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Automated Attendance system with RFID through SMART CARD

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Abstract

Student attendance is one of the important issues for colleges, because many colleges evaluate students' attendance and while giving the final grade, professors consider their total number of appearances on classes during the whole semester. Some colleges prefer to use paper sheet for controlling attendance, whereas some colleges prefer to use paper sheet for checking students' attendance and after this, fill out these information into a system manually Generally students' performance in studies is depending on the attendance. There is a need to develop system that reduces burden in analyzing the attendance and enhance smooth functioning of schools, colleges and colleges and to help the parents. Thus, this paper describes a brief introduction to application of attendance system and reviews some application of attendance system and techniques of data retrieval such as smart card, biometrics and RFID itself. This system would be applicable in collecting student attendance in classroom using passive RFID technology. Our project is Monitoring of Student using RFID. RFID stands for Radio Frequency Identification and Detection. In this we are using RFID reader and contactless smart card. Reader is located on fixed location sends signal to passive RFID chip detected in range of reader. Chip re-transmits the acknowledgement signal with its unique Identifier code, hence chip is identified. Also, a single reader can identify many no of chips in very short period of time. So, we are using these properties of RFID reader monitor the student. Also included module to make system better like in biometrics thumb detection for security and send message to parent if with respective student absent in class.

Keywords:
Contactless Smart card, RFID, RFID Reader

1. Introduction

An RFID system comprises three components that is an antenna, a transceiver and a transponder the antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the RFID tag with unique ID transmits data back to the antenna. Using the RF the RFID tag can be read by the RFID reader. Biometric is used to scan the fingerprint for uniquely identifying a student. Fingerprint matching is done by a fingerprint matching algorithm using both ridge features and minutiae features. In this system we will a template of the student fingerprint in the database with a specific RFID tag ID and when this fingerprint is verified once then his attendance will be finalized and stored in the database so that student cannot fool the system by giving his ID card to his friends in their absence to college. If the student's fingerprint is not identified he will be sent a warning SMS to student if he is not verify within time then guardian will be informed that the student was not present and was trying to cheat the system.

2. Existing system

2.1

In most universities, teachers take attendance by calling out the names and surnames of students, and the marking them, while, in others, teachers pass around a sheet of paper, asking students to sign in attendance sheet just next to their surnames. Both practices have the drawbacks. In the first case, if numerous groups attend the lesson, checking all of these students by name and surname might take about 10 minutes out of each lesson; in the second case, friends of absent students may write down their names and surnames. These practices plan university teachers and their institutions at considerable disadvantages when it comes to taking attendance.

2.2

Old fashioned student attendance system was a tedious task to perform and maintain and also time

consuming barcodes are less secure because can be easily reproduced .barcode technology is method to identification which is used to retrieve in shape of symbol generally in bar, vertical, space, square which have different width and height each one reader can identify data that are represented by using light beam and scan differently but during scanning more data are lost.

3. Problem statement

The traditional method of monitoring has some drawbacks. This method obviously not efficient as it wastes the user's energy and quite slow in term of completion. For example, a class that uses attendance sheet method requires the Students to pass the sheet to each other to sign up the monitor. If there is a large amount of students, it will take time in order to complete the monitoring. Besides that, there is possibility that some students might miss their turn to sign the attendance as they did not receive the attendance sheet.

Also in barcode system during reading symbol most of the data are lost and it is a time consuming system.

4. Proposed system

We developed automated student attendance system RFID trough SMART CARD system we improve the student monitoring system. Use RFID and smart card. With the help of that improve security. There will RFID transponders installed in every classroom. And when a student enters any of them the transponder will detect and store the student's last known position in the database. The software managing all these will be designed using java will share a common database of Ms SQL. The complete process will be automated and no one needs to be monitoring the system. As every tag has its own unique ID, it is easy to differentiate every tag holder. This is uniquely student identify .We manage attendance database. If student are not present then send the message to guardian. This system uses individual RFID tags for each user identification.

