A Project Report on

AI based Smart Attendance System

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

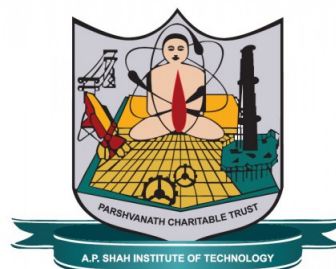## Bachelor of Engineering

in

Information Technology

by

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Academic Year 2020-2021

Approval Sheet

This Project Report entitled **"AI based Smart Attendance System"** Submitted by **"Jayesh Bhosale (17104014), Tejas Bhanushali (17104031), Yash Gangani (18204009)"** is approved for the partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering** in **Information Technology** from **University of Mumbai**.

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CERTIFICATE

This is to certify that the project entitled **"AI based Smart Attendance System"** submitted by **"Jayesh Bhosale (17104014)), Tejas Bhanushali (17104031), Yash Gangani (18204009)"** for the partial fulfillment of the requirement for award of a degree **Bachelor of Engineering** in **Information Technology**,to the University of Mumbai,is a bonafide work carried out during academic year 2020-2021.

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Acknowledgement

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Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

The management of the attendance can be a great burden on the teachers if it is done manually. To resolve this problem, smart and auto attendance management system is being utilized. But authentication is an important issue in this system. The smart attendance system is generally executed with the help of biometrics. Face recognition is one of the biometric methods to improve this system. Being a prime feature of biometric verification, facial recognition is being used enormously in several such applications, like video monitoring and CCTV footage system, an interaction between computer humans and access systems present indoors and network security. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. This report proposes a model for implementing an automated attendance management system for students of a class by making use of face recognition technique and alerting parents about the student's presence with the help of a message alert system, parents will also be able to visualize their kids overall attendance with the help of a dashboard. The primary goal of this research was the practical employment of these state-of-the-art deep learning approaches for face recognition tasks.

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List of Abbreviations

MAS: Manual Attendance System
AAS: Automated Attendance System
PCA: Principal Component Analysis
LDA: Linear Discriminant Analysis
SVM: Support Vector Machine
HCC: Haar Cascade Classifier
AS-LBP: Asymmetric Local Binary Pattern
VGG: Visual Graphic Group

Chapter 1

Introduction

One necessary component of every education system is recording student's attendance. The entire process could be time-consuming if it is managed manually. As a result of rapid growth in information technologies, automatic solutions have become a standard option for these types of education processes.

To verify the student attendance record, the personnel staff ought to have an appropriate system for approving and maintaining the attendance record consistently. By and large, there are two kinds of student attendance frameworks, i.e. Manual Attendance System and Automated Attendance System. Practically in the Manual Attendance System, the staff may experience difficulty in both approving and keeping up every student's record in a classroom all the time. In a classroom with a high Faculty-to-student ratio, it turns into an extremely dreary and tedious process to mark the attendance physically and cumulative attendance of each student. Consequently, we can execute a viable framework that will mark the attendance of students automatically via face recognition. It may decrease the managerial work of its staff. Especially, for an attendance system that embraces Human Face Recognition, it normally includes the student's facial images captured at the time he/she is entering the classroom, or when everyone is seated in the classroom to mark the attendance, Generally, there are two known methodologies to deal with Human Face Recognition, one is the feature-based methodology and the other is the brightness-based methodology. The feature-based methodology utilizes key point features present on the face, called landmarks, of the face, for example, eyes, nose, mouth, edges, or some other unique attributes. In this way, out of the picture that has been extricated beforehand, just some part is covered during the calculation process.

Since automation of recording student's attendance is beneficial for faculties, students, as well as parents. Once a student is identified, a message alert at the start and end of the day will be sent to parents via SMS. A dashboard will be created where parents will be able to review their wards attendance on a particular day and time, parents will also be able to visualize the overall attendance of their wards in a graphical format.

Chapter 2

Literature Review, Project Conception and Initiation

2.1 Literature Review

The Literature review of the topic was done to find out the advantages and disadvantages of different types of Algorithms and studies to make sure we use the most reliable Algorithms for our project.

2.1.1 Face Detection using Combined Skin Color Detector and Template Matching Method[2011]

Mr Sanjeev Sharma *et al* in 2011 presented a new face detection method which combines the Skin Color Detector and the Template Matching Method. Template matching methods find the similarity between the input images and the template images (training images). Template matching method can use the correlation between the input images and stored standard patterns in the whole face features, to determine the presence of a whole face features. Advantage of this method was that it had a 98 percent face detection probability, and its disadvantage was that this method can't use one or more color spaces in the skin color detector.

2.1.2 Visual Graphic Group (VGG) model[2014]

K. Simonyan *et al.* research work in 2014 was done on Visual Graphic Group (VGG) model for face recognition including illumination pre-processing algorithm [3]. This system could achieve 100 percent accuracy under a good illumination environment of poor illumination. The accuracy was 85.9 percent but the accuracy could reach more than 90 percent through preprocessing. Disadvantage of this system was that the attitude and expression of individual changes a lot when taken photos which will have a certain effect on face recognition results and illumination is too poor. The accuracy of this system is not constant.

2.1.3 Euclidean embedding using deep convolutional network[2015]

Florian Schroff *et al.* in 2015 suggested a method based on learning a Euclidean embedding per image using a deep convolutional network [4]. The network is trained such that the

squared L2 distances in the embedding space directly correspond to face similarity: faces of the same person have small distances and faces of distinct people have large distances. It had Much greater Representational efficiency, but disadvantage of this system was it's indirectness and its inefficiency.

2.1.4 Face detection and tracking: Using OpenCV[2017]

Rishi Kumar *et al.* research work in 2017 suggested that Face localization can be referred to as extraction of facial features using pattern recognition system. Both MATLAB and Open CV can be used for creating such prototypes and systems. In that paper researchers have carried out research using Open CV and compared all algorithms in terms of space and time paradigm. It identifies Haar cascades as the most efficient way of face detection. Advantage of Haar cascades was that it works and gives better accuracy in facial expression. and its disadvantage was that initially, it was time consuming.

2.1.5 Eigenfaces using grayscale images[2018]

Mrs. Madhurm *et al.* in 2018 suggested Eigenfaces using grayscale images. Their paper showed us that it is easy to convert color images to grayscale (also called grayscale') and then to apply Histogram Equalization [5]. It is a very simple method of automatically standardizing the brightness and contrast of your facial images. For better results, apply more processing stages such as edge enhancement, contour detection, motion detection, etc, OpenCV uses a face detector algorithm called a Haar Cascade Classifier. It's advantage is that classification is fast, even when it's applied at several scales, but it's disadvantage is that it assumes a fixed scale for the face.

2.2 Existing System

Face recognition is one of the best biometric technology that is used to establish an individual's identity also known as face recognition and face detection, the process works using devices like Camera and CCTV footage that capture the digital images or videos of individuals face and compare it face data stored in the database.

- Face Recognition Architecture: Typical face recognition system consists of three steps, gaining face data, extracting face features, and recognition of a face.
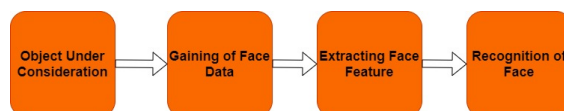

Figure 2.1: Existing Face Recognition System Architecture.

2.2.1 Gaining of Face Data:

The first step of the face recognition system is the Acquisition and processing of Face data. Face images are collected from different sources. The sources may be a camera or

face image database. The collected face images should have the pose, illumination, and expression, etc variation to check the performance of the face recognition system under these conditions. Therefore input image is normalized and some image transformation methods apply to the input image.

2.2.2 Extracting Face Feature:

This process is extracting relevant information from a face image. In feature extraction, a mathematical representation of an original image is called a biometric template or biometric reference. The biometric reference is stored in the database and forms the basis (vector) of any recognition task. In recognition extracted features are used. A grayscale pixel is considered as an initial feature.

2.2.3 Recognition of Face:

Once the features are extracted and selected, the next step is to classify the image. Appearance-based face recognition algorithms use classification methods Such as PCA, LDA. In classification, the similarity between faces from the same individual and different individuals after all the face images in the database are represented with relevant features. Sometimes feature extraction recognition process is done simultaneously.

2.3 Problem Statement

The management of attendance can be a great burden on the teachers if it is done manually, and sending the report of each student's attendance to respective parents manually also becomes tedious. In this system, we made sure to schedule the lectures for faculties at a given time slot so it becomes easy and also provided visualization of the ward's attendance that can be easily used by parents. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. Hence, a smart and auto attendance management system with a message alert system is being utilized.

Chapter 3

Project Design

3.1   Objectives

- To develop a smart attendance management system using facial recognition that will take care of the problems which are being faced in manual attendance systems.

