



Hybrid of Student Attendance Tracking System Using RFID Device and Fingerprint Sensor

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ABSTRACT

Security system is the important thing in any industrial area to protect from intruder and automatic data base maintenance of the entire student in an organization. RFID technology facilitates automatic wireless identification using electronic passive and active tags with suitable readers. The project proposes a Attendance monitoring problem in colleges using RFID technology .In addition to these peripherals fingerprint is used to identify the person.

The process of finger print scanner, to scan the image of the student's thumbs and performs the identification process. The scanned image is compared with the image stored in the database for each and every student. If the image is matched, it will automatically mark Attendance for that student and enroll the time in the database. Visual Basic front end is used to interface the micro controller and PC through serial port and database connectivity and validation checking options. MS Access is used as the back end to store the details of each and every student

Keywords: RFID, Lecture, Attendance, Passive tag, Reader, Fingerprint

I. INTRODUCTION

Attendance Management System (AMS) is the easiest way to assist the faculty and the lecturer for this time-consuming process. The most common means of tracking student attendance in the classroom is by enforcing the students to manually sign the attendance sheet, which is normally passed around the classroom while the lecturer is conducting the lecture. For instance, lecturers with a large class may find the hassle of having the attendance sheet being passed around the class and the manual signing of attendance by students are burdensome and most likely distract them from teaching and getting full attention from the students and besides, as the attendance sheet is passed around the class, some students may accidentally or purposely sign another student's name. The first case leads to a student missing out their name, while the latter leads to a false attendance record. Another issue of having the attendance record in a hard copy form is that a lecturer may lose the attendance sheet, so The project proposed for a Attendance monitoring problem in colleges using RFID technology .In addition to these peripherals fingerprint sensor is used to identify the person .In this proposes project to provide more secure and efficiency for attendance management system.

II. EXISTING WORK

A number of related works exist in literature, application of RFID Technology to different areas and specifically to the area of academic attendance monitoring problem.

In[6] authors designed and implemented a model of a secured and portable embedded reader system to read the biometric data from the electronic passport. The authors attempted to solve problems of reliability, security and privacy in E-passports by authenticating holder online using Global System of Mobile Communications (GSM) network. The GSM network is the main interface between identification center and the e-passport reader. The communication data is protected between server and e-passport reader by using AES to encrypt data for protection while transferring through GSM network.

Author in [5] reviewed the current research application of RFID to different areas with emphasis on application for supply chain management and developed a taxonomic framework to classify literature which enables swift and easy content analysis to help identify areas for future research.

Authors in [9] reviewed the use of RFID in an integrated- circuit(IC) packaging house to resolve inventory transaction issues. His study suggests that RFID contributes significant improvements to the water receiving process and the inventory transaction process that reduce labour cost and man-made errors.

In [10], an automated attendance management system was implemented both in electronic and mobile platform using stationary matrix AR 400 RFID reader with four circulatory polarized antennae. In the electronic platform, the attendance management system depicts a simple client (antennae placed at classroom entrance) server (privileged student database) system. Students can visually see their names as they entered class on the screen and they are assured that their presence has been entered in the instructor's database. However, one important drawback about this system is the RFID tag read rates degrade tremendously as it comes closer to electronic devices.

In [1], an automatic attendance system using fingerprint verification technique was proposed. The fingerprint technique verification was achieved using extraction of abnormal point on the ridge of user's fingerprint or minutiae technique. The verification confirms the authenticity of an authorized user by performing one to one comparison of a captured fingerprint templates against the stored templates in the database. The proposed automatic attendance system signals either true or false based on logical result of previous one to one

verification of person's authenticity

[2]. Authors in [3] also reviewed and proposed biometric system using fingerprint identification for attendance automation of employees in an organization. authors in [4] proposed student wolf pack club tracking system to simplify. Our proposition emphasizes a simple, reliable and cost effective model for face-face classrooms' attendance management that uses existing student ID card chip as the passive tag.

