ABSTRACT

We are living in a world where everything is automated and linked online. The internet of things, image processing, and machine learning are evolving day by day. Many systems have been completely changed due to this evolution to achieve more accurate results. The attendance system is a typical example of this transition, starting from the traditional signature on a paper sheet to face recognition. This Project proposes a method of developing a comprehensive embedded class attendance system using facial recognition with showing whether the face of the person is the student for that specified class or not. The system is based on the machine learning algorithm which is to be implemented on python language and using computer/laptop camera for the input image of the students or a normal outer camera can also be used which has to be connected to the system which is programmed to handle the face recognition by implementing the Local Binary Patterns algorithm LBPs.

1. INTRODUCTION

To maintain the attendance record with day-to-day activities is a challenging task. The conventional method of calling the name of each student is time consuming and there is always a chance of proxy attendance. The following system is based on face recognition to maintain the attendance record of students. The daily attendance of students is recorded subject wise which is stored already by the administrator. As the time for corresponding subjects arrives the system automatically starts taking snaps and then applying face detection and recognition technique to the given image and the recognized students are marked as present and their attendance updated with corresponding time and subject id. We have used deep learning techniques to develop this system. Our system is capable of identifying multiple faces in real time. The main objective of this project is to develop a face recognition based automated student attendance system.

2.DETAILED PROJECT PROFILE

Attendance is important for both the teacher and student of an educational organization. So it is very important to keep a record of the attendance. The problem arises when we think about the traditional process of taking attendance in classrooms. Calling the 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 of the above problems. There are some automatic attendance making systems which are currently used by many institutions. One such system is biometric technique and RFID system.

Although it is automatic and a step ahead of traditional methods it fails to meet the time constraint. The student has to wait in a queue for attendance, which is time-consuming. 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 the name of the student, or checking the 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. In addition, the students have to register in the database to be recognized. The enrollment can be done on the spot through the user-friendly interface.

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 been 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. Light is a form of electromagnetic waves which are radiated from a source onto an object and projected to human vision. Robinson-Riegler, G., & Robinson-Riegler, B. (2008) mentioned that after visual processing done by the human visual system, 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 faces that exist in our memory to recognize. In fact, it is a hard challenge to build an automated system to have the same capability as a human to recognize faces. However, we need a large memory to recognize different faces. For example, in the Universities, there are a lot of students of different races and genders, it is impossible to remember every face of the individual without making mistakes. In order to overcome human limitations, computers with almost limitless memory, high processing speed and power are used in face recognition systems.

3 REQUIREMENT SPECIFICATION

3.1 Purpose

To identify the student faces accurately. To mark the attendance automatically. To reduce the time and the efforts required for manual attendance to provide a valuable attentive system for both teacher and students. It provides flexibility and reduces the time loss.

There will be no chance for a proxy.

The objective of this project is to develop a face recognition based automated student 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.

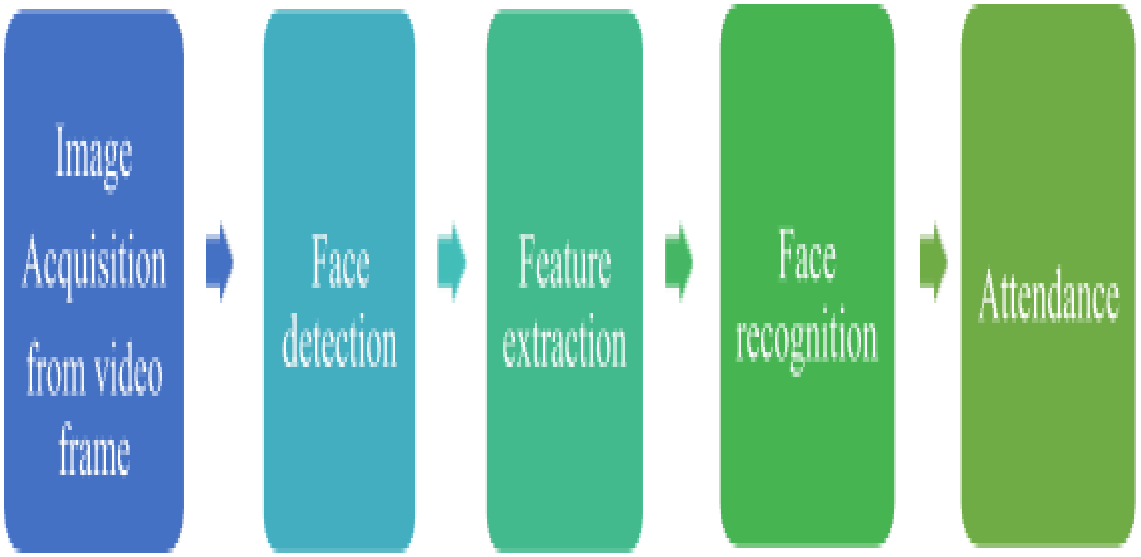

Fig 3.1 (Block Diagram of the General Framework)

3.2 SCOPE

In further work, we intend to improve face detection effectiveness by using the interaction among our system, the students and the teacher. On the other hand, our system can be improved by integrating video-streaming service and lecture archiving system, to provide more profound applications in the field of distance education, course management system (CMS) and support for faculty development (FD).We can further improve this system so as we can run this system with more than two students on a bench and allowing them to change their positions.

- Using this system we will able to accomplish the task of marking the attendance in the classroom automatically and output is obtained in an excel sheet as desired in real-time

- However, in order to develop a dedicated system which can be implemented in an educational institution, a very efficient algorithm which is insensitive to the lighting conditions of the classroom has to be developed.

- Also a camera of the optimum resolution has to be utilized in the system.

- Another important aspect where we can work towards is creating an online database of the attendance and automatic updating of the attendance

3.3 Abbreviation

All the students of the class must register themselves by entering the required details and then their images will be captured and stored in the dataset. During each session, faces will be detected from live streaming video of the classroom. The faces detected will be compared with images present in the dataset. If a match is found, attendance will be marked for the respective student. The task of the proposed system is to capture the face of each student and to store it in the database for their attendance. The face of the student needs to be captured in such a manner that all the features of the students' face needs to be detected, even the seating and the posture of the student need to be recognized. There is no need for the teacher to manually take attendance in the class because the system records a video and through further processing steps the face is being recognized and the attendance database is updated.

3.4 Hardware requirements

- RAM
- Storage Device/ Hard Disk to store the all images and database
- Webcam

3.5 Software requirements

- Pycharm
- Microsoft Excel
- Python

3.6 Tool Used

A face recognition-based attendance system typically uses a combination of several tools and technologies to accurately detect and identify faces. Here are the main components and tools involved:

Cameras: High-quality cameras capture images or video streams of individuals.

Face Detection: Algorithms such as Haar Cascades, Histogram of Oriented Gradients (HOG), or modern deep learning-based methods like Single Shot Multibox Detector (SSD) and You Only Look Once (YOLO) are used to locate faces in the images.

Face Recognition:

Deep Learning Models: Convolutional Neural Networks (CNNs) and models like OpenFace, FaceNet, DeepFace, or Dlib's face recognition are commonly used.
Pre-trained Models: Libraries like Dlib, OpenCV, or deep learning frameworks (TensorFlow, PyTorch) provide pre-trained models that can be fine-tuned or directly used for face recognition.

Database: A database to store facial data and attendance records. This can be a relational database like MySQL, PostgreSQL, or a NoSQL database like MongoDB.

Feature Extraction: Techniques to extract distinctive features from detected faces. Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), or deep learning embeddings from models like FaceNet are used.

Matching Algorithms: Algorithms to compare extracted features with stored templates. Methods like Euclidean distance, cosine similarity, or more complex machine learning models.

User Interface: A front-end interface for users to interact with the system. This can be a web application, a desktop application, or a mobile app.

Backend Server: Handles the processing of images, running face recognition algorithms, and managing the database. Technologies like Flask, Django, or Node.js are commonly used.

Security: Ensuring the privacy and security of stored facial data through encryption and secure access protocols.

Integration with Attendance Management System: Software to manage and record attendance data, often integrated with existing HR or school management systems

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4. SOFTWARE PROCESS MODEL USED

4.1 **Development Model**

OpenCV Library :-

OpenCV (Open-Source Computer Vision Library) is an open-source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

NumPy package :-

NumPy is a Python package which stands for 'Numerical Python'. It is the core library for scientific computing, which contains a powerful n-dimensional array object, provide tools for integrating C, C++ etc. It is also useful in linear algebra, random number capability etc.

Time Module :-

Python has a module named time to handle time related tasks. To use functions defined in the module, we need to import the module first.

Date Time Module :-

A date in python is not a date type of its own, but we can import a module named date time work with dates as a date object.

Presentation Layer

This layer is responsible for the user interface. All the components that users see and interact with within the application are in this layer.

Application Layer

Application layer controls the overall functionality of the system. Functionality such as logging into the system, facial detection, and recognition is all done in this layer.

Data Layer

In this layer, Data and Information are stored and retrieved in the database. The names, images of students as datasets, and teachers are stored in the database. Once the face is matched, marking of attendance in the database.