• For the security purpose, we are used thumb detection of the user
• Similarly we can monitoring the student from one place.

5. System Requirement

A) Hardware Components
B) Software Requirement

A) Hardware Components:

Hardware components include RFID, Smart card, Biometrics.

RFID:

RFID Reader read contain of smart card, There are three types of RFID an RFID system comprises three components that is an antenna, a transceiver and a transponder the antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the RFID tag with unique ID transmits data back to the antenna. Using the RF the RFID tag can be read by the RFID reader.

Biometrics:

Biometric is used to scan the fingerprint for uniquely identifying a student.

Smart card:

Smart card build by with wide verity of chip, it is used in wide range application.

B) Software Requirement:

JAVA:

Java is a set of several computer software products and specifications that together provide a system for developing application software and deploying it in a cross-platform computing environment. Java is used in a wide variety of computing platforms from embedded devices and mobile phones on the low end, to enterprise servers and supercomputers on the high end. Writing in the Java programming language is the primary way to produce code.

MySQL Database:

MySQL is a popular choice choice of database for use in web applications, and is a central component of the widely used. The MY SQL is the open source database.

Mat lab:

Mat lab for embedded programming

6. System Architecture:

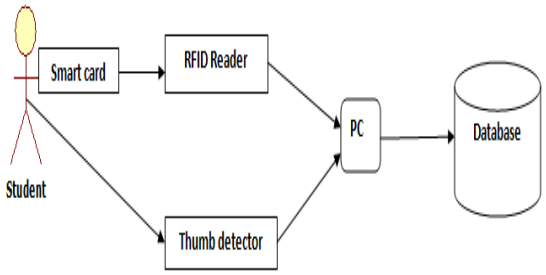

Figure 6.1 .System Architecture

The thumb detection is meant to prevent a student from giving his/her RFID-card to a classmate who attends the lecture, scanning the other student's RFID-card to make it appear as if s/he had also attended. When a student enters class, the RFID reader reads his/her student ID card, while the thumb detection simultaneously detects thumb expression and sends it to the PC. After some time, the professor submits all data for storage in a database.

6.1 Importance of Biometrics

Biometric is a method for uniquely identifying human being based on some physical characteristic and in this system we will be using the fingerprint. The fingerprint is an impression left by friction ridges of a human finger. Fingerprint image capturing is considered to be one the most critical step in an automated authentication system. It needs to be of high a high quality image and the basic idea is to measure the distance between ridges and valleys. There are two major categories of fingerprint scanner that are solid-state fingerprint and optical fingerprint readers for this system we will be using a optical fingerprint system which connected to the system using an universal serial bus (USB 2.0) .The top layer of the sensor, where the finger is placed, is known as the touch surface.

Beneath this layer is a light-emitting phosphor layer which illuminates the surface of the finger. The light reflected from the finger passes through the phosphor layer to an array of solid state pixels (a charge-coupled device) which captures a visual image of the fingerprint. A scratched or dirty touch surface can cause a bad image of the fingerprint. The nonlinear distortions, presented in touch-based fingerprint sensing, make fingerprint matching more difficult. As shown in below figure, even though these two fingerprint images are from the same individual, the relative positions of the minutiae are very different due to skin distortions. This distortion is an inevitable problem since it is usually associated with several parameters including skin elasticity, no uniform pressure applied by the subject, different finger placement with the sensor etc. [2]

