CHAPTER 1
INTRODUCTION

1.1 DESCRIPTION

Attendance Management System is an application developed for daily evaluation of student's attendance. It is facilitated to access the information of attendance of a particular student in a particular subject of study. The information can be generated by the faculties and admin, as provided by the system for a particular student throughout a complete semester. This system will also enable the evaluation of student regular presence in various subjects.

Attendance being a very necessary side of administration may normally become an arduous, redundant activity, pushing itself to inaccuracies. The traditional approach of making roll calls proves itself to be a statute of limitations as it is very difficult to call names and maintain its record especially when the ratio of students is high. Some organizations use document-oriented approach and others have implemented these digital methods such as biometric fingerprinting techniques. However, these methods prove to be a statute of limitations as it make students to wait in a time-consuming queue. Post completion of face recognition, the system generates the name and identification number of the students who are present and identified in the image. Then attendance is marked in front of the student names in the excel format with respective date and subject of the lecture.

1.2 EXISTING SYSTEM

In the existing methods, some of the disadvantages are listed.

- Staff has to take attendance manually.
- If the student fails to bring his id card then he will not be able get attendance.
- It is a tedious job to maintain records.
- It is difficult to generate consolidated reports.
- Sheets may get lost.

1.3 PROBLEM DEFINITION

- Student's attendance are taken manually by using attendance sheet, which is a time consuming event.
- Moreover, it is very difficult to verify each student in a large classroom environment with distributed branches whether the authenticated students are actually responding or not.
- This project attempts to make use of dlib library to perform the face recognition for the purpose of marking attendance.
- Though many traditional methods are existed, those are vulnerable but our system will minimize the proxies.

1.4 PROPOSED SYSTEM

To overcome the drawbacks of the existing system proposed has been evolved.

- It aims to reduce the paperwork and save time for generating the accurate results from the attendance system.
- The system provides the best user interface and efficient reports.
- Face recognition proved to be a productive method for taking attendance in an institution with high precision and less computational complexity.

1.5 ORGANIZATION OF THE PROJECT

- Literature reviews of already existing proposals are discussed in chapter 2.
- Chapter 3 has system specification which tells about the software and hardware requirements.
- Chapter 4 discusses the overall project and design which tells the brief description of each of the module in this project.
- Chapter 5 has the implementation and experimental result of the project.
- Chapter 6 deals with the conclusion and future work.
- Finally chapter 7 deals with the references.

CHAPTER 2

LITERATURE REVIEW

2.1 AUTOMATIC ATTENDANCE MANAGEMENT SYSTEM USING FACE DETECTION [2016]

2.1.1 DESCRIPTION

This paper is about biometric attendance management. In this method camera is fixed in the classroom. After fixing the camera the image will be captured. During the training phase all students' images are trained. In the captured image the faces are recognized and faces get cropped from the captured image. During the attendance marking phase the recognized faces are checked against the database image. And if the image is matched with the database image the attendance gets marked. If the image is not found it will ask the admin to add the student image in the database. If the attendance is marked as absent it will send an alert to the concerned student parent. For the face recognition it uses a method called Eigen face. Eigen face is one of the fastest approach. The Eigen face method decomposes images into small features. Discrete images are mapped using linear values of Eigen face.Finally all the faces are recognized using the best Eigen face value.

2.1.2 MERIT

- Hardware installation is easy.

2.1.3 DEMERIT

- Accuracy is low and face recognition is difficult.

2.2 CLASS ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION [2018]

2.2.1 DESCRIPTION

This paper proposes a comprehensive embedded class attendance system with controlling the door access. The proposed scheme is based on face recognition. By using Local Binary Pattern algorithm (LBP) the face gets recognized. After capturing image it will be passed to the raspberry pi which handles the implementation of face recognition algorithm. If the student image was matched the door will be opened with the help of servo motor. In addition, the attendance result will be stored in the MySQL database. The experimental results show that higher accuracy can be achieved with our proposed one. The numerical results are provided to show the performances of the proposed scheme in different cases of face recognition.

2.2.2 MERIT

- Easily accessible.

2.2.3 DEMERIT

- Less sensitivity and not effective in darkness.

2.3 AUTOMATED ATTENDANCE SYSTEM USING IMAGE PROCESSING [2018]

2.3.1 DESCRIPTION

This paper proposes an idea of using image detection and recognition which can automatically handle the attendance system. In this paper, Viola Jones algorithm used for face detection and Fisher Face Algorithm are used for face recognition. At first video segments are captured from the classroom. Then, the face was detected by preprocessing the video input .Face cropping has been done At last; the cropped image would be compared with the database. If the cropped face matches with the database it marks the attendance and if the image is not found it will ask the user to register.

2.3.2 MERIT

- Maintains attendance in high efficient manner

2.3.3 DEMERIT

- Accuracy rate is less than 50%

2.4 REAL TIME SMART ATTENDANCE SYSTEM USING FACE RECOGNITION TECHNIQUES [2019]

2.4.1 DESCRIPTION

Generally attendance system is executed with the help of biometrics. Face recognition is one of the best methods to improve this system. This paper proposes a method to automate the attendance management system by making use of recognition techniques like Eigen face values, Principal Component Analysis(PCA),Convolution Neural Network(CNN).Firstly student has to enroll and details will be stored in the database and the camera will be fixed outside the classroom. If the face is not present in the database it prompts the student to register. In face recognition module the images are recovered from the camera inside the classroom. It will mark present for the students who are present in the class. Marked attendance is stored in the database for the future purpose.

2.4.2 MERIT

- Proxy less with high accuracy

2.4.3 DEMERIT

- Less efficient

2.5 REAL TIME ATTENDANCE USING FACE RECOGINITION TECHNIQUE [2020]

2.5.1 DESCRIPTION

This paper is about integrating the face recognition technique with Open Source Computer Vision (OpenCV) for attendance management system. It will facilitate the attendance automation process and enable staff to enquire student details based on the check in and checkout time. Firstly the camera has been installed in the classrooms. After that image will be captured and the captured image will be passed to the face recognition module. The recognized images are checked with images of the students which is stored in a database with individual id .If the image is not found in the database by performing haar cascade method student can add their image into the database. Student information and attendance are stored in Excel Sheet.

2.5.2 MERIT

- Accuracy high in smaller area

2.5.3 DEMERIT

- Detection rate is low in larger area

2.6 ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION [2020]

2.6.1 DESCRIPTION

This paper describes the face recognition technique used for the attendance management system. It uses an algorithm called cascade classifier and Local Binary Pattern Histogram (LBPH) for face recognition. In this application students have to register by entering the ID and Name registered with Face recognition. This data will be stored in database. Local Binary Pattern is a basic algorithm used to detect face from front side. Haar cascade is based on Haar wavelet technique to analyze the pixels from the captured image. The recognized images are checked with images of

the students which is stored in a database with individual id .If the image is not found in the database by performing haar cascade method student can add their image into the database. Student information and attendance are stored and it will be available for the respective staffs.

