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RFID and FINGERPRINT based Students Database System

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Abstract - *Radio frequency Identification (RFID) systems have recorded significant achievement when applied to different areas such as education, manufacturing, healthcare, agriculture, and more. RFID technology uses either passive or active tags with suitable readers to simplify automatic recognition and tracking of objects. The emergence of electronic paradigm for learning compare to traditional method and availability of almost all data on the superhighway (Internet). In recent years, there has been an increase in RFID based application due to its inherent benefits. In this project only authentic person can be access the information from system have implemented a student database system based on RFID, FINGERPRINT technology containing student documents which can activate, authenticate, and validate the user. This paper proposed an RFID–based student information system that will enable students to access and retrieve their information using RFID cards and fingerprint.*

Keywords: Fingerprint module, RFID module, serial to USB converter, Buzzer, Microcontroller 328P

1. Introduction:

Fingerprint verification is one of the most reliable personal recognition methods in biometry. This project consists of microcontroller, RFID reader, Fingerprint scanner keyboard, and LCD. A technology that can solve this problem and even do more is the RFID technology. RFID is an automated identification as well as information gathering technology, that ensures more accurate and timely data entry. RFID is not actually a new technology; it only quickly gained more attention recently because of its current low cost and advances in other computing fields that open up more application areas. RFID combines radio frequency and microchip technology to create a smart system that can be used to identify, monitor, secure and do object inventory. At their simplest, RFID systems use tiny chips called —tags that contain and transmit some piece of identifying information to an RFID reader a device that in turn can interface with computers [7].RFID is a technology that uses radio waves to retrieve data from an electronic tag – called RFID tag or label, which is attached to an object through a reader for the direction of identifying and tracking the object [1]. In this system student have their RFID tag .Tag contain all the data about student like academic result, domicile, cast certificate, etc. Student scans their tag on RFID scanner then all the student data is stored in collage server. Student data are also stored in University server, Government server [2]The purpose of this project is to create an RFID-based information system that allow students to access or retrieve information using their RFID in this system the RFID reader reads the id number from passive tag and sends it to the microcontroller, if the id number is valid then only it gives the access to the fingerprint scanner otherwise it stops the process, if the fingerprint is matched then microcontroller identified the valid person.

Fig -1: fingerprint module

2. Literature review:

So many works that use RFID technology to accomplish tasks that are related to the proposed system exist in the literature. For instance, an RFID-based system designed for taking attendance in Nigerian educational institutions [12]. In this system, an RFID reader was integrated with graphical user interface using USB UART serial communication. The system has login, admin, database, main menu, class record, admin registration and database file forms.

Another system that approves RFID to control attendance was proposed by Saparkhojayev and Guvercin [1]. In this system the course instructor's page of each course during the lecture is displayed after login to the system using password. The RFID reader will then automatically read students' respective RFID cards and compare the record with the one already stored on the database and simultaneously a web camera will capture their pictures as they enter the class. If the record matches, then student will be recorded present for the class.

An attendance management system that used visual key6.0 and Microsoft access to design the GUI and the attendance database respectively was presented [2]. The core component of the system is Atmel4 AT89S52 which is a complementary metal oxide semiconductor 8-bit microcomputer with 8K bytes of downloadable flash

programmable and erasable read only memory that has high performance and consumes less power.

It is operable in two modes especially idle and power down modes the unique tag identifier which is stored in the RFID tag is the input to the system. It's generally said that the roots of radio frequency identification technology can be traced back to World war II. The Germans, Japanese, Americans and British were all using radar which had been discovered in 1935 Scottish physicist Sir Robert Alexander Watson-Watt to warn of approaching planes while they were still miles away.

The problem was that, there was no way to identify which planes belonged to the enemy and which were a country's own pilots returning from a mission. Radio Frequency Identification (RFID)) research and discovery began in earnest in the 1970s. RFID is commonly used to transmit and receive data without wires. RFID readers and tags communicate through a distance using radio waves.

There are a lot of advantages in RFID included their price, size, memory quantity and their capability. The pure memory based RFID chip without a co-processor is cheap, and its footprint is small and usually use in car immobilizer applications where the IC should fit in a tiny glass tube buried in the key.

Advances in radar and RF communications systems continued through the 1950s and 1960s. Scientists and academics in the United States, Europe and Japan did research and presented papers explaining how RF energy could be used to identify objects remotely. Companies began commercializing anti-theft systems that used radio waves to determine whether an item had been paid for or not. Electronic article surveillance tags, which are still used in packaging today, have a 1-bit tag. The bit is either on or off. If someone pays for the item, the bit is turned off and a person can leave the store. But if the person doesn't pay and tries to walk out of the store, readers at the door detect the tag and sound an alarm.

