A Project Report

on

Ur Info: A cross-platform Application

Submitted in partial fulfillment of the requirement for the award of the degree of

Image based attendence system using face recognition.

Submitted in partial fulfillment of the requirement for the award ofthe degree of

B.tech cse with DA

Under The Supervision of

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CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project, entitled **" Ur Info: A cross-platform Application "** in partial fulfillment of the requirements for the award of the **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING** submitted in the **School of Computing Science and Engineering** of Galgotias University, Greater Noida, is an original work carried out during the period of **JULY-2021 to DECEMBER-2021**, under the supervision of **Mr.V. ARUL, Assistant Professor**, **Department of Computer Science and Engineering** of School of Computing Science and Engineering , Galgotias University,
Greater Noida

The matter presented in the project has not been submitted by me/us for the award of any other degree of this or any other places.

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Abstract

The traditional method of raising your hand in a classroom to say "present ma'am" or "yes ma'am" or whatever other things you would say is kind of fading away. With the introduction of online classes where students and teachers interact through an online platform, it would be harder to take attendance in the more traditional way. However, computer vision comes to the rescue to help us create an image-based attendance system for taking attendance online with the help of your pixelated pictures! In mary universities with the help of this sytem we can save our time in classroom and also teachers can use those times in studying.

Keyword: image detection,student database, face recognition.

contents

Chapter 1.

Introduction

Recording student attendance is a common practice in many schools and universities, especially for those who enforce compulsory attendance policy . Some scholarship programs also demand a class nattendance report of their awardee. Several studies have been conducted in investigating the correlation between students' attendance and their academic performance. Majority of the studies reported a positive correlation between these two factors . Recent study also reported that student absenteeism could be used as an effificient predictor of student failing rate . In contrast, other studies that student attendance and academic performance are weakly correlated or even non correlated . Academic performance is A complex topic with multiple facets and should not be evaluated basedon class attendance alone. Whether or not there exists acorrelationbetweenstudent attendance and their academic performance, theirattendance is still worthwhile to be recorded as it is part of the academic process.There are two conventional practices for recording student attendance in a classroom, namely roll-call and sign-in-sheet In roll-call, a lecturer calls out a list of students' name and records who are present in the class. With sign-insheet, each student needs to locate their name and sign the sheet to record their attendance in the class. The attendance sheet is circulated among students in the class as the lecture progresses. These conventional practices are proven to be especially in classes with large number of students.

Several issues are identifified as follows:

(a) Time ineffificiency:

Roll-call is a time consuming procedure as lecture time is wasted to call the name of each enrolled student and record their attendance. Sign-in-sheet is also considered time ineffificient where attendance sheet needs to be circulated among students in the class, although it is not necessarily halting or stopping the ongoing lecture .

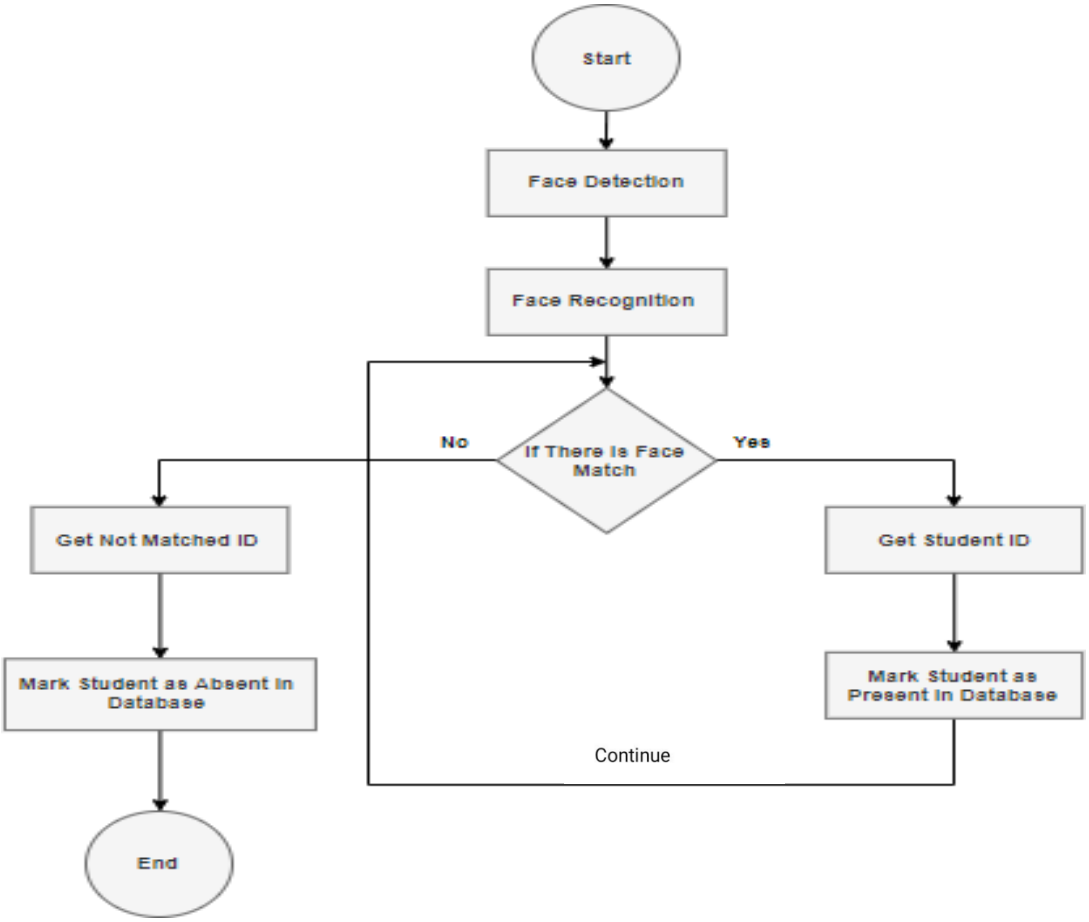
b) Labour intensiveness:

In terms of staff-workload, both roll-call and sign-in-sheet require administrative staff to convert the attendance record from a printed (paper-based) for mat into digital format by inputting the data into spreadsheets or a database management system. This procedure is necessary for further data processing such as calculating the attendance percentage for each student or for each course . Such procedure is labour intensive and time ineffificient, especially for institutions with large number of classes and students.

c) Human error:

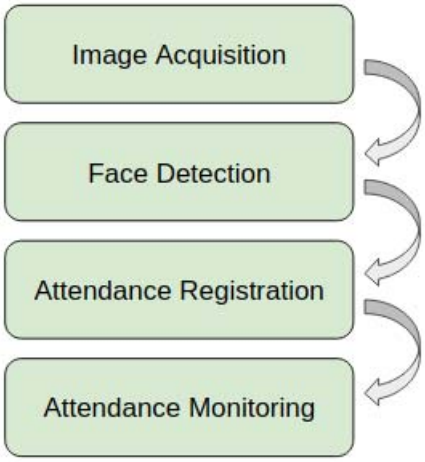
The increase in staff-workload may introduce mistakes and errors during the aforementioned data conversion procedure (i.e., from printed to digital format). In addition, attendance data recorded on a piece of paper is easy to be lost or damaged due to poor practices in document handling. Human error may also occur while the attendance is being recorded in the class.

1.1 flow chart



1.2 Project design:

We propose a low cost solution in recording student attendance by employing face detection technique. Our solutionconsists of four stages: image acquisition, face detection,attendance registration, and attendance monitoring.. We named our proposed solution IBAtS (Image BasedAttendance System). The system is designed to improve thetime effificiency and to reduce the staff-workload, which wouldultimately improve the reliability of the attendance record.



Four stages in IBAtS. A lecturer initiates the procedure by taking class photographs which cover the entire class attendees. IBAtS then proceeds withface detection procedure to locate faces in each photo. Each detected face is sent back to the students and they can register their attendance by simply selecting their own face. As the academic semester progresses, interested parties (e.g., lecturers, students, and head of department) are able to monitor the attendance report in real-time.

IMPLEMENTING THE ATTENDANCE SYSTEM

1. Install Python and dependencies. Follow this in the documentation.
2. Install OpenCV along with python wrappers. Follow the guides for Windows and Linux.
3. Install numpy using pip install numpy
4. Install requests using pip install requests
5. Create a file attendance.py and start coding as follows

First, import the necessary dependencies.

```
?
1 import cv2
2 import requests
3 import numpy as np
4 import json
5 import argparse
6 import signal
7 import logging
8 import datetime, time
```

Deepsight Face runs as an http service on localhost. Hence, we need to define the API endpoints.

```
?
1 face_api = "http://localhost:5000/inferImage?returnFaceId=true"
2 compare_api = "http://localhost:5000/compareFaces"
```

