

CHAPTER 1

INTRODUCTION

1.1: GENERAL BACKGROUND

The success of an institution begins by engaging teaching staff's regular attendance. Having higher attendance result in students higher learning standards and marks and better educational experience. So not only students but also teacher's attendance also matters. So, educational institutions need to have higher quality attendance monitoring.

Even though keeping attendance data is an essential part of educational institute there has been a little advancement in attendance monitoring using finger print attendance system. Still, many of institutions use traditional handwritten attendance. This makes it hard for teaching staffs to mark their attendance and track their progress. Chances of fraud in this traditional attendance system are higher than it is in automated attendance system. This project will help eliminate the traditional attendance system, minimize manipulation during attendance and record arrival and return of teaching staffs.

In our proposed facial attendance monitoring machine, there is an administrator where he or she must add user information according to data set. There is also a portal for teaching staff where they can monitor their progress. Also, a remark is generated which is an add on feature where the mood of the corresponding individual is predicted.

CHAPTER 2

LITERATURE SURVEY

2.1: Related Work

2.1.1 : Automated attendance system using ML approach

The conventional method of taking attendance is done manually by the teacher or the administrator which requires considerable amount of time and efforts also involving errors and proxy attendance. As the number of students are increasing day by day, it is a challenging task for universities or colleges to monitor and maintain the record of the students. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent years however, it is intrusive and cost required for deployment on large scale gets increased substantially. To overcome these issues, biometric feature like facial recognition can be used which involves the phases such as image acquisition, face detection, feature extraction, face classification, face recognition and eventually marking the attendance. The algorithms like Viola- Jones and HOG features along with SVM classifier are used to acquire the desired results. Various real time scenarios need to be considered such as scaling, illumination, occlusions and pose. The problem of redundancy in manual records and keeping attendance is solved by this system. Quantitative analysis is done on the basis of PSNR values.

2.1.2 : Automated attendance system using face recognition by k-means algorithms

Attendance plays a crucial role in educational institutions, several of the other industries and workplaces. Nowadays it's taken by standard methodology i.e., Attendance are taken manually. This method takes a great deal of your time and additionally there might be an error. Face recognition system could be a technology capable of distinguishing or confirming someone from a digital image or from a video supply. In this paper, we tend to build a system that marks the presence of students or employees by recognizing their faces and manufacturing the attending sheet automatically. Face Recognition's accuracy rate is

definitely littered with the factors like changes in illumination, posture changes, expression changes, and occlusion. In this paper, a K-means clustering algorithmic rule is employed to research the facial expression. The biometric features of the face unit are extracted and also the K-mean clustering technique is used to cluster the face features. Then, SVM methodology is employed to classify the features of the image. It may accomplish high recognition performance with fewer feature numbers. Finally, a report (attendance sheet) is generated for interpretation.

2.1.3 : Attendance monitoring using CCTV

In Institutions/schools attendance maintaining is one of the major works for the faculties to check the strength of a class. The faculties are provided with paper-based attendance. They separately have it for various periods of subjects known log book. They mark the attendance every time when they go to class for their periods. To avoid manual paper-based attendance system nowadays smart attendance monitoring system like biometric facial recognition system is being suggested. It is enormously used in much application such as monitoring the class room using CCTV, Computer –human interaction, Accurate Attendance maintaining and in security issues. This system rectifies the problems in marking the student's entry as absent even they are inside the classroom. In the implementation process, detecting the face, identifying and marking the attendance automatically whether the student is present or not is done. Principle Component Analysis (PCA), Eigen face value detection, Convolutional Neural Network (CNN) are the methods being used in this paper to create an automatic attendance management system. This model is successfully done in comparison with database of student's face to control the movement of people with a predefined protocol.

2.1.4 : Smart Attendance Monitoring System (SAMS): A Face Recognition based Attendance System for Classroom Environment

In present academic system, regular class attendance of students' plays a significant role in performance assessment and quality monitoring. The conventional methods practiced in most of the institutions are by calling names or signing on papers, which is highly time-consuming and insecure. This article presents the automatic attendance management system for convenience or data reliability. The system is developed by the integration of ubiquitous

components to make a portable device for managing the students' attendance using Face Recognition technology.

2.1.5 : IAAS: IoT-Based Automatic Attendance System with Photo Face Recognition in Smart Campus

The existing attendance checking system uses student identification (ID) cards or mobile applications. If the attendance is processed by an automatic attendance checking system, the attendance checking process can be more convenient for both students and professors than manual attendance checking. For getting these advantages, this paper proposes an IoT-based Automatic Attendance System (IAAS). IAAS is an attendance checking system using a face recognition technology. The image data of students are collected by a capturing device (e.g., smartphone and tablet PC) and processed by the face recognition system. This system checks who are attending the class and send their attendance to an attendance database system through an email notification.

2.1.6 : Design of intelligent attendance system based on face recognition

It classroom attendance methods in Chinese universities, and the attendance costs are too high. In this paper, we use the deep learning related ideas to improve the AlexNet convolutional neural network, and use the WebFace data set to improve the network training and test. The Top-5 error rate is only 6.73%. We applied this model to face recognition and combined with RFID card reading technology, which developed a smart classroom attendance system based on face recognition. Research shows that the system is efficient and reliable, which effectively reduce classroom attendance costs.