- To develop a message alert system to notify parents about the ward's attendance.

- To make a dashboard to review and visualize the attendance of a student.

- To make it useful not only to wards but also to faculties for scheduling or rescheduling the lectures.

3.2   Proposed System

Finding faces is the most integral part in face detection. There are various techniques from which faces could be found. In this paper, we will be comparing the various algorithms used previously by implementing them and analysing them. Even though face detection is the most important step in the area of image processing still the techniques used for its implementation need to be reworked upon so as to optimize its performance and bring down the hurdles it is cladding. The working of face detection algorithms is majorly based on the accuracy of the face detection, due to this face detection is the cusp point in the entire process of face detection and tracking.

This System architecture consists of 5 Main modules i.e Face Detection, Face Recognition, SMS alert To parents, DashBoard, and Data Visualization.

3.2.1   Data Collection through Classroom Camera:

Data Collection is an initial and important part of the system. This module continuously sends image Frames to Face Detection and Recognition Module by simply video monitoring through Classroom Camera. When students enter the classroom or students already present in the classroom, those image frames can be captured by the Data Collection module.
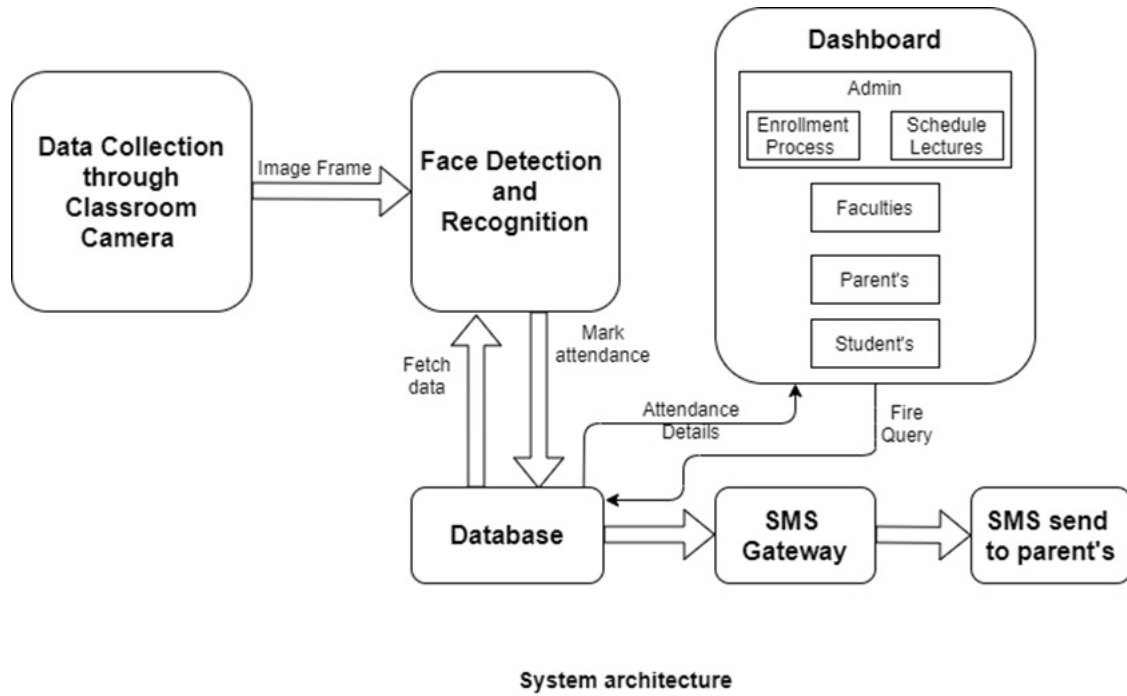
System architecture

Figure 3.1: Proposed System Architecture.

3.2.2 Face Detection and Recognition Module:

Face Detection: A proper and fast face detection algorithm always enhances the performance of face recognition systems. Various algorithms are proposed for face detection such as Face geometry-based methods, Feature Invariant methods, Machine learning-based methods. Out of all these methods we are using the Haar Cascade classifier (HCC) algorithm, Which is more reliable and also known for faster face detection. Image Frames from Data Collection Module is sent to Face Detection and Recognition Module, with the help of the HCC algorithm, detection of student's face can be done, also train the face data which will be helpful for face recognition of students.

Face recognition: Face Recognition is the automatic identification of a person from an image/video. It is one of the most active and widely used techniques because of its reliability. In our system when a student enters the classroom their face data gets detected and recognized by comparing pre-trained data stored in the database. If student face data gets recognized their attendance will be marked and stored in Database.

3.2.3 The DashBoard for Visualization of Data:

The DashBoard is mainly Divided into four parts, i.e Admin, Faculties, Students, Parents, Admin, and Faculties have rights to Enroll Students and Schedule the Lectures. The DashBoard is connected to a Database from where an admin can fetch the Query related to stored Data and monitor the Attendance report. Students and Parents Can see the attendance report with the help of Dashboard and Vizualize the attendance by applying filters according to their convenience. For example, If students or parents want to see the attendance of a particular date or attendance between the two dates they can easily visualize attendance with graphs. The DashBoard is implemented with the help of Web technologies Like HTML, CSS, JavaScript.

3.2.4   Database:

The Database is one of the important parts of every system which will helpful for store data. In this system, DashBoard is connected to a database. For Enrollment of student, Student face recognition, attendance report is stored in the database. With the help of fetching Query and applying Script, admin can make changes in the database. from data, the attendance report is sent to DashBoard.

3.2.5   SMS alert To Parents:

SMS alert system is implemented in our system, which will be helpful for sending SMS to parents with the help of SMS Gateway. If a student is absent then SMS notification will be sent to their parents on daily basis.

