. In the event that the client is intrigued to go to the following stage, client need to click "Click Here" button. By clicking the "Click Here" button client will be ready to enter the following stage.

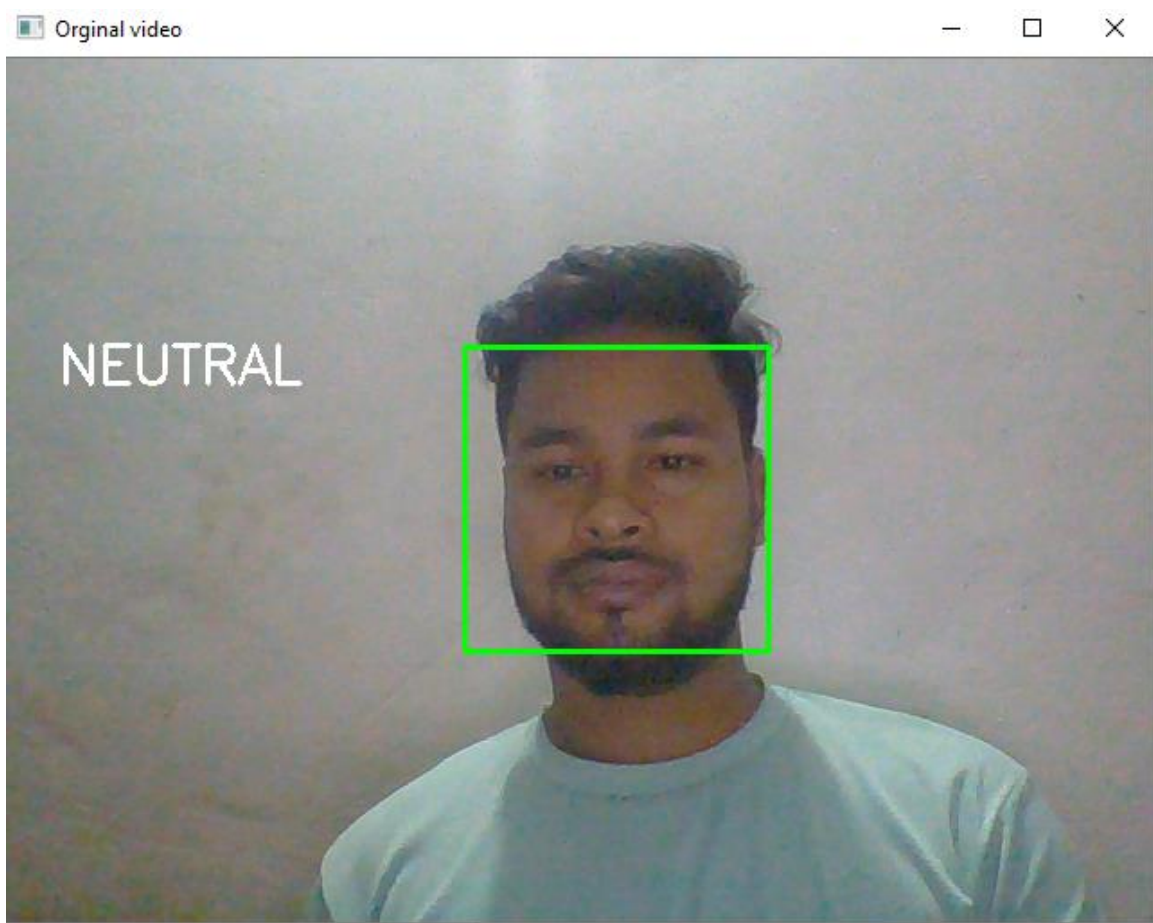## 4.3 Output

Figure 4.3.1 shows the final result of an output.

Fig 4.3.1: Output

Based on user's facial expression or image the system will show the mood of the user.