Since this program will be a little sophisticated, we would like to log a few things. Hence, we need to initialise the logs.

```
?
01 # init logger
02 logger = logging.getLogger('Attendance')
03 logger.setLevel(logging.DEBUG)
04 # create console handler with a higher log level
05 ch = logging.StreamHandler()
06 ch.setLevel(logging.DEBUG)
07 # create formatter and add it to the handlers
08 formatter = logging.Formatter('%(asctime)s - %(name)s - %(levelname)s - %(message)s')
09 ch.setFormatter(formatter)
```

```
10
11  # add the handlers to the logger
    logger.addHandler(ch)
```

Next, initialise the attendance register and attendance database. The database is a simple python dictionary that contains a name and its associated face vector. Also, the attendance register is a python list that consists of attendance log. Each attendance log is a python dict with name and timestamp.

```
?
01  # attendance register
02  att_reg = []
03  try:
04  att_reg = json.loads(open('att_log').read())
05  except:
06  pass
07
08  # initialize database
09  db = {}
10  try:
11  db = json.loads(open('att_db').read())
12  except:
13  pass
```

We then need to define some arguments that our program will be taking such as capture frame size and run mode. Our program will have two modes: Enrollment and Normal. In enrollment mode, our program will prompt the user to enter names of any newly detected face. In normal mode, the program will ignore unknown faces and log names that are known to the register.

```
?
1  # parse arguments
2  parser = argparse.ArgumentParser(description='Awesome Attendance System')
3  parser.add_argument('--enroll', action='store_true', help='Enable enrollment of
4  unknown faces')
5  parser.add_argument('--src', action='store', default=0, nargs='?', help='Set video
6  source; default is usb webcam')
7  parser.add_argument('--w', action='store', default=320, nargs='?', help='Set video
   width')
   parser.add_argument('--h', action='store', default=240, nargs='?', help='Set video
   height')
   args = parser.parse_args()
```

Let's begin by capturing from the webcam.

```
?
1  # start the camera
2  cap = cv2.VideoCapture(args.src)
3  cap.set(cv2.CAP_PROP_FRAME_WIDTH, args.w)
4  cap.set(cv2.CAP_PROP_FRAME_HEIGHT, args.h)
```

```
5  ret, frame = cap.read()
```

We need to define a routine to catch any interrupt and save the attendance before exit

```
?
```

```
01  # catch exit signal
02  def signal_handler(signal, frame):
03  if args.enroll:
04  logger.info("Saving Attendance DB")
05  with open('att_db','w') as att:
06  att.write(json.dumps(db,2))
07
08  logger.info("Saving attendance")
09  with open('att_log','w') as att:
10  att.write(json.dumps(att_reg))
11
12  exit(0)
13  signal.signal(signal.SIGINT, signal_handler)
```

Next, we define some functions that do the attendance management.

```
?
```

```
01  # enroll a new face into db
02  def enroll(embedding):
03  name = input("New face detected, enter name\n")
04  if name != "x":
05  db[name] = embedding
06  print("Enrolled %s into db!"%name)
07
08  # search for a face in the db
09  def identify_face(embedding):
10  for name, emb in db.items():
11  face_pair = {"faceA":emb, "faceB":embedding}
12  cmp_r = requests.post(compare_api, data=json.dumps(face_pair))
13  cmp_r = cmp_r.json()
14  logger.debug(cmp_r)
15  if cmp_r["same"]:
16  return name
17
18  return None
19
20  # last attendance
21  def mins_since_last_log():
22  return ((datetime.datetime.now() - datetime.datetime.strptime(att_reg[-1]['time'],
23  '%Y-%m-%d %H:%M:%S')).seconds/60)
24
25  # mark attendance
26  def mark_present(name):
27      if len(att_reg) == 0:
28      logger.info("Detected %s"%name)
29      stime = datetime.datetime.fromtimestamp(time.time()).strftime('%Y-%m-
30  %d %H:%M:%S')
31      att = {'name':name,'time':stime}
32      att_reg.append(att)
33  return
```