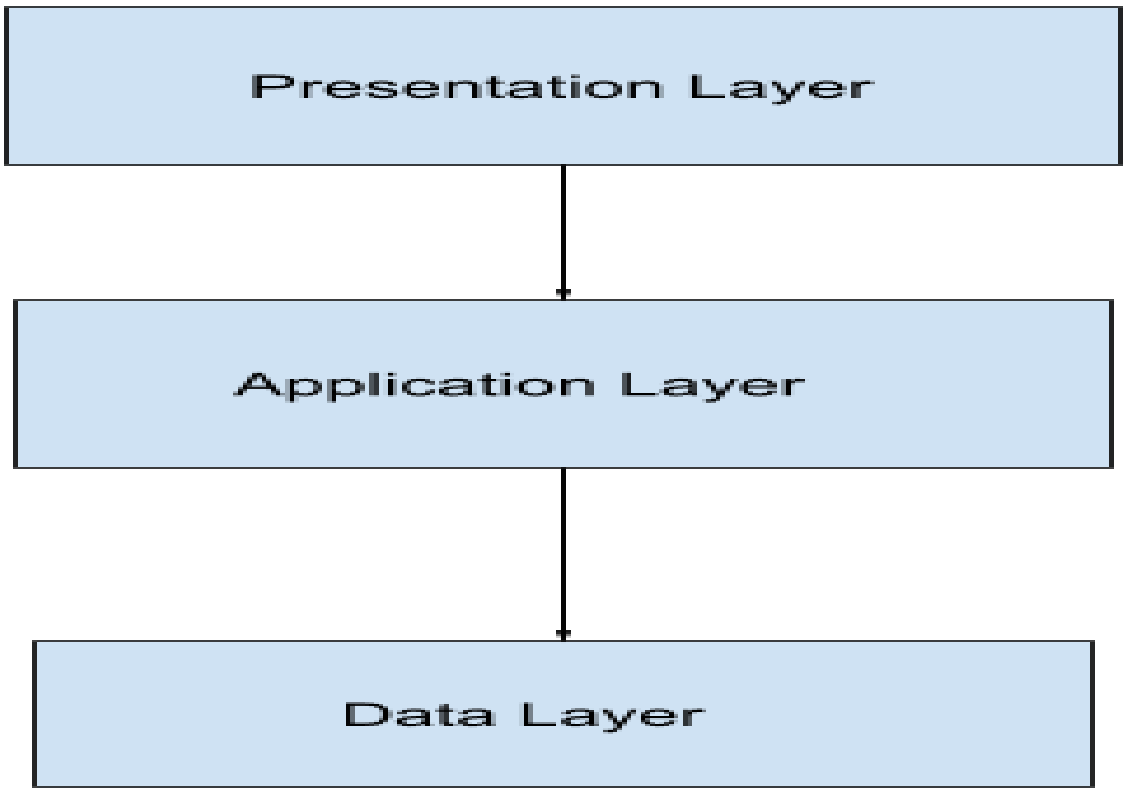


fig 4.1 Layers

5. SYSTEM DOCUMENTATION

5.1 Data dictionary

A data dictionary contains metadata i.e data about the database. It defines each data term encountered during the analysis and design of a new system. Data element can describe files or the processes

Following are some rules, which defines the construction of data dictionary entries:

1. Words should be defined to understand for what they need and not the variable need by which they by may be described in the program

2. Each word must be unique. We cannot have two definitions of the same client.

3. Aliases or synonyms are allowed when two or more entries show the same meaning.

For example a vendor number may also be called a customer number.

4. A self-defining word should not be decomposed. It means that the reduction of any information into subparts should be only if it is really required, that is it is not easy to understand directly.

Data dictionary includes information such as the number of records in file, the frequency a process will run, security factor like pass word which user must enter to get excess to the information

Field Name	Data Type	Length	Constraint	Description
Roll_no	Varchar	12	Primary Key	Student roll no
Name	Varchar	20	Not null	Name of a student
Date	Date	10	Not null	Date of Attendance
Time	Time	10	Not null	Time of Attendance

Attendance	Varchar	7	Present of Absent	Attendance of a student
Image	.jpg	100	Size must be 50KB	Images of a student

5.2 ERD

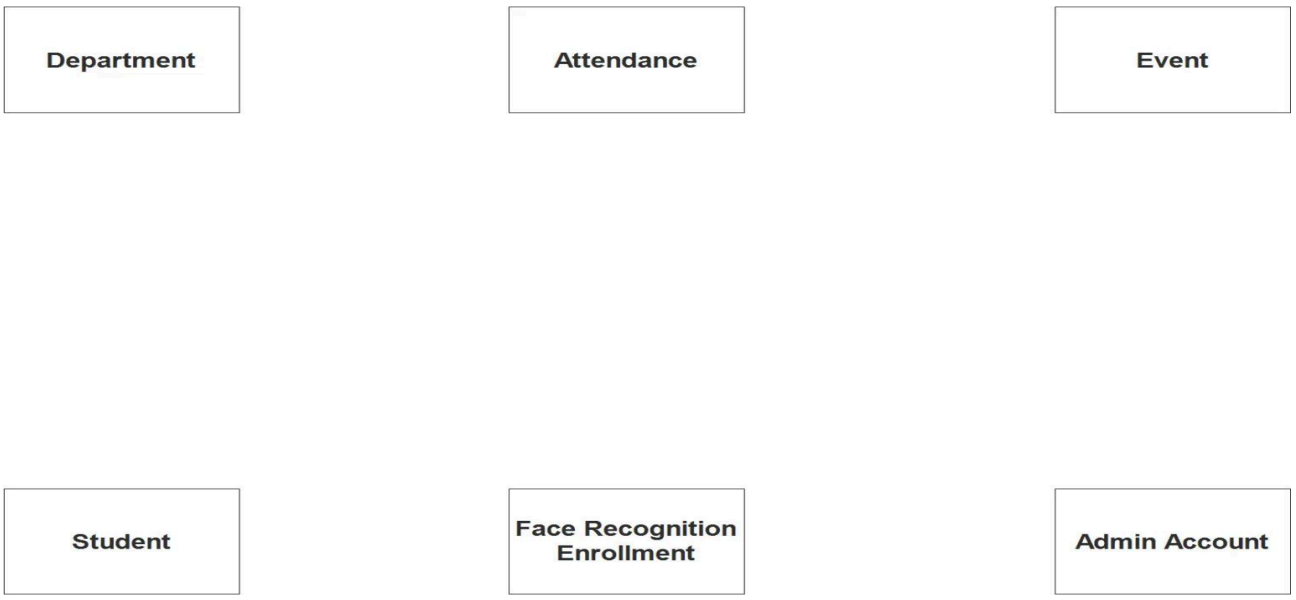
ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationship of entity sets stored in a database. In other words, ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic concepts: entities, attributes and relationships.
ER Diagrams contain different symbols that use rectangles to represent entities, ovals to define attributes and diamond shapes to represent relationships.

Step 1. In the Face Recognition Attendance System we have the following entities:

- Department
- Student
- Attendance
- Face Recognition Enrollment
- Event
- Admin Account

The Face Recognition Attendance System is divided into six tables, according to our methodology. As we work on the Face Recognition Attendance System database schema, here is what our database tables will look like as we progress. The database tables will be made up of these entities