2.1.7 : Research and development of attendance management system based on face recognition and RF id technology

Attendance sign-in is a crucial component of the daily management of enterprises and institutions, but the current approaches of attendance have problems such as sign-in deceit and low efficiency of attendance data statistics. This paper designs and develops an attendance system based on RFID (Radio Frequency Identification Devices, RFID) and face recognition. By utilizing a composite authentication method with high recognition, the reliability of attendance management and the accuracy of attendance certification are

enhanced. In this system, the attendance information of employees in enterprises and institutions can be intelligently managed. Moreover, the statistical efficiency of attendance data can also be effectively promoted, thus satisfying the daily attendance needs of enterprises and institutions.

2.1.8 : IoT based smart attendance monitoring system using RF id

Most of the institutional authorities are troubled with the cumbersome method of maintaining manual attendance of their employees. The manual process of signing on a paper is prolonged and insecure. An efficient attendance monitoring system needs to be enforced at such places. Radio Frequency Identification (RFID) based attendance system provides us with a solution that caters to issues like proxy attendance. This paper describes the design of an RFID based attendance monitoring system which uniquely identifies each employee/student based on their RFID tag which is attached to their ID card. This makes the mechanism of recording the attendance effortless, quicker and protected as compared to conventional method. This system is designed to be used at different educational institutions, corporate offices, government offices etc. The proposed system consists of both hardware and software components based on IoT Technology. The hardware component consists of RC522 RFID card reader and RFID tags/cards. The software component consists of the Web-based GUI for viewing the employee's or student's attendance, which is hosted on a web server and which stores the data in a database server. The employees or students just need to place their RFID card or tag on the reader and their attendance will be recorded for the day. Also, the attendance recorded will be more accurate as the system is synced with a real-time clock.

2.1.9 : Facial expression (mood) recognition from facial images using committee neural networks

Background: Facial expressions are important in facilitating human communication and interactions. Also, they are used as an important tool in behavioral studies and in medical rehabilitation. Facial image-based mood detection techniques may provide fast and practical approach for non-invasive mood detection. The purpose of the present study was to develop an intelligent system for facial image-based expression classification using CNN

Methods: Several facial parameters were extracted from a facial image and were used to train several generalized and specialized neural networks. Based on initial testing, the best performing generalized and specialized neural networks were recruited into decision making committees which formed an integrated committee neural network system. The integrated committee neural network system was then evaluated using data obtained from subjects not used in training or in initial testing.

2.1.10 : Personalized emotion recognition and emotion prediction system based on cloud computing

Promoting economic development and improving people's quality of life have a lot to do with the continuous improvement of cloud computing technology and the rapid expansion of applications. Emotions play an important role in all aspects of human life. It is difficult to avoid the influence of inner emotions in people's behavior and deduction. This article mainly studies the personalized emotion recognition and emotion prediction system based on cloud computing. This paper proposes a method of intelligently identifying users' emotional states through the use of cloud computing. First, an emotional induction experiment is designed to induce the testers' positive, neutral, and negative three basic emotional states and collect cloud data and EEG under different emotional states. Then, the cloud data is processed and analyzed to extract emotional features. After that, this paper constructs a facial emotion prediction system based on cloud computing data model, which consists of face detection and facial emotion recognition. The system uses the SVM algorithm for face detection, uses the temporal feature algorithm for facial emotion analysis, and finally uses the classification method of machine learning to classify emotions, so as to realize the purpose of identifying the user's emotional state through cloud computing technology. Experimental data shows that the EEG signal emotion recognition method based on time domain features performs best has better generalization ability and is improved by 6.3% on the basis of traditional methods. The experimental results show that the personalized emotion recognition method based on cloud computing is more effective than traditional methods.

