Classroom Attendance Using Facial Recognition

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Abstract— In almost every institution and organization, attendance monitoring is a very important process. The current method involves the use of sheets of paper or books in taking Employees' attendance. This method could easily allow for impersonation and the attendance sheet could be lost or damaged. Taking attendance is thus time consuming using this traditional approach and hence there is a need of an automated and a reliable system. The Attendance monitoring system (AMS) will provide the needed solution. This system uses Face Recognition (using Smartphone Camera) to realize the functionalities. The camera is used in the attendance while entering Classrooms, Labs, etc. The system consists of two APK files, one for the organization and one for the employees respectively, which are installed on their android devices. The AMS will be used to mark the attendance of the employees and will also be used to generate reports of all the employees and thus will enable the faculty members to keep track of employee's records. Rather than signing on the attendance sheets, the employee will mark the attendance by just a single click on his device. Also, the faculty has the facility to generate reports on a single click. There is a facility to generate report of one or more than one employee.

Key words—Attendance monitoring system (AMS) ,

1. Introduction

Attendances of every students are being maintained by every school, college and university. Faculty has to maintain proper record for the attendance. Attendance system is a system that is used to track the attendance of a particular person and is applied in the industries, schools, universities or working places. The manual attendance record system is not efficient and requires more time to arrange record and to calculate the average attendance of each student. The traditional way for taking attendance has drawback. Old conventional methods for student attendance is still used by most of the universities. As this method is used, many students are helping their friends by signing in their attendance in case of their absent in the institute.

Hence there is a requirement of a system that will solve the problem of student record arrangement and student average attendance calculation.The technology-based attendance system such as smart cards and biometrics based attendance system reduced human involvement and errors .

The proposed system should store the absent and present student's attendance details in electronic format so that management of attendance becomes easy.

2. Motivation

Technological improvements can be useful tools to help in the development of new systems to eliminate the disadvantages of the classical methods.

The faculty needs to take the attendance once again in case of the loss in attendance sheet and therefore absent students gets an opportunity to mark their fake presence in new attendance sheet. To avoid such things we are implementing

technology based attendance systems which will store data permenantly and with great accuracy.

3. Objective

In this application we impose a system which is being developed by using different techniques.
Like NFC cards and Face recognition, Based on this technique a new approach for student attendance recording and management is proposed to be used for various colleges or academic institutes.

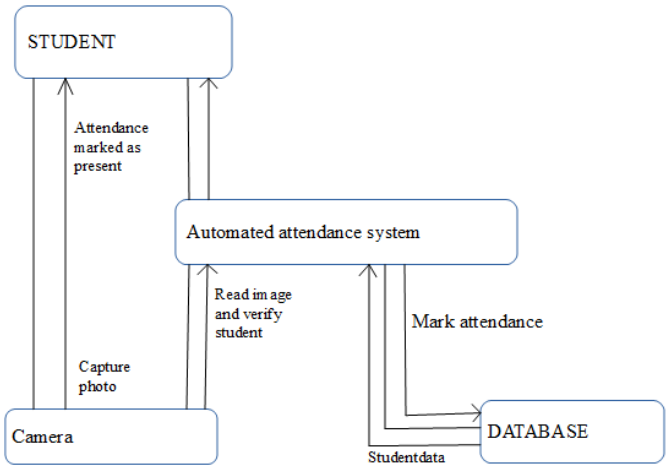
The main objective behind the system is to reduce maual papre work attendance to overcome some problems with existing system. NFC card will be used at canteen and stationary, amount will deduct from students account.
System is connected to parents application so attendance and reports of perticular students will sent to parents application.
Face recognition : In this, local features on face like nose, eyes and lip corners are portioned and then given to face detection system to easier the task of face recognition.

4. Literature Survey

There are many types old electronic based attendance applications like Computerized based attendance system, Bluetooth based, Mobile based attendance system. All those having their advantages and disadvantages.
A desktop application developed , in which all the list of registered students in a particular course will be displayed when the lecturer start the application.The attendance is done by clicking a check box next to the name of the students that are present, and then a register button is clicked to mark their presence.
The attendance system which can take attendance using Bluetooth,in this project, attendance is being taken using mobile phone. Application software is installed in lecturer's mobile phone enables it to query student's mobile phone via Bluetooth connection and through transfer of student's mobile telephone Media Access Control (MAC) addresses to the lecturer's mobile telephone, presence of the student can be confirmed.

We are implementing system using Face recognition. Face recognition which reliably distinguishes one person from another or used to recognized the identity. They have five subsystems: data collection, signal process, matcher, storage and transmission.

5.Architectural Diagram



6.Technologies to be used

•About JAVA :

Java is an object oriented programming language. It is a complete platform for object oriented programming. Java is a platform independent because of JVM. JVM is a Java Virtual Machine. It converts the java program into the bytecode which can be understood by any JVM. We need to install JVM on our machine separately, it comes along with the operating system.Even if JVM makes java platform independent, JVM itself is a platform dependent. Java is a more secure language.Java is a portable, light weight.

•About JSP :

JavaServer Pages (JSP) is a technology for developing Webpages that supports dynamic content. This helps developers insert java code in HTML pages by making use of special JSP tags, most of which start with <% and end with % >

A JavaServer Pages component is a type of Java servlet that is designed to fulfill the role of a user interface for a Java web application. Web developers write JSPs as text files that combine HTML or XHTML code, XML elements, and embedded JSP actions and commands.

