

Face Recognition Attendance System (Using Flutter App Interface)

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ABSTRACT

The general problem in today's educational institution is to keep the right track of student attendance on a daily basis. The purpose of this project is to make a face recognition-based attendance system using Python and Flutter for educational institutions to further improve the quality of the current attendance system into more efficient and eco-friendly as compared to the previous system. The current, antiquated system has a great deal of uncertainty, which led to inaccurate and ineffective attendance taking. Every human face has a unique trait associated with it and with the help of these factors we can identify each face. When a person is recognised, their attendance will be recorded automatically into excel. Which is then further shared with respective faculty. The management of the attendance by traditional method can cause great burden on the teachers. To resolve this problem, an auto attendance management system can be utilized. By using this, the problem of proxies and students being marked present despite being absent can easily be solved. We intend to show student's attendance of each subject, display lecture schedule, defaulter's list and critical defaulter's list, and display percentage of attendance. The Teachers can view the spreadsheet showing day-wise attendance.

Keywords - Python, Flutter, Excel, Defaulters list, Schedule

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I. INTRODUCTION

Facial Recognition-Based Attendance System for Educational Institutions is the topic of this research. Scientific data shows that there is a high correlation between students' performance/growth and attendance. Therefore, it is necessary to keep a right track of attendance. Our system will also keep a track of date and time when the face is recognised so, this will lower the scope of bunking the lectures.

The problem with the previous method of attendance taking is that it is time and space consuming. The main goal of this project is to resolve the issues

occurring due to the previous attendance system while creating a smart system that can benefit the institute. This is the direction in which the project will be developed.

II. LITERATURE REVIEW

To create our attendance system we referred to various articles/books as follows.

FaceRecognition Attendance System for Human Resource Management. From this, we took the idea of marking the attendance in a spreadsheet. Artificial Intelligence Learning

Automation Skills With Python-We got a general overview of python programming.Face Detection and Recognition. We referred to this to understand how to use the OpenCV library in python. A technique for the attendance system to recognize faces through parallel techniques . We referred to this article to

understand the basic steps that are involved in image processing during face recognition attendance systems.A Sensor-fusion Method of Detecting A Speaking Student.We understood the method for detecting the location of the speaker that is the target of automatic video filming.Face Recognition based Attendance Management System.We took this as a basic reference for structure of our system.From this,we understood human face recognition which is one of known methods which can be used for user authentication.

III. TRADITIONAL AND EXISTING SYSTEM

Traditionally attendance is marked in registers, and the process has to be repeated for every lecture . This can be time consuming.The attendance percentage and the list of the defaulters have to be calculated manually. The process can be tedious and lead to errors. For example, any error in attendance can affect the student’s academic performance.

IV. PROPOSED SYSTEM

In this mini-project we are going to develop a system for the purpose of taking attendance in an organization. Our system will contain a face recognition feature that will use an image processing method.the project uses a Programming language(python) , Flutter ,Pycharm,various packages such as face recognition package,opencv package etc.

The system works by using the facial data as reference to recognise the student and mark his/her attendance. The App uses the database we created to store the pictures of the students and then the System recognises the image marking the attendance on a spreadsheet.

Thus, the System functions in 3 steps:

- 1.Creating a Database for storing the pictures and the Attendance
- 2.Face recognition system that recognises the students.
- 3.Storing the Attendance on an Excel Sheet

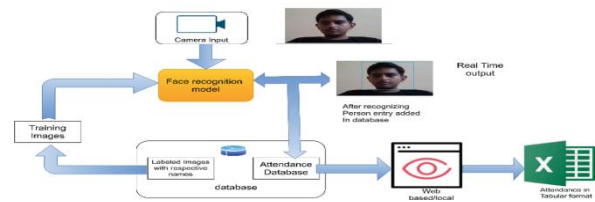


Fig 1:- The face recognition AI Flowchart:

The following are the steps that we are going to follow for the working of the application :-

1. Creating a database

1. The Picture of the student is taken in such a way that it captures all the dimensions of the faces.We also need to input students' faces from multiple directions using a camera.
2. We apply the face detection algorithms (**detectMultiScale algorithm**) that encode the students' photos. Then whenever they are recognised in the class then they are marked present.

2. Face recognition

1. We input the live images taken by the camera into the system as input and then convert them into frames, now each frame acts as an input to the recognition system.
2. The frames are now used to detect the faces of the students and recognize them in the algorithm(**OpenCV algorithms**).
3. The encodings which are generated in the database are now compared to the encodings from the live input. If the faces match,Then the student is marked present in the excel sheet.

3. Attendance

The attendance is then stored in the excel sheet which is then again stored in the system. Which is then used in the backend of the database.

V. ALGORITHM AND PROCESS DESIGN

- **Step1:**Create a folder (face recognition folder)that will contain a program file , image folder , Attendance excel sheet.