CHAPTER 3

DESIGN

3.1 : BLOCK DIAGRAM

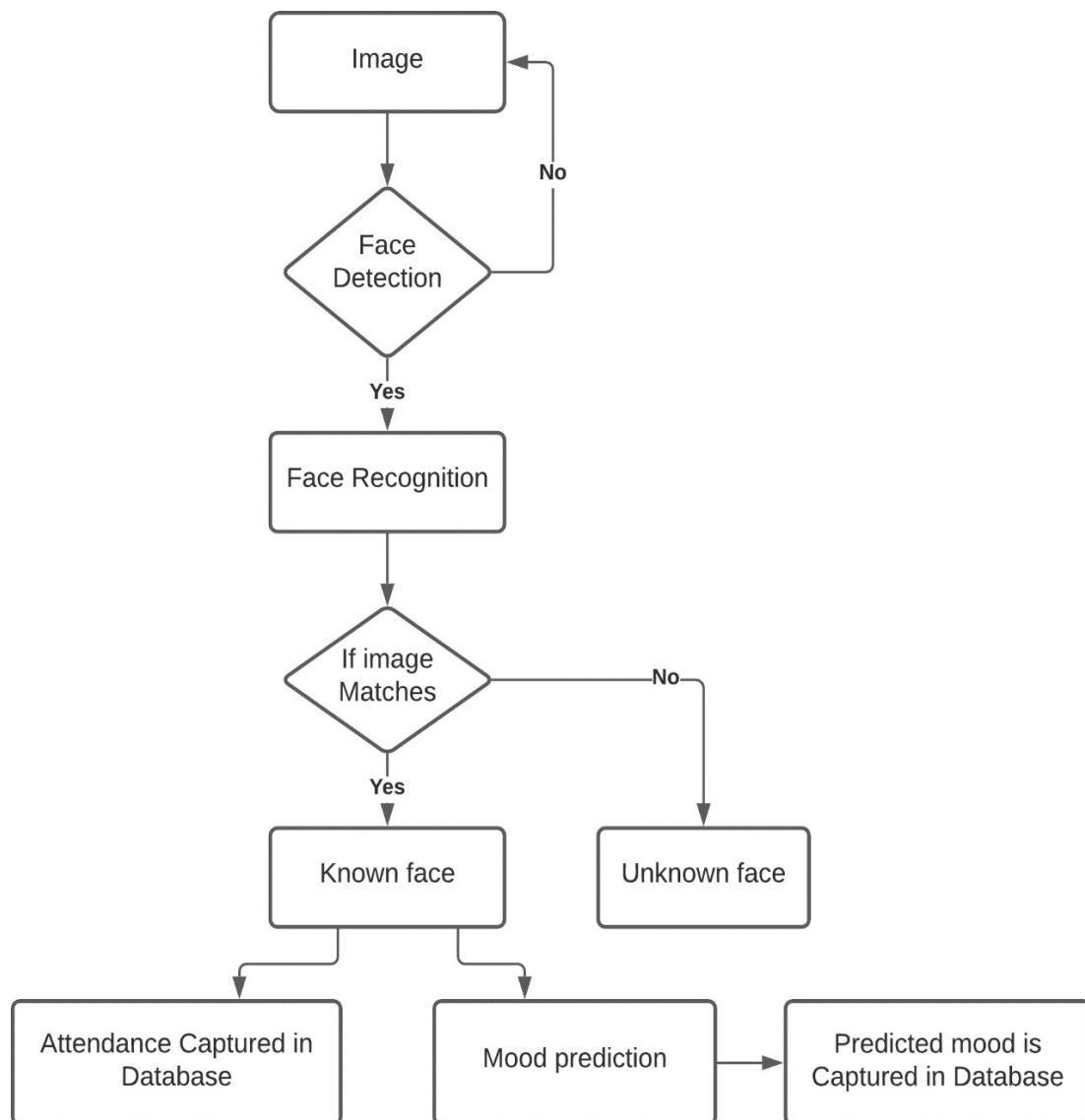


Fig 3.1 Block Diagram

The block diagram describes how the attendance is marked on the basics of face recognized for individual employees. So, there exist a camera module that is continuously recording the video and it is pre-processed to detect a face from the video. Once a face is detected the it is then feed to the facial recognition algorithm. And here the recognized face is matched with the database to identify the employee. If it's a match the attendance for the employee is capture in the database. As an add-on feature form the recognized facial data, we can predict their mood and add this as a remark for the employee.

3.2 : DFD

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

3.2.1 : 0-LEVEL DFD

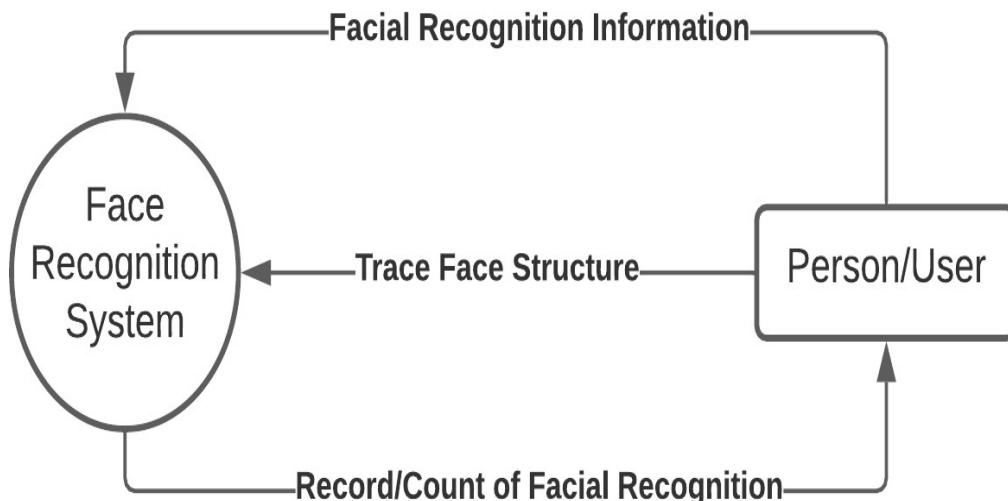


Fig 3.2 0-Level DFD

This is the simple view of our entire system processes. In figure 3.2 we can see that, the users facial information is recorded and the facial structure is processed with face recognition system and a record or count of facial recognition is given back to the user.

3.2.2: 1-LEVEL DFD

Level 1 DFD provide a broad overview but go into greater depth than a context diagram.