The First RFID Patents Mario W. Cardullo claims to have received the first U.S. patent for an active RFID tag with rewritable memory on January 23, 1973. That same year, Charles Walton, a California entrepreneur, received a patent for a passive transponder used to unlock a door without a key. A card with an embedded transponder communicated a signal to a reader near the door. When the reader detected a valid identity, number stored within the RFID tag, the reader unlocked the door. Walton licensed the technology to Schlage Lock of San Francisco, a lock maker and other association.

3. System Overview:

The proposed system is the development of accessing the data to the students whenever it require. As this system consist of RFID module, Fingerprint module, Microcontroller, LCD. The block diagram of the proposed system is as follow:

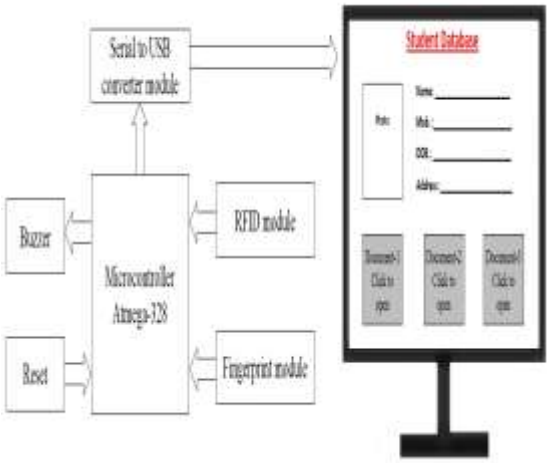

Fig -2: system overview

Firstly, we have stored the database of the students which contain documents of the students .PC is connected to Microcontroller ATMEGA 328P which is 28 pin dual inline package using Serial to USB converter module used for serial communication. Whenever authorized user want to access his document then simply he can scan RFID tag provided to him using RFID scanner module which is connected to the microcontroller and we Students database system using RFID and fingerprint module have programmed microcontroller in such a way that firstly it checks the user is authorized or not .

If the user is authorized then whatever information similar to that students provided in the data will be available to that particular user. We also have provided fingerprint module for authentication and better security. With the help of fingerprint module authorized user can access his information from database store in the pc. When the fingerprint or RFID reader read the tag then buzzer is on.

4. Proposed Algorithm:

4.4 Flowchart:

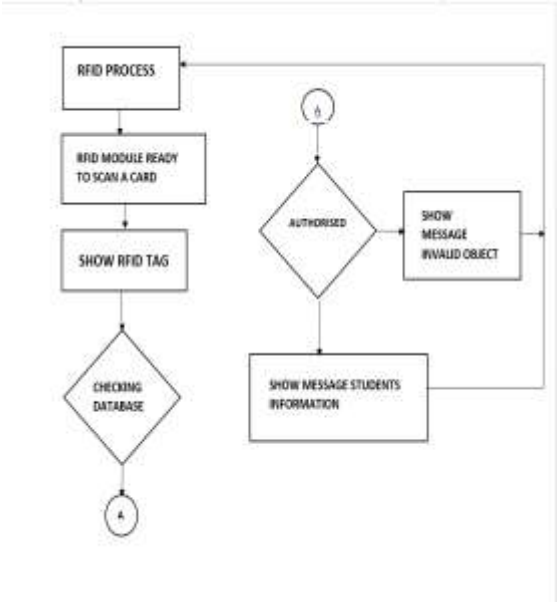

Fig-3: Flowchart

- RFID tag access the database provided by using identity card of student then the card is scan by rfid scanner.
- When the card is scanned by the rfid scanner then it start to checking the database according to the student id card.
- If the card user is authorized then it shows the message student information which used for accesing the documents related to that students.
- If card user is not authorized then it show the invalid object, and avoid the access the data to that particular user.

5. RESULT SECTION:

Fig–4: RFID and fingerprint based student database system

In this, firstly student has to insert the RFID card as well as give the fingerprint, if the software having students information then it shows valid user otherwise it shows invalid user. Because we already store the information about the students in MT2 software, if the user is valid then it shows the students name, year, mobile number and address of the student. Then we can access the documents as shown in output window.

6. CONCLUSION:

Through this project named as "Student database system using RFID and Fingerprint module" it is found that RFID base tracking yields economic and accurate solution that is portable, flexible, small and simple hardware. In this project we had done half of the work till now .in that we considering all the situations and possibility .we decide the specification for project and chosen components and sensors which are helping to achieve desire target.

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