3.3 Use case diagram
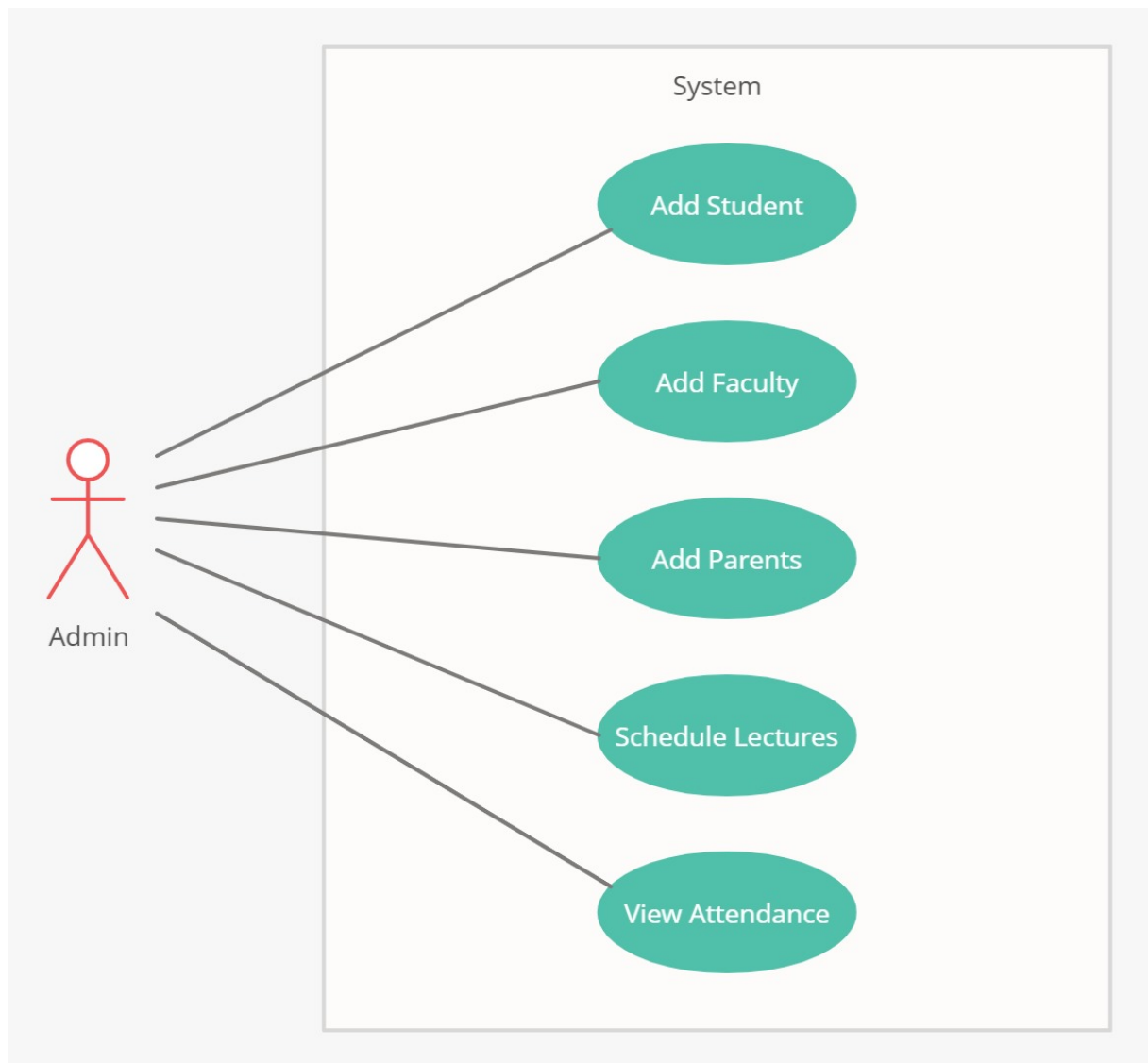
Figure 3.2: Use Case for Admin.

In the above diagram Admin is an actor. Admin can register to students, faculties and parents. Also admin can schedule lectures and view the attendance. Here Admin has the authority to view and modify students, parents as well as faculties data.
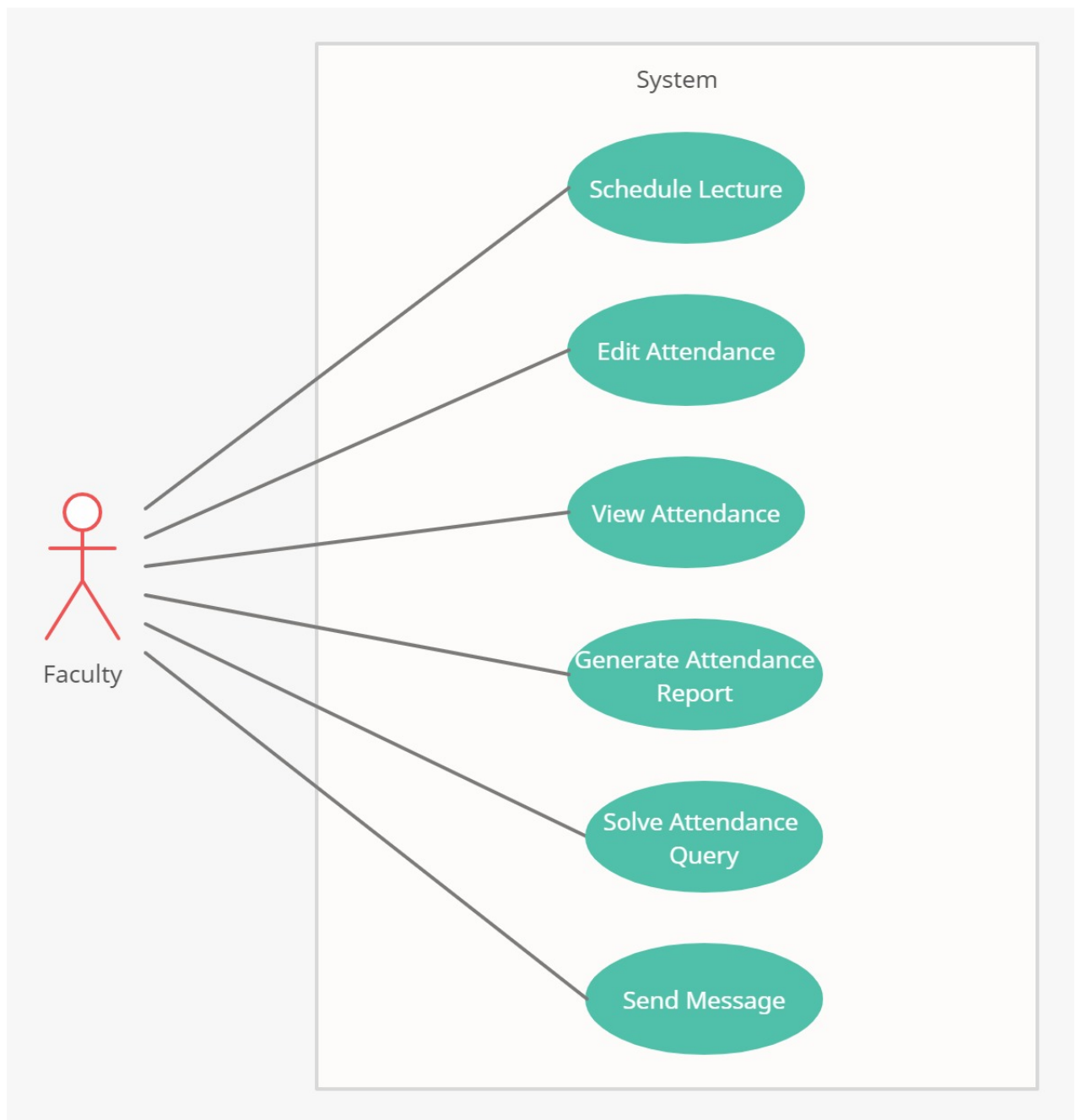
Figure 3.3: Use Case for Faculty.

In the above diagram Faculty is an actor. Faculty can schedule lectures, edit attendance, view the attendance, generate attendance report and solve attendance query. Faculty can also be able to send attendance related notification to the parents through SMS. Faculty also has the authority to modify student's data in case there's an technical error in the system.
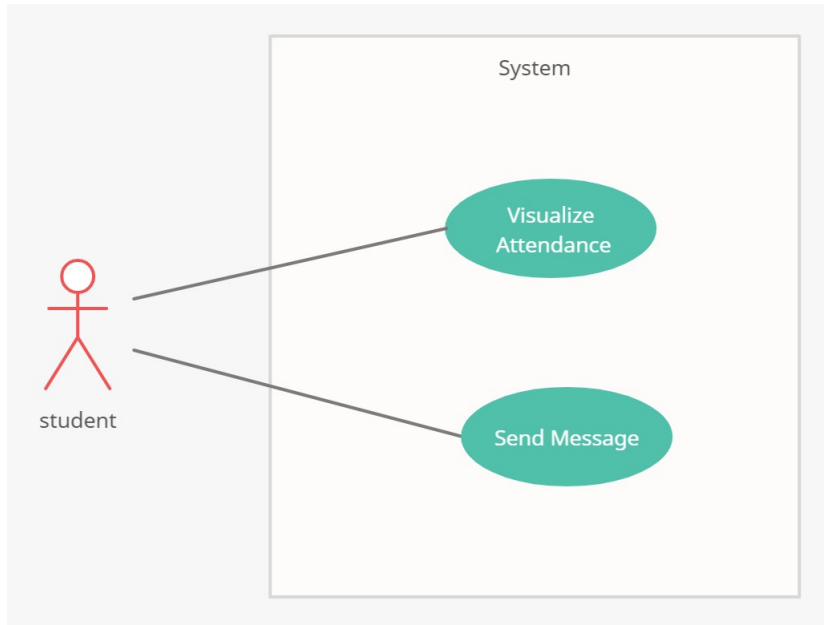
Figure 3.4: Use case for student.

Here in the above diagram Student is an actor. Student can visualize their attendance and send message if they have any query related to the attendance. Students can visualize their attendance w.r.t to their academic year and subjects, once visualization is done they can generate the report of their overall attendance.
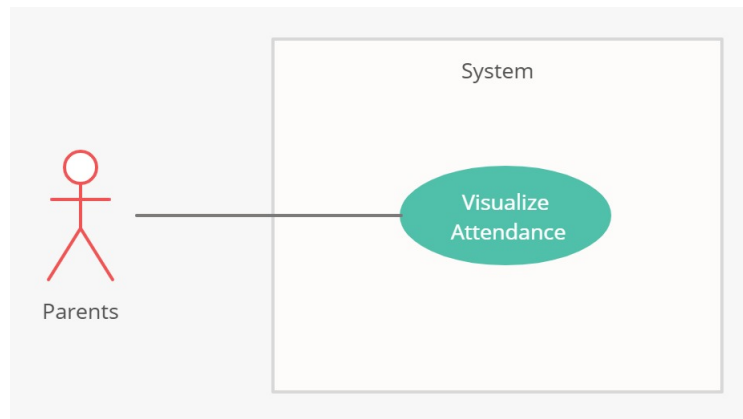
Figure 3.5: Use Case for Parents.

In the above figure Parents is an actor. Parent can visualize their ward's attendance using dashboard. Parents can visualize their wards attendance w.r.t to their academic year and subjects, once visualization is done they can generate the report of their wards overall attendance. Visualization here is done w.r.t to overall percentage of lectures attended of a subject as well as number of lectures attended from total number of lectures.

