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ATTENDANCE MARKER SYSTEM USING FACE RECOGNITION

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Abstract

Attendance marker system is capable software to monitor and maintain record of attendance . Now days its important to maintain attendance records of the employee in companies or in hospitals and for the students and teacher in school and colleges. And it is very complex to take these attendance on a sheet or on a computer with the help of some operator and more difficult to store it in a room and the biggest difficulty comes when we have to find attendance record of previous employee or student a year later so to overcome this problem this attendance marker system provide solution to take attendance with the help of face recognition and store data in google sheet with the help of google cloud and google drive and later with the help of android app we can check our attendance percentage or record with the help of suitable credentials. The main issue was to store the attendance to choose between amazon web service and google cloud .So I find google cloud more useful as per my project requirement as we can use google security in android app with the help of google cloud platform. This software not only use to solve attendance management system but also encourage students and employee to reach their school and work place on time with the help of sending an email message specially for the employee who work in hospitals and health care facilities.so overall it is a complete system to provide one solution to many problem.

Keywords— Attendance marker system, Face recognition , Google cloud platform , machine learning , Google API , Android application.

Introduction

Attendance marker system is a software provide solution to traditional attendance management system by using technologies like face recognition , google cloud , python, google sheets connected with google drive and a android application . Its helps to take attendance with the help of face recognition which is a great tool to identify persons face with the help of digital masking from video and image . In this person face act as an biometric to mark attendance . In first step it learn and store the copy of person face as an image and when person comes it then recognize and mark their attendance [1][2].

Before making this project we explore many projects which use face recognition to mark attendance and we find that the user attendance is getting marked but user did not able to get any information about its attendance (marked as present or marked as

absent) as its is a software so chances are high that some time it get failed to identify user face due to lack of light while identifying face or due to latency in local database moreover user have no GUI to check its overall attendance to check its overall monthly attendance [3][4]

The scope of this project is to provide a GUI to user to check its status of previous and current attendance and a daily notification about the attendance though email so in case system fails to recognize the user-face user can raise request regarding attendance issue

The benefit of this system is to overcome the difficulty face while recording the attendance using traditional method like we do not have to use waste any paper or pen to mark the attendance and moreover it do not uses traditional database where we have only limited space it uses cloud to remove the space deficiency so we can maintain the record of

attendance upto a long period of time . And the main benefit of this system is that it sent the status of attendance on email in real-time by removing latency between database and system moreover user can raise request of system downtime in real-time so user do no have to compromise with there attendance as user have proof of their attendance sent by system at time of recognizing [5][6]

2 LITERATURE REVIEW

Earlier it is very complex to take these attendance on a sheet or on a computer with the help of some operator and more difficult to store it in a room and the biggest difficulty comes when we have to find attendance record of previous employee or student a year later it's a headache.so we digitalize the old approach by designing a online system using face recognition software library which we used in pyton created environment and then run it by the spyder compiler. Traditionally we have to rollcall each student and mark their attendance and half of the lecture wasted in marking student attendance and maintaining that record but this online system help to reduce this work pressure from the teachers and save their precious time. Now we do not have to waste papers we can construct the attendance record by just taking some necessary information from the database. And there is an mobile – based android application which is made with the help of v.bnet and sql server to provide UI interface to check their previous attendance record and their attendance percentage. And we use google cloud to use its google drive API service to store the data stored in google sheet in google drive [7][8].

Before establish an smart attendance system based on face recognition it is researched by many researchers .There primary aim was to developed technical product that overcome obstacles like identifying, recognizing, recording, monitoring, positioning, and tracking students or staff as compared to conventional systems that require more processes and daily resources and impose

duplication of effort. Earlier research recommends educational institution to use this attendance management system. Which is emphasized by the current research in this field. In researches we find that attendance system that use face recognition technology spread more and used more as compared to other online attendance system [9][10].

It is most challenging and difficult duty to manage the attendance of employees or student. Every study of researchers try to simplify such a difficult process which used various method and technologies which include biometrics , Iot and raspberry or any other portable device. Different algorithms were applied before making attendance on the system. Different algorithms are used to identify the person face and inform to their administrator . It is important to pay attention how fast data is stored and retrieved . The objective of this review is to provide a brief idea of overview of current studies and researches and their contributions.