2.6.2 MERIT

- Robust Against monotonic grey image

2.6.3 DEMERIT

- Take more than 5 secs to recognize.

2.7 STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION [2020]

2.7.1 DESCRIPTION

This paper describes the face recognition technique used for the attendance management system. It uses an algorithm called haar cascade classifier, K-Nearest Neighbor (KNN), Convolution Neural Network (CNN), Support Vector Machine (SVM) and Local Binary Pattern Histogram (LBPH) for face recognition. In this application attendance report will generated and stored in excel format .This system is tested against various conditions. The system developed need less installation .The recognized images are checked with images of the students which is stored in a database .If the image is not found in the database student can add their image into the database. Student information and attendance are stored and it will be available in data base.

2.7.2 MERIT

- Cost efficient

2.7.3 DEMERIT

- Less computational Complexity

CHAPTER 3

SYSTEM SPECIFICATION

3.1 SYSTEM REQUIREMENTS

3.1.1 HARDWARE REQUIREMENTS

- System : Pentium IV 2.4 GHz.
- Hard Disk : 500 GB
- RAM : 4 GB

3.1.2 SOFTWARE REQUIREMENTS

- Operating system : Windows 10
- Coding Language : PYTHON
- Tool : PYTHON 3.9, FLASK

3.2 SOFTWARE DESCRIPTION

3.2.1 ABOUT PYTHON

PYTHON is an interpreted, object-oriented, high level programming language with dynamic semantics. It supports modules and package which encourages code reuse.Typical uses include:

- User-friendly Data Structures
- Software development
- Writing system scripts
- Data analysis, exploration, and visualization
- Scientific and engineering graphics.

PYTHON is often used as a scripting language for Web applications. It means it can automate specific series of tasks in an efficient way. It works on different platforms like Windows, Mac, Linux, etc.

3.2.2 CHARACTERISTICS OF PYTHON

- Python is a very easy to use developer-friendly language.
- Open Source Programming language.
- Support a wide area of GUI.
- Easily Portable language.
- Supports other Programming Languages like C,C++,Java,etc.
- Tools for building applications with custom user interface.

3.2.3 ABOUT FLASK

FLASK is a micro web framework written in python. It does not require specific tools or libraries. It allows us to build web applications. It will not force any dependency. It has features like url routing, template engine.

3.2.4 CHARACTERISTICS OF FLASK

- Development server and debugger.
- Integrated support for unit testing.
- RESTful request dispatching.
- Uses Jinja templating.
- Support for secure cookies.

CHAPTER 4

PROJECT DESIGN

4.1 DESCRIPTION OF ADMIN MODULE

In this module admin has the access to add faculties and student. The details of the faculties are stored in database. Under the student functionality the student basic details and an image of the student are collected for model generation.

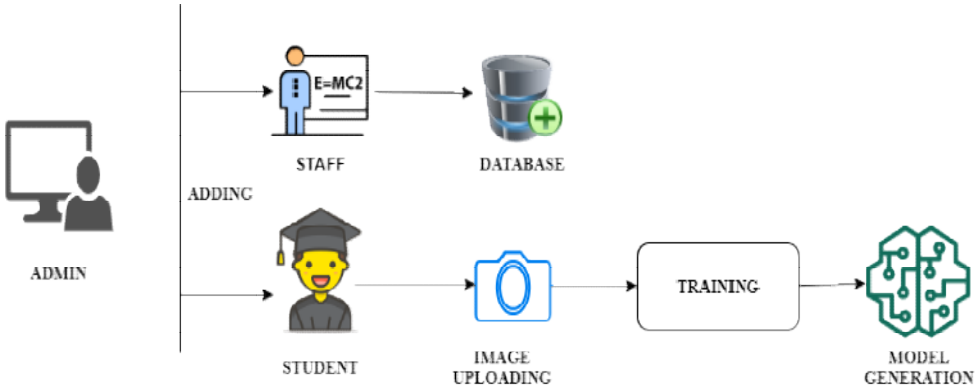


Figure 4.1.1 Admin Module

Input Student image

Output Model of the student

Step 1 Addition of faculty and students.

Step 2 Storing the details of student and staff into the database.

Step 3 Allowing students to capture the image.

Step 4 Uploading the captured image of the student.

Step 5 Using face recognition algorithm the training has been done for the uploaded image of a particular student.

Step 6 Model is generated for each student.

Step 7 Generated models are stored in separate folders.

Step 8 Save the folder name with the ID number of the student.

4.2 DESCRIPTION OF TEACHERS MODULE

In this module faculty has the access for taking attendance of the student, report generation and sending alert mail for the parents. Attendance are stored in excel format for further use.

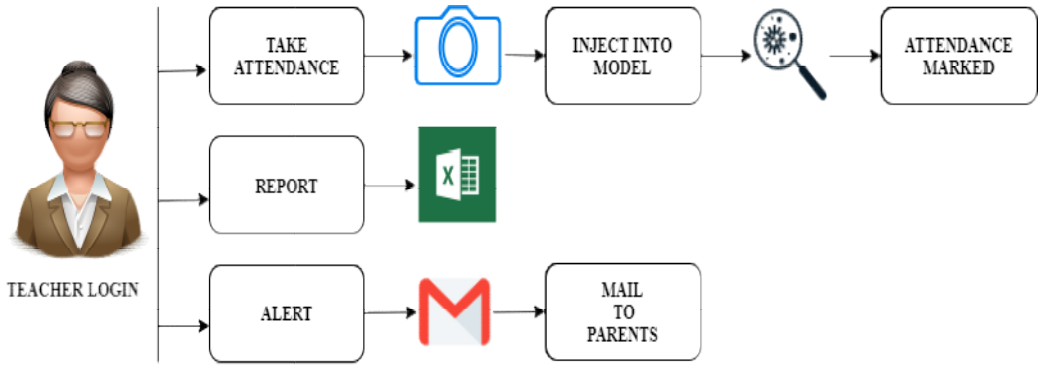


Figure 4.2.1 Teachers Module

Input Student image

Output Attendance report.

Step 1 Teacher allows students to capture images of the student.

Step 2 Captured image is injected into the model.

Step 3 The image is compared with the generated model.

Step 4 By entering the corresponding roll number and subject code the attendance will be marked.

Step 5 If the model is not present it will prompt the staff to add the student.

Step 6 Hence the attendance is stored in the Excel sheet.

Step 7 In the report generation tab the staff can generate the attendance based on hours and particular week and consolidated report.

Step 8 Staff can send mail to the student parents about the daily presence of student in the classroom.

