MINOR PROJECT REPORT

JORHAT INSTITUTE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF CS & IT

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Titel of the Project

"Face Recognition Based Attendance System"

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Project Objective:

Attendance is prime important for both the teacher and student of an educational organization. So it is very important to keep record of the attendance. The problem arises when we think about the traditional process of taking attendance in class room. Calling name or roll number of the student for attendance is not only a problem of time consumption but also it needs energy. So an automatic attendance system can solve all above problems. There are some automatic attendances making system which are currently used by much institution. One of such system is biometric technique and RFID system. Although it is automatic and a step ahead of traditional method it fails to meet the time constraint. The student has to wait in queue for giving attendance, which is time taking. This project introduces an involuntary attendance marking system, devoid of any kind of interference with the normal teaching procedure. The system can be also implemented during exam sessions or in other teaching activities where attendance is highly essential. This system eliminates classical student identification such as calling name of the student, or checking respective identification cards of the student, which can not only interfere with the ongoing teaching process, but also can be stressful for students during examination sessions.

Background:

Face recognition is crucial in daily life in order to identify family, friends or someone we are familiar with. We might not perceive that several steps have actually taken in order to identify human faces. Human intelligence allows us to receive information and interpret the information in the recognition process. We receive information through the image projected into our eyes, by specifically retina in the form of light.

We actually classify shape, size, contour and the texture of the object in order to analyze the information. The analyzed information will be compared to other representations of objects or face that exist in our memory to recognize.

Nowadays, face recognition system is prevalent due to its simplicity and awesome performance. For instance, airport protection systems and Police use face recognition for criminal investigations by tracking suspects, missing children and drug activities.

Problem Statement:

 Traditional student attendance marking technique is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking technique such as 5 calling student names or checking respective identification cards. There are not only disturbing the teaching process but also causes distraction for students during exam sessions. Apart from calling names, attendance sheet is passed around the classroom during the lecture sessions. The lecture class especially the class with a large number of students might find it difficult to have the attendance sheet being passed around the class. Thus, face recognition attendance system is proposed in order to replace the manual signing of the presence of students which are burdensome and causes students get distracted in order to sign for their attendance.

One of the difficulties of facial identification is the identification between known and unknown images. In addition, paper proposed found out that the training process for face recognition student attendance system is slow and time-consuming.

Aims and Objectives:

The objective of this project is to develop face recognition attendance system. Expected achievements in order to fulfill the objectives are:

● To detect the face segment from the video frame.

● To extract the useful features from the face detected.

● To classify the features in order to recognize the face detected.

● To record the attendance of the identified student

Algorithm Used:

Step 1: Import the necessary libraries

```python
import face_recognition
import cv2
import numpy as np
import csv
import os
from playsound import playsound
from datetime import datetime
import pandas as pd
from subprocess import call
```

Step 2: Define a folder path where your training image dataset will be stored.

```python
path = 'C:\Users\LENOVO\Desktop\Minor Project\images'
```

Note: We are storing images of people by "person_name.jpg/jpeg" this format only.

Step 3: Create a list to store person_name and image array.

```python
images =[]
known_faces_names=[]
myList = os.listdir(path)
print(myList)
for cl in myList:
    curImg = cv2.imread(f'{path}/{cl}')
    images.append(curImg)
    known_faces_names.append(os.path.splitext(cl)[0]) #removes file extension from the
image and takes the name of the image
    print(known_faces_names)
```

Step 4: Create a function to encode all the train images and store them in an empty list known_faces_encodings=[ ].

```python
known_faces_encodings=[]
def findEncodings(images):
    for img in images:
        img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
        encode = face_recognition.face_encodings(img)[0]
        known_faces_encodings.append(encode)
    return known_faces_encodings
known_faces_encodings = findEncodings(images)
student=known_faces_names.copy()#create another list that stores the known students
names.
```

Step 5: Now create a csv file as 'today's_date.csv'

```python
nowdate = datetime.now()
current_date=nowdate.strftime("%d-%m-%Y")
#creating csv file
f = open(current_date+".csv","w+",newline='')
lnwriter=csv.writer(f)
lnwriter.writerow(["Name","Roll no","Time"])
```

Step 6: Read Webcam for Real-Time Recognition and mark the attendance in the csv file and remove the names of students from the list that are being marked present.

```python
video_capture=cv2.VideoCapture(0)
face_loc=[]
face_encodings=[]
face_name=[]
s=True

while True:
    ret, frame=video_capture.read()
    small_frame=cv2.resize(frame,(0,0),fx=0.25,fy=0.25)
    small_frame=cv2.cvtColor(small_frame, cv2.COLOR_BGR2RGB)
    if s:
        face_locations= face_recognition.face_locations(small_frame)
        face_encodings=face_recognition.face_encodings(small_frame, face_locations)
        face_names=[]
        for face_encoding in face_encodings:
            matches=face_recognition.compare_faces(known_faces_encodings, face_encoding)
            name=""
            face_distance=face_recognition.face_distance(known_faces_encodings,face_encoding)
            best_match_index= np.argmin(face_distance)
            if matches[best_match_index]:
```

```python
            name= known_faces_names[best_match_index]
        face_names.append(name)
        if name in known_faces_names:
            if name in student:
                roll_no=known_faces_names.index(name)+1
                student.remove(name)
                print(student)
                nowtime = datetime.now()
                current_time = nowtime.strftime("%H:%M:%S")
                playsound("attendance.wav")
                lnwriter.writerow([name.capitalize(),roll_no,current_time])


cv2.imshow("attendence sys",frame)
if cv2.waitKey(1) & 0xFF == ord('q'):
    break
```

Flow Chart:

```
                          ┌─────────┐
                          │  Start  │
                          └────┬────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │  Image stored in system │
                    └──────────┬───────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │ Recognition process start │
                    └──────────┬───────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │ Camera captures the user image │
                    └──────────┬───────────┘
    Check                      │
    Continuously               ▼
                          ◇─────────────◇     Don't match
                         < Compare with  >─────────────────┐
                          < system image  >                 │
                           ◇───────────◇                    ▼
                     Match       │              ┌──────────────────────┐
                                 ▼              │ Ignore the unknown person │
                    ┌──────────────────────┐   └──────────┬───────────┘
                    │   Present to the user │              │
                    └──────────┬───────────┘              ▼
                               │              ┌──────────────────────┐
                               ▼              │    No Data record     │
                    ┌──────────────────────┐ └──────────┬───────────┘
                    │ A csv file generated with │◄────────┘
                    │   student details    │
                    └──────────┬───────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │ Attendance uploaded in Web server │
                    │      automatically   │
                    └──────────┬───────────┘
                               │
                               ▼
                          ┌─────────┐
                          │   End   │
                          └─────────┘
```