Implementation of Smart Android Based Attendance System Based on Face Recognition

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Abstract— **The colleges & schools have always faced a major problem with the concern of proxy attendance and time consumed for attendance. A lot of valuable time is wasted for marking attendance of the students from the class. So the various authors have tried to propose the techniques to automate the process of attendance marking using biometrics or barcodes or face detection etc. In this paper, we survey about the previously proposed systems & thereby analyze the drawbacks of those systems for proposing the advanced and efficient solution to automation of attendance.**

IndexTerms—**ZigBee technology, RFID Tags, Fingerprint identification, Speech Recognition, Attendance System, Wireless communication, GPRS System, Haar Cascading Algorithm.**

INTRODUCTION

AllIn most educational institutions, participation of students in learning process is regarded as a vital exercise for allowing knowledge transfer. This signifies the importance of having students to attend the scheduled lectures and classes.

Conventional methods for recording students attendance are still adopted by most colleges. One common method is by having students to manually sign the attendance sheet, which is typically passed around the classroom while a lecturer is giving the lecture. This approach could undoubtedly allow the students to cheat about their attendance, where a student may sign for an absent student. Besides, such attendance sheet could easily be misplaced or lost.

A stricter approach especially to prevent students cheating about their attendance is additionally tedious, where a lecturer calls out the individual names from the students list and validate the presence of every single student. Such manual methods of taking students attendance have been proven to be difficult and time consuming. Thus, there is a need for a semi-automated system that would eliminate all of these troubles.

Therefore, it is author's objectives to develop a portable attendance system equipped with an online database, especially to prevent data loss as well as to promote paperless and a greener environment. Besides that, the application will help to reduce time being wasted, leading to a higher learning productivity in class. There are a few paperless attendance systems that have been developed but such systems need to be equipped with either a computer or RFID reader, resulting in additional cost for hardware and its maintenance. With that in mind, author have aimed to address this issue by having a system with minimal hardware requirement and at the same time, enhancing the mobility aspect of the existing attendance systems. In this section, author review a few related systems and their different methods in recording students' attendance. An RFID based system is developed to record students attendance during class hour as the students enter the class. This system requires each classroom to be installed with an RFID reader that is connected to a computer. The RFID reader will be used to capture the student information through the student's card. The obvious limitation of such biometrics based attendance system is that they cost a lot more expensive than a pure RFID based system. The attendance recording process in these systems would also be time consuming due to the fact that biometric scan would normally take a while for recognition and validation process. In spite of this, author do not deny the importance of such systems in highly secured environment.

RELATED WORK

Managing the attendance data of such a large group is also very difficult. Another disadvantage of present system is the chance for the student to mark fake attendance. Fingerprint based devices are being used in corporate environments. These devices use computer to store and verify fingerprints. It can be ported to academic environment with modifications. Wireless attendance management system, a style methodology of wireless fingerprint sensible of attendance management system using Zig-Bee technology. It achieves sensible attending management system, by fingerprint identification. It understand low-priced, power and high performance fingerprint information transmission and recognition operate. During this paper complete development and implementation of the sensible attending management system is provided by the employment for fingerprint module and GPS system. This numerous modules that represent completely different components of the sensible attending management system square measure explained victimization their hardware demand. [1]

India has many numbers of colleges and teaching is one of the major activities providing employment to number of people who like to give knowledge to the people. The applicant's automated attendance monitoring system uses tags (worn or carried by students or other attendees) and readers to monitor the whereabouts of individuals. Thus, for instance, as students enter a classroom, the antenna of a

reader placed on the ceiling of classroom would interact with Radio Frequency Identification ("RFID") tags that are worn or carried by the students. The system would then track which students have entered the classroom, and by comparing the list of entering students with the class list, the system could generate a provisional list of absent students and further the information can be forwarded to the parent. [2]

In this paper author present the development and implementation of a speech biometric based attendance system. Biometric person authentication is the task of verifying the a person's identity using human characteristics or traits to restrict the access to an intended service. Automatic attendance system is one of the applications of biometric person authentication systems. Traditionally fingerprint or face image/video are being used as the biometric for such applications. Person authentication using speech biometric is commonly termed as speaker verification (SV). Recent developments in SV research motivates the use of speech as a biometric for using in practical person authentication systems such as attendance systems with reasonable reliability. Based on the constraint on the text content of the speech data, S V systems can be classified into two: text-dependent and text-independent. In a text-dependent SV system the text is fixed, or known to the system while in a text-independent SV system the user is free to speak anything . [3]

