Features of Attendance Administration using Biometric Finger Print System

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Abstract: *The heritage method involves the sheets of paper or books to maintain the student attendance which becomes tedious task and also rises the problems of numerous errors, and waste a lot of time. This paper illustrates the drawbacks of heritage methods and gives the solution to the attendance administration system expending fingerprint equipment in an institution of higher education environment. There are two separate stages involved in using a system like this; Enrollment and Authentication.*
Keywords: *Authentication, Enrollment, fingerprint, heritage*

I. Introduction

Fingerprint scanning is the most popular biometric technology and it's easy to maintenances. Moreover, many institutions take care of attendance which is used for multiple purposes for record maintenances, assignment of students, and promotion of optimum and correspondent attendance in class. In growing countries, a minimum attendance percentage is required and this policy has not been attached to because the attendance present method takes over the various challenges method of taking attendance presents. This heritage method involves the use of paper or student handbook and easily allow for the act of the attendance sheet could be stolen or lost, and also taking of attendance is time-consuming and it is difficult to ascertain the number of students that have made the minimum percentage and thus eligible for the exam. Thus, there is a need for a system that would eliminate all of these trouble spots.

It smooth case the detailed student attendance in a detailed class with the new system will be generating a report and it is evaluating the attendance eligibility of a student. Instead of signing an attendance sheet, the person will hand over their thumb over the fingerprint scanner. The fingerprint is likening against a list of pre-registered users, and once a match is made, the separation will be registered as having attended that lecture. This paper talk over the related works in the problem domain; features the general summary of the offer system; details design study of the system, both at the hardware and software level; talk over the operation and how the system was tested in tune with system design and running experimental; states the observations made; and makes recommendations for future improvement. In this new technologies, fingerprint becomes the most grow up and popular biometrics fingerprint technology used for automatic personal identification. The reason for this popularity of fingerprint verification is that fingerprints satisfy uniqueness, stability, permanency and easily taken.

The fingerprint-based attendance management system was developed to provide a faster, more secure, and more convenient method of user verification than passwords and tokens can provide for a reliable personal identification.

II. Related Works

A set of allied works suggestion on the use of distinct methods and origin to virtually cover the attendance of students. Authors in [1], an embedded computer mean lecture attendance administration system was offered. The system delivers to make the electronic card and card reader periodical interact to the digital computer system. Authors in [2], given a wireless attendance guidance system that witnesses using the iris of the idiomatic. The system uses a not connected iris recognition administration system that can terminate all the process including capturing the image of iris acknowledgment, extracting minute, storing and matching. Attendance administration has also processed out applying attendance software greatly uses passwords for the witness. The authors in [3] designed and implemented a system that authenticates the user based on passwords, this type of system allows for impersonation since the password can be shared or tampered with. Passwords could also be forgotten at times thereby preventing the user from accessing the system. MohdHelmy et al. [4] describes the integration of mobile the device with software for recording examination attendance is sufficient. In a test, it was found that it reduces time, manpower, cost, printing and paper, and eases the examination procedures. QunHou et al. Zhang Yongqiang et al. [10], designed a wireless fingerprint based attendance system to record and obtain the attendance data using fingerprint or known as biometrics. Man et al. [11] designed a

time management and access monitoring system using microprocessor card to monitor students" or staffs" movement with the records that are kept in the database for administrator reference in campus, office or the certain area. All data captured by this system could be accessed by teachers; headmaster and parents.

Other attendance solutions are RFID means (Radio Frequency Identification) basic student attendance system and GSM-GPRS groundwork student attendance system. These are all device-based solutions. While GSM-GPRS mean systems use situation of class for attendance marking which is not dynamic and if docket or position of the class changes, wrong attendance might be marked. Problem with RFID [7] based systems is that students have to carry RFID cards and also the RFID detectors are needed to be installed [6].

This system, however, is a cost-effective simplified system that uses fingerprints for identification. The fingerprint is unique to each individual and cannot be participating. It allows students to register for lectures with ease and eliminate errors that are running mate with attendance reports because the system cause reports at the termination of the semester.

