S.D.M. College OF Engineering and Technology Dharwad
Department of Information Science and Engineering

IOT CASE STUDY ON

<u>SMART ATTENDANCE SYSTEM (Face Detection)</u>

Submitted By

Name	USN
Aditya Bammangouder	2SD20IS003
Guruprasad Bhagwat	2SD19IS021
Kanishkvardhan A N	2SD19IS023
Kanishkvardhan A N	2SD19IS023

SMART ATTENDANCE SYSTEM (Face Detection)

ABSTRACT:

The attendance of students is a topic in our paper. Face recognition is used to track student attendance. The Laptop's inbuilt camera is used for face detection and recognition. photographs of students who are present in the class will be captured for face detection. When the taken photographs are compared to the recorded photos, we will be able to distinguish the faces of each student, and attendance will be assigned to that subject class. This procedure is followed for each class, and students are assigned attendance as a result. This is an automated technology that assists the instructor in taking class attendance without causing any disruption or wasting time. The concept can be applied to a variety of scenarios, one of which is facial recognition, which saves time and effectively identifies and eliminates the possibility of proxy attendance. The main goal of this project is to create an automatic attendance system using a Raspberry Pi and OpenCV/Python modules, as well as a recognizer algorithm. The proposed method can be used in any field where an attendance system is used and is important. Furthermore, because the project objectives and design criteria were all met, it's best to describe this project as an engineering solution for tracking and managing attendance at all universities and institutions.

INTRODUCTION:

This is designed to record student attendance without the need for human intervention, making it particularly beneficial for institutions and schools to keep track of attendance. This approach saves time for people because they may check their attendance and academic performance from anywhere by registering on the student registration page developed in this paper. We are still employing the same old methods of classroom management in this day of technology and automation. Attendance is the most crucial factor in the classroom, as it is closely related to students' academic performance. Recently, some students have been preoccupied with bettering themselves during lectures only when there is strict classroom supervision (Research Gate, 2018). The more effective the attendance system, the higher the level of involvement and learning in class. Previously, we used tactics such as roll numbering, calling, and signing against a specific roll number. These approaches are time demanding and have a high probability of proxy. We came up with the notion of automating this procedure using current technology to achieve a well-kept and disciplined classroom. This project's goals will be met with the help of a facial recognition system, as well as appropriate hardware and software. Image processing has led to the development of facial recognition systems. Image processing is concerned with the extraction of necessary data from a digital image, and it plays a unique role in technological growth. Our main focus will be on obtaining digital algorithms to extract usable data. As the visual data is sent into the image processing system, it is processed to make it usable for human interpretation. That information from image processing will play a significant role and assist in a variety of fields where it can be used. Image processing has a wide range of applications and can be used in almost any situation where imaging data may be linked to pre-determined algorithms. It was a sophisticated image processing application that also served as the foundation for our research. Our facial anatomy was a classic example of a multidimensional complexity that required extensive computational analysis to recognize.

LITERATURE REVIEW:

There has been a lot of research done so far on the many techniques for implementing an effective attendance monitoring system. The sorts of input methods used, the sorts of data processing used, and the controllers utilized to construct the systems all differ. In this section, we'll look at the numerous options available, as well as the benefits and drawbacks of each system. “Attendance System Using NFC Technology with Embedded Camera on Mobile Device” is the first system (Bhise, Khichi, Korde, Lokare, 2015). Near field communication (NFC) is a sort of short-range wireless communication that occurs between two active and passive devices. Both devices are essentially inductor coils that respond to electromagnetic induction. The active gadget generates an electromagnetic field with a specified radius and strength. Which was utilized to construct a timekeeping system. Students can be given NFC tags that are uniquely programmed with their unique identifying numbers in a school context, for example. The professors carry the NFC readers to the classes, and students must swipe their NFC tags near the reader, say the instructors' phone. This information is subsequently sent to the school database, which is used to track the student's attendance. This approach, however, is open to impersonation, in which one individual can sign in as another. Time management systems, which are utilized at many universities, institutions, and schools, are another comparable system that uses biometrics (fingerprint recognition, RFID, and so on) to identify end-users. These systems, on the other hand, raise new privacy concerns. These systems can potentially be damaged physically by their users. As a result, they will incur increased maintenance costs. We suggest an idea that eliminates physical access to the automated system for anyone.