The following are essential data to accommodate:

- Face Recognition Records
- Visitors Records
- Employees/Staff Records

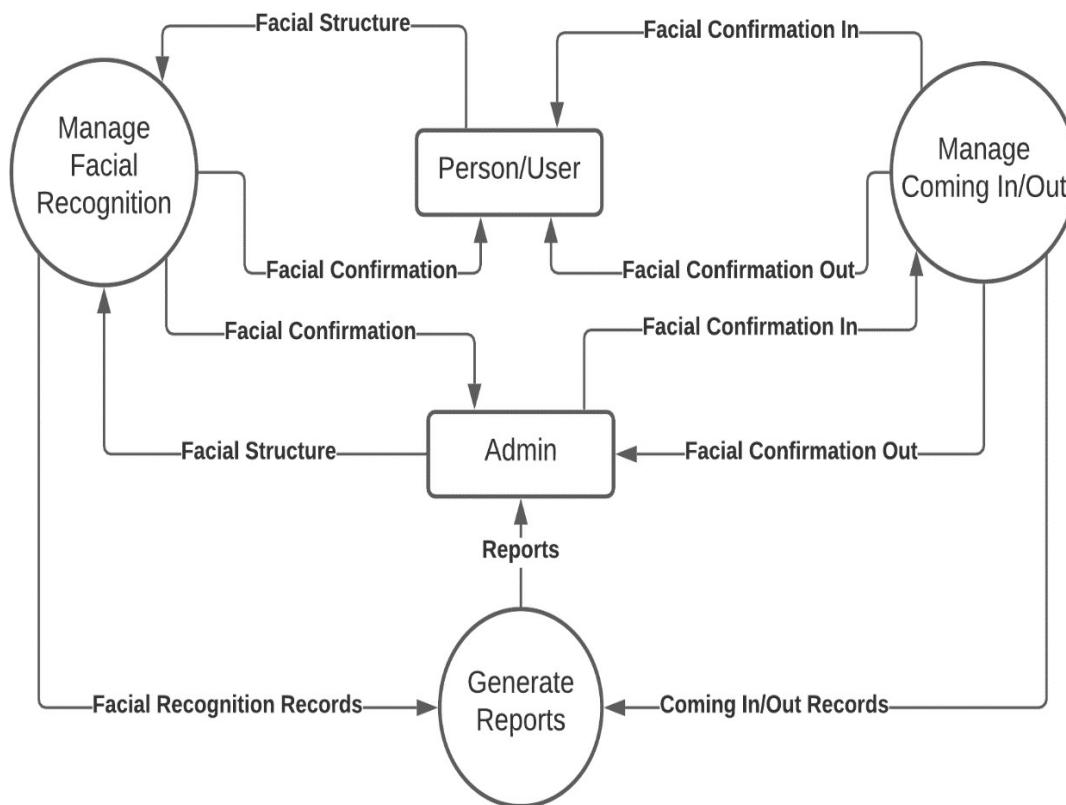


Fig 3.3 1-Level DFD

3.2.3: 2-LEVEL DFD

The Processes that the system should prioritize are as follows:

- Managing Facial Records
- Records of Unfamiliar Faces in Real-Time
- Records of Familiar Faces in Real-Time
- Secure Real-Time Records
- Count of Individuals that comes in and out of the Establishment