III. System Overview

This new fingerprint device method gives the solution to attendance problems via the usage of attendance management software interface to a fingerprint device. Here the student's data and the fingerprint are enrolled previously into the database. The fingerprint is captured using a fingerprint device. The student's finger was placed over the fingerprint device with the collection of information about the students are passed to the database and hold attendance of particular detail in lecture hand. In the end of the semester the administration check the details about the student's attendance reports are generated, this system gives a report to the student's attendance percentage that is qualified for exams or not during student's presence in the lecture periods. A simple biometric system architecture is shown below.
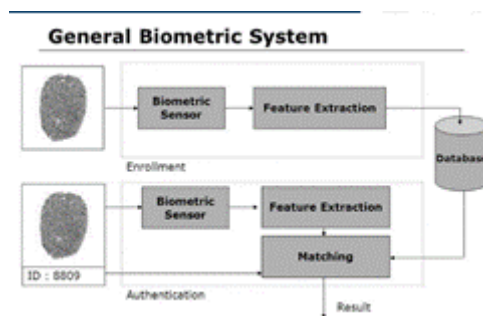

Figure 1: General Architecture of a Biometric System

IV. System Design

The new Automatically Fingerprint Attendance System Techniques (AFAS) gives the report to the student's attendance for the individuality of fingerprint image by evaluating previously stored students data in a database. An automated fingerprint identification system (AFIS) is the backend of the AFAS. The outline of this design implement the challenges of drawing and the system working mode (verification or identification), dealing with poor grade images and other programming language exception, and defining administration and optimization policy [5], [9]. A student's fingerprint biometric system split into three parts: Hardware design, Software design, and Attendance Administration Approach Report Generation. Each of this are explained below.

Hardware design Architecture

The fingerprint biometric system using the Secugen Fingerprint Reader and the GrFinger Software Development Kit (SDK) tool passed by the Griaule that can be work as an interface between the fingerprint reader and the GrFinger attendance software. The hardware system of fingerprint biometric system used two types of device. The first one is fingerprint scanner and it is used to clipping the fingerprint image and the second one is the personal computer which is used to store student data in a database, runs the comparison algorithm and enable functions on applications. The fingerprint biometric system scanner communicates with the computer through its USB interface. This does not affect the development of hardware.

Figure 2: Fingerprint Device

Software Architecture

The software architecture fit the database and the application program.

Database: All the data are kept in the database. This data from tables and records of the database that is implemented in Microsoft SQLServer database. SQLServer is fast and easy, it can store a huge amount of record and need the little configuration.

Application Program: the Attendance Management System uses the application program is developed with Microsoft C# programming language using Microsoft Visual Studio framework and it gives a user interface for. C# brings the rapid development paradigm of VB to the word of c++ developers, which some obvious changes. The advantages of Microsoft C# programming language are its robustness, easy to program, has an excellent database connectivity, runs on the two most common operating system platforms (Windows and Unix) and it has a larger user community that provides online support

Methods and Flowchart

The fingerprint image identification work with biometric fingerprint system. In this fingerprint image identification, the system analysis a separate by comparing his biometric with every record in the database. In general, biometric fingerprint image identification answer of two stages:

A. Enrolment
B. Authentication

The Enrolment represents the biometrics user is drawn using a fingerprint reader, which are probably to be a visual, valid state or an ultrasound sensor or another suitable device and the unique features are pull and hold in a database as a pattern for the subject onward with the student ID. The purpose of the enrolment module is to allow a student operating his/her ID and fingerprints into a database next to specific stock. These used to take decision and identity of the student, express the procedure of authentication. This work activates only an administrator in the attendance system.

In authentication, the biometrics system captured the user fingerprint image and the additional information are matched (comparison algorithm) with already stored information from the database to determine a match. The identification accuracy of a biometric system [8] is measured with the false (impostor) acceptance rate (FAR) and the false (genuine individual) reject rate (FRR). The FAR/FRR ratios depend, among other factors, on the type of difficulty of the algorithms used in the fingerprint extraction. Usually, algorithms with high-medium complexity lead to acceptable low FRR/FAR.

However, as it becomes more complex the computational cost increases which leads to undesirable high processing times. Thus, the overall performance of the identification system should be evaluated in terms of FAR/FRR, computational cost and other factors such as security, size, and cost. A brief flowchart is

Figure 3. Flowchart of Attendance System Using Biometrics (Fingerprint).

Figure 3: Flowchart of Attendance System Using Biometrics (Fingerprint)

V. System Operations

The administrator wants to log in the registration of user (student) which needs to collect the full details of data from the particular students for the initial time entering this will store in the database for further verifications. And also include the details about courses and exams all other needs of an administrator. All details are properly added to the attendance are enrolled. The teaching faculty selects the course code and the attendance type after the student fingerprint image gathered with the fingerprint reader and mainly stored in the database.