- **Step 2:** Upload the images in the image folder(initial data set).
- **Step 3:** Download python and vs code editor. use pip install face recognition and pip install opencv command in command prompt to download face recognition package(containing numpy) and opencv package .
- **Step 4:** Create a new project in the face recognition folder.
- **Step 5:** Import the following packages:
 - 1)face_recognition
 - 2)cv2
 - 3)numpy
 - 4)csv, os and datetime
- **Step 6:** Take input from webcam-using VideoCapture method from opencv. make parameter as 0 because we have to take input from default webcam
- **Step 7:** Loaded all the images and encoded it
- **Step 8:** Create a list containing the encodings and their respective names.
- **Step 9:** Use datetime method to get the exact date and create a csv file by using open method(name+type(w+ read and write format)+newline="(empty)").
- **Step 10:** Create an infinite loop. use the read method to get the data of video that is captured. take the second input as the first input is the 1 input is the signal.
- **Step 11:** Use the resize method to decrease the size of input from the webcam. convert the input data into rgb file as face recognition uses rgb file and cv2 takes the input in bgi format.
- **Step 12:** Take the location and encodings of the face appearing in the webcam by using methods

present in face recognition package

- **Step 13:** Compare the face present in the webcam and the images stored. This can be done by using the numpy.argmax method.
- **Step 14:** Use strftime("%H:%M:%S") method to get time of capture. if the face is present in the stored faces then print the name and fill the row of csv file created by(name+"present"+time).
- **Step 15:** Use imshow method display the webcam and add the break condition of infinite while loop
- **Step 16:** Close the csv file and webcam.

VI. COMPARATIVE ANALYSIS WITH EXISTING SYSTEM

The main issue that the previous system faced was the accuracy of the data/attendance recorded. Because, someone else can give the attendance of his or her friend which violates the institute rules. For example, a student is very lazy to attend physics lecture, so Aniket (his friend) marked his attendance. Solving this might waste a lot of time, which is not efficient. The second problem being unfriendly to the environment. As it takes a lot of material to store the data and this leads to environmental damage. Also, it takes time and human resources which lead to inefficiency. These are all problems that we face.

Face recognition is the most natural biological feature recognition technology. According to the cognitive rules of human beings, its algorithm is 10 times more complex than a fingerprint algorithm. It also makes the attendance system quicker. It also reduces human Intervention as complex tasks are taken care of by machine.

VII. USER INTERFACE

1. Login Page :

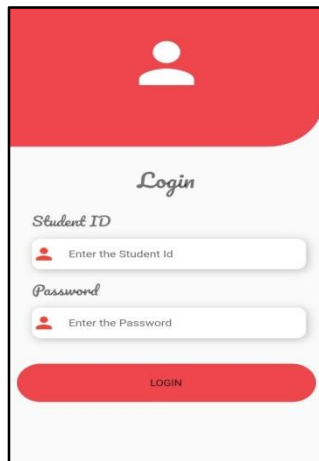


Fig-01

The first thing that the user(student or teacher) will see after entering the app is the login page. The login page will ask the user for two credentials that are student ID and password.

2. Home Page:

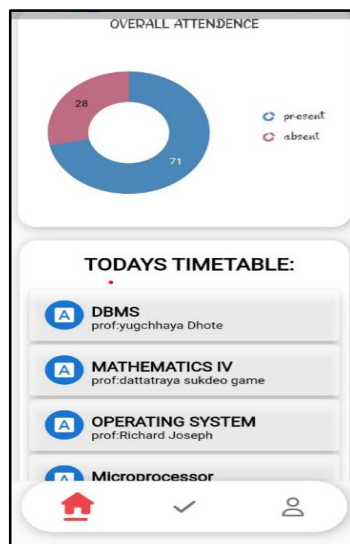


Fig-02

This is the home page which appears once the user logs into our attendance app. From this home page, the user can navigate to different pages. We have mainly created 3 main pages that are home page, attendance status page, profile page. Each page consists of an AppBar that displays the name of the current page.

The Home page contains the following:

The circular graph :

The circular graph represents the overall attendance of students. It represents the percentage of attendance of the student where present and absent both values are given.

Today's timetable:

This section consists of all subjects along with attendance in each particular subject and the timetable of that subject on a particular day. It will also contain the information of all modules present in the subject for the student so that the student can easily find the details of a particular subject..

Thus the student will be able to see his overall attendance as well as attendance in each particular subject through the home page of our attendance app.