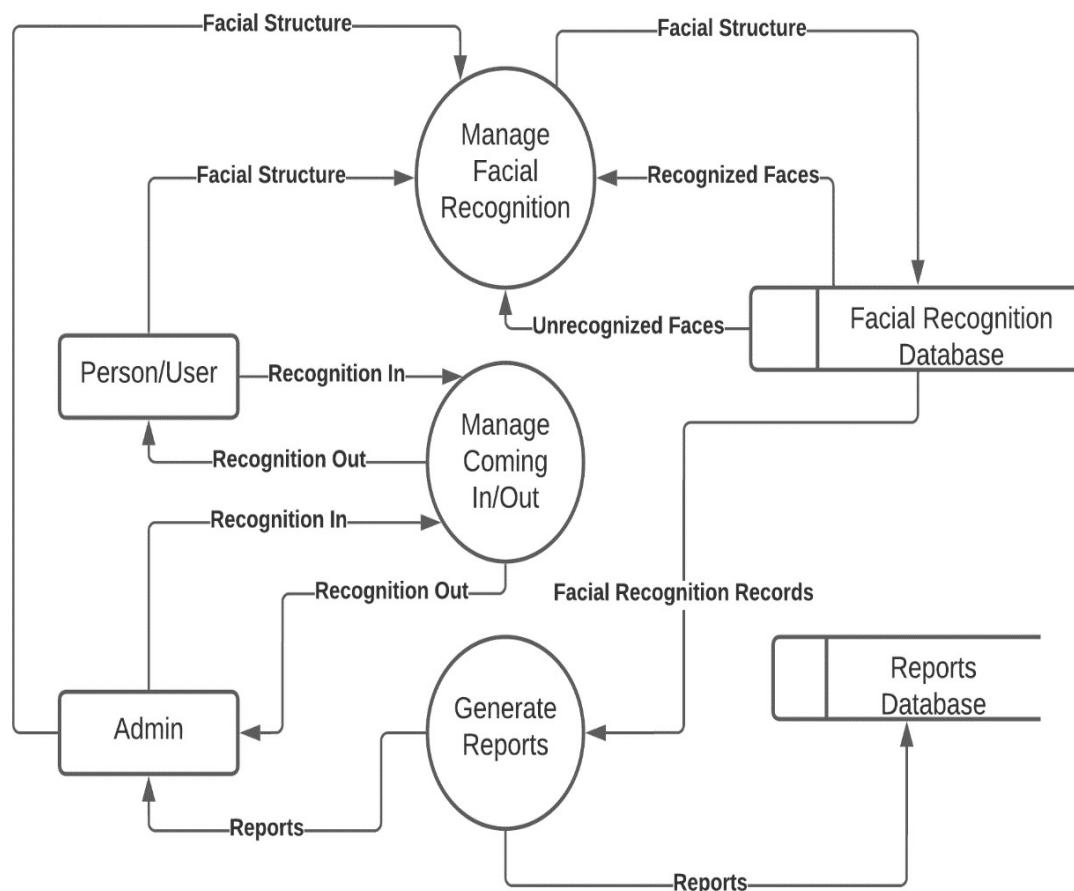


Fig 3.4 2-Level DFD

CHAPTER 4

IMPLEMENTATION DETAILS

5.1 : Platform – Anaconda

Anaconda is an open-source distribution of the Python and R programming languages for scientific computing, that aims to simplify package management and deployment. The distribution includes data-science packages suitable for Windows, Linux, and macOS. Anaconda is popular because it brings many of the tools used in data science and machine learning with just one install, so it's great for having short and simple setup. Like Virtualenv, Anaconda also uses the concept of creating environments so as to isolate different libraries and versions.

5.2 : IDE- JUPYTER

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more. Jupyter Notebook provides you with an easy-to-use, interactive data science environment across many programming languages that doesn't only work as an IDE, but also as a presentation or education tool. It's perfect for those who are just starting out with data science.

5.3 : Python

Python is an elevated level programming language for broadly useful programming. It was created by Guido Van Rossum and released in 1991. It enables clear programming on both small and large scales. Python bolsters various programming standards including object arranged, useful and procedural. Python is an easily readable language. It uses English keywords whereas other programming languages use punctuations. Python utilizes whitespace space as opposed to wavy sections to delimit squares. Python was mainly

developed to read codes easily. Python supports various libraries such as Pandas, NumPy, SciPy, Matplotlib etc. It supports various packages such as Xlsx Writer and Xl Rd. Python is an exceptionally helpful language for web improvement and programming advancement. It tends to be utilized to make web applications. It very well may be utilized to peruse and alter documents. It very well may be used to perform complex science. Python has gotten a very well-known language since it can chip away at various stages. Python code can be executed when it is composed. Python is a very significant language since the program is updated without investing additional exertion and energy. Python bolsters many working frameworks.

CHAPTER 5

WORK PLAN

Task to be done	Done by?	By When?
Dataset collection	Paul Jose & Safil P H	Jan
Model Implementation	Joju Sunny & Paul Jose	Jan-Feb
Training	Joju Sunny & Safil P H	Feb
Prototype testing	Safil P H & Paul Jose	Feb-Mar
Final result	Joju Sunny & Paul Jose	Mar

CHAPTER 6

DATABASE

Daily attendance report

Employee_id	Employee_name	Dept.	In_time	Out_time	Attendance
101	Mintu	CSE	8:45	4:15	Full
102	Angel	CSE	8:35	4:20	Full
105	Mahesh	CSE	8:49	4:16	Full
209	Eldhose	HS	8:44	2:50	Half

Individual attendance report of employee_id 101

Employee_id	Employee_name	Dept	Date	In_time	Out_time	Attendance	Remark
101	Mintu	CSE	03/01/2022	8:45	4:15	Full	Nill
101	Mintu	CSE	04/01/2022	8:44	4:16	Full	Nill
101	Mintu	CSE	05/01/2022	8:46	4:17	Full	Nill
101	Mintu	CSE	06/01/2022	8:46	4:15	Full	Nill
101	Mintu	CSE	07/01/2022	8:45	12:45	Half	Nill

CHAPTER 7

PAGE DESIGN

Admin view

SYSTEM ADMIN

[View Attendance Report](#)
[Modify Attendance](#)
[Search Individual Report](#)

Today ◀ ▶ **January 2022** ▾

Sun	Mon	Tue	Wed	Thu	Fri	Sat	1 Jan
26	27	28	29	30	31	1 Jan	
2	3	4	5	6	7	8	
	1:30pm Invitat						
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	
30	31	1 Feb	2	3	4	5	

[+ Google Calendar](#)

Daily attendance report

Employee_id	Employee_name	Dept.	In_time	Out_time	Attendance
101	Mintu	CSE	8:45	4:15	Full
102	Angel	CSE	8:35	4:20	Full
105	Mahesh	CSE	8:49	4:16	Full
209	Eldhose	HS	8:44	2:50	Half

Employee Activity Reports

EMPLOYEE PORTAL

Employee_id : 101 Name: Mintu Department: Computer Science and Engineering

[View Attendance Report](#)
Today In_time : 8:45
Today Out_time : NA

[Analyse Remarks](#)
Feeling Uncomfortable
[Check for a counselling section](#)

[Notices](#)