A method of taking attendance by employing an application running on the Android platform is proposed in this paper. This application, once installed can be used to download the students list from a designated web server. Based on the downloaded list of students, the device will then act like a scanner to scan each of the student cards one by one to confirm and verify the student's presence. The device's camera will be used as a sensor that will read the barcode printed on the students' cards. The updated attendance list is then uploaded to an online database and can also be saved as a file to be transferred to a PC later on. This system will help to eliminate the current problems, while also promoting a paperless environment at the same time. Since this application can be deployed on lecturers' own existing Android devices, no additional hardware cost is required. [4]

In this system, author found that there are lot of tools to use and reduce the burden of lecturers. Using RFID is the one example of that. So Author combined the RFID and IOT (Internet of Things) so as to do attendance marking automatically and there is no need to do it by lectures. Here authors are planning to use the Cloud as storage for better performance. Using IOT and Cloud, professors can access it from anywhere and anytime which will provide us the better proficiency and flexibility. [5]

In this paper, author proposed a user friendly students time attendance system that can be applicable in different schools or universities in order to form a smart classroom based on WSNs and IoT technologies. Authors proposed intelligent chairs that can be identified as the sources of

information, which integrated with four 50 kg load sensors and HX711 amplifier that measure the students weights and send the digital signals to a receiver in order to recognize the student presence during class schedule. This smart classroom is also installed with one ZKTeco ZK4500 fingerprint reader in order to increase the identification for students. The transmitted signals from the intelligent chairs will be connected by Android application which will be installed on the lecturers' smart phones. [6]

PROPOSED SYSTEM

The proposed system makes use of facial recognition which is a technique under image processing. We are proposing this system so that we can mark the issue of student's attendance management by using an Android Application for the same. Herein, the lecturer or a staff member would be authorized to capture the student's images inside a classroom to mark their attendance accordingly. We purposely selected Android devices for our system as they are compact, handy and portable, due to which allows they are easily accessible anywhere anytime. An admin would be authorized to register the staff members or teachers wherein he/she can monitor or view the activity of teachers such as their lecture duration, scheduling times, etc. The image captured by the staff member in the class gets uploaded to the server and the python face recognition algorithm determines the trained faces from the image and automatically marks the attendance for the students in the image. The students who are not in the image are automatically considered to be absent for the day. The proposed system architecture is shown in fig 1.
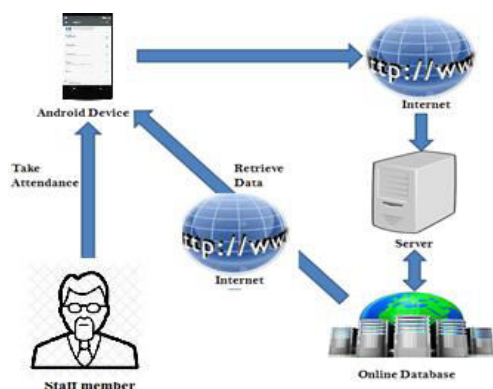

Fig 1. Proposed System architecture.

The system we are proposing in this system aims to address the issues of capturing student's attendance in class through the use of an Android-based attendance management application. In which a staff member has authority to capture the images of students in the classroom. Android devices are normally small, light and portable, which allows them to be used anywhere and at anytime with ease.Admin has authority to register teachers. And can view all the activity of teachers such as teacher's lectures conducted.When staff member will take a image of students and provided to admin.

Admin has authority to update their attendance to the database.Teachers has authority to register students.

Modules and Working of Proposed System

Fig 2. Face Recognition and Detection

The proposed attendance system mainly consists of Four phases; Image acquisition, Face Detection, Feature Extraction, Face Recognition. The working of the system is depicted as follows:

1. Image Acquisition

The system consists of a camera that captures the images of the classroom and sends it to the image pre-processing. Then that image is sends for face detection.

2. Face Detection

This phase isolates the facial area from remaining area of the background image for all the dataset of faces which trained for the model.

3. Feature Extraction

Feature extraction does face determination of students. In this system frontal facial features are extracted.

4. Face Recognition

The face input image is matched with trained model. If the face gets matched with the previously trained image then the face is recognized.