4.4 Result

After performing the system, the founded results are given bellow.
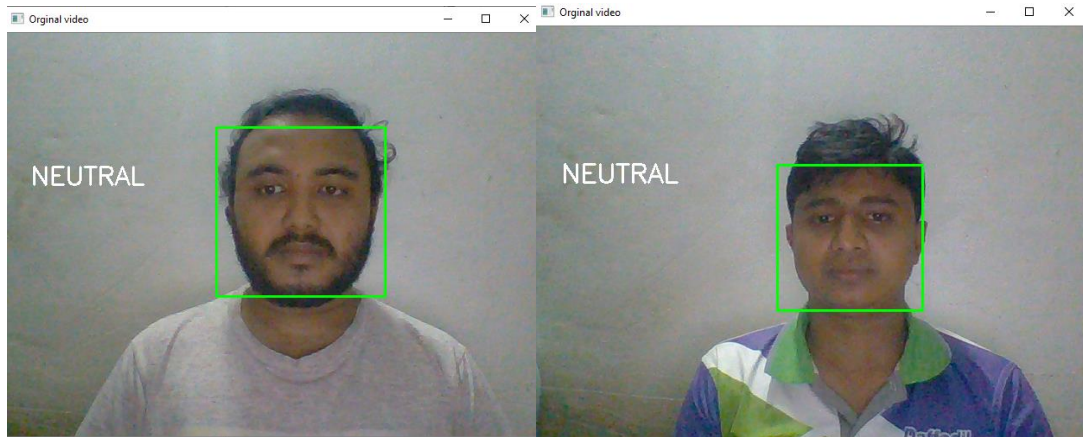
Fig 4.4.1: Neutral Mood

Figure 4.4.1 shows the output of "Neutral" facial mood expression.
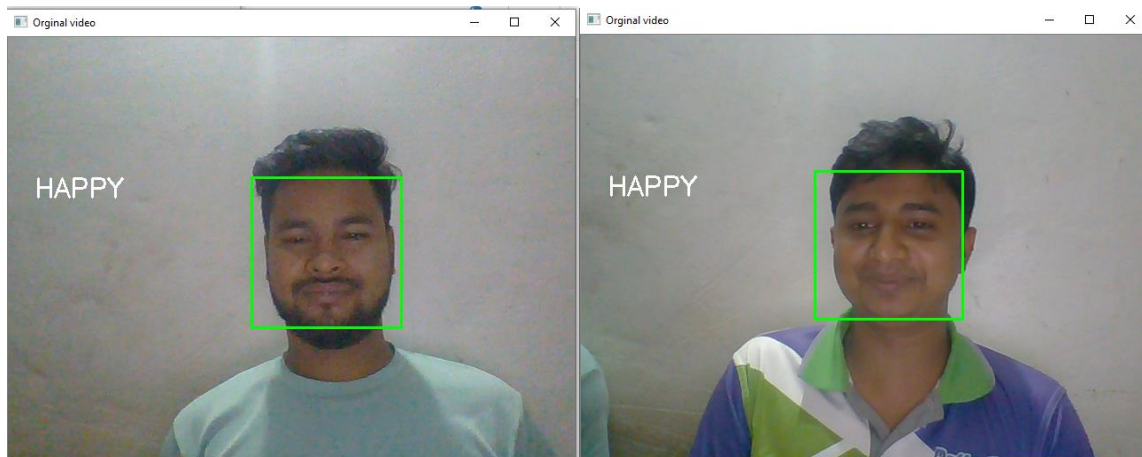

Fig 4.4.2: Happy Mood

Figure 4.4.2 shows the output of "Happy" facial mood expression.
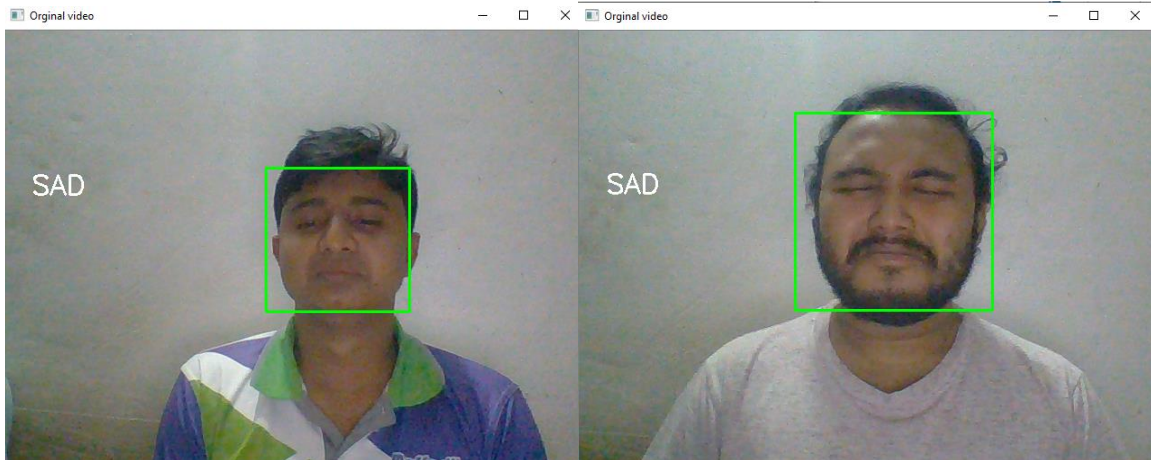
Fig 4.4.3: Sad Mood

Figure 4.4.3 shows the output of "Sad" facial mood expression.

