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## **INT 247 MACHINE LEARNING PROJECT**

### **FACE AND EXPRESSION DETECTION**

Submitted by: Maurice Yengkhom

Registration number: 11907009

Section: K19GA

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## **DECLARATION**

I, Maurice Yengkhom (11907009), solemnly declare that the project is based on my own work carried out during the course of our study under the supervision of Madam Upinder Kaur.

I assert the statements made and conclusions drawn are outcomes of my work.

I further certify that the work contained in this report is original and has not been submitted to any other institution for any other degree/ diploma/ certificate in the University.

**Maurice Yengkhom**

**11907009**

## **ACKNOWLEDGEMENT**

I am highly indebted to Madam Upinder Kaur for her guidance and constant supervision as well as for providing necessary information regarding the project and also for support in completing the Project.

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## **ABOUT THE PROJECT**

### **FACIAL RECOGNITION USING PYTHON**

The main aim of this project is to build a machine learning model to capture and recognise a human face using our laptop or pc webcam with a rectangular box around the faces.

I have used a cascade file with data that can detect a human face easily by implementing it with OpenCV.

The project is published in my GitHub Repository link given below  
<https://github.com/mauriceyeng/ML-Project>

## **MODULES USED**

### **NumPy**

NumPy is a Python Library used for working with arrays. It is an open source project and can be used freely. NumPy stands for Numerical Python.

### **OpenCV**

OpenCV is a great tool for image processing and performing computer vision tasks. It is an open-source library that can be used to perform tasks like face detection, object tracking and much more.

Here I have used a function of OpenCV called **cv2** to read and capture video.

### **OS**

OS is a module that provides function for interacting with the Operating system.

### **Cascade Classifier**

Cascading Classifiers are trained with several hundred or thousand positive sample views of a particular object and arbitrary negative images of the same size.

### **Harr-cascade**

In this project harrcascade.xml which is an Object Detection Algorithm is used to identify faces in real time video capture. Furthermore, cascadesmiles.xml and cascadeeyes.xml are used to detect smile and eyes of the user.

It is an open-source algorithm which is the most accurate in detecting faces.

## CODE

```
import numpy as np
import cv2
import os

os.chdir(r"D:\LPU\Year 3\6th sem\ML Project")

face_cascade=cv2.CascadeClassifier("harrcascade.xml")
eye_cascade=cv2.CascadeClassifier("cascadeeyes.xml")
smile_cascade=cv2.CascadeClassifier("cascadesmile.xml")

def detect_face(image):
    face_copy=image.copy()

    face_rects=face_cascade.detectMultiScale(face_copy,1.3,5)
    for(x,y,w,h) in face_rects:
        cv2.rectangle(face_copy,(x,y),(x+w,y+h),(0,0,255),5)

    eye_rects=eye_cascade.detectMultiScale(face_copy,1.1,10)
    for(x,y,w,h) in eye_rects:
        cv2.rectangle(face_copy,(x,y),(x+w,y+h),(0,0,255),5)

    smile_rects=smile_cascade.detectMultiScale(face_copy,1.7,22)
    for(x,y,w,h) in smile_rects:
        cv2.rectangle(face_copy,(x,y),(x+w,y+h),(0,0,255),5)

    return face_copy

capture=cv2.VideoCapture(0)
```

```
while True:
    ret,frame=capture.read()
    frame=cv2.cvtColor(frame,cv2.COLOR_BGR2GRAY)
    output=detect_face(frame)
    cv2.imshow("output",output)

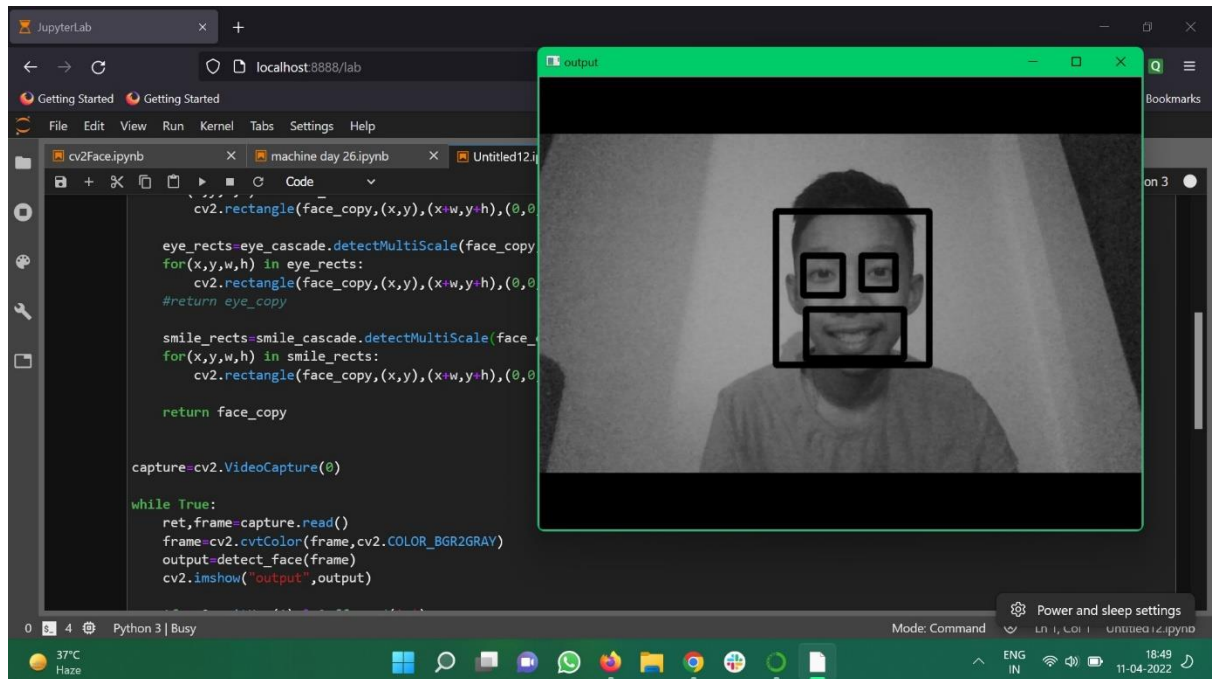
    if cv2.waitKey(1) & 0xff==ord('a'):
        break

capture.release()
cv2.destroyAllWindows()
```



## SCREENSHOT

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A screenshot of the working model of face detection program in real-time using a webcam. Here the eyes and smile are also detected.

## CONCLUSION

The project is made using a special module called OpenCV which makes it possible to detect and recognise a human face. There are many more functions to the module like detecting eyes, nose, smile etc which is useful in many real-life applications like Artificial Intelligence apps.

## REFERENCE

- IBM CAREER EDUCATION MACHINE LEARNING TRAINING COURSE
- HARRCASCAD FILES BY VIOLA AND JONES