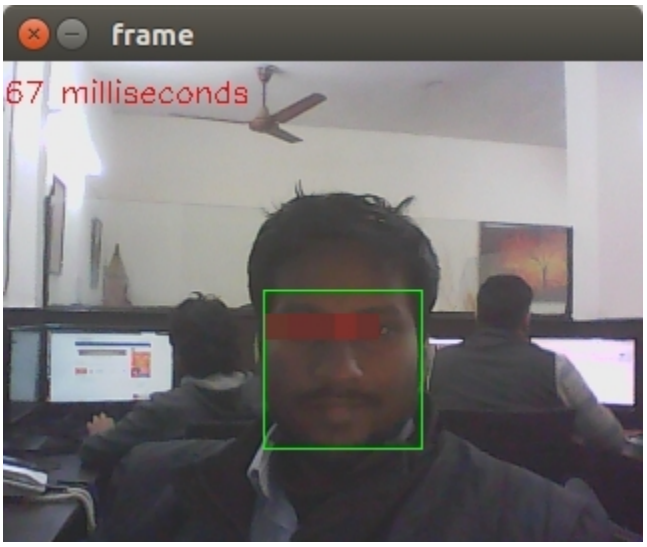
```
34
35 if att_reg[-1]['name'] != name or mins_since_last_log()
36 &amp;amp;amp;amp;amp;amp;amp;gt; 1:
37 logger.info("Detected %s"%name)
   stime = datetime.datetime.fromtimestamp(time.time()).strftime('%Y-%m-%d %H:%M:%S')
   att = {'name':name,'time':stime}
   att_reg.append(att)
```

Finally, we write code that actually implements our system.

```
?
```

```
01 &amp;amp;amp;amp;amp;amp;lt;pre&amp;amp;amp;amp;amp;amp;gt;# start processing
02 while True:
03 _, framex = cap.read()
04 key = cv2.waitKey(50) &amp;amp;amp;amp;amp;amp;amp;amp; 0xFF
05
06 frame = cv2.resize(framex, (args.w,args.h))
07
08
09 r, imgbuf = cv2.imencode(".jpg", frame)
10 image = {'pic':bytearray(imgbuf)}
11
12 r = requests.post(face_api, files=image)
13 result = r.json()
14
15 if len(result) &amp;amp;amp;amp;amp;amp;amp;gt; 1:
16 faces = result[:-1]
17 diag = result[-1]['diagnostics']
18
19 for face in faces:
20 rect, embedding = [face[i] for i in ['faceRectangle','faceEmbeddings']]
21 x,y,w,h = [rect[i] for i in ['left', 'top', 'width', 'height']]
22
23 cv2.rectangle(frame, (x,y), (x+w,y+h), (0,255,0),1,8)
24 name = identify_face(embedding)
25 if not name is None:
26 cv2.putText(frame, name, (x,y+22), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0,0,255))
27 mark_present(name)
28 break
29 else:
30 if args.enroll:
31 enroll(embedding)
32
33 cv2.putText(frame, diag['elapsedTime'], (0,20), cv2.FONT_HERSHEY_SIMPLEX, 0.5,
34 (0,0,255))
35
36 cv2.imshow("frame", frame)
37 if key == ord('q'):
38 break;
39
   print("Exit")
```

Sample output



Chapter 2.

Literature survey:

R. Patel and S. B. Yagnik, “A literature survey on face recognition techniques,

From the literature, we identifified a number of proposals to improve our practice in recording student attendance. Ingeneral the main focus of these proposals is to reduce thestaff-workload while collecting and processing the student attendance data, which will also improve the time effificiency andthe reliability of the data. We classifified these proposals intotwo categories: token-based and biometrics-based attendancesystems.In token-based attendance system, each student is required to present a token to verify and register their attendance in a class.

This would introduce a fairly high investment cost, especially for institutions with a large number of classrooms. In addition, only one student can register their attendance at a given time (assuming there is only one reader installed in a classroom). For classes with large number of students, this could result in a long queue of students waiting to register their attendance.

Some studies in token-based attendance system try to make further improvement (to overcome the aforementioned issues)by automating the attendance registration procedure. The study reported in utilised an indoor positioning system, based on students' smartphone WiFi connection [to track students attendance in each class. The study took advantage of the large scale deployment of WiFi infrastructure in their campus. In addition to the automated attendance tracking, their proposed method is also capable of tracking late arrival and early departure students in each class. A fairly similar approach was also reported in although attendance record was not the primary focus of their study. A slightly different approach was proposed in where Bluetooth connections among minimum number of eight nearby students' smartphones were utilised to estimate the class attended by those students.

4.Conclusion

In this approach, a face recognition based automated student attendance system is thoroughly described. The proposed approach provides a method to identify the individuals by comparing their input image obtained from recording video frame with respect to train image. This proposed approach able to detect and localize face from an input facial image, which is obtained from the recording video frame. Besides, it provides a method in pre-processing stage to enhance the image contrast and reduce the illumination effect

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