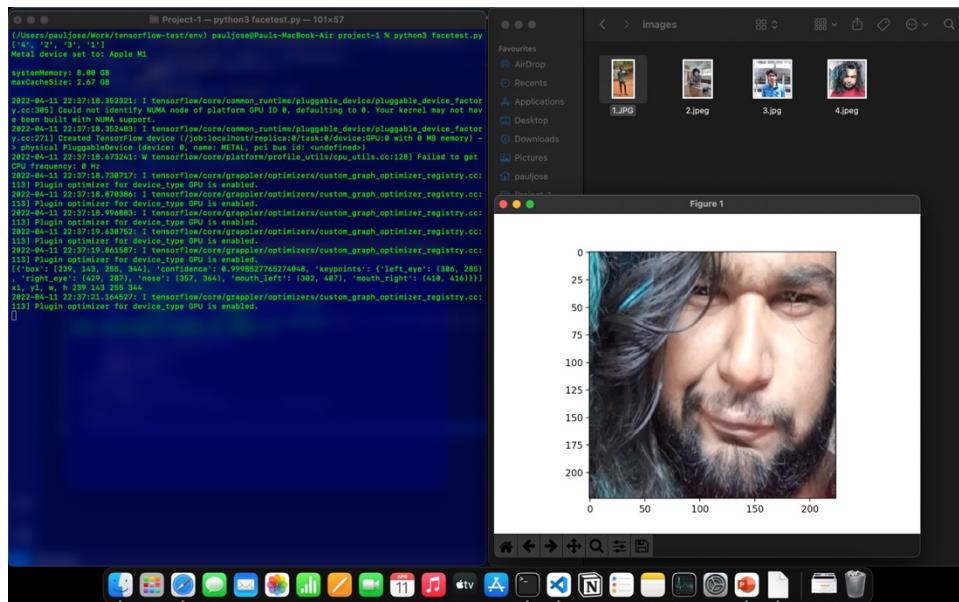
[Inform Admin](#)

①

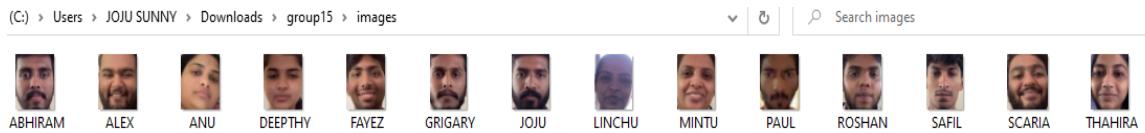
CHAPTER 8

SCREENSHOTS

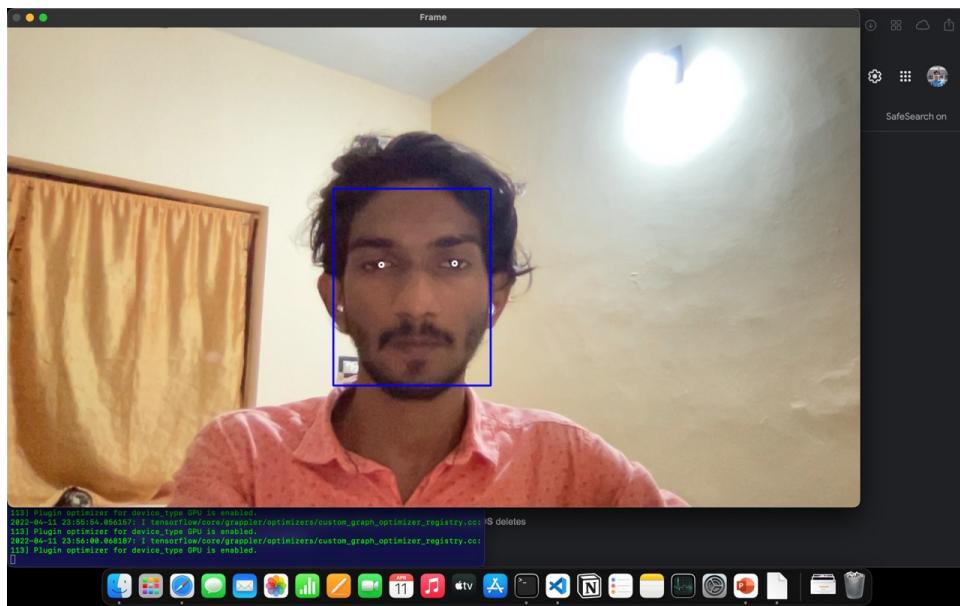
Face Detection



Dataset



Face Recognition



CHAPTER 9

CONCLUSION

Face recognition systems are part of facial image processing applications and their significance as a research area are increasing recently. Implementations of system are crime prevention, video surveillance, person verification, and similar security activities. The goal is reached by face detection and recognition methods. Knowledge-Based face detection methods are used to find, locate and extract faces in acquired images. Implemented methods are skin colour and facial features. Neural network is used for face recognition. An automatic attendance management system aims at solving the issues of manual methods of existing systems. We have used the concept of face recognition to implement a system that marks the attendance of a particular person by detecting and recognizing the face. These systems perform satisfactorily with different facial expressions, lighting and pose of the person. There are future scopes to make a more compact ergonomics to make it a more user-friendly product to make an impact in building a healthier academic environment. Face detection is the key of biometric recognition. Face detection technology is used in the field of public security video monitoring. The application of face recognition technology in intelligent video surveillance system has broad application prospects and great practical significance. So, we combine these facial recognition methods to improve our design and the results can be of a higher accuracy.