CHAPTER 5

IMPLEMENTATION AND RESULTS

5.1 IMPLEMENTATION

Implementation is the most crucial stage in achieving a successful system and giving the users confidence that the new system is effective and workable. Implementation of this project refers to the installation of the packages in its real environment to the full satisfaction of the users and operations of the system. Testing is done individually at the time of development using the data and verification is done the way specified in the program specification. In short, implementation constitutes all activities that are required to put an already tested and completed package into operation. The success of any information system lies in its successful implementation. System implementation is the stage in the project where the theoretical design is turned into a working system.

5.1.1 ADMIN - app.py

5.1.1.1 PACKAGES

This function will load the necessary packages including math, sklearn, pickle, face_recognition that are needed for admin functionality.

```
from flask import Flask,render_template,request,redirect,url_for,session
import MySQLdb
import os

#import for face recongition
from math import sqrt
from sklearn import neighbors
from os import listdir
from os.path import isdir, join, isfile, splitext
import pickle
from PIL import Image, ImageFont, ImageDraw, ImageEnhance
import face_recognition
from face_recognition import face_locations
from face_recognition.face_recognition_cli import image_files_in_folder
```

5.1.1.2 AUTHENTICATION SYSTEM

This function will authenticate the admin by verifying the username and password. Once the admin successfully logged in, register_teacher function is called where the faculty details are collected and stored it in the database. Similar to the faculty addition, the student addition can be carried out by calling the function called signup_student. In signup_student, where the basic details and the image of the student is collected to the purpose of model generation.

```
app = Flask(__name__)

APP_ROOT = os.path.dirname(os.path.abspath(__file__))
print(APP_ROOT)

conn = MySQLdb.connect(host="localhost",user="root",password="Arasii@5670",db=
"login_info")

@app.route('/')
def index():
    return render_template("index.html",title="Admin Login")
@app.after_request
def set_response_headers(response):
    response.headers['Cache-Control'] = 'no-cache, no-store, must-revalidate'
    response.headers['Pragma'] = 'no-cache'
    response.headers['Expires'] = '0'
    return response

@app.route('/login',methods=['POST'])
def login():
    user = str(request.form["user"])
    paswd = str(request.form["password"])
    cursor = conn.cursor()
    result = cursor.execute("SELECT * from admin_login where binary username=%s
and binary
 password=%s",[user,paswd])
    if(result==1):
        return render_template("task.html")
    else:
        return render_template("index.html",title="Admin Login",msg="The username or
password is incorrect")


@app.route('/register_teacher',methods=['POST'])
def register_teacher():
    return render_template("signup.html",title="SignUp")
@app.after_request
def set_response_headers(response):
    response.headers['Cache-Control'] = 'no-cache, no-store, must-revalidate'
```

```
    response.headers['Pragma'] = 'no-cache'
    response.headers['Expires'] = '0'
    return response


@app.route('/student',methods=['POST'])
def file_upload():
    return render_template("upload.html")


@app.route('/signup_teacher',methods=['POST'])
def signup():
    user = str(request.form["user"])
    paswd = str(request.form["password"])
    email = str(request.form["email"])
    cursor = conn.cursor()
    result = cursor.execute("SELECT * from teacher_login where binary username=%s"
,[user])
    print (result)
    if(result == 1):
        return render_template("signup.html",title="SignUp",uname=user,msg="already
 present")
    cursor.execute("INSERT INTO teacher_login (username,password,email) VALUES
(%s, %s, %s)",(user,paswd,email))
    conn.commit()
    return render_template("signup.html",title="SignUp",msg="successfully
signup",uname=user)


@app.route('/signup_student',methods=['POST'])
def signup_student():
    user = str(request.form["student_name"])
    email = str(request.form["student_email"])
    roll_id = str(request.form["roll_id"])
    email1 = str(request.form["parent_email"])
    cursor = conn.cursor()
    result = cursor.execute("SELECT * from student_login where binary roll_id=%s",
[roll_id])
    print (result)
    if(result == 1):
        return render_template("upload.html",uname=user,msg=" already present")
    cursor.execute("INSERT INTO student_login (username,student_email,parent_email,
roll_id) VALUES(%s, %s, %s, %s)",(user,email,email1,roll_id))
    conn.commit()
    return render_template("upload.html",uname=user,msg=" successfully signup")


@app.route("/upload", methods=['POST'])
def upload():
    target = os.path.join(APP_ROOT,"train/")
    if not os.path.isdir(target):
        os.mkdir(target)
```

```
    classfolder = str(request.form['class_folder'])
    session['classfolder'] = classfolder
    target1 = os.path.join(target,str(request.form["class_folder"])+"/")
    session['target1']=target1
    print(target1)
    model = os.path.join(APP_ROOT,"model/")
    if not os.path.isdir(model):
        os.mkdir(model)
    classname = str(request.form['class_folder']+"/")
    model = os.path.join(model,classname)
    if not os.path.isdir(model):
        os.mkdir(model)
    session['model']=model
    session['classname'] = classname
    if not os.path.isdir(target1):
        os.mkdir(target1)
    id_folder = str(request.form["id_folder"])
    session['id_folder']= id_folder
    target2 = os.path.join(target1,id_folder+"/")
    if not os.path.isdir(target2):
        os.mkdir(target2)
    target3 = os.path.join(target2,id_folder+"/")
    if not os.path.isdir(target3):
        os.mkdir(target3)
    for file in request.files.getlist("file"):
        print(file)
        filename = file.filename
        destination = "/".join([target3,filename])
        print(destination)
        file.save(destination)
    return call_train()
```

5.1.1.3 TRAINING PHASE

This function is responsible for training student data through face recognition and storing it in a database. The whole training process involves preprocessing the image and the model generation.

```
def train(train_dir, model_save_path = "", n_neighbors = None, knn_algo =
 'ball_tree', verbose=True):
    id_folder=str(session.get('id_folder'))
    X = []
    y = []
    z = 0
    for class_dir in listdir(train_dir):
        if not isdir(join(train_dir, class_dir)):
            continue
        for img_path in image_files_in_folder(join(train_dir, class_dir)):
```

```
            image = face_recognition.load_image_file(img_path)
            faces_bboxes = face_locations(image)
            if len(faces_bboxes) != 1:
                if verbose:
                    print("image {} not fit for training: {}".format(img_path,
 "didn't find a face" if len(faces_bboxes) < 1 else "found more than one face"))
                    os.remove(img_path)
                    z = z + 1
                continue
            X.append(face_recognition.face_encodings(image,
known_face_locations=faces_bboxes)[0])
            y.append(class_dir)
    print(listdir(train_dir+"/"+id_folder))
    train_dir_f = listdir(train_dir+"/"+id_folder)
    for i in range(len(train_dir_f)):
        if(train_dir_f[i].startswith('.')):
            os.remove(train_dir+"/"+id_folder+"/"+train_dir_f[i])

    print(listdir(train_dir+"/"+id_folder))

    if(listdir(train_dir+"/"+id_folder)==[]):
        return render_template("upload.html",msg1="training data empty,
 upload again")
    elif(z >= 1):
        return render_template("upload.html",msg1="Data trained for "
+id_folder+", But one of the image not fit for trainning")
    if n_neighbors is None:
        n_neighbors = int(round(sqrt(len(X))))
        if verbose:
            print("Chose n_neighbors automatically as:", n_neighbors)

    knn_clf = neighbors.KNeighborsClassifier(n_neighbors=n_neighbors, algorithm
=knn_algo, weights='distance')
    knn_clf.fit(X, y)

    if model_save_path != "":
        with open(model_save_path, 'wb') as f:
            pickle.dump(knn_clf, f)

    return render_template("upload.html",msg1="Data trained for "+ id_folder)
```