MATHEMATICAL MODEL

Set theory of the proposed system:

S = {I, P, O}

I= Input to the System.

P= Processing of System.

O= Output of the System.

I ={i1,i2,i3,i4}

i0= Staff Registration and Login Credentials

i1= Student Face registration.

i2= Classroom Snap from Android Camera.

i3= Face Detection from input samples.

i4= Date and Time of attendance.

P ={p1,p2,p3,p4}

p0= Registering staff (teachers).

p1= Registering face samples of students with details.

p2= Recognition of faces from the input classroom image.

p3= Attendance marking for detected faces.

O= {o0, o1, o2}

o0= Detected faces of the present students.

o1= Attendance Marked for detected faces.

o2= Staff wise attendance records.

5. RESULTS OF SYSTEM

```
Python 2.7.15 (v2.7.15:ca079a3ea3, Apr 30 2
D64)] on win32
Type "copyright", "credits" or "license()"
>>>
 RESTART: C:\wamp\www\AndroidFileUpload\upl
Enter user roll No:13
>>> |
```
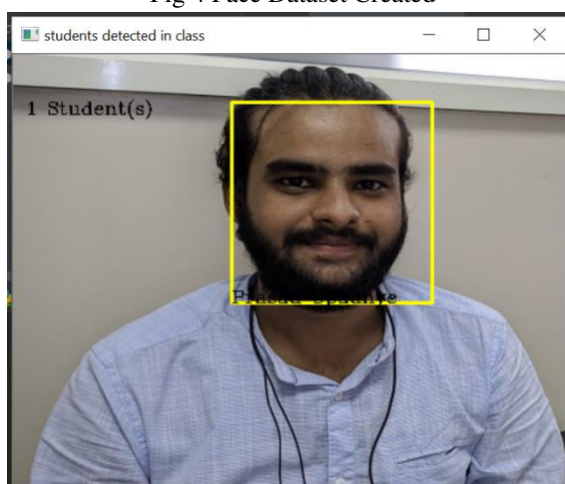
Fig 3 Add Student
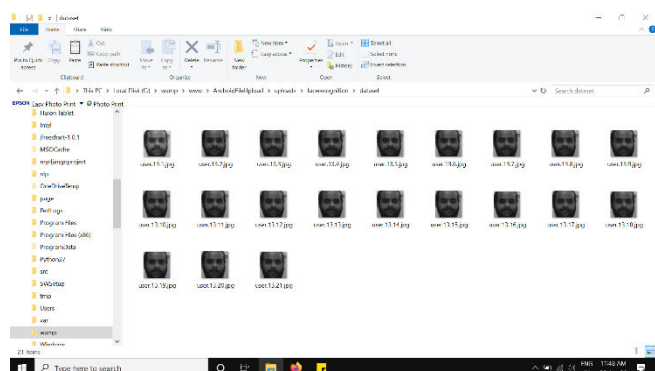
Fig 4 Face Dataset Created

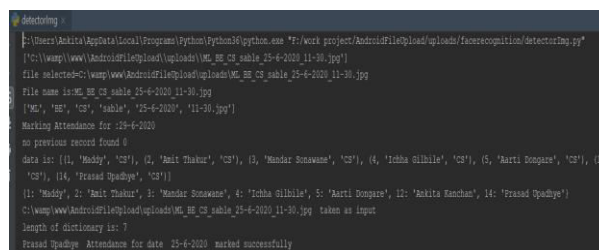Fig 5 Face Detected from Uploaded Image

Fig 6 Attendance Marked for detected Face

APPLICATIONS

1. The proposed can be used in educational institutes.
2. It can be used in Corporate world like in banks, IT firms wherein arrival time plays a vital role.

1. CONCLUSION

Thus, the survey on smart attendance system depicts the use of various software based or hardware based, barcode based or RFID based, biometric based or face recognition-based techniques which have few advantages as well as few shortcomings. Many of the existing systems in the literature proposed the system requires additional hardware requirement for achieving the desired results. So, to overcome, this above framework is the better and reliable solution from every perceptive of time and security. In this way we have accomplished to add to a reliable and effective participation framework to distinguish faces in classroom and recognize the faces accurately to mark the attendance.

Thus, there is a need of an efficient system which will not only save the attendance marking time but will save paper and give efficiency as well.

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