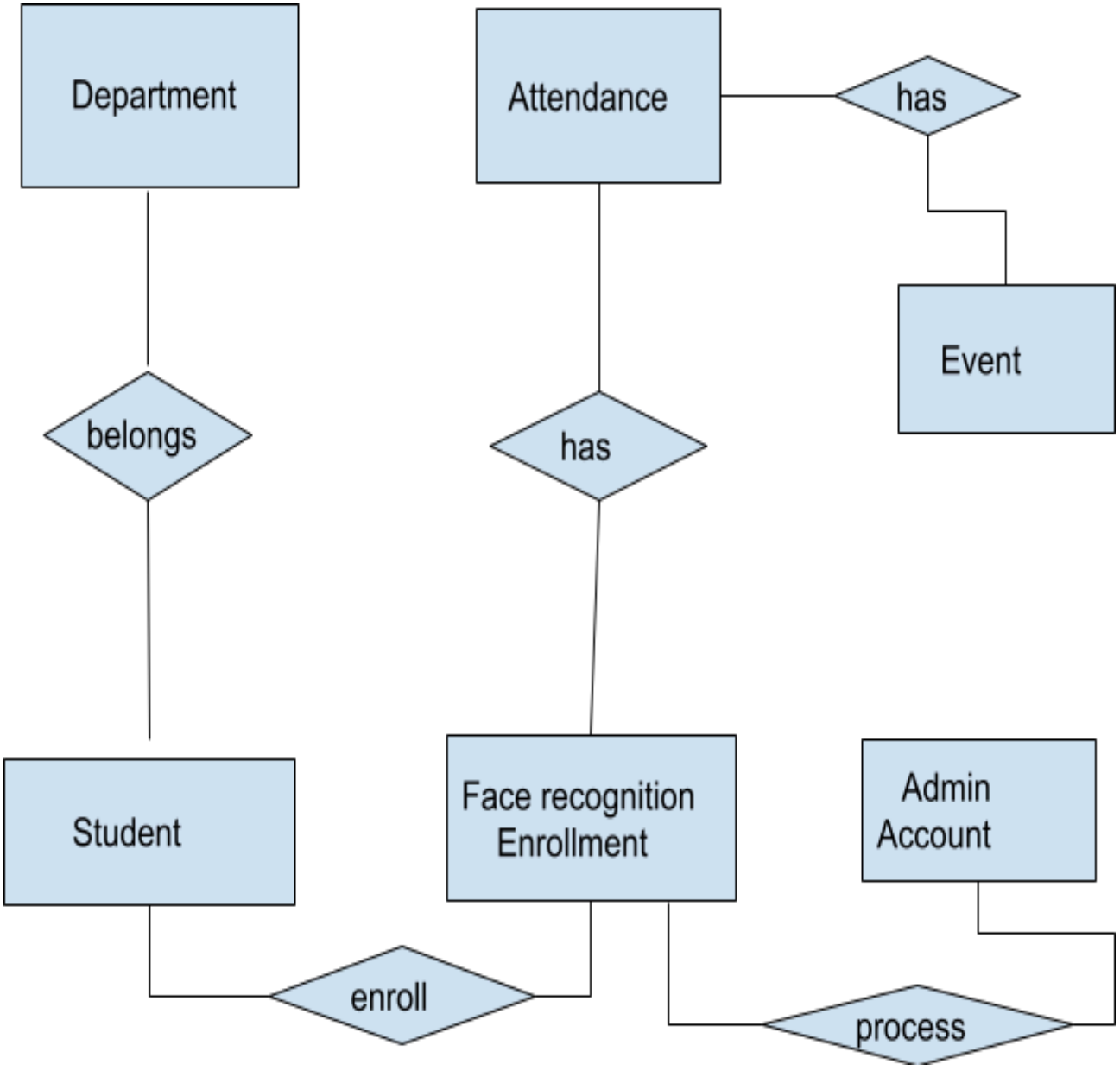
fig 5.2.1 ERD 1



Step 2. After we have specified our entities, it is time now to connect or establish a relationship among the entities.

- The student or employee belongs to a department (1 to 1 relationship).
- The student can only be registered once in the face recognition system (1 to 1 relationship).
- The administrator account processes the enrolment of students and employees in the face recognition system (1 to many relationships).
- The event information is attached to the attendance module of the system (1 to 1 relationship).
- The information of the student or employee is recorded in the attendance module of the project.

fig 5.2.2 ERD 2



Step 3. The last part of the ERD process is to add attributes to our entities.

Department Entity has the following attributes:

- Department ID – primary key represented with underline
- Department Code
- Department Name

Student Entity has the following attributes:

- Student ID – primary key represented with underline
- Student ID Number
- Last name
- First name
- Middle Name
- Gender
- Department ID – foreign key
- Contact Number
- Email
- Username
- Password
- Account Status

Attendance Entity has the following attributes:

- Attendance ID – primary key represented with underline
- Event ID – foreign key
- Enrolment ID – foreign key
- Date
- Time

Face Recognition Enrollment Entity has the following attributes:

- Enrollment ID – primary key represented with underline
- ID Number
- Face Image
- Type
- Admin ID – foreign key

Event Entity has the following attributes:

- Event ID – primary key represented with underline
- Event Name
- Description
- Date
- Upload Banner

Admin Account Entity has the following attributes:

- Admin ID – primary key represented with underline
- Username
- Password
- Name
- Contact
- Email

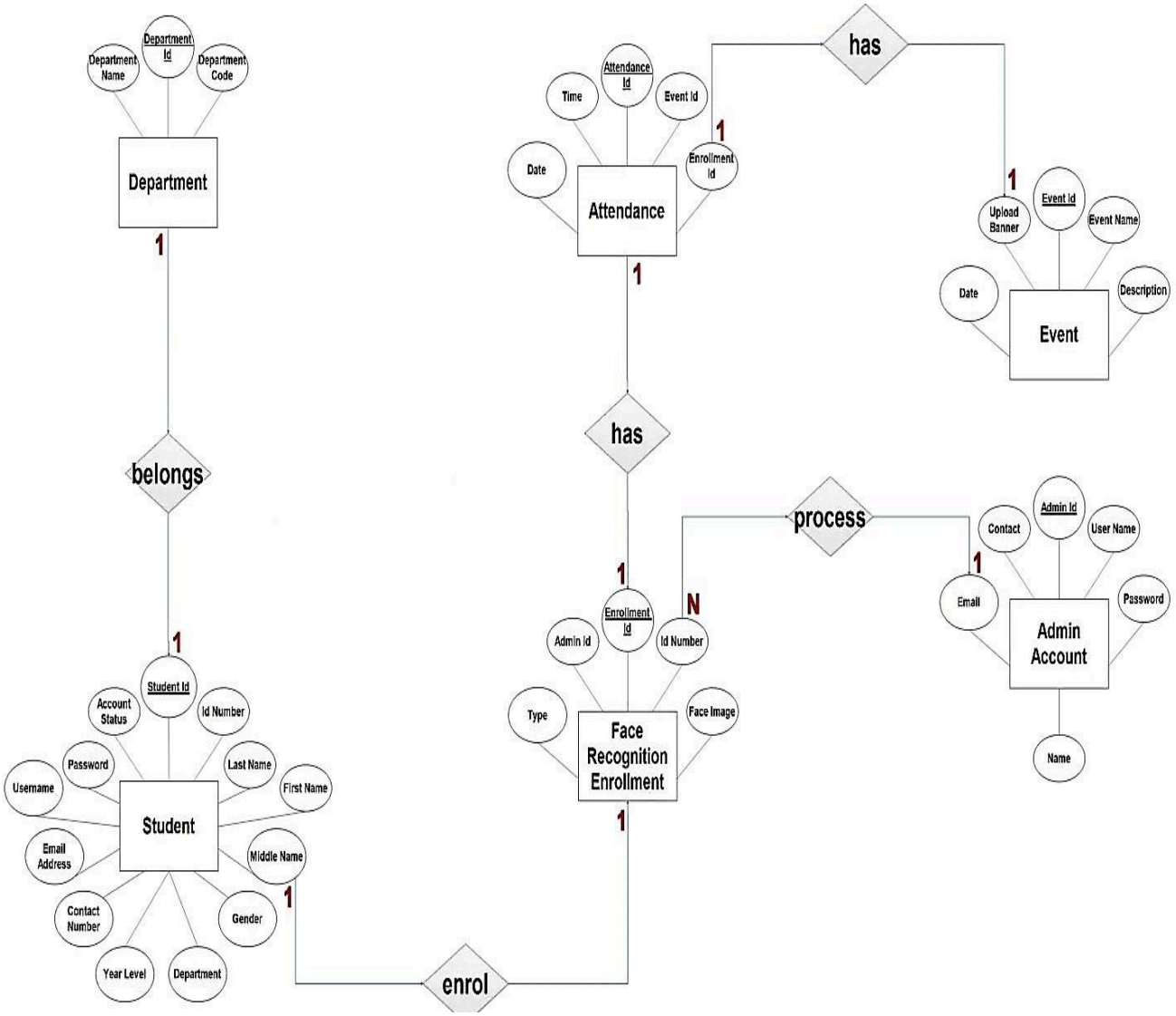


fig 5.2.3 ERD 3

5.3 Data Flow Diagram

DFD is the abbreviation for Data Flow Diagram. The flow of data of a system or a process is represented by DFD. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does not have control flow and no loops or decision rules are present. Specific operations depending on the type of data can be explained by a flowchart. Data Flow Diagrams can be represented in several ways. The DFD belongs to structured-analysis modeling tools. Data Flow diagrams are very popular because they help us to visualize the major steps and data involved in software-system processes.
Components of DFD
The Data Flow Diagram has 4 components:

- **Process**

  Input to output transformation in a system takes place because of process function. The symbols of a process are rectangular with rounded corners, oval, rectangle or a circle. The process is named a short sentence, in one word or a phrase to express its essence.

- **Data Flow**

  Data flow describes the information transferring between different parts of the systems. The arrow symbol is the symbol of data flow. A relatable name should be given to the flow to determine the information which is being moved. Data flow also represents material along with information that is being moved. Material shifts are modeled in systems that are not merely informative. A given flow should only transfer a single type of information. The direction of flow is represented by the arrow which can also be bi-directional.

- **Warehouse**

  The data is stored in the warehouse for later use. Two horizontal lines represent the symbol of the store. The warehouse is simply not restricted to being a data file rather it can be anything like a folder with documents, an optical disc, a filing cabinet. The data warehouse can be viewed independent of its implementation. When the data flows from the warehouse it is considered as data reading and when data flows to the warehouse it is called data entry or data updation.

- **Terminator**

  The Terminator is an external entity that stands outside of the system and communicates with the system. It can be, for example, organizations like banks, groups of people like customers or different departments of the same organization, which is not a part of the Modeled systems also communicate with terminators.