III. BLOCK DIAGRAM

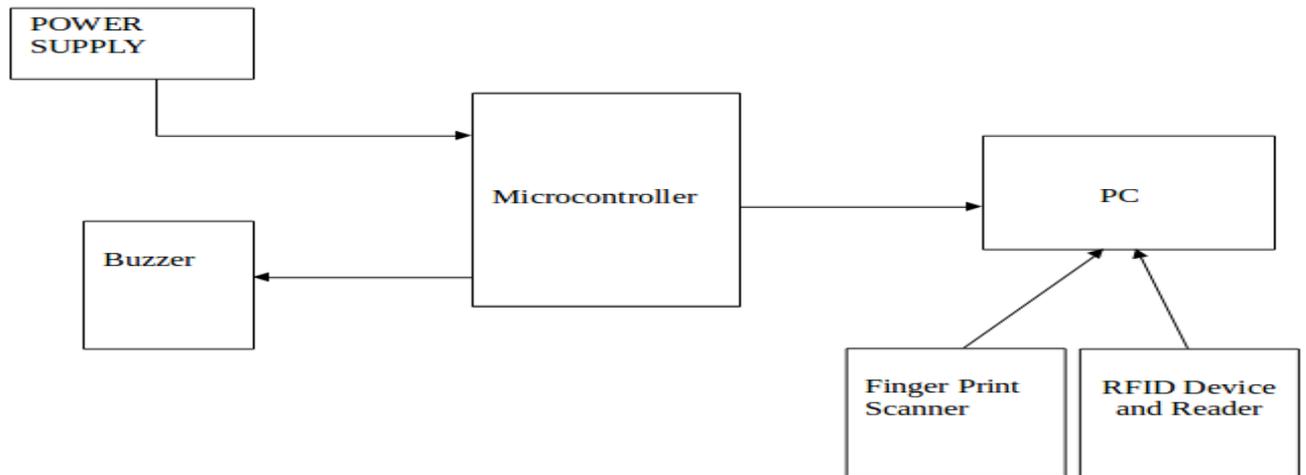


Fig 1 System Architecture

It gives the access to the fingerprint scanner otherwise it stops the process, if the fingerprint is matched then micro controller sends the password to the authenticated person mobile number then the authenticated person enters the both passwords in the keyboard which was already given by the user and received from the micro controller. if these two passwords are matched then the locker will be opened otherwise the micro controller sends the warning message to the authenticated person mobile number and it will be remain in locked position. Buzzer means to provide the alarm signal after micro controller read the finger print image.

A. FUNCTIONALITY OF RFID DEVICE

Radio-frequency identification (RFID) is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. Some tags are powered by electromagnetic induction from magnetic fields produced near the reader. Some types collect energy from the interrogating radio waves and act as a passive transponder.

Other types have a local power source such as a battery and may operate at hundreds of meters from the reader. Unlike a bar code, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object. Radio frequency identification (RFID) is one method for Automatic Identification and Data Capture (AIDC). RFID tags are used in many industries. An RFID tag attached to an automobile during production can be used to track its progress through the assembly line. The primary purpose of an RFID system in this application area is to detect the presence and absence of the student data to be

transmitted wirelessly by mobile device, called a tag, which is read by an RFID reader and processed according to the programmed instructions on the personal computer (PC). The ease with which RFID can be integrated into current operations depends on the openness and flexibility of the technology infrastructure especially the PC that will be used to collect and collate RFID data. The proposed system provides solution to lecture attendance problem through coordinated hardware and software design handshaking data communications between RFID tag and RFID reader serially interfaced to the digital computer system.

The Intelligent RFID based student attendance management system. Absolutely key part of the technology is RFID Tags; RFID tags do not need to contain batteries, and can therefore remain usable for very long periods of time (maybe decades). The scanning antennas can be permanently affixed to a surface; handheld antennas are also available. They can take whatever shape you need; for example, you could build them into a door frame to accept data from persons or objects passing through. each student is having identity card in which RFID Tag is mounted. RFID Tag itself contains some data which is being read by RFID reader. This Reader is passing tag data to the server.