In testing method illustrate the given condition satisfied with the match by the captured person fingerprint image from the fingerprint templates, the user automatically registered for that lecture, mid-semester test, and semester exam, otherwise the message shown in the textbox that fingerprint is not founds.

VI. Attendance Report

Reports are generated for each course and the total number of students for each attendance is listed and their corresponding status. An example is shown in Figure.
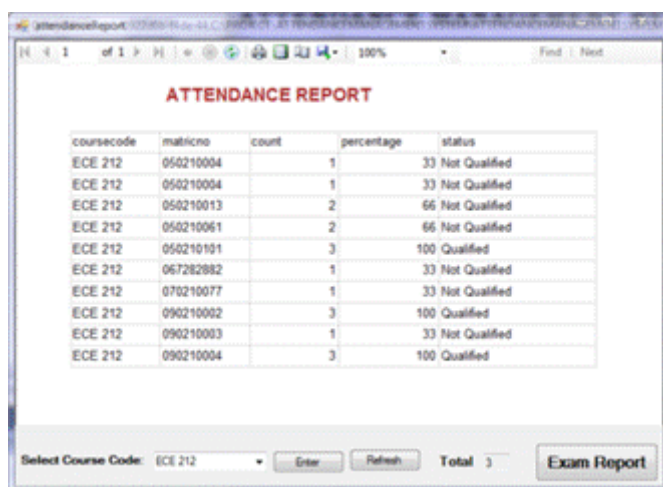

Figure4: Reports Form for Attendance System

The output screen shows the result of a system that is effective and it has a fast response. There was no erroneous identification of students, few conditions of false refuse which were later approved and only pre-registered students were authenticated. The matrix of the identified students was enrolled for attendance spontaneously. The new biometric fingerprint system checked the personal information from pre-collected data with current fingerprint image of eighty students in Electronics and Computer Engineering department,

In the test, there is no fault receiving error acceptance i.e. a student that was identified falsely enrolled are not pre-registered enrolled for attendance. There were a low error rejections handling the test in which the system failed to recognize some pre-registered users. The rejected attributes are the improper collection of data to the placement of the finger on the scanner and fingers that have been slightly scarred due to injuries. The 80 students are split into 8 groups and each group having 10 students and the success rate of over 94% was obtained from the tests carried out. The results of the test are shown below in the chart (Tabel).
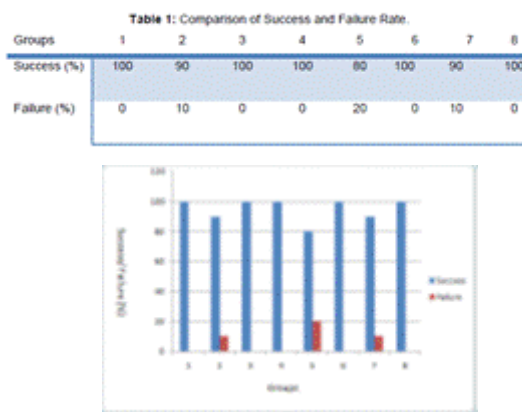
Table 1: Comparison of Success and Failure Rate.

Groups	1	2	3	4	5	6	7	8
Success (%)	100	90	100	100	80	100	90	100
Failure (%)	0	10	0	0	20	0	10	0

Figure5: Comparison of Success and Failure Rate

VII.   Comparison With Manual Attendance

The traditional method of taking attendance during the lecturer period performance of 80 students are nearly attendance taking time was 18.83 seconds as our proposed fingerprint biometric system can taking time approximately 3.79 seconds .the graph can show the automatic fingerprint system is best one compared with the traditional method of sheet and handbook used. The new fingerprint method save our time and workout with much better and faster.

VIII.   Conclusion

With the help of this proposed model, the performance of the system was acceptable and would be considered for full implementation especially because of its short execution time and reports generation. The main benefaction of this work is to the usage biometrics fingerprint system work better execution and report generation. Everyone who tested the system was pleased and interested in the product being developed for use in schools and other sectors.

IX. Recommendations In Future Work

The following suggestions should be considered in carrying out further work on this study:

The system can be linked with the school's central database so that the student registration phase can be eliminated and the bio-data can be directly from the database. The university should acquire the fingerprints of all students at admission. The components could be chosen and assembled in a commercialized manner: instead of a stand-alone fingerprint scanner and a laptop, the unit could have the fingerprint scanner, a small LCD screen, and a keypad all attached to the wall of each classroom. The system could be modified into a web based system so that reports could be generated anywhere. The system could be adapted for human resource use i.e. attendance, pension, payroll processing, etc.

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