•MySQL:

Many computer programs, including web-based programs like blogs, photo galleries and content management systems need to store and retrieve data. For example, blog software need to store the posts (i.e., articles) you write, and retrieve them when a visitor goes to your site. Similarly, photo galleries store information about their pictures (for example, for sites that allow users to rate the photos, the numerical rating for each picture is stored in a database). Instead of reinventing the wheel and implementing their own system of storing and retrieving data, these software simply use the specialized database programs I mentioned earlier. To make it easy for other programs to access data through them, many database software support a computer language called "SQL" (often pronounced as "sequel"). SQL was specially designed for such a purpose. Programs that want the database software to handle the low-level work of managing data simply use that language to send it instructions.

- Image processing

In computer science, Digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.

7. Overall Description:

PRODUCT PERSPECTIVE :

1. To reduce paperwork and save time with mobile and web portal.

2. To Eliminate duplicate data entry and errors in time and attendance entries

3. To Improve visibility to track and manage student attendance & absenteeism across multiple campuses.

4. To Keep the parents informed about the student's performance via Android application.

5. To increase security and confidentiality with role-based permissions to users.

6. To provide card access at canteen and to purchase stationary items.

REQUIREMENT SPECIFICATION :

HARDWARE REQUIREMENTS :

1. Arduino

SOFTWARE REQUIREMENTS :

1. Net Framework (3.5 or more)
2. MSSQL (2008/10/12)
3. Android studio 2.1.1
4. JDK 1.7/1.8

PRODUCT FUNCTION :

1. Students will mark his attendance using face recognition on gate.

2. Weekly/Monthly report of attendance will be generated.

3. Marks and attendance along with comments will be sent to parent application.

4. Teachers can view student information on web portal.

5. Also able to purchase Stationary items.

USER CHARACTERISTICS :

1. System provides Registration form for Student, Parent, Teacher.

2. System provides Login form for Student, Parent, Teacher.

3. Using web portal student can see their attendance and progress reports.

4. Using Android app parents will able to see students reports.

5. User can purchase items at Canteen and stationary.

8. Mathematical Model

System Specification:

S= {S, s, X, Y, T, f_{main}, DD, NDD, f_{friend}, memory shared, CPU_{count}}

S (system):- Is our proposed system which includes following tuple.

s (initial state at time T) :-GUI of Automated Attendance Using NFC and Face Recognition. The GUI provides login for HOD and Teacher and Android GUI provides loging for Students and Parents.

X (input to system) :-Face Recognition and NFC tag along with User ID associated with it will be sent to the server for attendance marking.

Y (output of system) :-Attendance of student will be marked, his monthly attendance percentage will be calculated, term work marks will be displayed and any announcements made by the staff will be displayed.

T (No. of steps to be performed) :- **2**. These are the total number of steps required to process student attendance.

f_{main}(main algorithm) :- It contains Process P. Process P contains Input ,Output and subordinates functions. It shows how the marked attendance will be processed into

different modules and how the results are generated.

DD (deterministic data):- It contains Database data. Here we have considered AutomatedAttendance Database which contains number of ambiguous queries. These queries will provided required analysis of data for students . Hence, AutomatedAttendance is our DD.

NDD (non-deterministic data):- . We can say system as NDD, as in particular seesion their can be n number of entries, i.e there can be many entries at gate in a particular session but we cannot guarantee the same number will be there in classroom.

Memory shared: - Database. Database will store information like Staff, Student, Parents registration details and attendance details of each student. Since it is the only memory shared in our system, we have included it in the memory shared.

CPU_{count}: - 2. In our system, we require 1 CPU for server and minimum 1 CPU for client. Hence, CPU_{count} is 2.

Subordinate functions:

Identify the processes as P.

S= {I, O, P....}

P= {FR,AR,FB,N,BA}

Where,

FR is face recognition system

AR is attendance register using NFC

FB is Feedback given by students for teachers.

N are the notifications sent by teachers to parents and students.

p is process

FR= {U, R, CP}

Where,

U is user face image

R is a template matching face recogniser.

CP is attendance generated at gate for student if the student is recognized by face recognition

AR = {RR,AS,Log}

Where,

RR is NFC recognizer which will collect information from users NFC.

AS is Attendance system which will mark attendance of the student.

Log is maintained and saved on server. Test result and attendance summary is sent to students parent.

FB= {SA,WA}

Student Application which will be used to give feedback for staff.

Web Application for HOD which will analyse the feed back.

N={TP,SA,PA}

TP is Teacher's Portal where it will send notifications to students and Parents.

SA is Student's Portal where it receive notifications.

PA is Student's Portal where it receive notifications.

Algorithm:

Step 1: Face Recognition of student.

Step 2: Student attendance register for college

Step 3: Student attendance register for class

Step 4: Maintain Logs

Step 4.1: Student attendance , Marks summar

Step 4.2: Student's Information share to student's parent

Step 5: Notifications

Step 5.1: Notifications sent to students and parents.

Step 5.2: Display notifications

Step 6: Feedback from Students to HOD.

Step 7: Stop.

9. Conclusion

This proposed system gives automated attendance of student's via Face Recognition. Typically students attendance is marked by the lecturer manually which spends a lot of time. Also amount of proxies gets recorded in manual system.Face recognition will assist in validating student and marking the attendance of that individual student ensuring avoidance of proxies.

10. References

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