5.1.1.4 MODEL GENERATION

This function will result in the model generation through the input image and storing the result in the folder which is named after the register number of the student.

```
def call_train():
    id_folder = str(session.get('id_folder'))
```

```
model=str(session.get('model'))
if not os.path.isdir(model + id_folder):
    os.mkdir(model + id_folder)
model = model + id_folder + "/"
model = model + "model"
target1=str(session.get('target1'))
print(id_folder)
print (target1)
target1 = target1 +id_folder
print(target1)
print(model)
return train(train_dir=target1,model_save_path=model)
```

5.1.2 TEACHERS - APP.PY

5.1.2.1 PACKAGES

This function will load the necessary packages including flask, flask bootstrap, MySQLdb, sklearn, shutil, pickle, face_recognition, xlsxwriter, pandas, flask_mail that are needed for faculty functionality.

```
from flask import Flask,render_template,request,redirect,url_for,session
from flask_bootstrap import Bootstrap
import MySQLdb
import os
from math import sqrt
from sklearn import neighbors
from os import listdir
from os.path import isdir, join, isfile, splitext
import shutil
import pickle
from PIL import Image, ImageFont, ImageDraw, ImageEnhance
import face_recognition
from face_recognition import face_locations
from face_recognition.face_recognition_cli import image_files_in_folder
from datetime import datetime,timedelta
from pytz import timezone
import xlsxwriter
import pandas as pd
from glob import glob
from flask_mail import Mail, Message
from io import BytesIO
import base64
import lable_image
```

5.1.2.2 IMAGE CAPTURING

This function will be responsible for capturing the image of the student to mark the attendance. Here the image is taken and pass it to the match() function where the prediction taken place.

```
def upload():
    if not os.path.isfile(APP_ROOT+"/image.jpeg"):
        return render_template("upload.html",msg="spoof detected")
    id_folder = str(request.form['id_folder'])
    session['id_folder']= id_folder
    target = os.path.join(APP_ROOT,"test/")
    if not os.path.isdir(target):
        os.mkdir(target)
    target1 = os.path.join(target,str(request.form["folder_name"])+"/")
    test_append = str(request.form["folder_name"])
    session['test_append']= test_append
    print(target1)
    if not os.path.isdir(target1):
        os.mkdir(target1)
    shutil.copyfile(APP_ROOT+"/"+"image.jpeg",target1+"image.jpeg")
    destination = APP_ROOT + "/" + "test/" + test_append + "/" + "image.jpeg"

    session['destination'] = destination
    teacher_name = str(session.get('user'))
    session['teacher_name'] = teacher_name
    #return render_template("upload.html",msg="uploaded successfully")
    return match()
```

5.1.2.3 IMAGE DETECTION

This function will classify the student based upon the model which is already trained and stored in database. For prediction, predict() function is called and the classification is done using KNN classifier. Once the prediction is completed, the status of the student is stored in the excel sheet.

```
def match():
    destination = str(session.get('destination'))
    print(destination)
    if os.path.isfile(destination):
        test_append = str(session.get('test_append'))
        session['test_append'] = test_append
        id_folder = str(session.get('id_folder'))

        train_dir = APP_ROOT1[0]+"admin_site/train/"+ test_append
        try:
            model = APP_ROOT1[0]+"admin_site/model/"+test_append+"/" + id_folder +
 "/" +"model"
            print(model)
```

```
            return predict1(model)
        except FileNotFoundError:
            os.remove(APP_ROOT1[0]+"teachers_site/image.jpeg")
            return render_template("upload.html",msg="trained model not present for "
 + test_append + ": "+id_folder)


def predict(X_img_path, knn_clf = None, model_save_path ="", DIST_THRESH = .45):
    if knn_clf is None and model_save_path == "":
        raise Exception("must supply knn classifier either thourgh knn_clf or
model_save_path")

    if knn_clf is None:
        with open(model_save_path, 'rb') as f:
            knn_clf = pickle.load(f)

    X_img = face_recognition.load_image_file(X_img_path)
    X_faces_loc = face_locations(X_img)
    if len(X_faces_loc) == 0:
        return []

    faces_encodings = face_recognition.face_encodings(X_img, known_face_locations=
X_faces_loc)


    closest_distances = knn_clf.kneighbors(faces_encodings, n_neighbors=1)

    is_recognized = [closest_distances[0][i][0] <= DIST_THRESH for i in range(len
(X_faces_loc))]


    return [(pred) if rec else ("unknown") for pred, rec in zip(knn_clf.predict
(faces_encodings), is_recognized)]

def predict1(model):
    test_append = str(session.get('test_append'))
    test_dir = APP_ROOT1[0]+"teachers_site/test/" + test_append
    f_preds = []
    for img_path in listdir(test_dir):
        preds = predict(join(test_dir, img_path) ,model_save_path=model)
        f_preds.append(preds)
        print(f_preds)
    print(len(preds))
    print(len(f_preds))
    for i in range(len(f_preds)):
        if(f_preds[i]==[]):
            os.remove(APP_ROOT1[0]+"teachers_site/image.jpeg")
            return render_template("upload.html",msg="upload again, face not found")
        else:
            os.remove(APP_ROOT1[0]+"teachers_site/image.jpeg")
    excel = os.path.join(APP_ROOT,"excel/")
```

```
    if not os.path.isdir(excel):
        os.mkdir(excel)
    excel1 = os.path.join(excel,test_append)
    if not os.path.isdir(excel1):
        os.mkdir(excel1)
    teacher_name = str(session.get('teacher_name'))
    excel2 = os.path.join(excel1,teacher_name)
    if not os.path.isdir(excel2):
        os.mkdir(excel2)
    session['excel2'] = excel2
    excel3 = excel2+"/"+date+'.xlsx'
    if not os.path.isfile(excel3):
        workbook = xlsxwriter.Workbook(excel2+"/"+date+'.xlsx')
        worksheet = workbook.add_worksheet()
        worksheet.set_column(0,0,20)
        worksheet.write('A1','Roll Id')
        f_preds.sort()
        row = 1
        col = 0
        if f_preds[0][0] == 'unknown':
            return render_template("upload.html",msg= "Student Not Matched")
        for i in range(len(f_preds)):
            for j in range(len(f_preds[i])):
                worksheet.write_string(row,col,f_preds[i][j])
                row += 1
        workbook.close()
        return render_template("upload.html",msg= f_preds[0][0] + " present")
    else:
        df = pd.read_excel(excel2+"/"+date+'.xlsx')
        writer = pd.ExcelWriter(excel2 + "/" + date+'.xlsx')
        df.to_excel(writer,sheet_name="Sheet1",index=False)
        workbook  = writer.book
        worksheet = writer.sheets['Sheet1']
        rows=df.shape[0]
        worksheet.write_string(rows+1,0,f_preds[0][0])
        writer.save()
        df = pd.read_excel(excel2+"/"+date+'.xlsx')
        df.drop_duplicates(['Roll Id'],keep='first',inplace=True)
        # result = df.sort_values("Roll Id")
        writer = pd.ExcelWriter(excel2 + "/" + date+'.xlsx')
        df.to_excel(writer,'Sheet1',index=False)
        workbook = writer.book
        worksheet = writer.sheets['Sheet1']
        worksheet.set_column(0,0,20)
        writer.save()
        return render_template("upload.html",msg= f_preds[0][0] + " present")
```

