**1.Original Image Program**

import cv2 as cv

imgFile = cv.imread(baby.jpg')

cv.imshow('babyoriginal', imgFile)

cv.waitKey(0)

cv.destroyAllWindows()

**2.Gray Image Program**

import numpy as np

import cv2

img = cv2.imread('baby.jpg',0)

cv2.imshow('image',img)

k = cv2.waitKey(0)

k = cv2.waitKey(0) & 0xFF

if k == 27: # wait for ESC key to exit

cv2.destroyAllWindows()

elif k == ord('s'): # wait for 's' key to save and exit

cv2.imwrite('babygray.png',img)

cv2.destroyAllWindows()

**3.Original Colour Video Display Program**

import cv2

cap = cv2.VideoCapture(0)

while True:

if cap.grab():

flag, frame = cap.retrieve()

if not flag:

continue

else:

cv2.imshow('video', frame)

if cv2.waitKey(10) == 27:

break

**4.Gray Color Video Display Program**

import numpy as np

import cv2

cap = cv2.VideoCapture(0)

while(True):

# Capture frame-by-frame

ret, frame = cap.read()

# Our operations on the frame come here

gray = cv2.cvtColor(frame, cv2.COLOR\_BGR2GRAY)

# Display the resulting frame

cv2.imshow('frame',gray)

if cv2.waitKey(1) & 0xFF == ord('q'):

break

# When everything done, release the capture

cap.release()

cv2.destroyAllWindows()

**5.Face Detection Program**

import cv2

import numpy as np

import serial

import struct

import time

a=0

b=0

x=0

y=0

ser = serial.Serial('com4',9600)

time.sleep(2)

font=cv2.FONT\_HERSHEY\_SIMPLEX

FaceCascade=cv2.CascadeClassifier('haarcascade\_frontalface\_default.xml'

)

cap=cv2.VideoCapture(0)

def BoxDraw():

cv2.line(flipit,(213,0),(213,480),(255,0,0),2)

cv2.line(flipit,(426,0),(426,480),(255,0,0),2)

cv2.line(flipit,(0,160),(640,160),(255,0,0),

cv2.line(flipit,(0,320),(640,320),(255,0,0),2)

pass

while True:

ret,frame=cap.read()

flipit=cv2.flip(frame,1)

gray=cv2.cvtColor(flipit,cv2.COLOR\_BGR2GRAY)

face=FaceCascade.detectMultiScale(gray,1.2,4)

try:

for (x1,y1,w1,h1) in face:

a=int((2\*x1+w1)/2)

b=int((2\*y1+h1)/2)

x=int(a/3.66)

y=int(b/2.55)

ser.write(struct.pack('>BB', x,y))

cv2.rectangle(flipit,(x1,y1),(x1+w1,y1+h1),(0,255,0),2)

except:

pass

cv2.imshow('flipit',flipit)

k=cv2.waitKey(20) & 0xff

if k==27:

break

cap.release()

cv2.destroyAllWindows()

**6.Arduino Coding**

#include <Servo.h>

int data\_x = 0;

int data\_y = 0;

int data[1];

Servo myservo\_x;

Servo myservo\_y;// create servo object to control a servo

// twelve servo objects can be created on most boards

//int pos = 0; // variable to store the servo position

void setup() {

Serial.begin(9600);

myservo\_x.attach(9); // attaches the servo on pin 9 to the servo object

myservo\_y.attach(10);

myservo\_x.write(90);

myservo\_y.write(90);

}

void loop() {

while (Serial.available() >= 2) {

// data\_x=Serial.read();

// data\_y=Serial.read();

for (int i = 0; i < 2; i++) {

data[i] = Serial.read();

}

myservo\_x.write(data[0]);

myservo\_y.write(data[1]);

Serial.println(data[0]);

Serial.println(data[1]);

}

}