Fig 4.4.4: Finding the Frequency of the Mood

So, after receiving the 30 second video using laptop webcam, we use TensorFlow backend so we can the frequency of Mood from the 30 second video. Using this we can understand which mood is most. In the given Fig 4.4.4 we can see that; Sad face only comes 5 times that's why Sad mood is written 5 and Happy mood comes 22 times that why it's showing 22. So, for that we can say that Happy mood is most in the Fig 4.4.4.
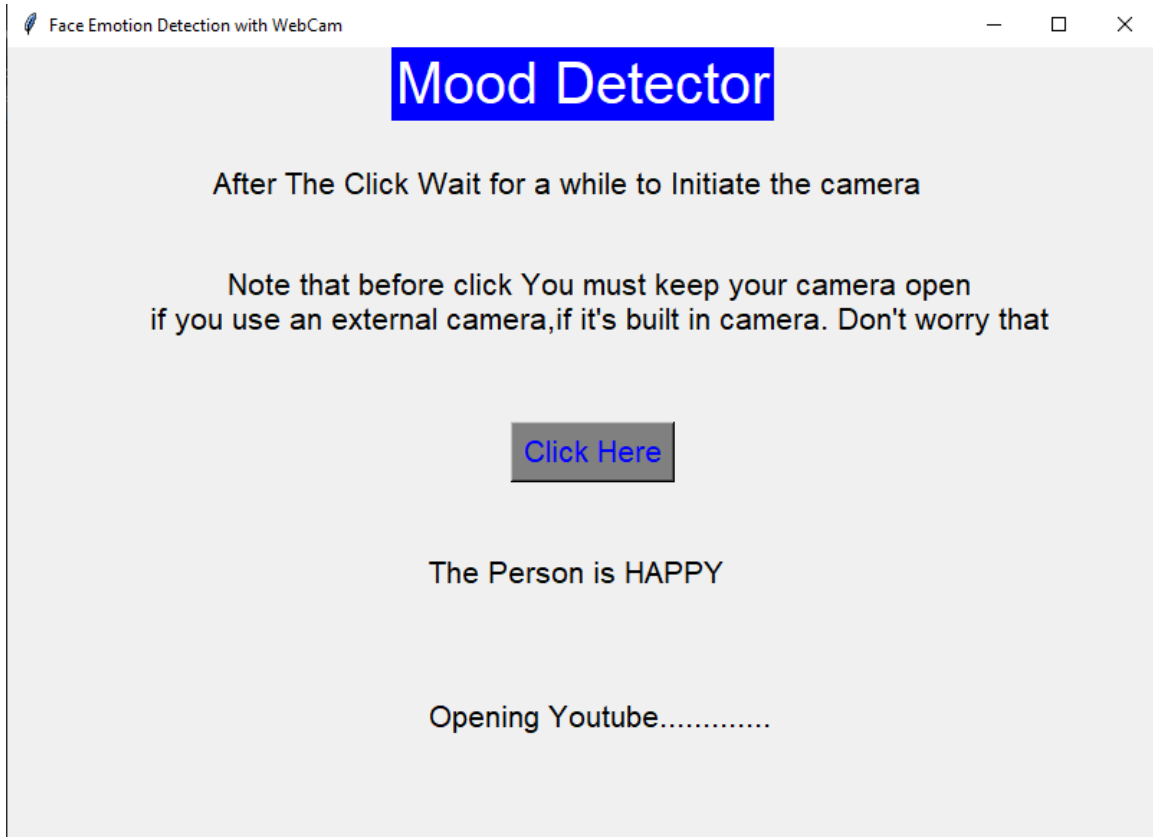
©Daffodil International University