5.1.2.4 ATTENDANCE VIEW

This function will be responsible for viewing the attendance(i.e) report for the

particular class.

```
def view():
    test_append = str(request.form['folder_name'])
    session['test_append']=test_append
    teacher_name = str(session.get('user'))
    excel_dir = APP_ROOT+"/excel/"+test_append+"/"+teacher_name+"/"
    excel_date = request.form['fname']
    time = request.form['ftime']
    time = time[:2]
    print(time)
    final_excel=glob(excel_dir + "/" + excel_date+ "@" + time +"*.xlsx")[0]
    print(final_excel)

    df = pd.read_excel(final_excel)
    df.index += 1
    return render_template("files.html",msg=final_excel,df=df,date=excel_date+"@"+
    time+
   "hrs")
```

5.1.2.5 MAIL CONFIGURATION

```
# mail settings

app.config.update(
    DEBUG = True,
    #Email settings
    MAIL_SERVER = 'smtp.gmail.com',
    MAIL_PORT = 465,
    MAIL_USE_SSL = True,
    MAIL_USERNAME = 'demo@gmail.com',
    MAIL_PASSWORD = 'demo12345',
    MAIL_DEFAULT_SENDER = 'demo@gmail.com'
    )
mail = Mail(app)

# declaring timezone then creating custom date format

india = timezone('Asia/Kolkata')
date = str(datetime.now(india))[:10] + "@" + str(datetime.now())[11:13] + "hrs"
```

5.1.2.6 MAIL ALERT

The configuration of the mail server with their credentials to send the alert to the student and parents regarding their attendance status.

```
def send_mail():
```

```
    test_append = str(request.form['folder_name'])
    teacher_name = str(session.get('user'))
    excel_dir = APP_ROOT+"/excel/"+test_append+"/"+teacher_name+"/"
    excel_date = request.form['fname']
    time = request.form['ftime']
    time = time[:2]
    final_send = glob(excel_dir + "/" + excel_date+ "@" + time +"*.xlsx")[0]
    print(final_send)
    df = pd.read_excel(final_send)
    roll_id = list(df['Roll Id'])
    print(type(roll_id))
    print(roll_id)
    cursor = conn.cursor()
    for i in range(len(roll_id)):
        cursor.execute("SELECT student_email,parent_email from student_login where
        binary
        roll_id=%s",[roll_id[i]])
        email = list(cursor.fetchone())
        print(type(email[1]))
        print(email[0])
        print(email[1])
        msg = Message('Auto Generated',recipients= [email[0],email[1]])
        msg.body = "Hi.. " + roll_id[i] + " is present for the lecture of " + "Prof. " +
        str(teacher_name.split('.',1)[0]) + ", which is held on " + excel_date + "@" + time +
        "hrs"
        msg.html = "Hi.. " + roll_id[i] + " is present for the lecture of " + "Prof. " +
        str(teacher_name .split('.',1)[0])+ ", which is held on " + excel_date + "@" + time +
        "hrs"
        mail.send(msg)
    return "<h1>mail sent<h1>"
```

5.1.2.7 ATTENDANCE UPDATION

```
def update():
    test_append = str(request.form['excel_folder'])
    print(test_append)
    teacher_name = str(session.get('user'))
    print(teacher_name)
    excel_dir = APP_ROOT + "/excel/" + test_append + "/" + teacher_name + "/"
    print(excel_dir)
    for file in request.files.getlist("updated_excel"):
        print(file)
        filename = file.filename
        print(filename)
        destination = "/".join([excel_dir,filename])
        print(destination)
        file.save(destination)
    return render_template("excel.html",msg="updated successfully")
```

5.1.2.8 CONSOLIDATED REPORT GENERATION

The function to calculate the overall percentage of the particular course or student.

```
def calculate():
    test_append = str(request.form['final_class'])
    print(test_append)
    teacher_name = str(session.get('user'))
    print(teacher_name)
    excel_root = APP_ROOT + "/excel/" + test_append + "/" + teacher_name + "/"
    print(excel_root)
    excel_names = os.listdir(excel_root)
    print(excel_names)
    for i in range(len(excel_names)):
        if excel_names[i].startswith("."):
            os.remove(excel_root+excel_names[i])
        else:
            if os.path.isdir(excel_root+excel_names[i]):
                shutil.rmtree(excel_root+excel_names[i], ignore_errors=False, onerror=None)
    excel_names = os.listdir(excel_root)

    if(excel_names==[]):
        return render_template("excel.html",msg1="No excel files found")

    for i in range(len(excel_names)):
        excel_names[i] = excel_root + excel_names[i]
    print(type(excel_names))
    # read them in
    excels = [pd.ExcelFile(name) for name in excel_names]
    # turn them into dataframes
    frames = [x.parse(x.sheet_names[0], header=None,index_col=None) for x in excels]
    # delete the first row for all frames except the first
    # i.e. remove the header row -- assumes it's the first
    frames[1:] = [df[1:] for df in frames[1:]]
    # concatenate them..
    combined = pd.concat(frames)
    if not os.path.isdir(excel_root+"final/"):
        os.mkdir(excel_root + "final/")
    final = excel_root + "final/"
    print(final)
    # write it out
    combined.to_excel(final+"final.xlsx", header=False, index=False)

    # below code is to find actual repetative blocks

    workbook = pd.ExcelFile(final+"final.xlsx")
    df = workbook.parse('Sheet1')
    sample_data = df['Roll Id'].tolist()
    print (sample_data)
    #a dict that will store the poll results
    results = {}
```

```
for response in sample_data:
    results[response] = results.setdefault(response, 0) + 1
finaldf = (pd.DataFrame(list(results.items()), columns=['Roll Id', 'Total presenty']))
finaldf = finaldf.sort_values("Roll Id")
print (finaldf)
writer = pd.ExcelWriter(final+"final.xlsx")
finaldf.to_excel(writer,'Sheet1',index=False)
workbook  = writer.book
worksheet = writer.sheets['Sheet1']
worksheet.set_column(0,1,20)
writer.save()
final = final + "final.xlsx"
session['final']=final
final = final[91:]
return viewfinal(final)
```