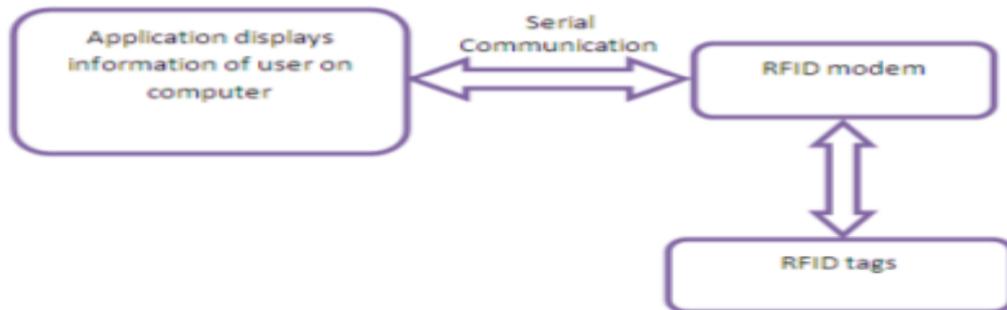


Fig 2 Functionality of RFID device

IV. SYSTEM IMPLEMENTATION

Once the system has been designed, the next step is to convert the designed one in to actual code, so as to satisfy the user requirements as expected. If the system is approved to be error free it can be implemented. When the initial design was done for the system, the department was consulted for acceptance of the design so that further proceedings of the system development can be carried on. After the development of the system, a demonstration was given to them about working of the system. The aim of the system illustration was to identify any malfunctioning of the system.

Implementation includes proper training to end-users. The implemented software should be maintained for prolonged running of the software. Initially the system was run parallel with manual system. The system has been tested with data and has proved to be error-free and user-friendly. Training was given to end -user about the software and its features.

A.IMPLEMENTATION OF RFID DEVICE

The methodology for implementation can be divided into many phases taking into consideration of budget provision, the types of document holdings, number of volumes, types of items meant for circulation, and

the number and types member the institution has. Care should be taken to integrate the library automation package while detailed tender specification are drawn. Since the technology is new to Indian library environment proper demonstration of the system can be arranged and should visit the library where the system is successfully running. While evaluating the tender the past experience of firm supplying the equipment, tags, reader and software should be thoroughly investigated. The fixing of tags to documents can be initially outsourced then in house arrangement can be done after proper training. The reader should be able to read the other manufacturers RFID Tags.

B. RETROSPECTIVE CONVERSION

Retrospective conversion of already existing stack requires a "programmer" or conversion station." The conversion of existing barcoded items, including affixing the tags to library materials, takes 15-30 seconds per item depending on the amount of information added to the tag and the skill of the person doing the tagging. Preprogrammed tags, which are used for new acquisitions in libraries that want only identification numbers on the tags, take even less time because they do not involve scanning existing barcodes.

C. READERS

A typical RFID system includes three different kinds of readers, also known as sensors or scanner/wand. These devices designed to detect and read tags to obtain the information stored thereon.

I) The types of readers include staff workstations for circulation desk charging and discharging, patron self-charging stations, and longer-range walk-through exit sensors to detect and read an RFID tag passage for purposes of determining whether it is a charged or discharged.

II) RFID exit sensors at exits are of two types, one reads the information on the tag(s) going by and communicates that information to a server. The server, after checking against the circulation database, activates an alarm if the material is not properly checked-out.

D. FINGERPRINT MINUTIAE ALGORITHM

// ALGORITHM

algorithm=identity

//The 'Pixel based identity check' should be used.

expected (optional, but recommended)

Defines which probability you expect.

//Valid values are between 0.0 and 1.0. If not defined, use 0.98.

resize (optional)

Defines, if the actual image should be resized before calculation to match the size of the expected image.

Valid values are "true" and "false".

find (optional)

E. ALGORITHM EXPLANATION

This algorithm is similar to the classic algorithm, but accepts an amount of unexpected pixels. It splits every pixel in it's three sub-pixels red, green and blue. Afterwards it checks every actual color value against the expected color value. The final result is the amount of identical pixels divided by the total amount of pixels. The calculated result is checked against an expected value.