3. Attendance Status

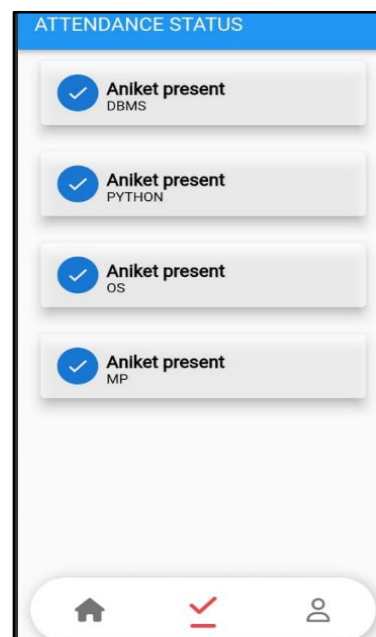


Fig-03

The attendance status page displays the status of student attendance. That is, it displays whether the attendance of the student is taken or not. We have also displayed the subject of which the attendance of students has taken. We have connected our python code and app to firebase. Thus, when our code recognizes the face of a student via a camera, the details of it are stored in firebase and then it is used to represent in the app.

4 . Profile page

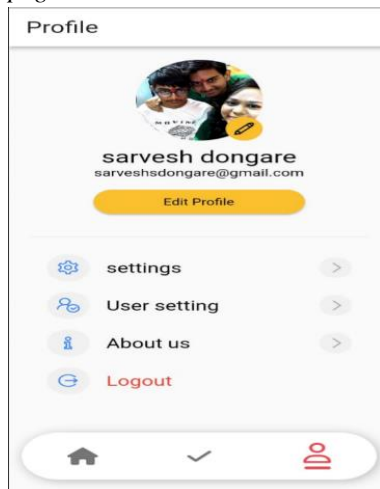


Fig-04

In the profile page we have displayed the profile photo of the student and his/her name along with email_id. In the profile page we also have added the settings page containing the settings related to the app such as language,etc. The user settings will contain the settings related to the account of the user.

5 . Edit profile page

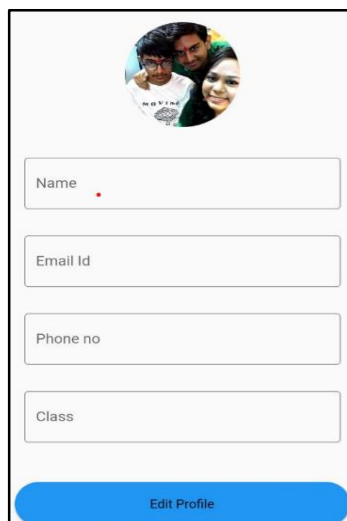


Fig-05

This page allows the user to change his profile details such as the name of the user,email id,phone number and the class of the student in the college. On pressing the edit profile button the changes get saved successfully in the firebase and are reflected in the profile page. Thus we allow the user to change the profile in a simpler way in our application.

6. About Page:

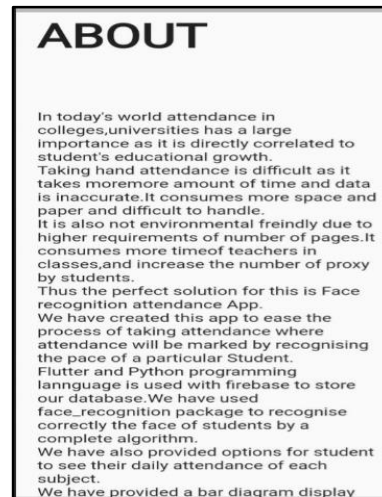


Fig:- 06

Upon clicking the about in the profile page , we have provided the details of the app,such as why the app is created,college name,creators name and various other details.Thus if a user needs the details of the app he can go into the abbott section of our app. These are the various pages in our face recognition based attendance system app. The creator's information is provided as followed.

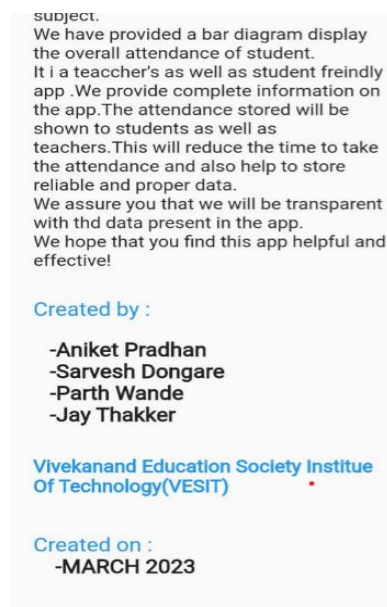


Fig-07

VIII. CONCLUSION

There are many flaws in traditional methods of taking attendance which causes difficulties in universities. The facial recognition

system helps in providing a solution by helping in eliminating the defects. This system also helps in making the attendance system quicker. This also helps in reducing human intervention as all the complicated tasks are taken care of by the machine and therefore this makes it way more efficient than fingerprint or RFID system .

In the future we are planning to create an app that will help the teachers monitor the attendance of students recorded by the face recognition system. The teachers will be able to view the lecture wise attendance, attendance percentage of students, defaulter list and also their lecture schedule.

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