5.2 SAMPLE OUTPUT

Figure 5.2.1 Test images

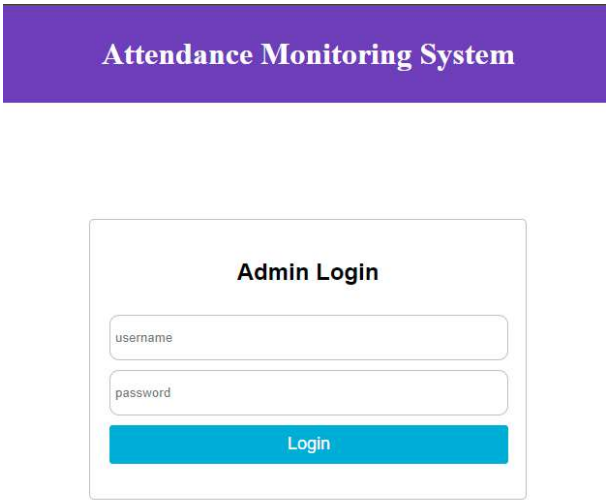


Figure 5.2.2 Admin panel

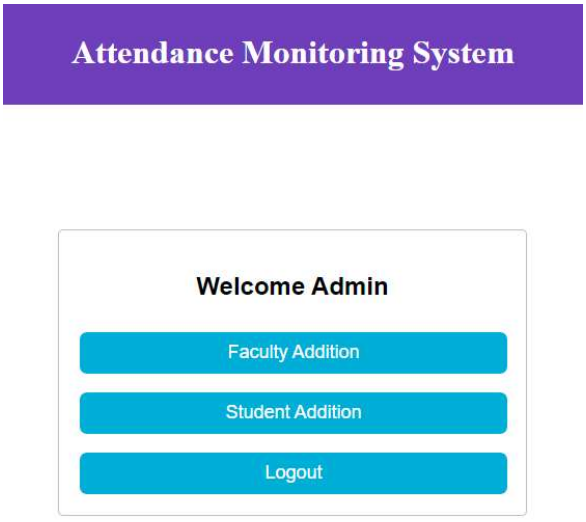


Figure 5.2.3 Admin dashboard

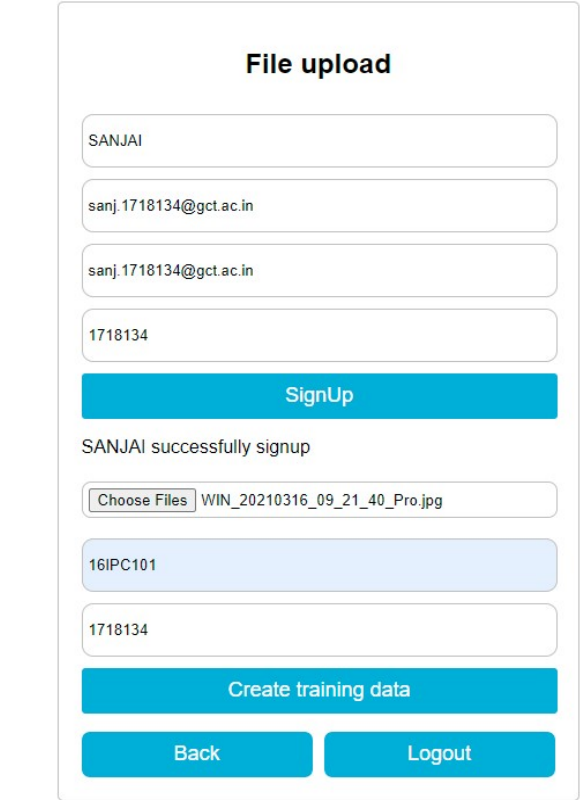
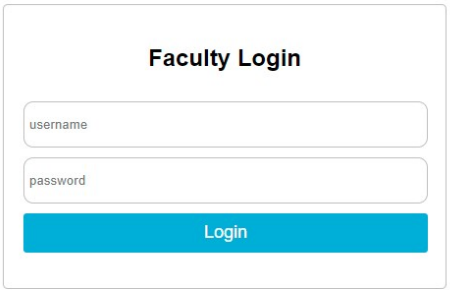


Figure 5.2.4 Student addition



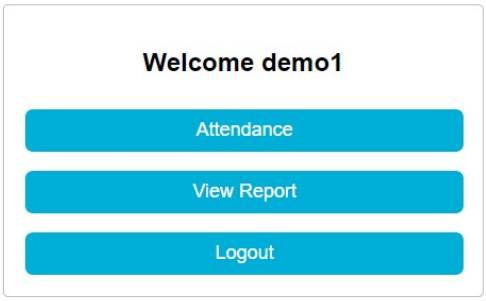
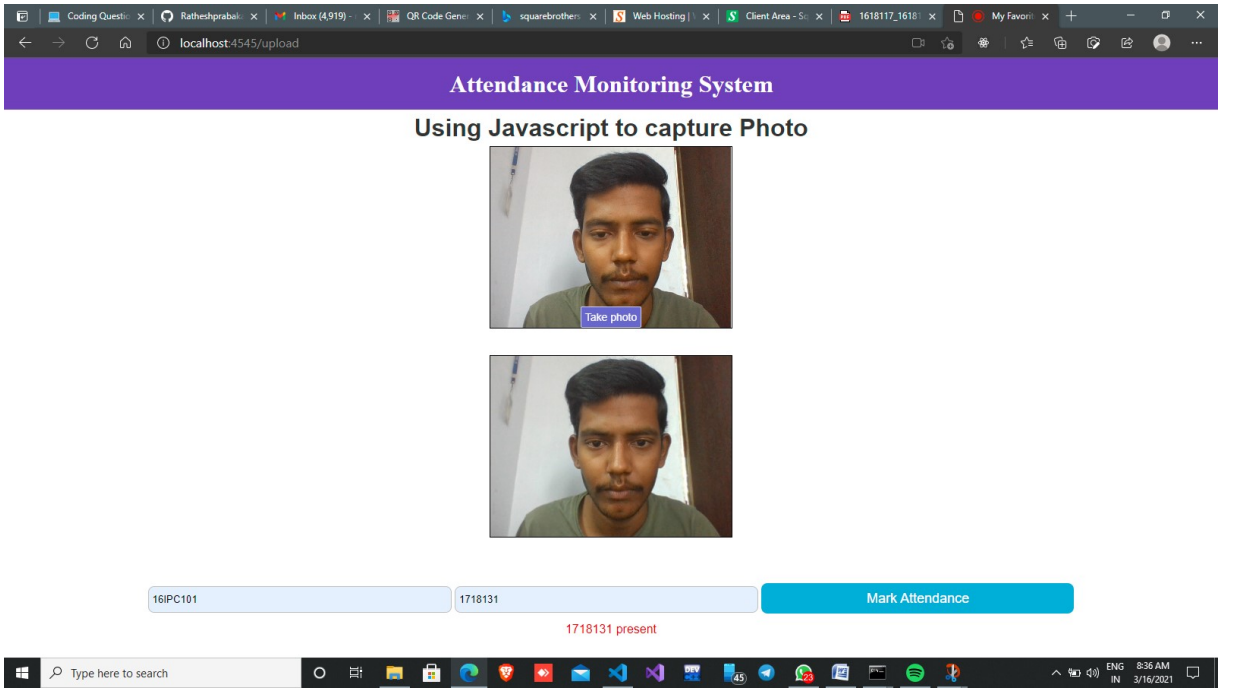