3.4   Activity Diagram
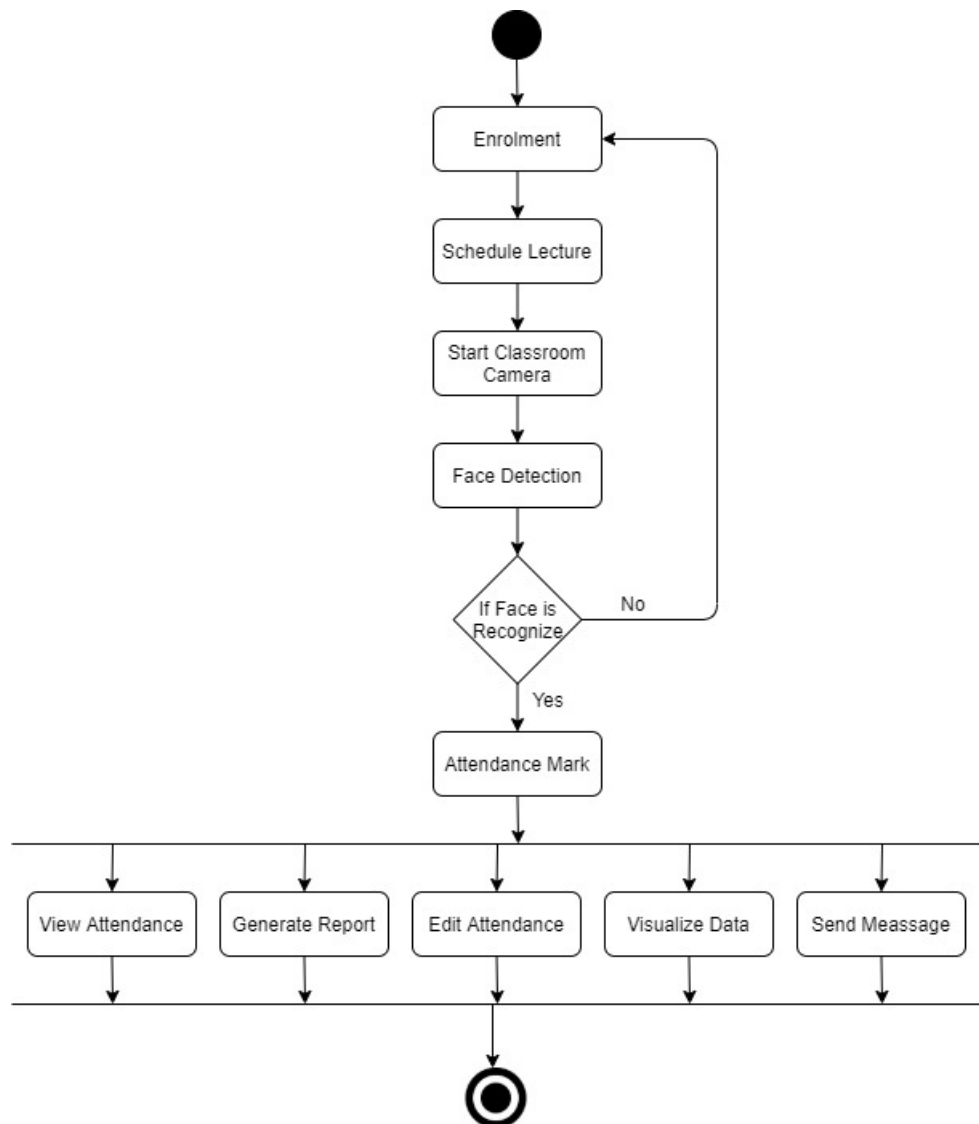
Figure 3.6: Activity Diagram.

In the above activity diagram, the functions of each modules are shown, where at start Enrollment of a student is done, after that faculties schedules the lecture, active classroom camera starts detecting the face of every student, if the face is recognized it will verify it with the enrolled database, once verified attendance is marked. From here every module is available through website like View attendance, Generate report, Edit Attendance, Visualize data and Send message.

3.5 Class Diagram
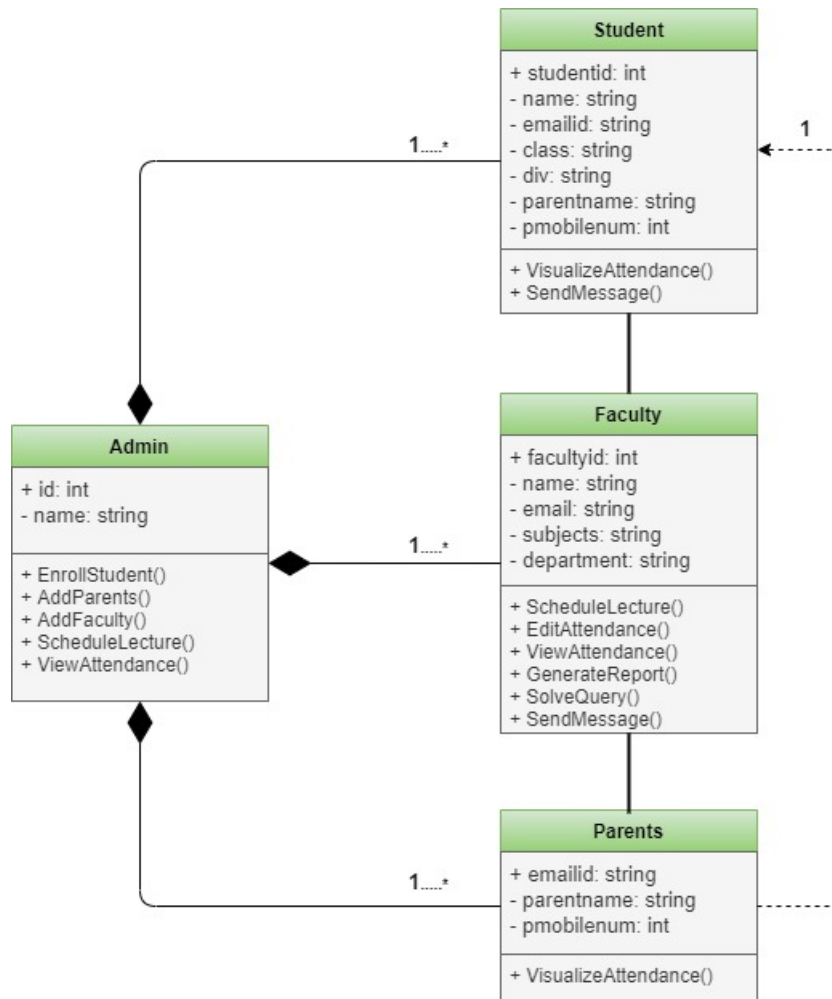
Figure 3.7: Class Diagram.

- The class diagram given above showcases the backend working of each main entity. As shown above each and every records are forwarded to Admin where it has the authority to Enroll Student, Add Parents, Add Faculty, Schedule Lecture and View Attendance.

- A Student is recorded by collecting their Id, name, Email Id, class, div, parent name and parent mobile number. While student can Visualize their attendance and send message to the Faculty.

- A Faculty is recorded by collecting their Id, name, Email Id, subjects and department. While they have the authority to Schedule Lecture, Edit Attendance, View Attendance, Generate Report, solve query and send message.

- A Parent is recorded by collecting their Email Id, name, and mobile number. While they can visualize their wards attendance on the dashboard.

Chapter 4

Project Implementation

Haar Cascades Classifier: Haar cascades make use of the image subtraction morphological process to detect the face [6]. In this, the cascades of different images of the same person are taken and recorded in the database. All the pixels in the influence of the white region are subtracted from all the pixels in the influence of a black region.
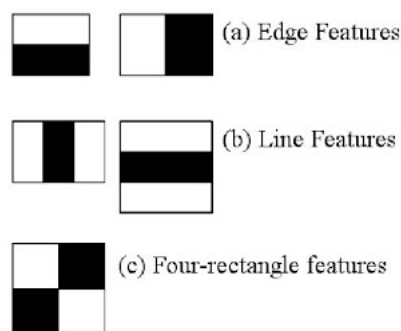

Figure 4.1: Haar Features.

This method of subtraction is performed on each of the images in the cascade but all the images might not give us the best results. Many of the images have a lot of errors. The image with the least error is selected. The result of all the images is added together and is mentioned as a weak classifier. As all the week classifiers are added together to form a strong classifier. Applying the subtraction process and determining each image error is a very time and space consuming process. Instead of applying it to each of the images, subtraction is applied to images one by one. If the last image is not useful, it is discarded. This process works with the predefined set of trainers present in open CV but if the developer wants he/she can also create a self-cascade by applying basic code to the compiler. Many people prefer to prepare a self-cascade for better understanding.

- The Enrollment of students for this system is done with the help of the student's database.