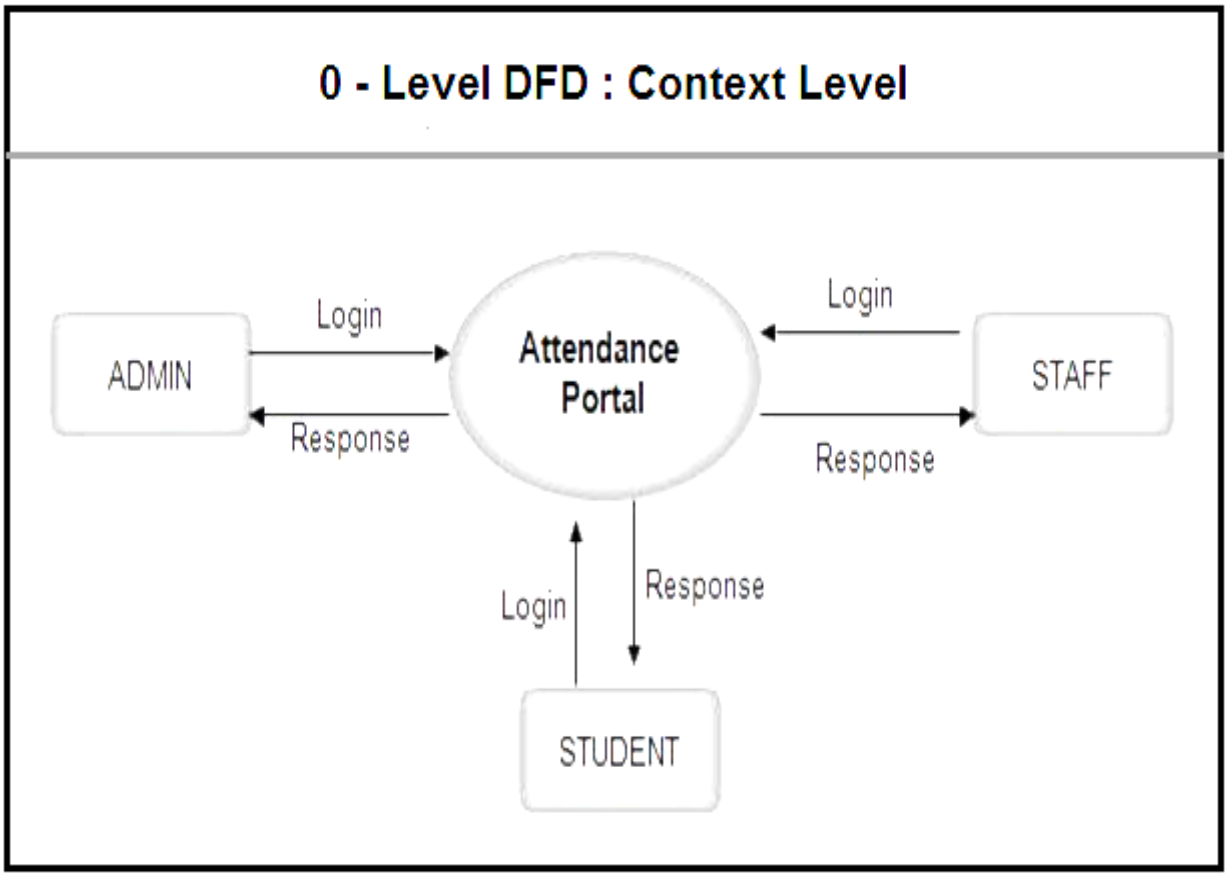
Rules for creating DFD

- The name of the entity should be easy and understandable without any extra assistance(like comments).
- The processes should be numbered or put in an ordered list to be referred to easily.
- The DFD should maintain consistency across all the DFD levels.
- A single DFD can have maximum processes up to 9 and minimum 3 processes.

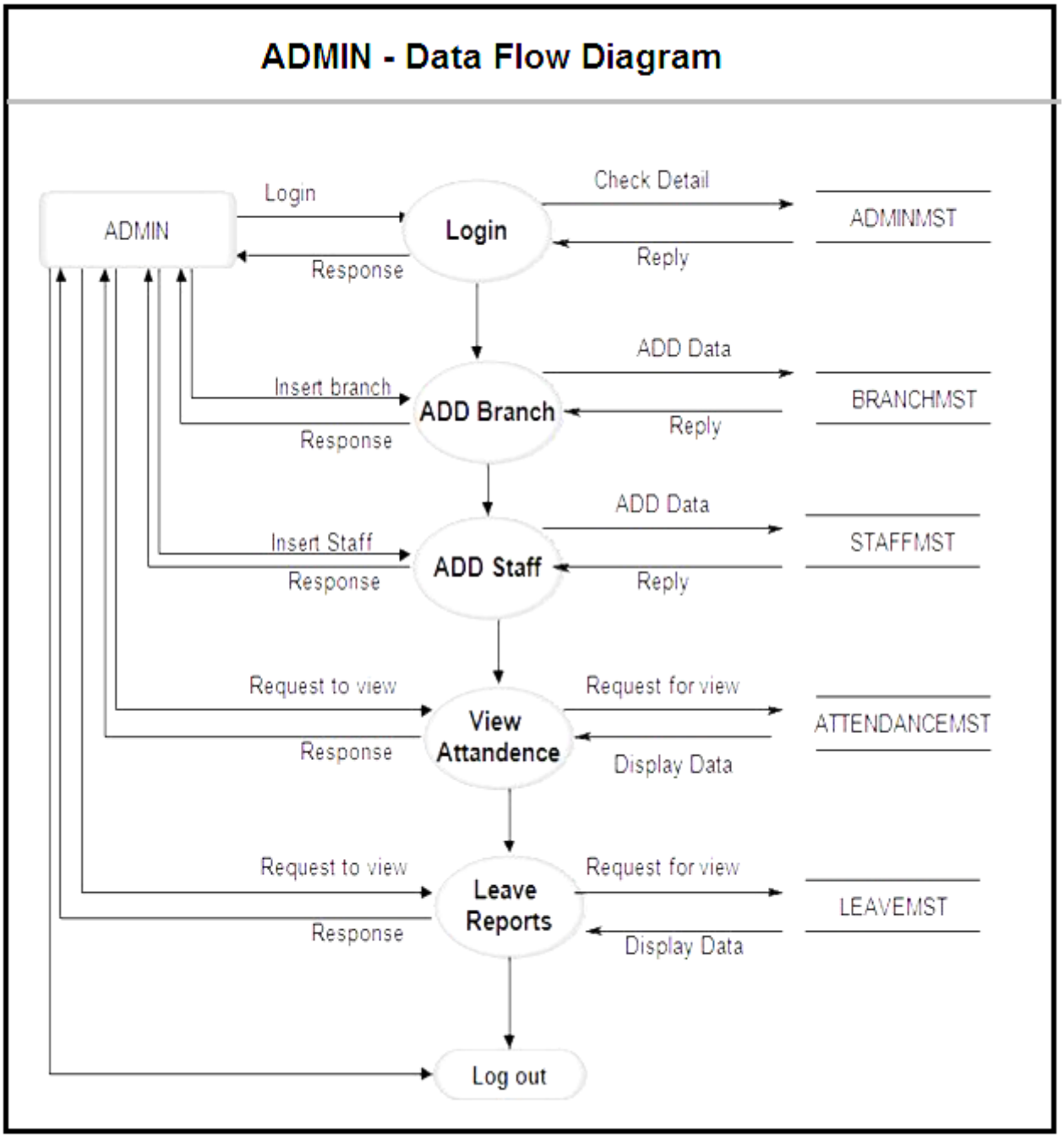
Levels of DFD

DFD uses hierarchy to maintain transparency thus multi level DFD's can be created. Levels of DFD are as follows:

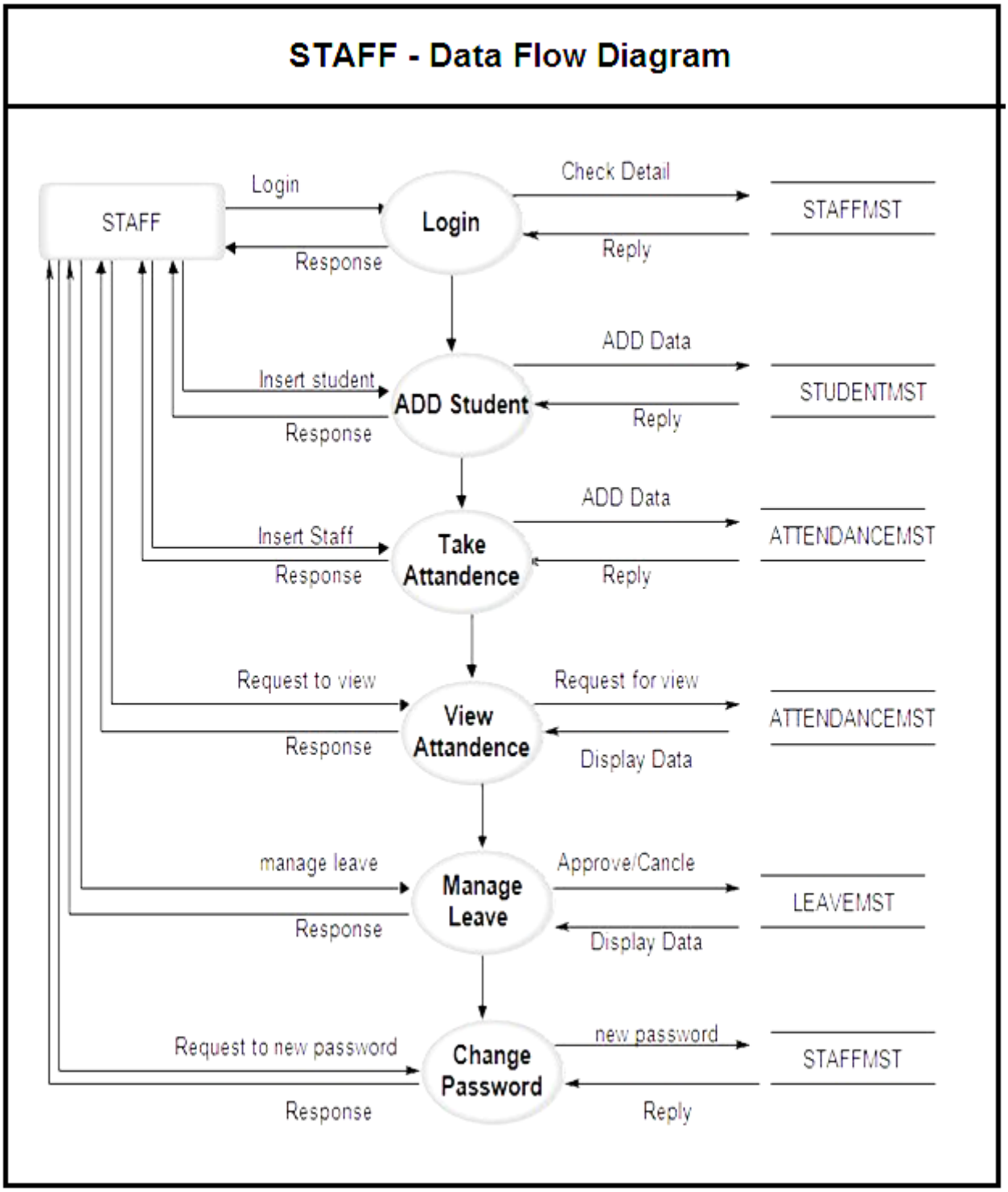
- 0-level DFD
- 1-level DFD:
- 2-level DFD:



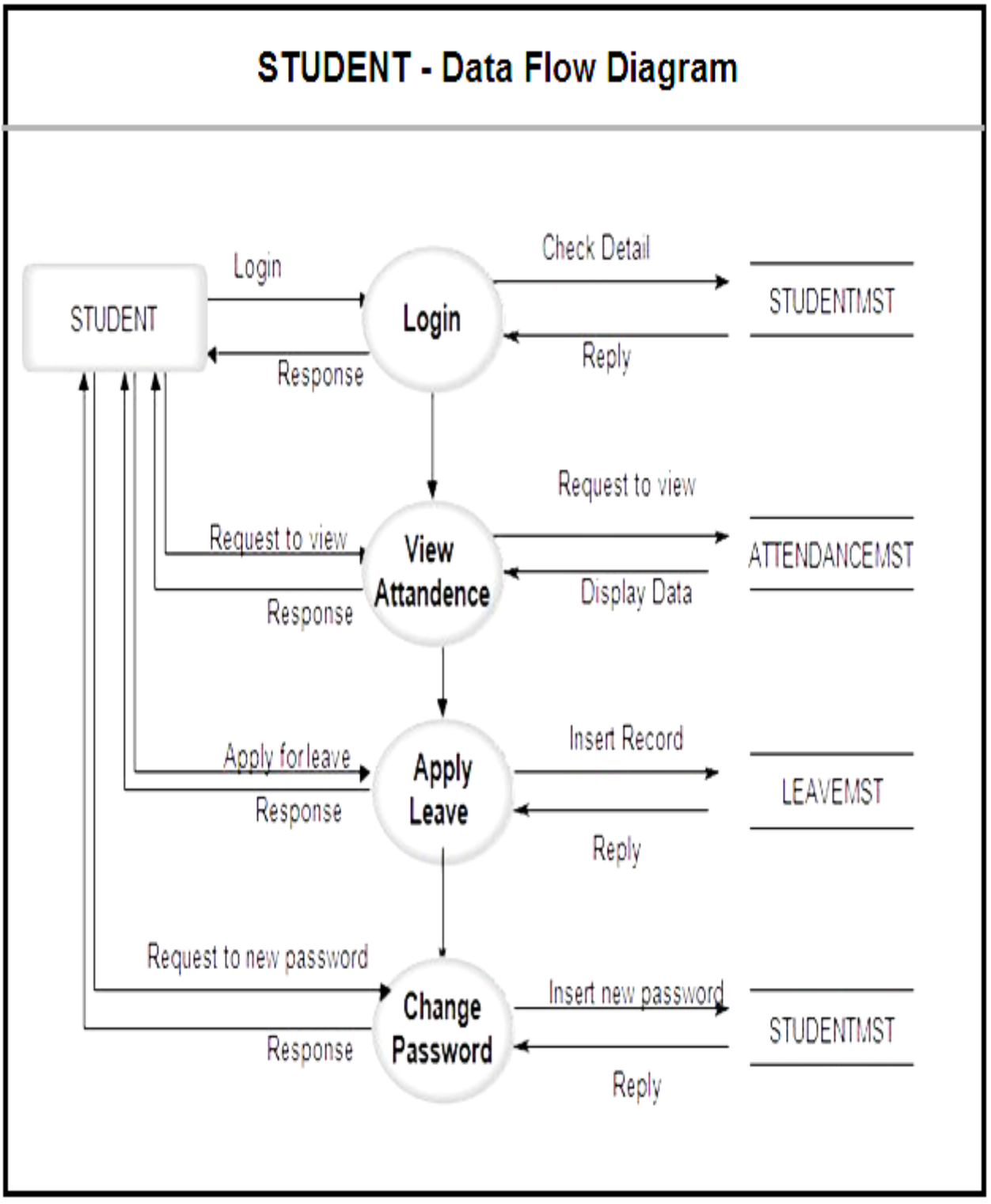
5.3.1 DFD 1



5.3.2 DFD ADMIN



5.3.3 DFD STAFF



5.3.4 DFD STUDENT

6. USER MANUAL

6.1 INTRODUCTION AND GUIDELINES

LBPH Algorithm : -

Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. It has further been determined that when LBP is combined with histograms of oriented gradients (HOG) descriptors, it improves the detection performance considerably on some datasets.

DETAILED EXPLANATION OF WORKING OF LBPH

1. Parameters: the LBPH uses 4 parameters:

Radius: the radius is used to build the circular local binary pattern and represents the radius around the central pixel. It is usually set to

.

Neighbors: the number of sample points to build the circular local binary pattern. Keep in mind: the more sample points you include, the higher the computational cost. It is usually set to 8.

Grid X: the number of cells in the horizontal direction. The more cells, the finer the grid, the higher the dimensionality of the resulting feature vector. It is usually set to 8.

Grid Y: the number of cells in the vertical direction. The more cells, the finer the grid, the higher the dimensionality of the resulting feature vector, It is usually set to 8.

2. Training the Algorithm: First, we need to train the algorithm. To do

so, we need to use a dataset with the facial images of the people we want to recognize. We need to also set an ID (it may be a number or the name of the person) for each image, so the algorithm will use this information to recognize an input image and give you an output. Images of the same person must have the same ID. With the training set already constructed, let's see the LBPH computational steps.

3. Applying the LBP operation: The first computational step of the

LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the

Key logic

Detection works on the basis that faces have some fairly recognizable features that a computer can figure out by pattern recognition- the eyes, nose, mouth, the ups and downs,the skin texture...This is a fairly easy process.

Once a face is detected algorithms are used to record the features on the face.These features are the basis for nodal points.Take a look at this picture
Now the algorithm takes some measurements like the distance between your eyes,length of your jawline,shape of your cheekbones or maybe the color of your eyes..Stuff that can be used to uniquely identify a face.
These measurements are then used to create a numerical code called the **faceprint** that is stored in the database.
After this whenever a person needs to be recognised, the faceprint is calculated from the photo and then compared with the faceprints inside for a possible match.