HARDWARE REQUIREMENTS:

Laptop inbuilt camera

quality:0.92 mp

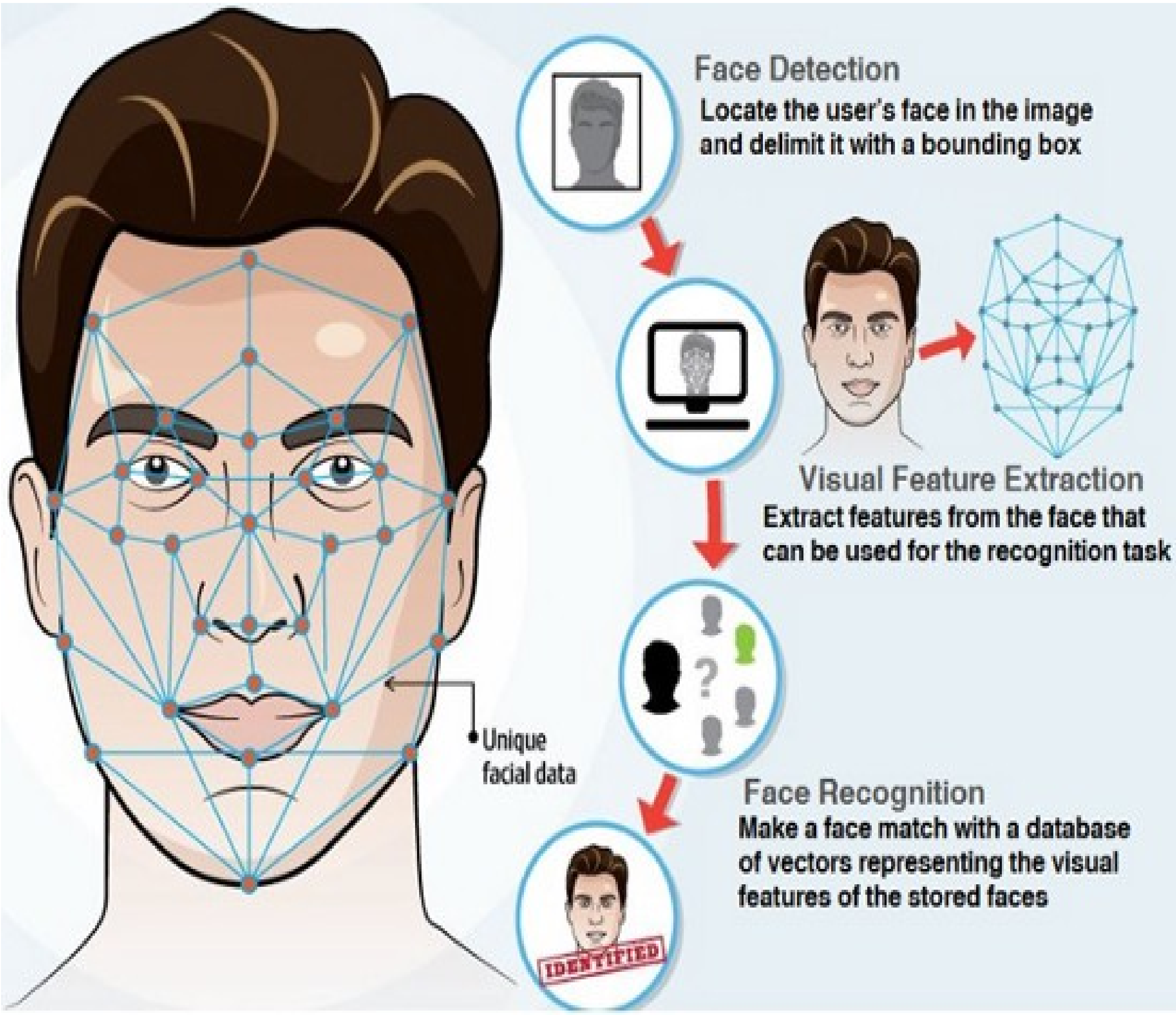
IMPLEMENTATION:

```
import cv2
import numpy as np
import face_recognition
import os
from datetime import datetime

path = 'images'
images = []
personNames = []
myList = os.listdir(path)
print(myList)
for cu_img in myList:
    current_Img = cv2.imread(f'{path}/{cu_img}')
    images.append(current_Img)
    personNames.append(os.path.splitext(cu_img)[0])
print(personNames)


def faceEncodings(images):
    encodeList = []
    for img in images:
        img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
        encode = face_recognition.face_encodings(img)[0]
        encodeList.append(encode)
    return encodeList


def attendance(name):
    with open('Attendance.csv', 'r+') as f:
```

```python
        myDataList = f.readlines()
        nameList = []
        for line in myDataList:
            entry = line.split(',')
            nameList.append(entry[0])
        if name not in nameList:
            time_now = datetime.now()
            tStr = time_now.strftime('%H:%M:%S')
            dStr = time_now.strftime('%d/%m/%Y')
            f.writelines(f'\n{name},{tStr},{dStr}')


encodeListKnown = faceEncodings(images)
print('All Encodings Complete!!!')

cap = cv2.VideoCapture(1)

while True:
    ret, frame = cap.read()
    faces = cv2.resize(frame, (0, 0), None, 0.25, 0.25)
    faces = cv2.cvtColor(faces, cv2.COLOR_BGR2RGB)

    facesCurrentFrame = face_recognition.face_locations(faces)
    encodesCurrentFrame = face_recognition.face_encodings(faces,
facesCurrentFrame)

    for encodeFace, faceLoc in zip(encodesCurrentFrame, facesCurrentFrame):
        matches = face_recognition.compare_faces(encodeListKnown, encodeFace)
        faceDis = face_recognition.face_distance(encodeListKnown, encodeFace)
        # print(faceDis)
        matchIndex = np.argmin(faceDis)

        if matches[matchIndex]:
            name = personNames[matchIndex].upper()
            # print(name)
            y1, x2, y2, x1 = faceLoc
            y1, x2, y2, x1 = y1 * 4, x2 * 4, y2 * 4, x1 * 4
            cv2.rectangle(frame, (x1, y1), (x2, y2), (0, 255, 0), 2)
            cv2.rectangle(frame, (x1, y2 - 35), (x2, y2), (0, 255, 0),
cv2.FILLED)
            cv2.putText(frame, name, (x1 + 6, y2 - 6),
cv2.FONT_HERSHEY_COMPLEX, 1, (255, 255, 255), 2)
```

```
            attendance(name)

    cv2.imshow('Webcam', frame)
    if cv2.waitKey(1) == 13:
        break

cap.release()
cv2.destroyAllWindows()
```