- Once the student is inside the class the CCTV camera takes a snapshot of the student which will be used for face detection and recognition

- Face detection and recognition is done with the help of algorithms like HCC (Haar CascadeClassifier) and with tools like OpenCV respectively.
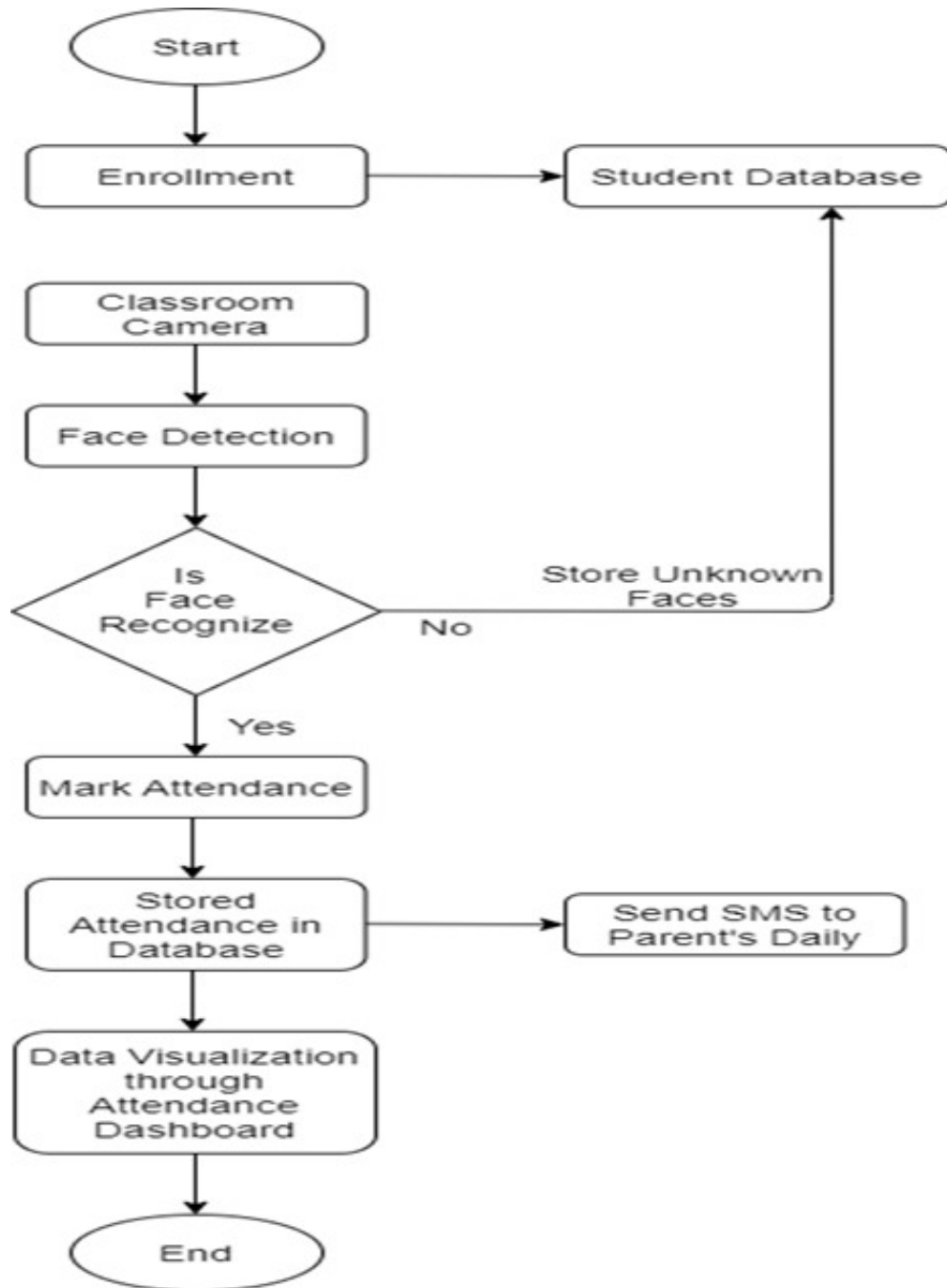
Figure 4.2: Flow Diagram.

- After a student is recognized the attendance gets stored in a database and an attendance report gets generated.

- The generated report will then be sent to the respective parents via SMS.

- A dashboard will be also created with the help of Html, css3, and PHP for the database MongoDB, an Excel sheet will be used, where parents will be able to visualize student's day to day and overall attendance.

- Data visualization will be done with the help of tableau public and tableau servers.

```python
Main2.py > ...
Set as interpreter
1   #!/usr/bin/env python
2   from flask import Flask, render_template, Response ,request,redirect
3   #from face import Takephoto,TrackImages
4   from flask_mysqldb import MySQL
5   import time
6   import cv2,os
7   import shutil
8   import csv
9   import numpy as np
10  from PIL import Image
11  import pandas as pd
12  import datetime
13  import time
14  import imutils
15  import schedule
16  import time
17  import mysql.connector as mysql
18  import mysql.connector as sql_db
19  app = Flask(__name__)
20  ############################## Database ##############################
21  app.config ['MYSQL_HOST']='localhost'
22  app.config ['MYSQL_USER']='root'
23  app.config ['MYSQL_Password']=''
24  app.config ['MYSQL_DB']='attendance_system'
25  mysql=MySQL(app)
26  @app.route('/' , methods=['POST','GET'])
27  def index():
28      return render_template('Add_Student.php')
29
30  def Takephoto(moodle,rollnb,name,parentsname,batch,division,mobnb,parentsnb):
31      #frame = Takephoto(Id,name)
32
33          Id=moodle
34          rollnb=rollnb
35          Name=name
36          parentsname=parentsname
37          batch=batch
```

Figure 4.3: Face Recognition module code.

This is the code for face Recognition.

```
templates > ⦿ Add_Student.php
  1    <?php session_start(); ?>
  2    <!DOCTYPE html>
  3    <html lang="en" dir="ltr">
  4      <head>
  5        <meta charset="utf-8">
  6        <title>Add Student</title>
  7        <meta name="viewport" content="width=device-width, initial-scale=1.0">
  8        <link rel="stylesheet" href="sidebar.css">
  9        <link rel="stylesheet" href="{{ url_for('static',filename='sidebar.css') }}" >
 10        <!--<link rel="stylesheet" href="{{ url_for('static',filename='sidebar1.css') }}" >-->
 11        <link rel="stylesheet" href="{{ url_for('static',filename='style.css') }}" >
 12        <script src="https://kit.fontawesome.com/a076d05399.js"></script>
 13      </head>
 14      <body>
 15        <div id="Sidenav" class="sidebar">
 16
 17
 18          <!--<a href="javascript:void(0)" class="closebtn" onclick="closeNav()">&times;</a>-->
 19            <a class="active" href="#">E-Attendence</a>
 20            <button class="dropdown-btn">Registration
 21              <i class="fa fa-caret-down"></i>
 22            </button>
 23            <div class="dropdown-container">
 24              <button class="dropdown-btn">Add Students
 25                <i class="fa fa-caret-down" ></i>
 26              </button>
 27              <div class="dropdown-container">
 28                <a href="#">Register Student</a>
 29                <a href="#">Face Enrollment</a>
 30              </div>
 31              <a href="Add_Parents.php">Add Parents</a>
 32              <a href="#">Add Faculty</a>
 33            </div>
 34
 35            <a href="Schedule_Lec_Admin.php">Schedule Lectures</a>
 36            <a href="#">View Attendence</a>
 37            <a href="#">Camera/Classroom settings</a>
 38            <!-- Logout Button Code-->
 39            <a href="logout.php">Logout</a>
```

Figure 4.4: Face Enrollment code.

This is the code for face enrollment.