Fig 4.4.5: Opening YouTube in Brower

In Fig 4.4.5 it's going to open YouTube in browser and this the front page before opening the browser. Here the mood is Happy because in Fig 4.4.4, we find out that the Happy Mood comes most times, that's why the application will open a happy song in the browser.
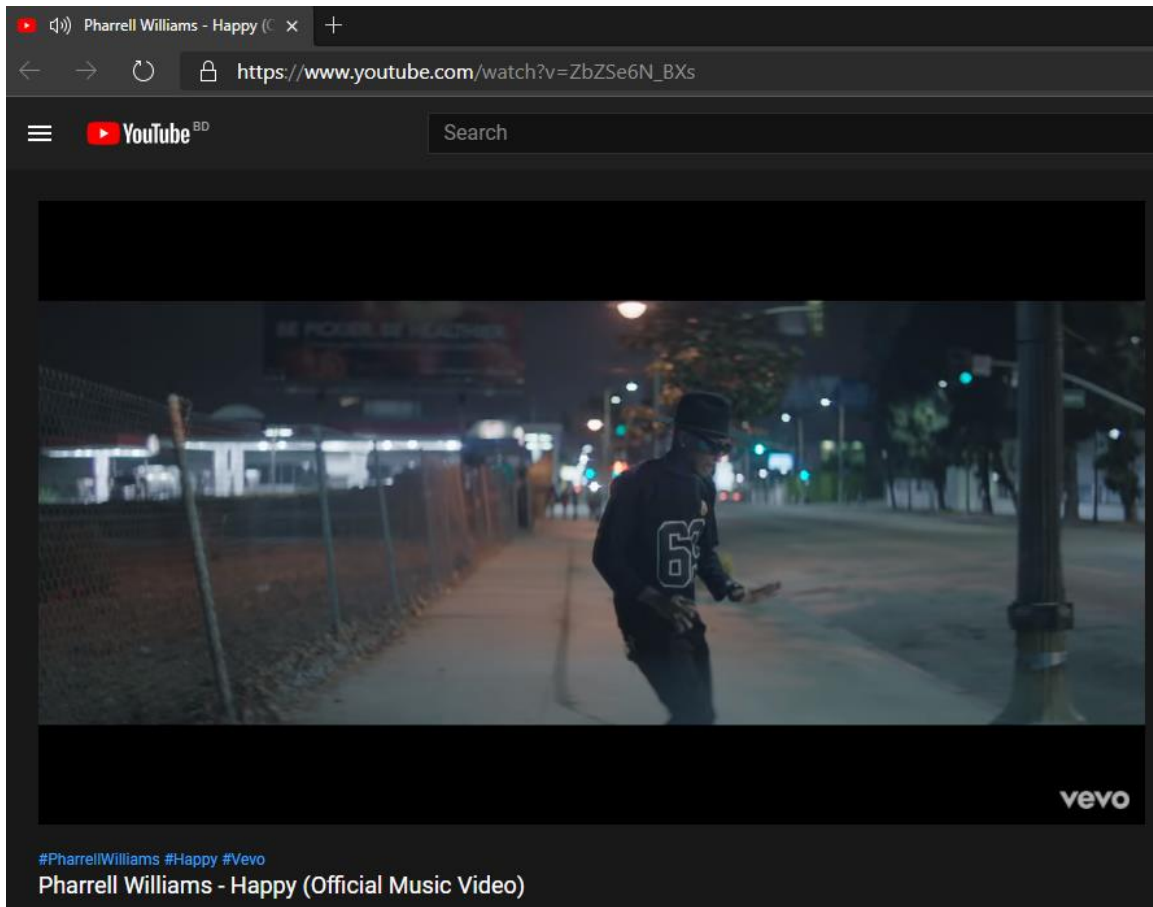
Fig 4.4.6: Browsing and Playing Happy Song

After opening the Browser, the application will play a song Depends the Mood.

Chapter 5
Conclusion

5.1 Conclusion

We have effectively finished our work and the following are the yields. Those are accessible in the current framework. The framework accordingly targets furnishing the android client with a less expensive free and easy to understand precise-feeling discovery framework, which is truly useful to the clients. For changing the mind-set framework our applications are truly useful. The principal bit of leeway of our applications is to recognize precise human feelings and furthermore recommend music and jokes for changing their state of mind.

5.2 Future Work

In future we are planning to add many important features in this project and I think those features are going to play important in a human life. So, our future work plan is given below:

- In future we are planning to made this as a "Mood Predictor an IoT based Robot".
- The future extension in the framework would to plan an instrument that would be programmed playing music or recordings dependent on the human facial disposition. This framework would be likewise useful in music treatment and give the music specialist the assistance expected to treat the patients experiencing messes like mental pressure, tension, intense gloom, and injury.
- We will try to improve the security of this project.

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