6.2 Workflow of System

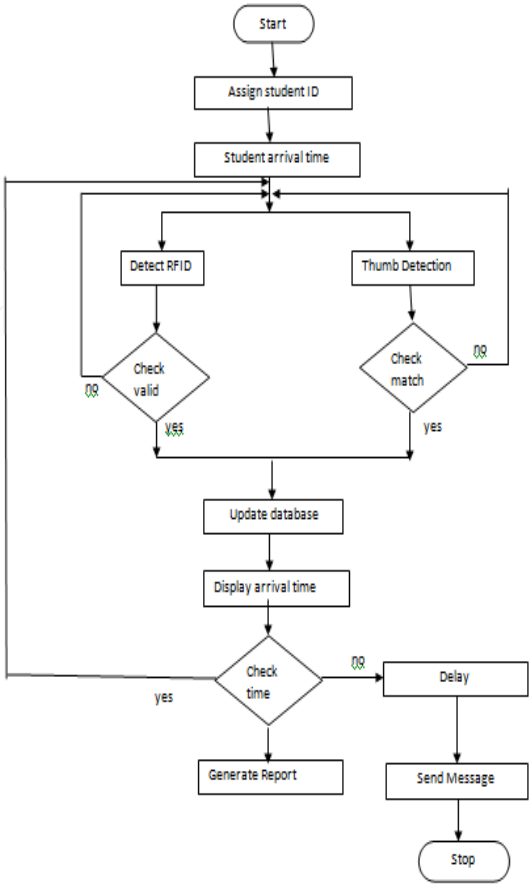

Figure6.2. Workflow of System

The above flowchart describes the flow of the system the actual works of our system starts after the login of admin and by initializing the RFID reader. When the RFID reader gets initiated they starts emitting the frequency with respective range of their own and they detect the RFID tag i.e. .Identity card which we provide to the student. The RFID readers reads the tag information and fetch the information of student,

as we know that every RFID tag has its own identity which acts as primary key which refers to the database details of respective student. Simultaneously thumb Detector match finger print if both condition satisfy then mark the attendance. The usage of Java is very important and the main function to build the system is because Java functions as a link between hardware and software. Additionally, it functions to send information to the online networking system through intermediary database system.

6.3 Interface Design

In this project development, the four important aspects need to be emphasized are java programming language, MySQL, and RFID set equipment, Thumb Detector. The whole system already successfully implemented with the combination of these four aspects. The software that has been used in this project is java, MySQL is used to track the student location and register the tag Id whereas MySQL is used as storage information system. Connectivity of java and MySQL are done to store the database and display the tracked location.java is used to register the student ID a well as track the location by using passive RFID reader and also Biometrics fingerprint Detection match fingerprint the whole data is send to the MySQL which is a database system. The interfacing was developed using java software and the flowchart of the system show relationships of overall system. [1]

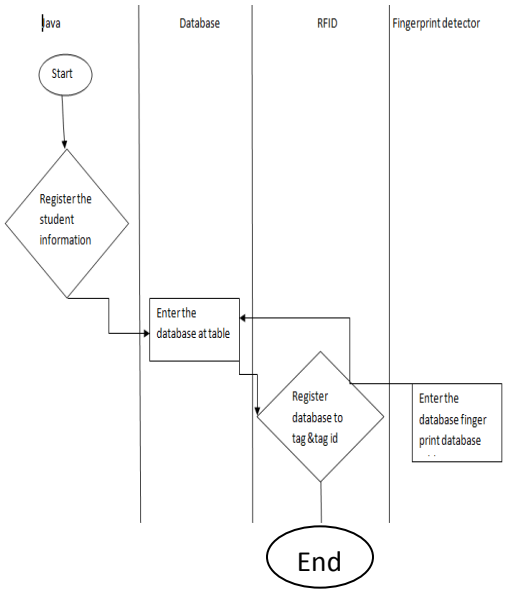

Figure 6.3: Interface Diagram

7. Advantages and Disadvantage

7.1 Advantages

i. It saves time for taking attendance during the class.
ii. More authentic attendance system.
iii. Reduces paper based system.

7.2 Disadvantage

Biometrics:

Sensor is that the image capturing capabilities are affected by the skin quality of fingure. For example dirty fingure is difficult to be capture properly. [2]

8. Conclusion

Multifunction smart ID cards with RFID offer several easy and cost-effective ways for campuses to raise the level of protection and quality of education. Today's smart access card technologies provide superior range and read performance so that educational institutions can improve efficiency and security at multiple levels.

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