Figure 5.2.5 Faculty login

Figure 5.2.6 Faculty dashboard



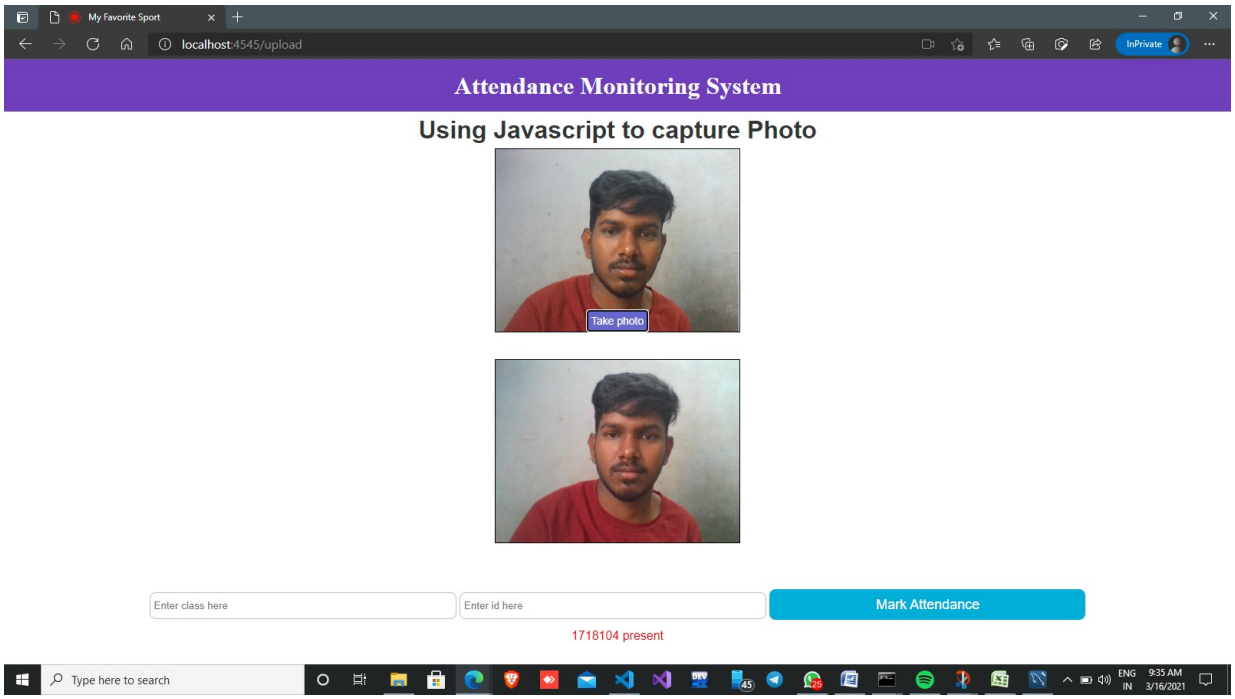


Figure 5.2.7 Take attendance

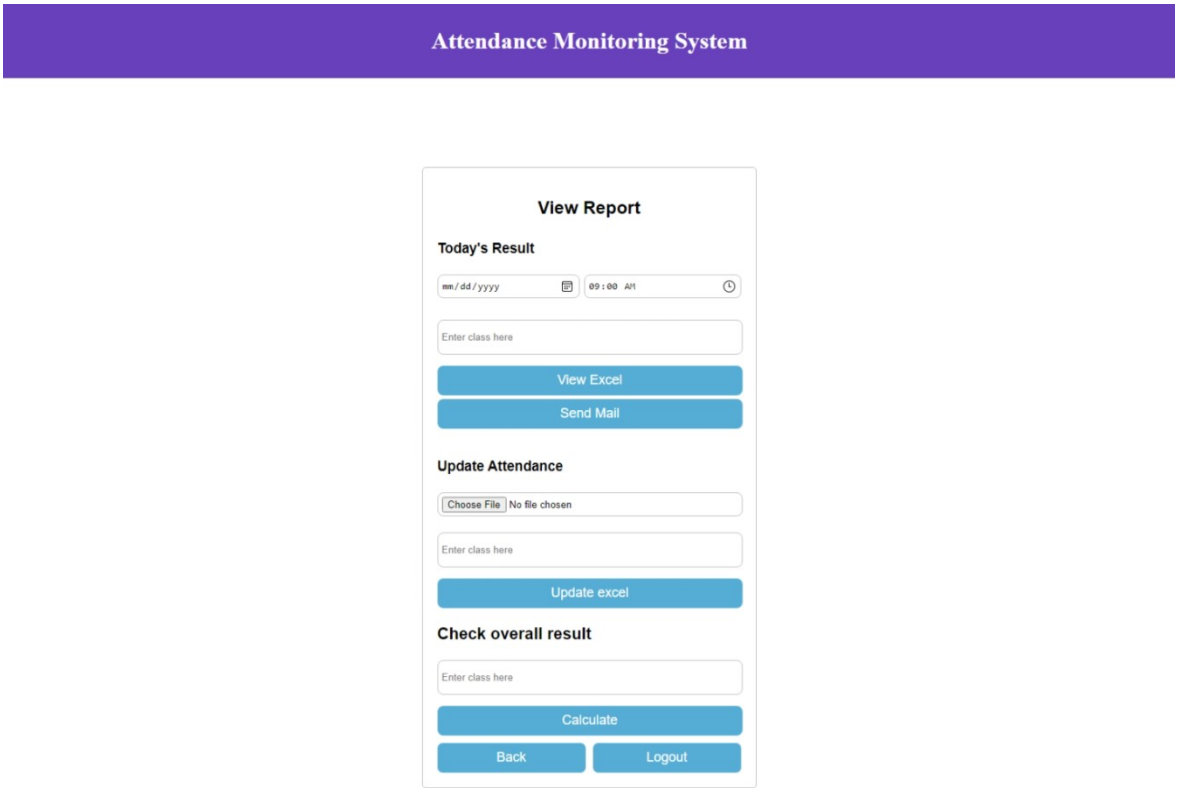


Figure 5.2.8 Report panel

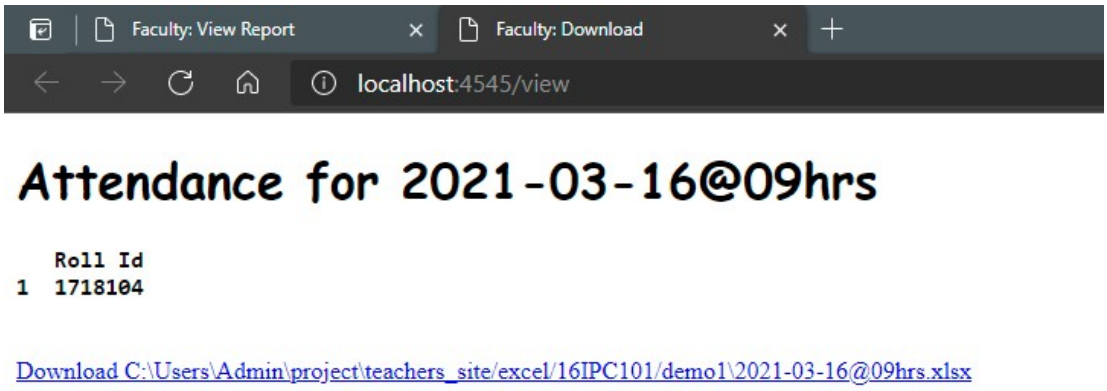


Figure 5.2.9 Attendance view

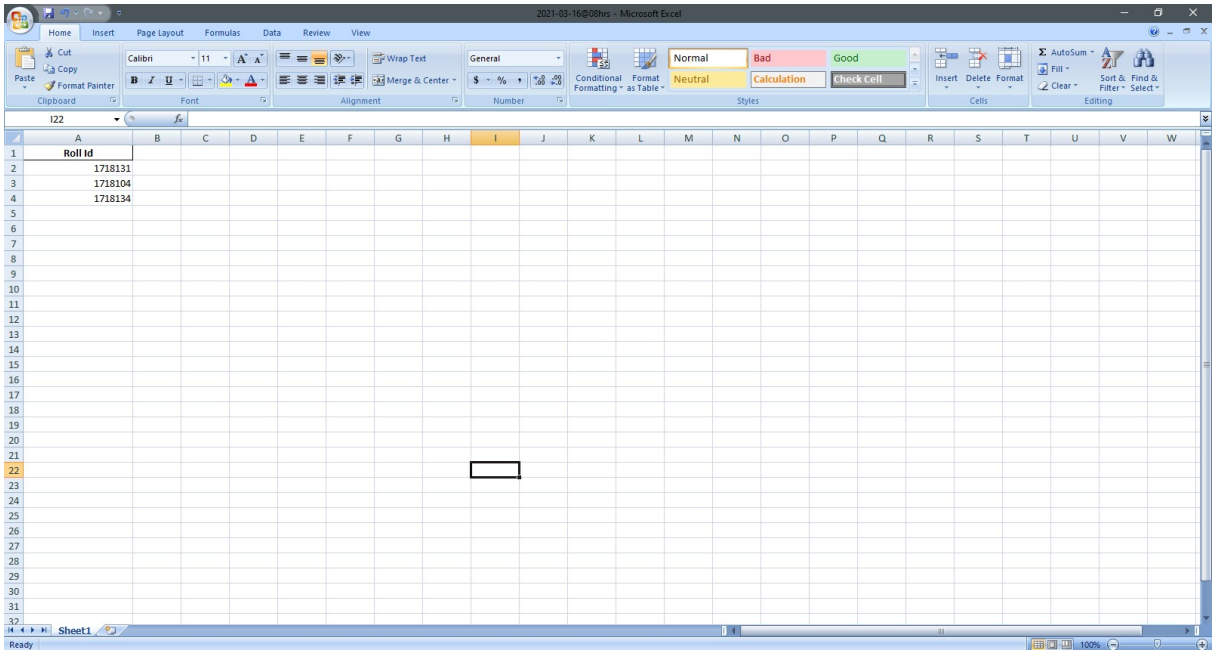


Figure 5.2.10 Report view

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 CONCLUSION

In this project, a smart attendance system with face recognition technology was developed. A model has been developed by training the students using face_recognition through dlib library while the models that have been generated can be used to mark the attendance. Thus the comparable detection can be obtained with satisfactory prediction accuracy. Different from the traditional methods, the process of marking and maintaining attendance can be performed in a face detection manner with the proposed model. This system is cost efficient and less manual work. The experimental results have shown that the attendance of the student can be marked and store it in the database.

6.2 FUTURE WORK

The future work is to improve the recognition rate when there are unintentional changes in a person like tonsuring head, using scarf, beard. Addition of student details and model generation for all students will be done in single trigger by storing and uploading the details in an excel sheet. The barcode of a particular subject will be displayed on the projector which will change every 10 seconds to avoid proxy attendance. The student needs to scan the barcode and capture the photo within 10 seconds or the barcode will expire. This will prevent other students from capturing the photo of barcode and sending it to their colleagues to mark the attendance.