In this diagram Face enrollment of student is being done where once the student fills the details they will be registered.
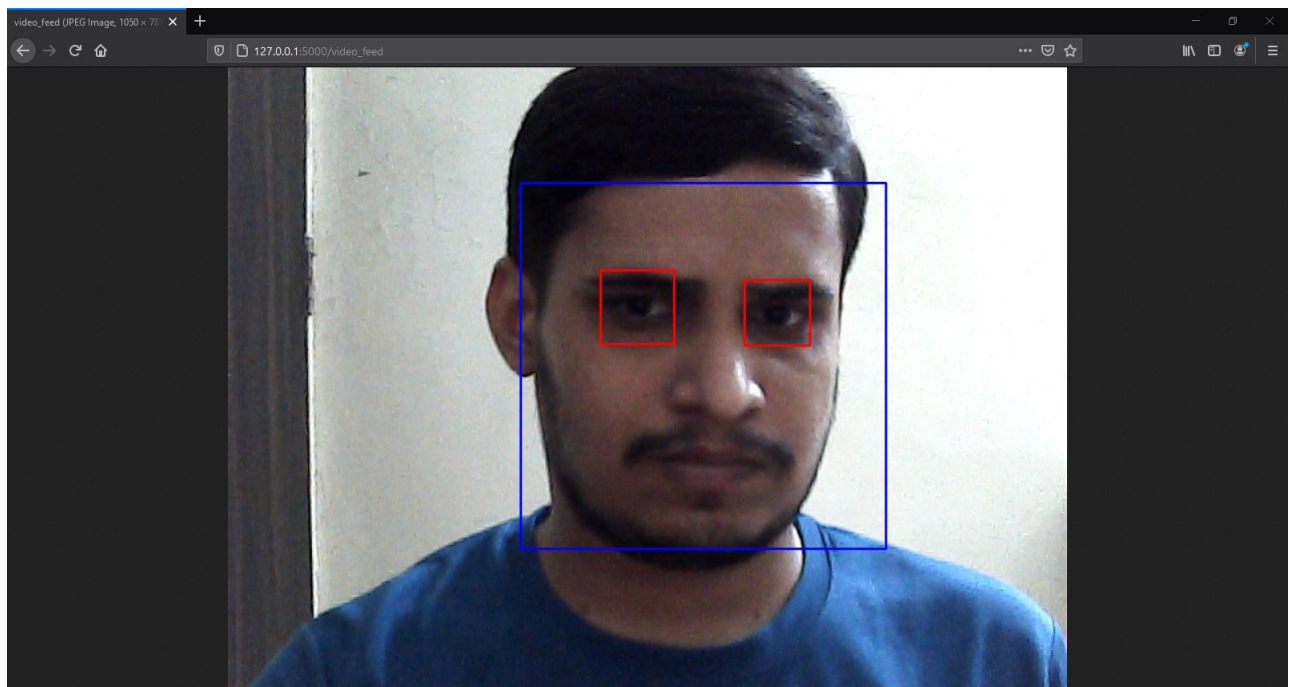
Figure 4.5: Face Enrollment.

Figure 4.6: Face Detection.

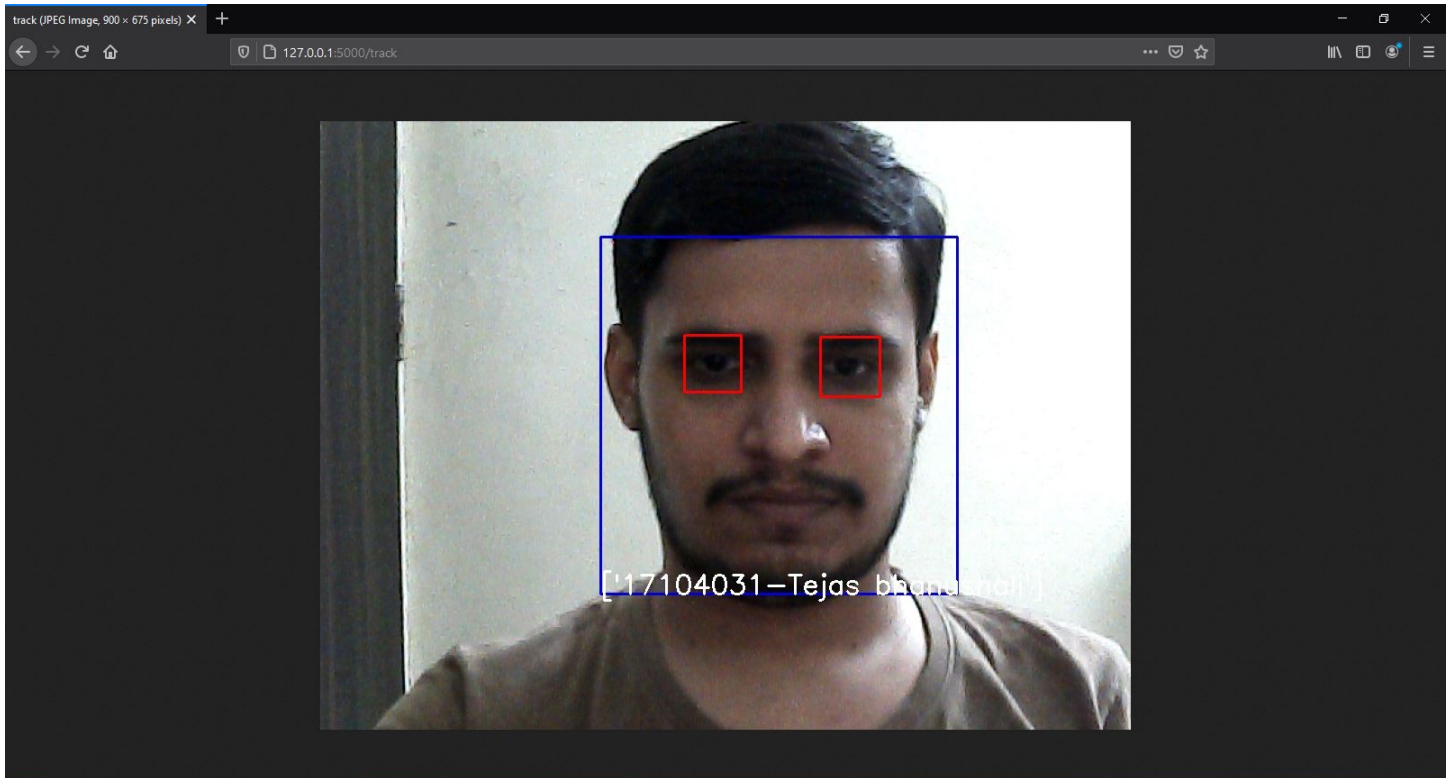In this image Face detection is being done by the system.

Figure 4.7: Face Recognition.
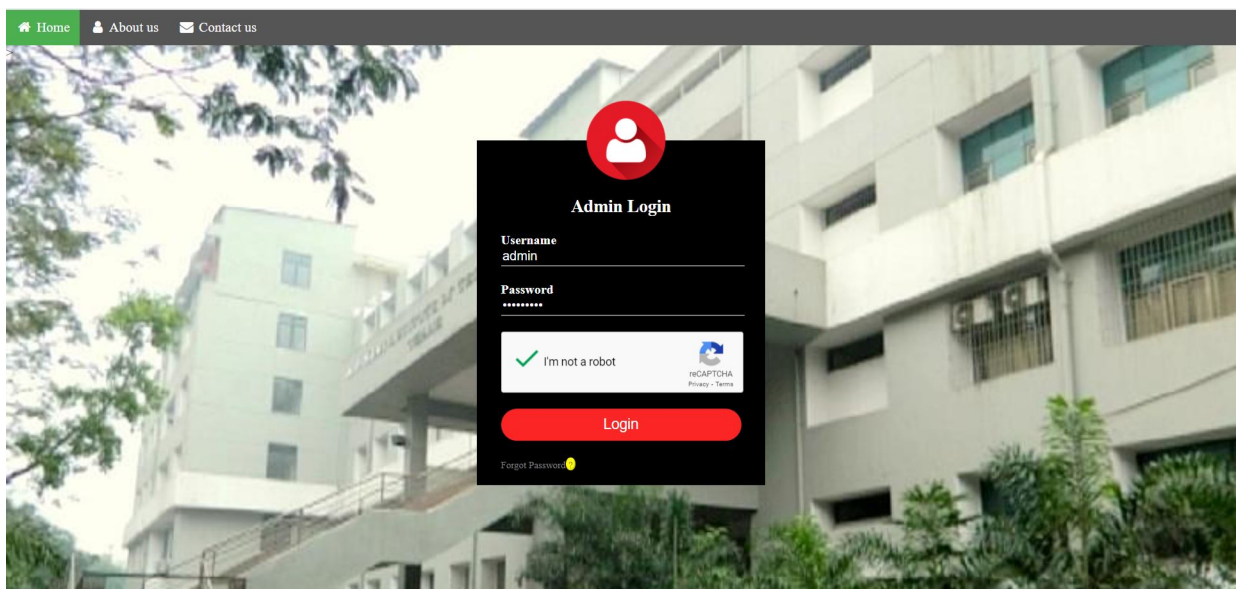
In this image the face has been recognized.

Figure 4.8: Admin Login.

This is the admin login page where after filling the details and verifying with E-Captcha entry is given.

Figure 4.9: Add Students.

This is the page of add student where faculty can add the student to their database by filling the details and upload the image.

Figure 4.10: Add Parents.

This page is to add parents, this too can be done by faculty even image of parents can be uploaded.

Figure 4.11: Add Faculty.

This page is to add faculty, after filling up the details only Admin can add the faculty into the system.