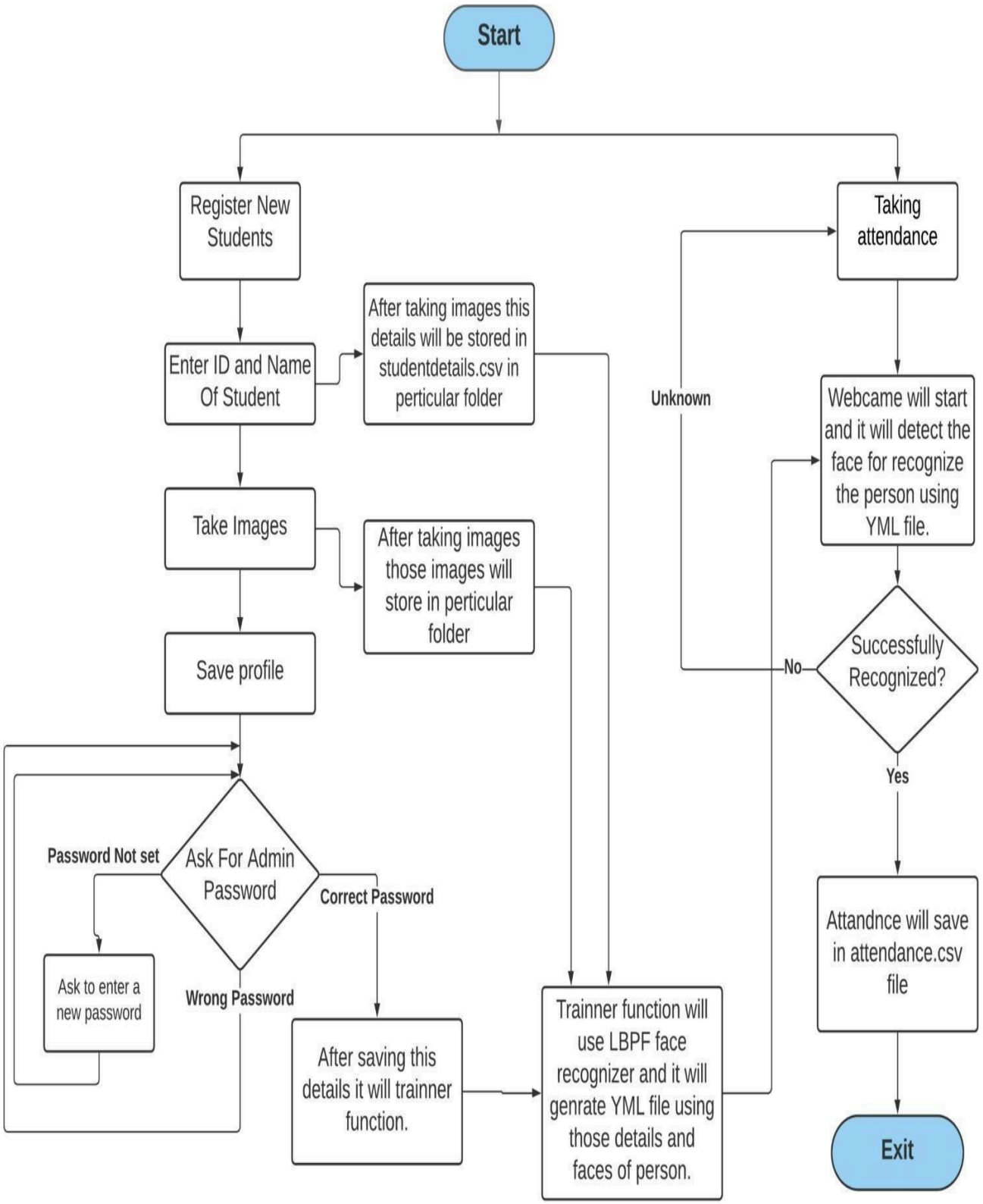
This is not how all face recognition systems work**.**Just one of the many methods out there.The above method uses 2D images but changes in the direction of the face, lighting conditions can cause problems.3D cameras can be used to solve this problem.

Face Recognition

Face recognition process can be divided into three steps-prepare training data, train face recognizer, and prediction. Here training data will be the images present in the dataset. They will be assigned with an integer label of the student it belongs to. These images are then used for face recognition. Facerecognizer used in this system is Local Binary Pattern Histogram. Initially, the list of local binary patterns (LBP) of the entire face is obtained. These LBPs are converted into decimal number and then histograms of all those decimal values are made. At the end, one histogram will be formed for each image in the training data. Later, during recognition process histogram of the face to be recognized is calculated and then compared with the already computed histograms and returns the best matched label associated with the student it
belongs to.

Attendance Updation

After face recognition process, the recognized faces will be marked as present in the excel sheet and the rest will be marked as absent and the list of absentees will be mailed to
the respective faculties. Faculties will be updated with a monthly attendance sheet at the end of every month.



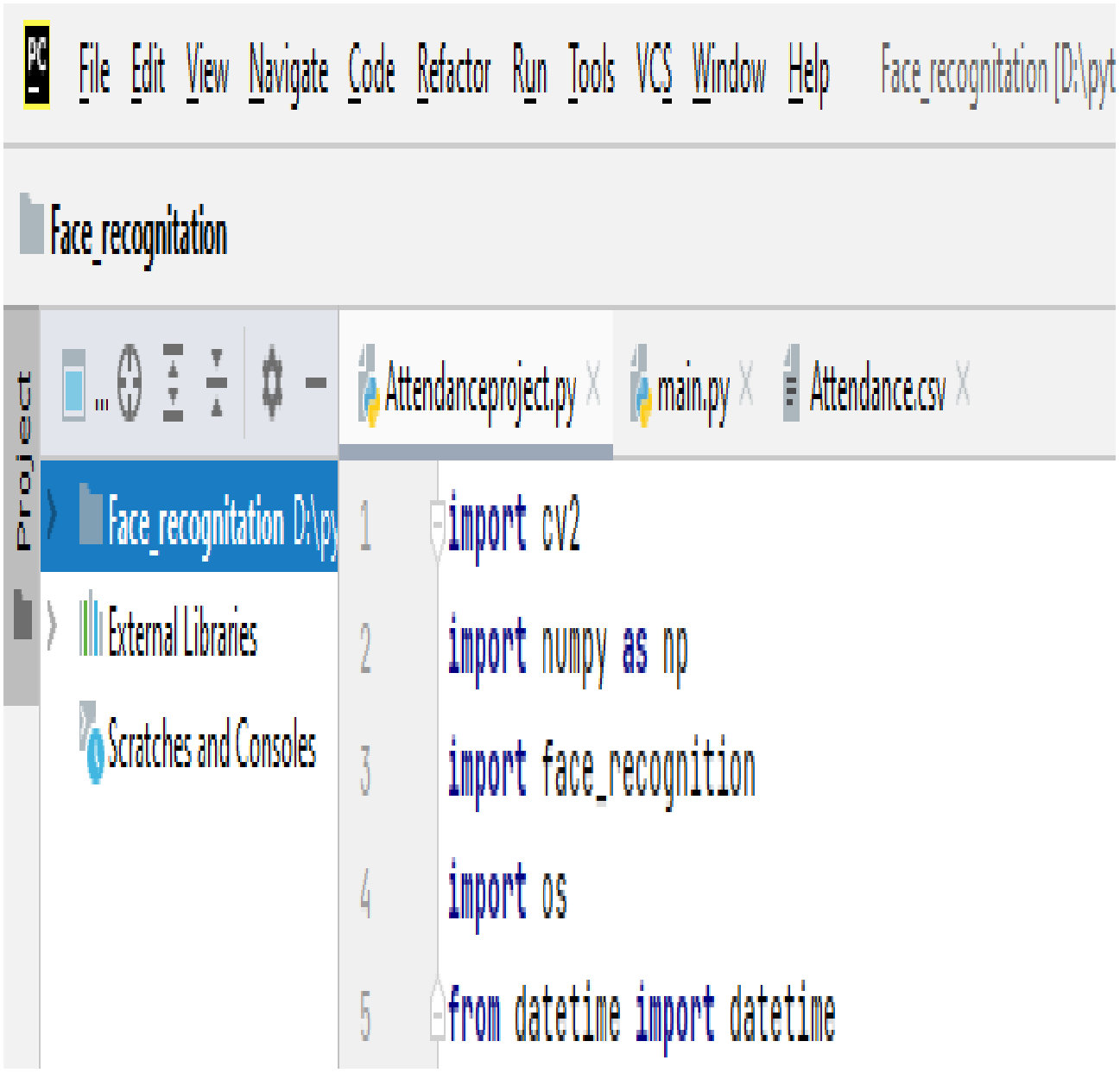
6.1 ARCHITECTURE

6.2 SCREEN LAYOUT AND DESCRIPTION

```
import cv2
import numpy as np
import face_recognition
import os
from datetime import datetime
path='imagesAttendance'
images=[]
studentNames=[]
mylist=os.listdir(path)
print(mylist)
for Student in mylist:
    curImg=cv2.imread(f'{path}/{Student}')
    images.append(curImg)
    studentNames.append(os.path.splitext(Student)[0])
print(studentNames)

def findEncodings(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 markAttendance(name):
    with open('Attendance.csv','r+') as f:
        studentDataList=f.readlines()
        studentNamesList=[]
        for line in studentDataList:
            entry=line.split(',')
            studentNamesList.append(entry[0])
        if name not in studentNamesList:
            now= datetime.now().strftime('%H:%M:%S')
            dt=datetime.today().strftime('%d:%m:%y')
            f.writelines(f'\n{name},{dt},{now}')

encodeListKnown=findEncodings(images)
camp=cv2.VideoCapture(0)

while True:
    Success,img=camp.read()
    Simg=cv2.resize(img,(0,0),None,0.25,0.25)
    Simg=cv2.cvtColor(Simg,cv2.COLOR_BGR2RGB)

    facesCurFrame=face_recognition.face_locations(Simg)
    encodesCurFrame=face_recognition.face_encodings(Simg,facesCurFrame)

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

```
        if matches[matchIndex]:
            name=studentNames[matchIndex].upper()
            #print(name)
            y1,x2,y2,x1=faceLoc
            y1,x2,y2,x1 =y1*4,x2*4,y2*4,x1*4
            cv2.rectangle(img,(x1,y1),(x2,y2),(0,255,0),2)
            cv2.rectangle(img,(x1,y2-40),(x2,y2),(0,255,0),cv2.FILLED)

cv2.putText(img,name,(x1+2,y2-2),cv2.FONT_HERSHEY_COMPLEX,1,(255,255,255),2)
            markAttendance(name)


    cv2.imshow('Webcam',img)
    cv2.waitKey(1)
```

import libraries



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import images from data set/ file

```
path='ImagesAttendance'
images=[]
studentNames=[]
myList=os.listdir(path)
print(myList)
for Student in myList:
    curImg=cv2.imread(f'{path}/{Student}')
    images.append(curImg)
    studentNames.append(os.path.splitext(Student)[0])
print(studentNames)
```

Encode images