CHAPTER 7

REFERENCES

[1] E.Varadharajan,R.Dharani,S.Jeevitha,B.Kavinmathi,S.Hemalatha.,2016,“Automatic Attendance Management System Using Face Detection”,International Conference on Green Engineering and Technologies .

[2] Salim,O.A.R,Olanrewaju,R.F.Balogun., 2018,“Class Attendance Management System Using Face Recognition”,7th International Conference on Computer and Communication Engineering .

[3] Hapani S,Prabhu N,Parakhiya N,Paghdal.,2018,“Automated Attendance system using Image Processing”,4th International Conference on Computing Communication Control and Automation.

[4]Sawhney,S.Kacker,Jain S,S.N Garg., 2019, “Real Time Attendance Using Face Recognition Technique”,9th International Conference on Cloud Computing,Data Science & Engineering(Confluence).

[5] Mayank Srivatsava,Amit Kumar,Aditya Dixit,Aman Kumar., 2020, “Real Time Smart Attendance System Using Face Recognition Techniques”, International Conference on Power Electronics andIot Applications.

[6] Kirtiraj Kadam, Manasi Jadhav, Shivam Mulay, Tushar Indalkar., 2020, “Attendance Management System Using Face Recognition”, International Journal of Advance Engineering and Research Development.

[7] Ketan N. Mahajan, Nagaraj V. Dharwadkar.,2020, “Student Attendance System Using Face Recognition”, International Conference on Computer Systems, Electronics and Control.