Figure 4.12: Faculty Login.

This is faculty login, similar to student login where after filling up the Email and password E-captcha will be done and will be logged in.

Figure 4.13: Schedule Lecture.

This is a schedule lecture page where Admin and Faculty can schedule the lectures as per their time table.

Figure 4.14: View Attendance.

This page is to view the attendance of students where even overall report of class can be generated w.r.t to branch, class, and subject.

Figure 4.15: Add Message.
This is a add message page where a student can send a message to the faculty.

Figure 4.16: Parents Login.
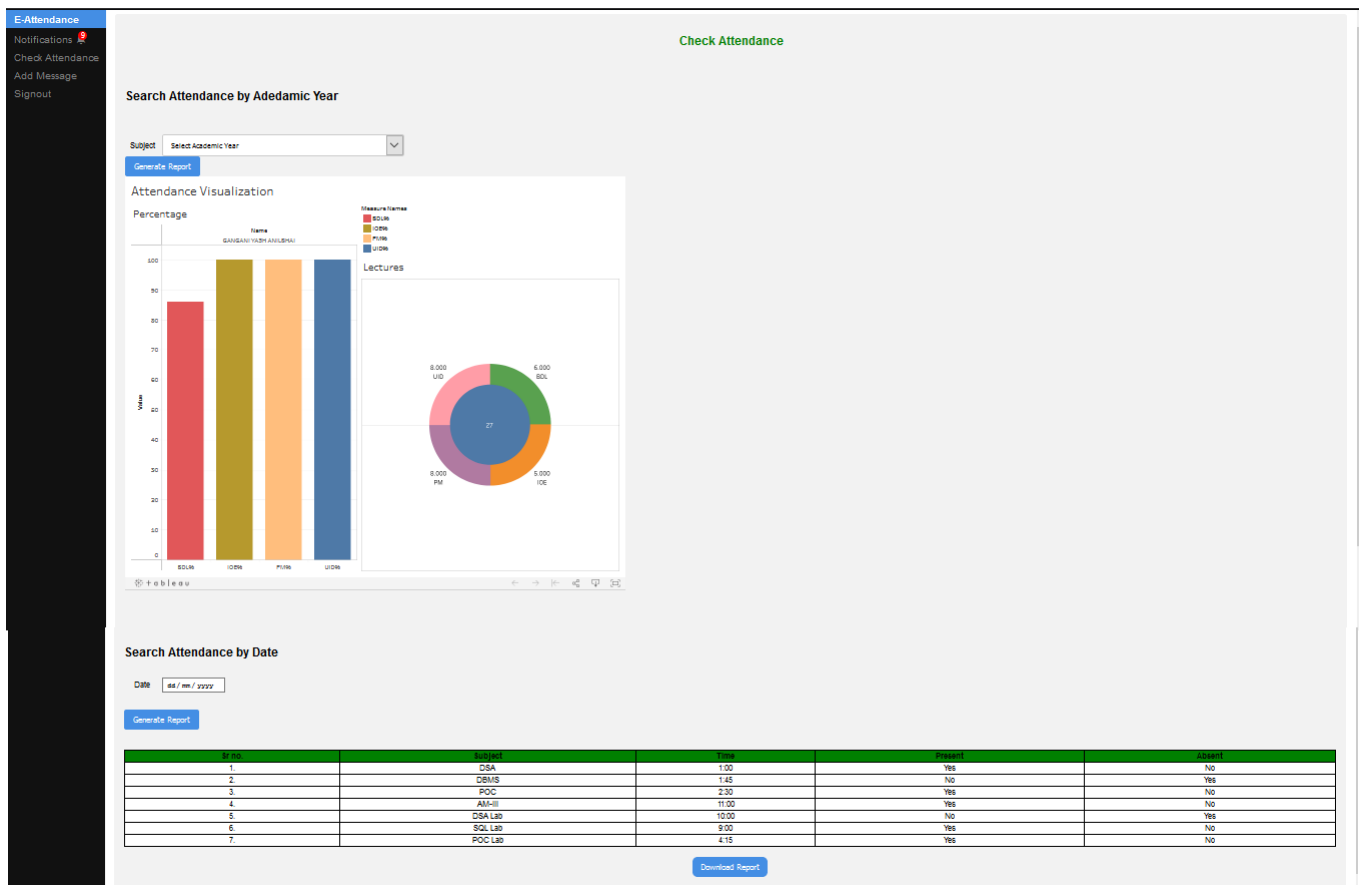This is a parents login page similar to Student and faculty login.

Figure 4.17: Parents Dashboard.

This is parents dashboard where they can view their ward's attendance visually as well as textual. In visual representation percentage of lectures present can been seen and pie chart of lectures present of different subjects.
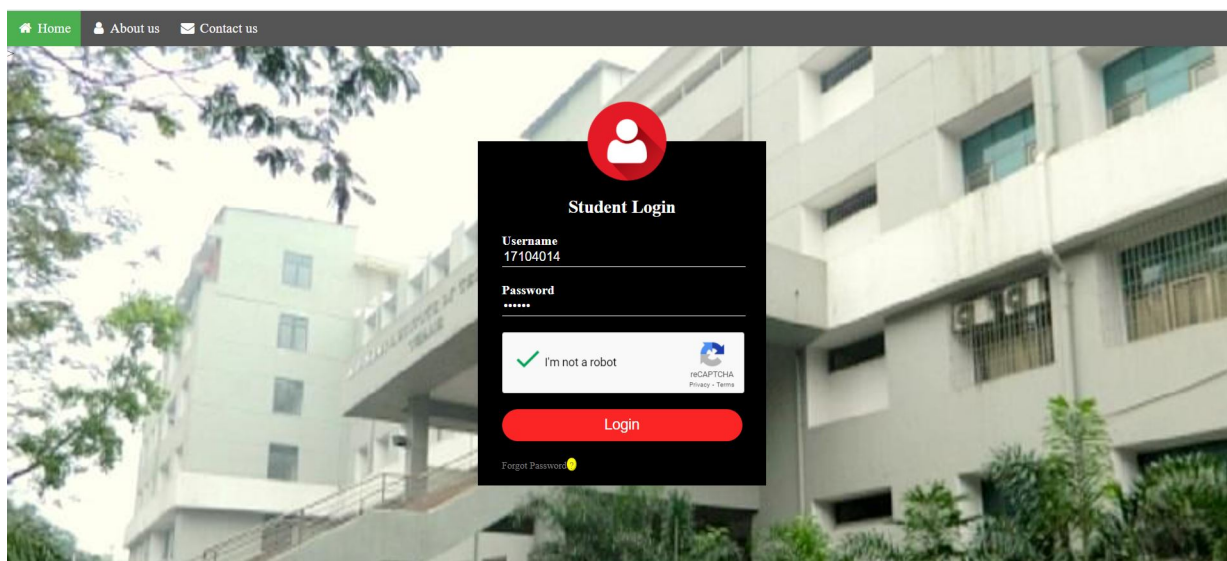

Figure 4.18: Student Login.

This page is for student login.

Chapter 5

Testing

5.0.1 Admin Dashboard operations

Test No.	Test Name	Expected Result	Actual Result
1.	Register student	Personal information should be stored in database, like Moodle ID, Student name etc.	Personal information stored in database successfully.
2.	Face enrollment	Camera tart capturing the student face and then Student face enrollment should be done.	Camera captured the student's face and student enrollment was done successfully.
3.	Add parents	Personal information of parents should be stored into the database.	Personal information of parents was stored into the database successfully.
4.	Add faculty	Personal info and academic info should be stored in database.	Personal info and academic info stored in the database successfully.
5.	Schedule lecture	Subject, classroom, Date and timing should be stored in database and lecture should be scheduled.	Subject, classroom, Date and timing stored in database and lecture is scheduled successfully.
6.	Edit Lecture	Faculty should be able edit the lecture.	Faculty was able edit the lecture successfully.
7.	View attendance	By selecting required fields, admin should be able to generate the list and see the attendance. Attendance table should be displayed.	After selecting required fields ,admin was able to generate the list and see the attendance partially. Attendance table is displayed successfully.

Table 5.1: Admin Dashboard testing

5.0.2 Faculty Dashboard operations

Test No.	Test Name	Expected Result	Actual Result
1.	Schedule Lecture	Subject, classroom, Date and timing should be stored in database, lecture should be scheduled.	Subject, classroom, Date and timing are stored in database, and lecture was scheduled partially.
2.	Edit Lecture	Should be able to edit the lecture	We were able to edit the lecture successfully.
3.	Edit attendance	By selecting required fields then clicking on the show button attendance table should be displayed. faculty should be able to edit the attendance table.	By selecting required fields then clicking on the show button attendance table was displayed and faculty was be able to edit the attendance table successfully.
4.	View attendance	By selecting required fields faculty should be able to generate the defaulter list and see the attendance. Attendance table is should be displayed, SMS msg should be sent to parents whose ward's attendance is below the attendance criteria.	By selecting required fields faculty were able to generate the defaulter list and see the attendance. Attendance table was displayed. SMS msg was send to parents whose ward's attendance was below the attendance criteria successfully.