CHAPTER 10

REFERENCE

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APPENDIX

Face Registration

```
import cv2
import os
import datetime
from mtcnn.mtcnn import MTCNN
import numpy as np
from keras_vggface.utils import preprocess_input
from keras_vggface.vggface import VGGFace
from PIL import Image
from numpy import asarray
from numpy import expand_dims
from matplotlib import pyplot
print("Starting...")
def encodeFaceData():
    count = 0
    print("Encoding . . .")
    image = []
    classnames = []
    encodeClassNames = []
    path = 'images'
    pathToEncode = 'Encodings'
    myList = os.listdir(path)
    myEncodeList = os.listdir(pathToEncode)
    print(myEncodeList)
    # loading images from the folder and appending into a list
    # also appending the image names into a list
    for entry in myList:
        encodeClassNames.append(os.path.splitext(entry)[0])
    for images in myList:
        if images.lower().endswith('.png', '.jpg', '.jpeg'):
            if (os.path.splitext(images)[0]) not in encodeClassNames:
                pixels = pyplot.imread(f'{path}/{images}')
                image.append(pixels)
                classnames.append(os.path.splitext(images)[0])
            else :
                print("File Unknown " + os.path.splitext(images)[0] + "\n")
    detector = MTCNN()
    for i, cl in zip(image, classnames):
        # detecting faces from the image set
        faces = detector.detect_faces(i)
        if faces:
            x1, y1, w, h = faces[0]['box']
            # only one face is choosen from multiples faces
            x2, y2 = x1 + w, y1 + h
```

```

faces = i[y1:y2, x1:x2]
faces = Image.fromarray(faces)
faces = faces.resize((224,224))
# resizing the face to feed into the algorithm
face_array = asarray(faces)
pixels = face_array.astype('float32')
samples = expand_dims(pixels, axis=0)
samples = preprocess_input(samples, version=2)
model = VGGFace(model='resnet50', include_top=False, input_shape=(224, 224,
3), pooling='avg')
# predicting the encoding or feature extracting
yhat = model.predict(samples)
print(classnames[count])
path = 'Encodings'
with open(os.path.join(path, f'{classnames[count]}.txt'), 'xb') as file:
    # saving the encodings to a folder Encodings with image name as file name
    np.save(file, yhat)
count = count + 1
else:
    print(f'Face not detected for {cl} \n')
    continue
detector = MTCNN()
cap = cv2.VideoCapture(0)
i = 1
path = 'images'
# Starting a loop to capture the frames continuously
while True:
    ret, frame = cap.read()
    if ret:
        cv2.imshow("Web cam", frame)
        if cv2.waitKey(1) & 0xFF == ord(' '):
            detector = MTCNN()
            # detecting faces from the current frame
            faces = detector.detect_faces(frame)
            if faces:
                x1, y1, w, h = faces[0]['box']
                # only one face is chosen from multiple faces detected
                x2, y2 = x1 + w, y1 + h
                cropped = frame[y1:y2, x1:x2]
                cv2.imshow("Captured face", cropped)
                if cv2.waitKey(0) & 0xFF == ord(' '):
                    key = input("Enter Y to continue press R to retake else press any other key: ")
                    if key == 'y' or key == 'Y':
                        # saving the image file into the folder images
                        name = input("Enter the name(in UPPERCASE): ")
                        cv2.imwrite(os.path.join(path, f'{name}.jpeg'), cropped)
                        cv2.destroyAllWindows()
                        continue

```

```
    elif key == 'R' or key == 'r':
        cv2.destroyAllWindows()
        continue
    else:
        encodeFaceData()
        exit(0)
    else:
        print("Face missing")
        continue
else:
    print("Cam missing . . .")
```

Face Encoding

```
import os
import numpy as np
from keras_vggface.utils import preprocess_input
from keras_vggface.vggface import VGGFace
from mtcnn.mtcnn import MTCNN
from PIL import Image
from numpy import asarray
from numpy import expand_dims
from matplotlib import pyplot
def encodeFaceData():
    count = 0
    print("Encoding . . .")
    image = []
    classnames = []
    encodeClassNames = []
    path = 'images'
    pathToEncode = 'Encodings'
    myList = os.listdir(path)
    myEncodeList = os.listdir(pathToEncode)
    print(myEncodeList)
    # loading images from the folder and appending into a list
    # also appending the image names into a list
    for entry in myEncodeList:
        encodeClassNames.append(os.path.splitext(entry)[0])
    for images in myList:
        if images.lower().endswith('.png', '.jpg', '.jpeg'):
            if (os.path.splitext(images)[0]) not in encodeClassNames:
                pixels = pyplot.imread(f'{path}/{images}')
                image.append(pixels)
                classnames.append(os.path.splitext(images)[0])
            else :
                print("File Unknown " + os.path.splitext(images)[0] + "\n")
    detector = MTCNN()
```

```
for i, cl in zip(image, classnames):
    # detecting faces from the image set
    faces = detector.detect_faces(i)
    if faces:
        x1, y1, w, h = faces[0]['box']
        # only one face is chosen from multiple faces
        x2, y2 = x1 + w, y1 + h
        faces = i[y1:y2, x1:x2]
        faces = Image.fromarray(faces)
        faces = faces.resize((224, 224))
        # resizing the face to feed into the algorithm
        face_array = asarray(faces)
        pixels = face_array.astype('float32')
        samples = expand_dims(pixels, axis=0)
        samples = preprocess_input(samples, version=2)
        model = VGGFace(model='resnet50', include_top=False, input_shape=(224, 224,
3), pooling='avg')
        # predicting the encoding or feature extracting
        yhat = model.predict(samples)
        print(classnames[count])
        path = 'Encodings'
        with open(os.path.join(path, f'{classnames[count]}.txt'), 'xb') as file:
            # saving the encodings to a folder Encodings with image name as file name
            np.save(file, yhat)
        count = count + 1
    else:
        print(f'Face not detected for {cl} \n')
        continue
encodeFaceData()
```