```
16
17  def findEncodings(images):
18      encodeList=[]
19      for img in images:
20          img=cv2.cvtColor(img,cv2.COLOR_BGR2RGB)
21          encode=face_recognition.face_encodings(img)[0]
22          encodeList.append(encode)
23      return encodeList
```

Use webcam and recognize the student

```
48  for encodeFace,faceLoc in zip(encodesCurFrame,facesCurFrame):
49      matches=face_recognition.compare_faces(encodeListKnown,encodeFace)
50      faceDis=face_recognition.face_distance(encodeListKnown,encodeFace)
51      #print(faceDis)
52      matchIndex=np.argmin(faceDis)
53
54      if matches[matchIndex]:
55          name=studentNames[matchIndex].upper()
56          #print(name)
57          y1,x2,y2,x1=faceLoc
58          y1,x2,y2,x1 =y1*4,x2*4,y2*4,x1*4
59          cv2.rectangle(img,(x1,y1),(x2,y2),(0,255,0),2)
60          cv2.rectangle(img,(x1,y2-40),(x2,y2),(0,255,0),cv2.FILLED)
61          cv2.putText(img,name,(x1+2,y2-2),cv2.FONT_HERSHEY_COMPLEX,1,(255,255,255),2)
62          markAttendance(name)
63
64
65  cv2.imshow('Webcam',img)
66  cv2.waitKey(1)
67
```

Mark attendance

mark the attendance of recognized student

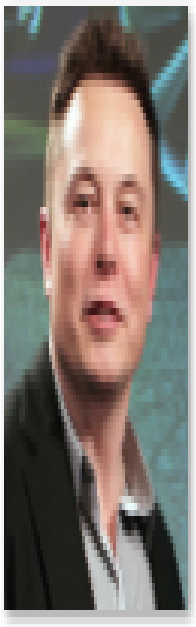
```
def markAttendance(name):
    with open('Attendance.csv','r+') as f:
        studentDataList=f.readlines()
        studentNamesList=[]
        for line in studentDataList:
            entry=line.split(',')
            studentNamesList.append(entry[0])
        if name not in studentNamesList:
            now= datetime.now().strftime('%H:%M:%S')
            dt=datetime.today().strftime('%d:%m:%y')
            f.writelines(f'\n{name},{dt},{now}')
```

6.3 OUTPUT REPORTS

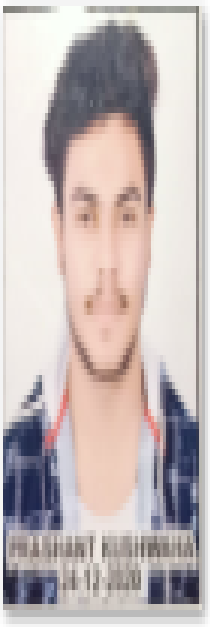
Input

Student images

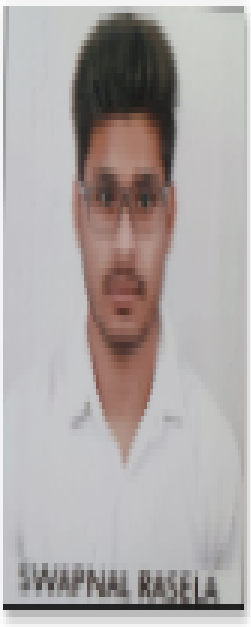
PC › Local Disk (D:) › python › Face_recognitation › imagesAttendance



Elon



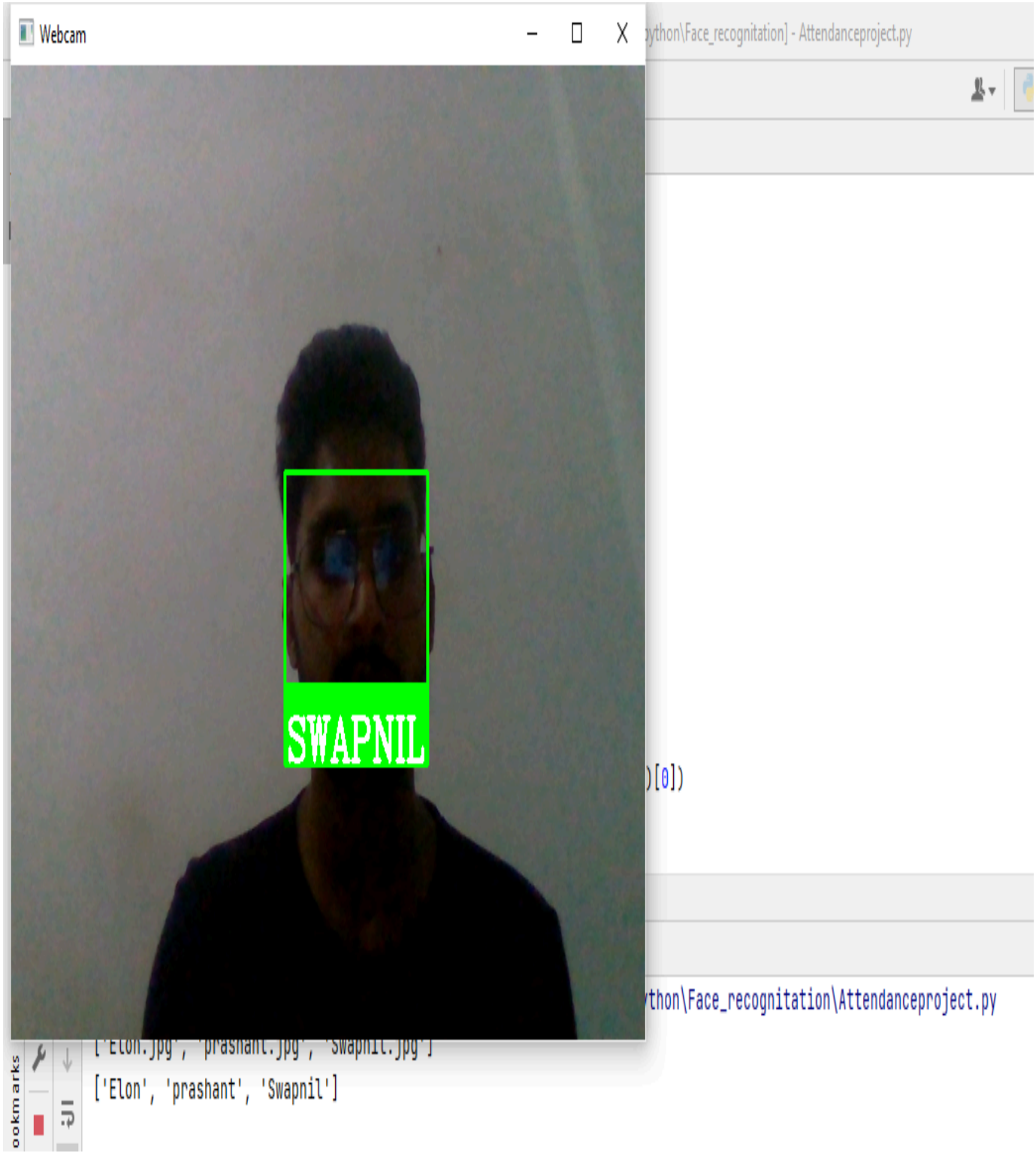
prashant



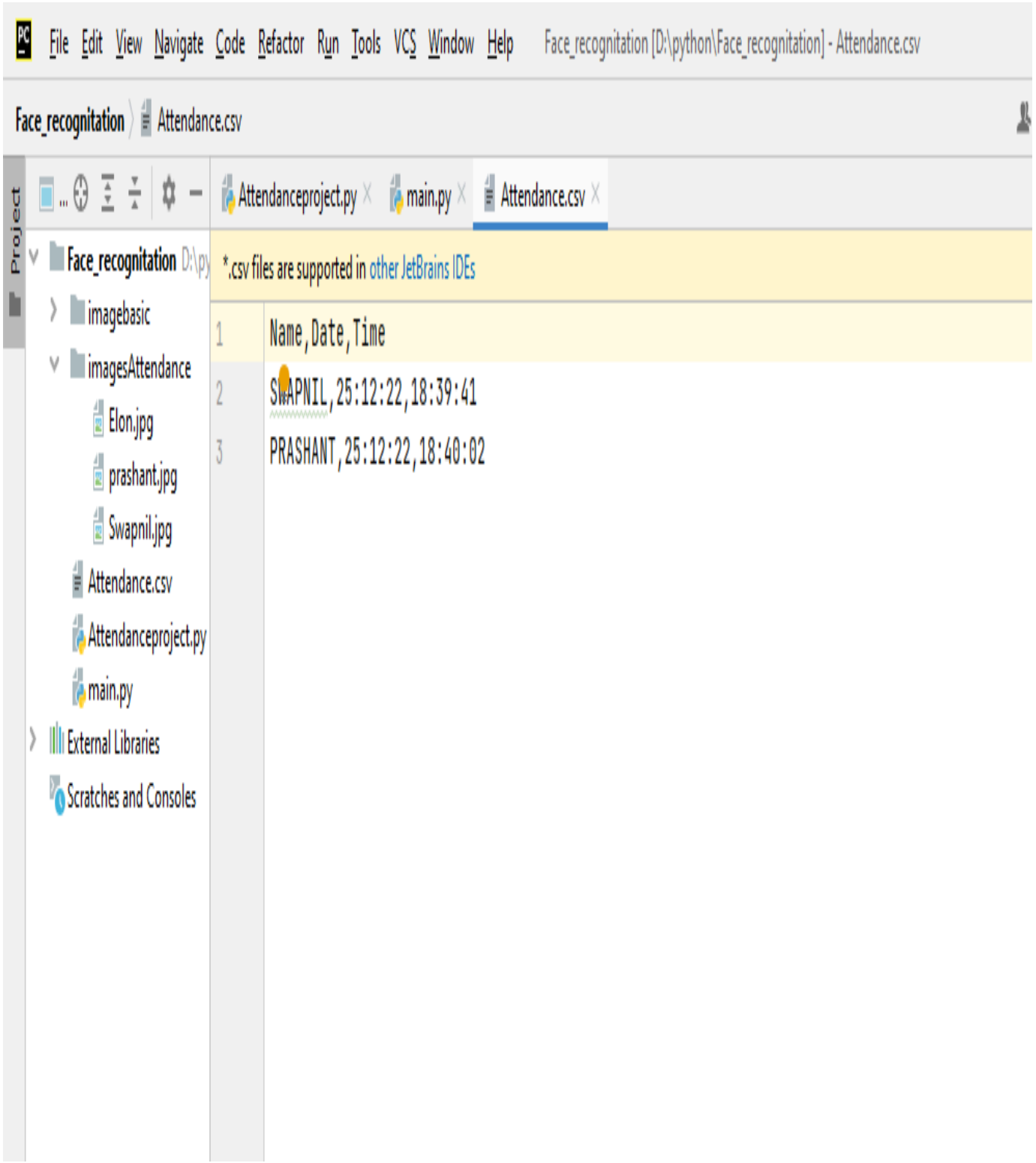
Swapnil

Webcam

Recognize Student face

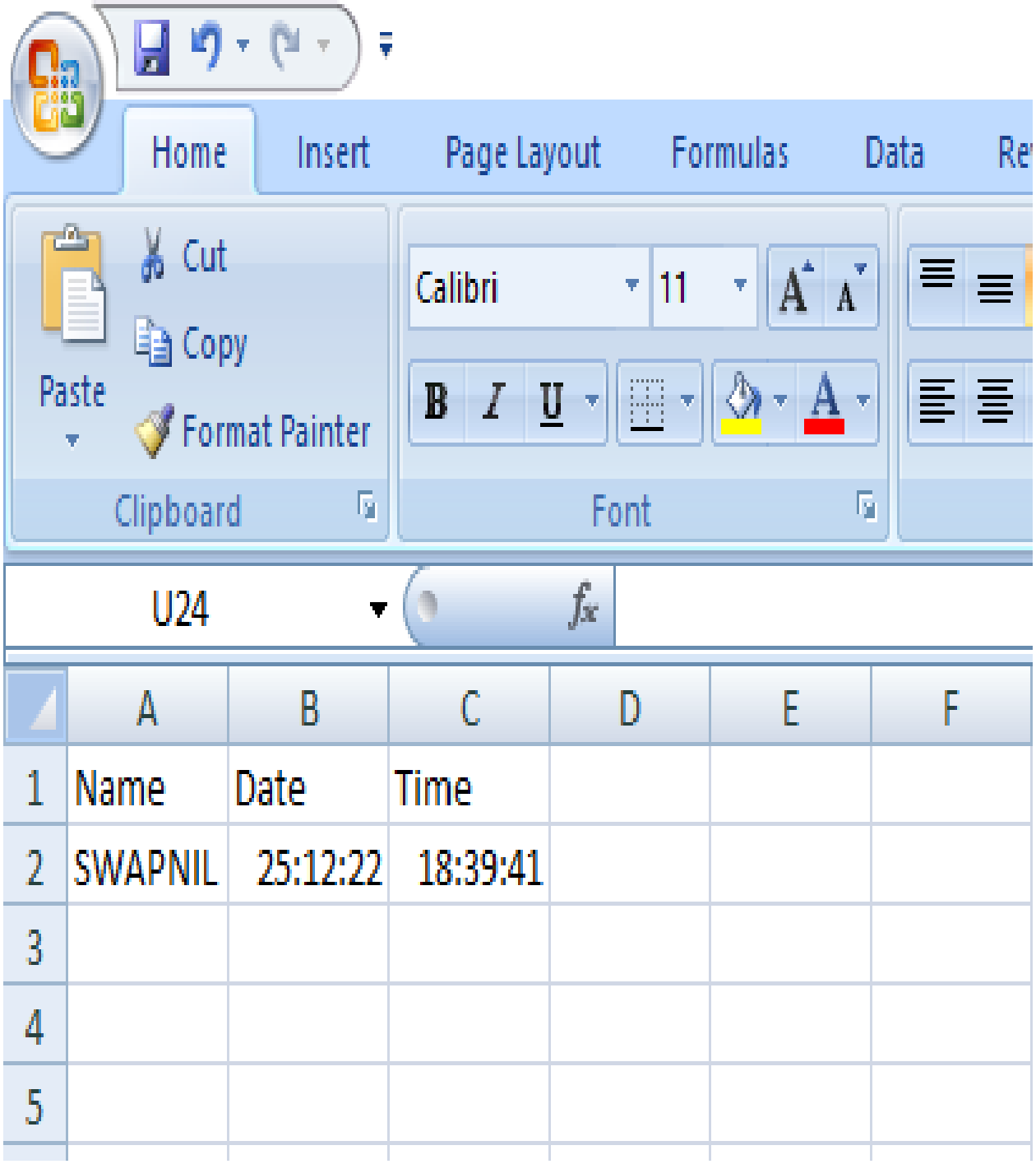


Output



Attendance sheet

Student Attendance



7. LIMITATION

1. Poor Image Quality

The effectiveness of facial-recognition algorithms is influenced by the image quality. When compared to a digital camera, the quality of the scanned video is relatively poor. Even high-definition video is typically 720p, but it can be as high as 1080p. These numbers correspond to around 2MP and 0.9MP, although a low-cost digital camera may capture 15MP. The difference is clear to see.

2. Small Image Sizes

How successfully a face will be identified depends on its relative size to the total image size when a face-detection algorithm discovers a face in an image or in a still from a video recording. The recognized face is just 100 to 200 pixels wide due to the already modest image size and the target's distance from the camera. Furthermore, it takes a lot of processing power to scan an image for different face sizes. To reduce false positives during detection and hasten image processing, the majority of algorithms allow for the choice of a face-size range.

3. Different Face Angles

The relative angle of the target's face has a significant impact on the recognition score. Usually, several angles are employed when enrolling a face in the facial recognition software. The algorithm's capacity to create a face template is impacted by any view other than a frontal view. The rating of any resulting matches increases with the directness and the image's resolution.

4. Data Processing and Storage