Table 5.2: Faculty Dashboard testing

5.0.3 Student Dashboard operations

Test No.	Test Name	Expected Result	Actual Result
1.	Check attendance	Using this tab student should be able visualize their attendance and also they should be able to download their attendance report.	Using this tab student were able to visualize their attendance successfully and they were able to download their attendance report partially.
2.	Add Message	By selecting name of the faculty student should be easily able to send their attendance related query to the respective faculty.	By selecting name of the faculty student was able to easily send their attendance related query to the respective faculty successfully.

Table 5.3: Student Dashboard testing

5.0.4 Parents Dashboard operations

Test No.	Test Name	Expected Result	Actual Result
1.	Check attendance	Using this tab parents should be able visualize their ward's attendance and also they should be able to download their ward's attendance report.	Using this tab parents were able to visualize their ward's attendance successfully and they were able to download their ward's attendance report partially.

Table 5.4: Parents Dashboard testing

5.1 Result

5.1.1 Attendance Marked

Figure 5.1: Edit Attendance.

This is the marked Attendance page where faculty were successfully able to view as well as edit the student's marked attendance if there's a system mistake.

5.1.2 SMS Sent
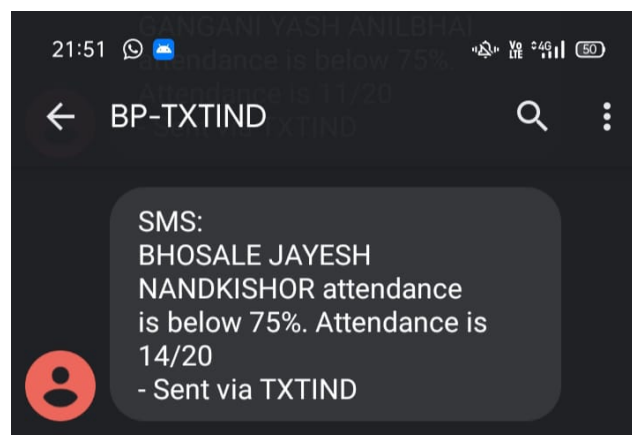
Figure 5.2: SMS.

This is SMS that was sent once the student is recorded present in class, and it's attendance was below 75 percent.

5.1.3 Dashboard for Visualization

Figure 5.3: Student Dashboard.

This is students dashboard where they were able to view their attendance visually as well as textually successfully. In visual representation percentage of lectures present were successfully displayed and pie chart of lectures present of different subjects were displayed including total number of lectures present.

Chapter 6

Conclusions and Future Scope

6.0.1 Conclusion

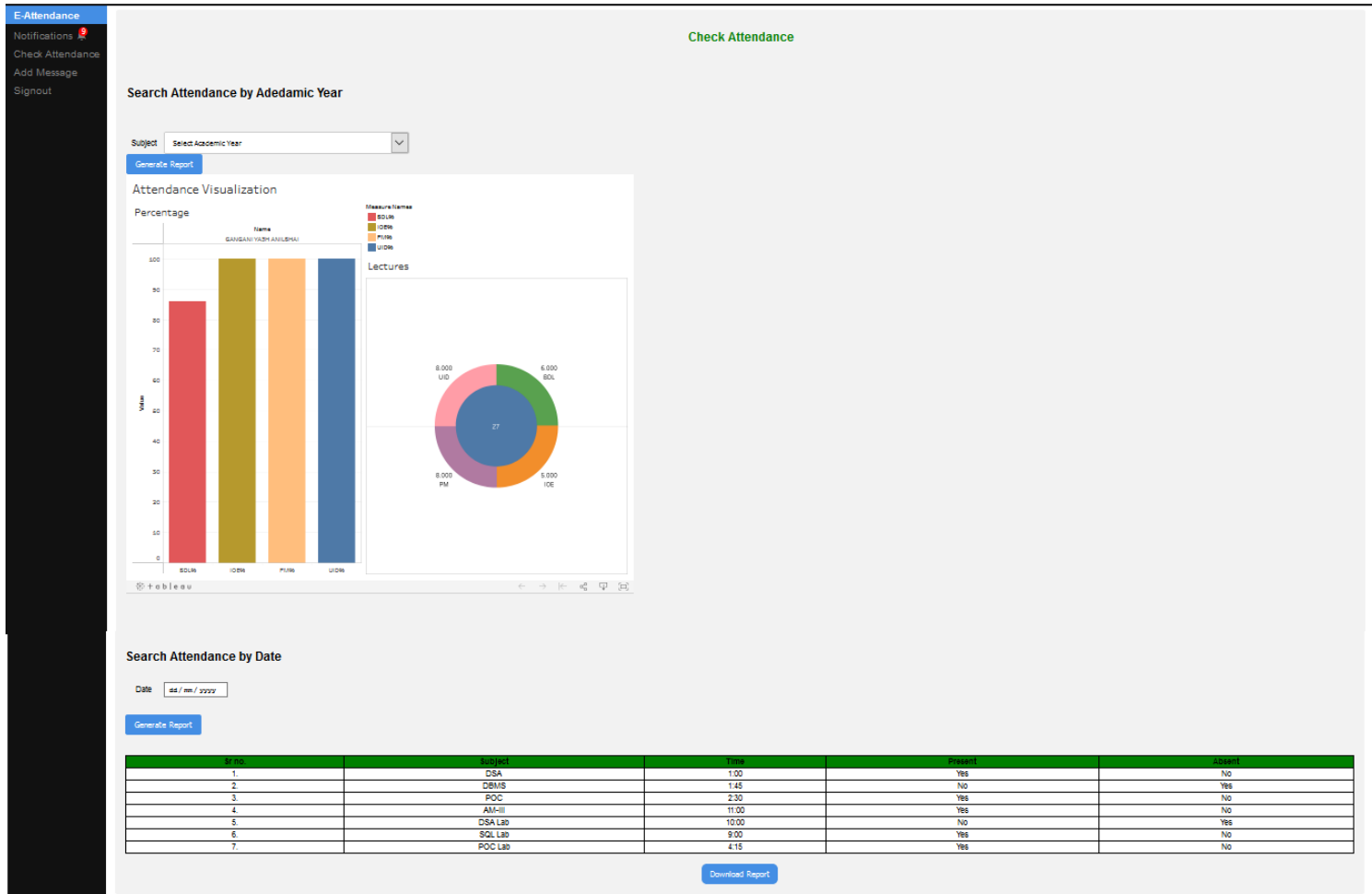In our work, we have implemented a system on AI based smart attendance system which is used for taking attendance by tracking the student's face and comparing the face data using data set of pre-trained data of student's face. Our system is helpful for parents to see the attendance on the dashboard and, also in the visualization of data. Haar Cascade algorithm is used in face detection. For better face detection and recognition small features can be improved in the future. As technology advances more features will be added to the system.

6.0.2 Future Scope

- In the future, by making small updates to the system it might be able to track student's emotions through which the attention of students can be monitored.

- During the examination it would be helpful to determine the ethics of students using emotion trackers in the system.

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Appendices

Appendix-A: Tableau Download and Installation

1. Open the Product Downloads and Release Notes page and select Tableau Desktop or Tableau Prep Builder from the list on the left side of the page.

2. Click on the version you want to install.

3. In the Download Files section of the page, click on the installer for your operating system to download it.

4. Product key location: Sign in to the Customer Portal(Link opens in a new window) page on the Tableau website using your email address and password. The information you need to sign into the portal for the first time is sent to you in a welcome email from Tableau after you purchase(Link opens in a new window) the product.

5. At the top of the Tableau Customer Portal page, click My Keys.

6. A table opens, listing any product keys assigned to you. Copy your product key from the Key Name column in the table. Keep this key ready and secure.

7. Install the product: As an Administrator, log in to the computer where you are installing Tableau Desktop.

8. As an Administrator, log in to the computer where you are installing Tableau Desktop.

9. Run the installer and follow the prompts.

10. Click Install to begin installation.

11. Activate and register tableau: After the installation process is finished, open Tableau Desktop. This launches the Tableau Registration form where you can register and activate your product.

12. Fill out the fields on the registration form and then click Activate Tableau.

13. Click on Activate with a product key.

14. If you are activating with a product key, delete any existing text in the Enter product key field, copy your product key and paste it into the text box, then click Activate.

15. Click Continue to finish the process.