3. PROJECTED METHODOLOGY

a. General design

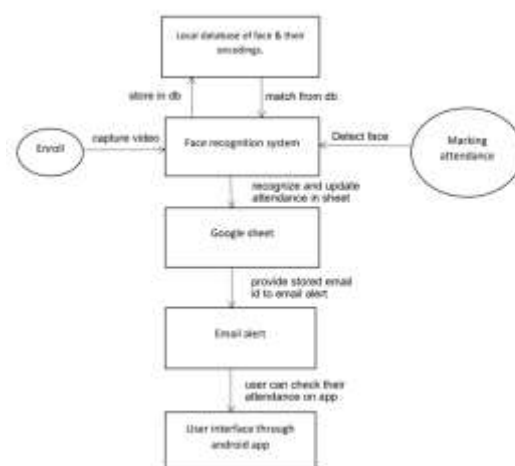


Fig.1 General design of system

The explanation of the design is provided below:

Attendance marker system consist of very simple architecture and anybody with basic knowledge of cloud and python can work on this project and understand this . we design the architecture in such a user friendly way that any

body will like it and adore it. As we know first it Capture a video and process each of the other frame and Resize the image to 1/4th of the original frame and then Convert the image from BGR to RGB. And generate a 128 byte array of data for each face detected and then Compare this array with the existing arrays in the local database and with the help of (Euclidian distance) Calculate Euclidian distance from each face in the local database and get the index of minimum distance and then it matches the best match index.

In this project we use google cloud instead of aws as to use the face recognition on amazon web service we have to pay it is not in the free tier so we created a python environment using anaconda prompt and then in the created environment we install the face recognition module using pip install face_recognition and open-cv to use it free and to save money . when the first time user come through enroll option it saves it face photo and face video encoding in a txt file in a local database and then when next time person or user come for attendance then it matches the user face from local database and if it matches the user face then it mark the attendance and then update in google sheet and send email alert to user email id and then user and check its percentage on the android app and if it unable to recognize the user it will mark as unknown.

b. Modules description

The attendance marker system consist of four section namely

App section – In this section the apk file of android app is encoded.

Known face encoding – In this section the video of user is encoded in txt document at the time of enrollment.

Known face photo – In this section the photo of user is stored at the time of enrollment.

Source code- This section consist of main code of software which has five python module and one credential.json file.

The name and working of five module are:

1.)Enroll.py-The module is made with the

help of python programming language. In this module we import face recognition package which we have install earlier with the help of anaconda prompt in the created environment . This module will capture face photo and face encoding and store it in local database . And after storing it in local database it will ask the user to input his or her email address and store it in google cloud with the help of google drive API and google sheet so at the time of recognition recognition.py module can access the data for the recognition of user face.

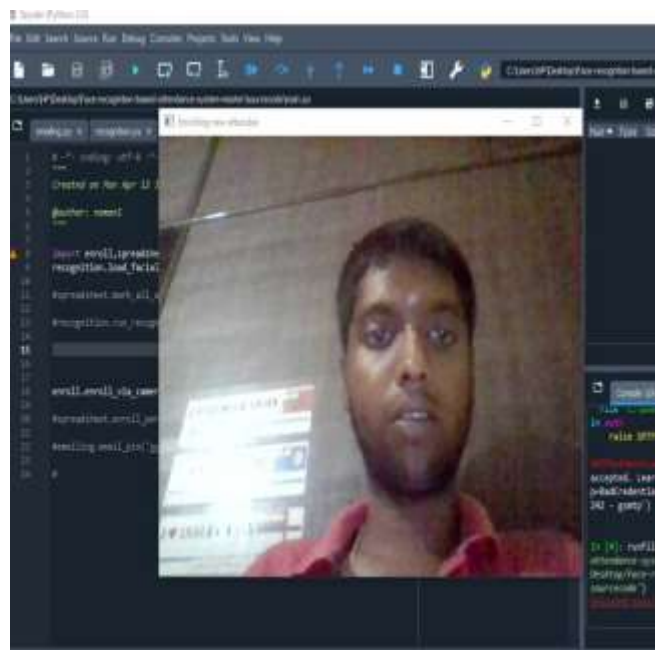
2.)Spreadsheet.py-This module is made with the

help of python programming language.

In this module the data recorded during enrollment and when

we mark the attendance. While doing enrollment it recorded the user email address and OTP generated at the time of enrollment and we use the concept of OTP to maintain consistency in database and moreover this spreadsheet act as an database . After storing details it get stored in google drive API which is created with the help of google cloud console and then we generate the API keys and then we extract the email address keys which is downloaded in the form of .json file and copy the email address in sheet share option so that we it record the data it is directly updated in google drive API on the google cloud console.

3.)Emailing.py- This module is used to send email to the registered student about their attendance when enroll.py module calls by recognition.py module.



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4.)Recognition.py-This module is used to recognize enrolled person in database with the help of information stored by enroll.py module in local database and update the attendance in database by calling spreadsheet.py module .