F. MINUTIAE EXTRACTOR

To compare finger print image minutiae extractor is used. The user has to place his thumb finger on the finger print device and the device results the current finger print. Active finger print is compared with the existing finger print image.

4.2.3 FINGER PRINT

A fingerprint consists of ridges and valleys. They together provide friction for the skin. The main identification of the skin is based upon the minutiae, which actually is the location and direction of the ridge endings

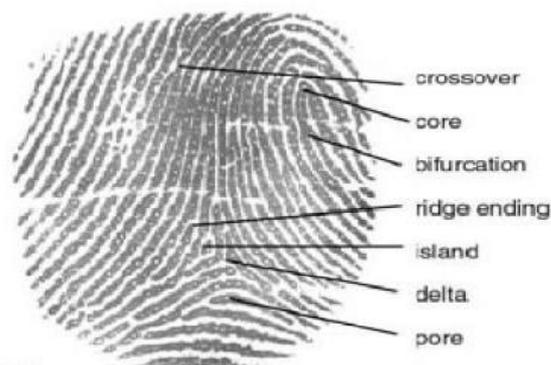


Fig 3: Fingerprint Characteristics

Fingerprint and splits along a ridge path. The image shown below represents two types of minutiae. Take a look. The image below shows all the other characteristics of a fingerprint. These characteristics may also be helpful during the process of minutiae extraction.

G. FINGER PRINT SCANNER

There are mainly two types of scanning methods for this technology. Either an optical or capacitance scanner is used to scan and make a picture of your finger. Though both the methods produce the same type of image, the making of it is completely different.

This scanned image is then compared with an earlier existing finger print of yours to get the correct identity. The comparison is carried out by the processor and the comparison is made between the valleys and ridges. Though the steps are simple, very complex algorithms must be carried out to perform this operation. Though your whole fingerprint is recorded, the computer takes only parts of the print to compare with other records.

Fingerprint verification is done using extraction of minutiae technique and the system automates the whole process of taking attendance. For employee fingerprint checking, it checks one fingerprint template with all templates stored in the database, like wise it checks for all employee which will take more time.

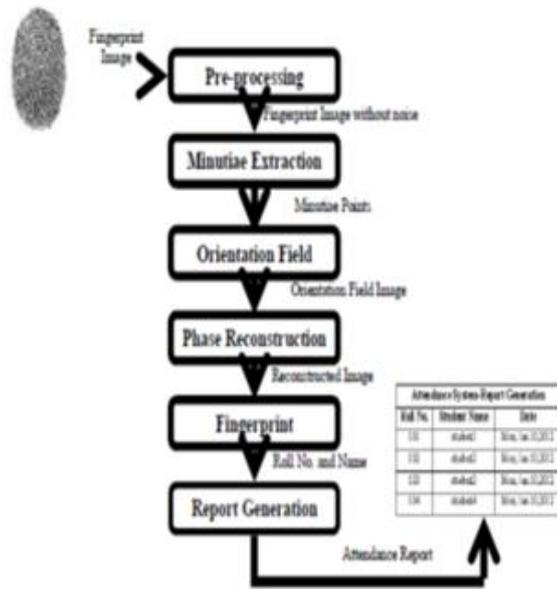


Fig 4 System Flow Diagram

After I am completing the project I am sure the problems in the existing system would overcome. In this project to process made computerized to the implemented a more security system using RFID, FINGERPRINT and to increase the efficiency. The main focus of this project is to reduce manual attendance. It is a low cost, low in power conception, compact in size system. The microcontroller compares the finger prints entered by finger print reader through devices. If these RFID tag value and finger print are correct the microcontroller provides necessary control signal to make attendance. The maintenance of the records is made efficient, as all the records are stored in the MS ACCESS database, through which data can be retrieved.

As a future work it is develop to planned student time table by using RFID device and face recognition. As the result provide more security to automatic student attendance tracking system and reduce manual attendance.

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