HOW FACE DETECTION WORKS:



Steps:

1. Face Detection. First, a camera will detect and recognize a human's face – one that can either be in a crowd or alone.
2. Face Analysis. After detection and recognition, a photo will capture the face and will then be analyzed. ...
3. Converting an Image into Data. After analysis, each nodal point becomes a number in the application database. The entire numerical code is referred to as a faceprint.
4. Matching. The final step of the process is finding a match. Your faceprint is compared to a database of other facial codes.

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4. Face Detection and Recognition Using OpenCV Maliha Khan Deptt. of Comp. Sc. and Engg, School of Engg. AnandTech Sharda University, Gr.Noida, Uttar Pradesh – 201306 malihakhan0009@gma il.com Sudeshna Chakraborty Deptt. of Comp. Sc. and Engg, School of Engg. and Tech Sharda University, Gr.Noida, Uttar Pradesh – 201306 Sudeshna. Chakraborty @sharda.ac.in Rani Astya Deptt. of Comp. Sc. and Engg, School of Engg. and Tech Sharda University, Gr.Noida, Uttar Pradesh – 201306 Rani.astya@sharda.ac. in Shaveta Khepra Deptt. of Comp. Sc. and Engg, School of Engg. and Tech Sharda University, Gr.Noida, Uttar Pradesh – 201306 Shaveta.khepra@shard a.ac.in