Facial Attendance

```
import os
import os.path
import numpy as np
from PIL import Image
import PIL
from mtcnn.mtcnn import MTCNN
from matplotlib import pyplot
from numpy import asarray
from keras_vggface.utils import preprocess_input
from keras_vggface.vggface import VGGFace
from scipy.spatial.distance import cosine
import cv2
from numpy import expand_dims
from datetime import date, datetime

def readCam():
```

```

print("Reading")
camencoding = []
detector = MTCNN()
cap = cv2.VideoCapture(0)
i = 1
# starting the camera inside a loop to continuously capture the frames and it will the
working in realtime
while True:
    ret, frame = cap.read()
    faces = detector.detect_faces(frame)
    # detect a face when someone passes through the camera's view
    if faces:
        x1, y1, w, h = faces[0]['box']
        x2, y2 = x1+w, y1+h
        faces = cv2.rectangle(frame, (x1, y1), (x2, y2), (255,255,255), 2)
        cropped = frame[y1:y2,x1:x2]
        cv2.imshow("faces", faces)
        if cv2.waitKey(1) & 0xFF == ord('q'):
            break
        faceEncoding = Image.fromarray(cropped)
        faceEncoding = faceEncoding.resize((224,224))
        face_array = asarray(faceEncoding)
        pixels = face_array.astype('float32')
        samples = expand_dims(pixels, axis=0)
        samples = preprocess_input(samples, version=2)
        model = VGGFace(model='resnet50', include_top=False, input_shape=(224, 224, 3),
pooling='avg')
        yhat = model.predict(samples)
        camencoding = yhat
        compare(camencoding)
    else:
        # print("Empty")
        continue

def compare(x):
    # print("Comparing")
    for i, name in zip(loader_arr, classnames):
        score = cosine(x, i)
        # from the encoding values compare the values
        # set a threshold value of .3
        if score < .3:
            markAttendance(name)
def markAttendance(name):
    path = f'{date.today()}.csv'
    if not (os.path.isfile(path)):
        f = open(path,'w')
        print("File Created")
        f.close()

```

```

nameList = []
timeInList = []
timeOutList = []
presenceList = []
with open(path,'r') as filer:
    myListData = filer.readlines()
    for line in myListData:
        entry = line.split(',')
        nameList.append(entry[0])
        timeInList.append(entry[1])
        timeOutList.append(entry[2])
        presenceList.append(entry[3])
if name not in nameList:
    with open(path,'a') as filea:
        now = datetime.now()
        dtString = now.strftime('%H:%M:%S')
        filea.writelines(f'{name},{dtString},0,NA,0\n')
else:
    index = nameList.index(name)
    timeIn = timeInList[index]
    timeIn = timeIn.strip()
    timeIn = datetime.strptime(timeIn,'%H:%M:%S')
    now = datetime.now()
    timeOut = now.strftime('%H:%M:%S')
    now = datetime.strptime(timeOut,'%H:%M:%S')
    inTimeDifference = str(now - timeIn)
    inTimeDifference = inTimeDifference.split(':')
    minutes = int(inTimeDifference[1])
    hours = int(inTimeDifference[0])
    if minutes >= 1:#minutes >= 5
        with open(path,'w') as filew:
            for line in myListData:
                entry = line.split(',')
                if entry[0] == name:
                    if minutes >= 3:#hours >=7
                        print("Reached")
                        filew.writelines(f'{name},{timeInList[index]},{timeOut},FULL,{hours}\n')
                    elif minutes >= 2:#hours >= 4
                        filew.writelines(f'{name},{timeInList[index]},{timeOut},HALF,{hours}\n')
                    else:
                        filew.writelines(f'{name},{timeInList[index]},{timeOut},NA,{hours}\n')
                else:
                    filew.writelines(line)
                    print("Writing", line)
def retrieveEncode():
    path = 'Encodings'
    global loaded_arr

```

```
loaded_arr = []
global classnames
classnames = []
# loading the encodings and class names from the folder
myList = os.listdir(path)
for item in myList:
    if item.lower().endswith('txt'):
        loaded_arr.append(np.load(f'{path}/{item}'))
        classnames.append(os.path.splitext(item)[0])
retrieveEncode()
readCam()
```