The high-definition video takes up a lot of disc space despite having a resolution that is much lower than that of digital camera images. Processing every frame of video would be a huge job, thus typically only a small portion (10% to 25%) is subjected to a recognition system. Agencies may employ computer clusters to reduce overall processing time. However, adding computers necessitates a significant amount of data transfer through a network, which may be constrained by

8.FUTURE ENHANCEMENTS

A possible future application for facial recognition systems lies in retailing. A retail store (for example, a grocery store) may have cash registers equipped with cameras; the cameras would be aimed at the faces of customers, so pictures of customers could be obtained. The camera would be the primary means of identifying the customer, and if visual identification failed, the customer could complete the purchase by using a PIN (personal identification number).

After the cash register had calculated the total sale, the face recognition system would verify the identity of the customer and the total amount of the sale would be deducted from the customer's bank account. Hence, face-based retailing would provide convenience for retail customers, since they could go shopping simply by showing their faces, and there would be no need to bring debit cards, or other financial media. Wide-reaching applications of face-based retailing are possible, including retail stores, restaurants, movie theaters, car rental companies, hotels, etc.e.g. Swiss European surveillance: facial recognition and vehicle make, model, color and license plate reader.

In order to prevent the frauds of ATM in India, it is recommended to prepare the database of all ATM customers with the banks in India & deployment of high resolution camera and face recognition software at all ATMs. So, whenever a user enters an ATM his photograph will be taken to permit the access after it is being matched with stored photo from the database.

Duplicate voters are being reported in India. To prevent this, a database of all voters, of course, of all constituencies, is recommended to be prepared. Then at the time of voting the resolution camera and face recognition equipment of the voting site will accept a subject face 100% and generate the recognition for voting if a match is found. Passport and visa verification can also be done using face recognition technology as explained above.

Driving license verification can also be exercised through face recognition technology as mentioned earlier. To identify and verify terrorists at airports, railway stations and malls the face recognition technology will be the best choice in India as compared with other biometric technologies since other technologies cannot be helpful in crowded places.

9. CONCLUSION

Automated Attendance System has been envisioned for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. The aim is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the office environment that can replace the old manual methods. This method is secure enough, reliable and available for use. No need for specialized hardware for installing the system in the office. It can be constructed using a camera and computer. In this system we have implemented an attendance system for a lecture, section or laboratory by which a lecturer or teaching assistant can record students' attendance. It saves time and effort, especially if it is a lecture with a huge number of students. Automated Attendance System has been envisioned for the purpose of reducing the drawbacks in the traditional (manual) system. This attendance system demonstrates the use of image processing techniques in the classroom. This system can not only merely help in the attendance system, but also improve the goodwill of an institution.

10. BIBLIOGRAPHY

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