5.)Main.py-This module is used to enroll person with the help of enroll.py module and at the time of recording attendance it uses image processing algorithm to match stored face encoding with real-time face by using Recognition.py module and tell the status of attendance by storing in database using spreadsheet.py module .

c. Discuss the results

user can interact the system with the help of GUI .User can enroll new students and record their face encoding and facial photo in local database with the help of main.py module as shown in fig 2.And at the time of attendance marking it recognize the user facial encoding and match with its local database and mark the attendance in google sheet and notify student on the app and their email as shown in fig 3.

Fig.2 Enrolling a user.

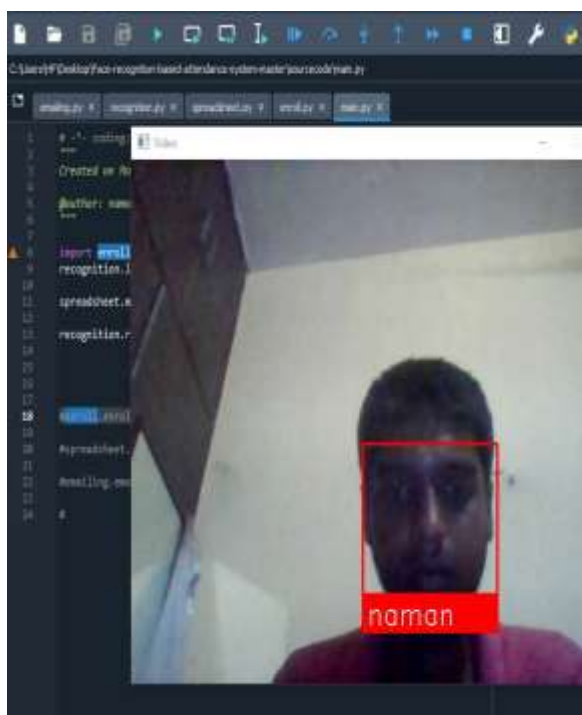


Fig.3 recognizing user face.

On opening the app user have to signup with the userid and verification code received through email and have to create a password as shown in fig.4 and after that user can check their attendance as shown in fig.5 with the help of their credentials as shown in fig.6

Fig.4 signup page for new user.



Fig.5 Login page for existing User.

No of test case taken	Predicted no of faces matched	Predicted unknown faces	Actual no of faces known matched	Actual no of unknown faces
10	4	6	6	4
30	14	16	15	15
50	24	26	26	24
70	30	40	35	35
100	50	50	55	45

Table 1: Accuracy table of system

When we take 10 cases the accuracy of model is = 0.5

When we take 30 cases the accuracy of model is = 0.7

When we take 50 cases the accuracy of model is = 0.6

When we take 70 cases the accuracy of model is = 0.8

When we take 100 cases the accuracy of model is = 0.9

Attendance system	
Number of days present : 1	
Attendance percentage : 7.14286	
4/1/2021	: absent
4/2/2021	: absent
4/3/2021	: absent
4/4/2021	: absent
4/5/2021	: absent
4/6/2021	: absent
4/7/2021	: absent

Fig.6 Attendance record of user.

4. Accuracy Analysis

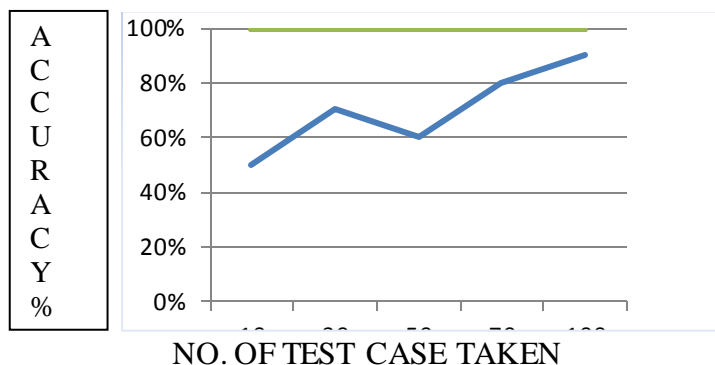


Fig.7 Graph plot b/w (Accuracy v/s No. of test case taken).

So when we take 10 cases accuracy of model is 50% and then we take 30 case the accuracy of model is 70% and when we take 60 cases the accuracy of model is 60% and then we take 70 cases the accuracy of model is 80% and at last we taken 100 cases the accuracy of model is 90% as shown in fig.7

5. CONCLUSION

In schools and at work place it is very difficult to manage the attendance of teachers and students with the help of traditional method using pen and paper moreover it is very difficult to search previous record of attendance which is very complex so to overcome these difficulty we can use this attendance marker system which uses facial recognition technology and python and database is made up of google sheet. In this system User can enroll new students and record their face encoding and facial photo in local database with the help of main.py module as shown in fig 1. And at the time of attendance marking it recognize the user facial encoding and match with its local database and mark the attendance in google sheet . The accuracy of the model is shown in fig.6 which shows that it accuracy on the number of test case taken.

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