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ARM 9 Based Intelligent System for Biometric Figure Authentication

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Abstract

Now a day's some universities in India are enforcing afiliated colleges to implement biometric fingerprint attendance system to monitor student attendance. This sytem requiresbiometric fingerprint scanner need to be installed in affiliated college where student studying and it is monitored by the university online. As finger print scanner is placed at affiliated college which is far away from the university, there is possibility of adding fake finger print into the scanner which can be used for proxy attendance of student who is not attending the college. In this paper, the proposed system is designed in such a way that, the acquired fingerprint of the student is initially stored in the database with complete student profile and photograph. And, when the student places his fingerprint it compares with stored database. If fingerprint matches it displays the student photo. The proposed intelligent system includes R305 fingerprint sensor and ARM 9 processor. We used RS232 for interfacing with system and visual studio 2008 software for designing the interface. This attendance system is verified practically with students and we obtained the desired results accurately.

***Keywords**: R305 sensor, RS 232, ARM 9, Visual studio 2008*

1. Introduction

Implanted frameworks are electronic gadgets that fuse microchips with in their executions. The principle purposes of the microchips are to rearrange the framework plan and give adaptability. Having a chip in the gadget helps in uprooting the bugs, making alterations, or including new gimmicks are just matter of changing the product that controls the gadget. On the other hand as such implanted machine frameworks are electronic frameworks that incorporate a microcomputer to perform a particular committed application [1]. The machine is covered up inside these items. Installed frameworks are universal. Consistently a large number of small machine chips come spilling out of plants discovering their path into our commonplace items.

Installed frameworks are independent projects that are inserted inside a bit of fittings [2]. While a general machine has numerous distinctive applications and programming that can be connected to different assignments, inserted frameworks are typically situated to a particular undertaking that can't be modified without physically controlling the hardware. An alternate approach to think about an installed framework is as a machine framework that is made with ideal proficiency, subsequently permitting it to finish particular capacities as fast as could be expected under the circumstances.

Implanted frameworks creators normally have a critical handle of fittings advances. They utilize particular programming dialects and programming to create inserted frameworks and control the supplies [3]. At the point when looking on the web, organizations offer installed frameworks improvement units and other inserted frameworks instruments for utilization by architects and organizations.

Now a day's attendance in the academic institutions is very important. So, to make the taking of attendance in an easy way and accurately we are going to implement the finger print based attendance with the latest ARM 9 Mini 2440 and latest finger print sensor R305 so that it will be in a faster way.

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2. Existing and Proposed System

In the current framework, the engineering utilized is a RFID, which embodies three parts an reception apparatus, a transceiver and a transponder. The radio wire uses radio recurrence waves to transmit flag that enacts the transponder. At the point when initiated, the tag transmits information again to the reception apparatus. Utilizing the RF, the RFID tag can be perused from a separation through the wallet, garments, tote or rucksack [4]. Each RFID tag has an extraordinary ID [6]. The rundown of understudies to be enlisted is selected first and their layouts are put away in the database with a particular RFID label ID. Be that as it may, in RFID case, there is a probability of the fakeness of clients by taking care of the RFID tag through a unapproved individual rather than approved individual's enrolment which prompts poor achievement rate of the framework. With a specific end goal to conquer this downside, in our framework biometrics is presented for participation enlistment.

The biometric is an art of securing a human personality focused around physiological or behavioral attributes and in this proposed framework unique mark is utilized as Biometrics. On receipt of live layout unique mark [5], it is confirmed with the database and recognizable proof procedure happens focused around Close enough. In the event that more signs, then is acknowledged overall rejected. Later, for the acknowledged individual, the programming deals with all the things, which is created utilizing PHP and CGI scripts and the web site utilizing Lighthttpd server, to impart a typical database of Sqlite, intended for implanted gadgets. The complete procedure is a mechanized one and nobody needs to screen the framework's conduct. For the understudies the individuals who are nonattendant, the fingerprints are not enrolled in the live format, a cautioning SMS will be sent after an endorsed time, which is situated at an edge time of school/college, to the Parent/ Guardian with a substance illuminating that the understudy is not show so as to dodge deceitful if any.

Table 1. Comparision table stating the Efficiency through put of different systems

Biometric Vs RFID

Biometric type	verification	identification	accuracy	Long term stability	Easy to use
Finger print	✓	✓	4	3	3
Facial recognition	✓	X	3	2	2
Hand geometry	✓	X	3	2	2
RFID	✓	X	2	2	2
Retinal Scan	✓	X	3	3	1

In Existing system a student finger are placed but not display student photo. In this disadvantage that instead of enrolling student data there are enrolling the student data with other faculties /attenders. In the Proposed Intelligent System, to overcome this problem a fingerprint scanner is used which can be directly connected to the pc's com port. In this sensor the device has two process. The first process is the fingerprint enrollment and another one is the matching. In fingerprint enrollment, student has two enroll his finger with two times and generate a template of the finger. In matching when student is placed his finger it compare the generated template with reference template, if matches itdisplay the student Id. We also added his photo and his name and roll number. These fingerprintdevice is connected to ARM 9 and displays the result.

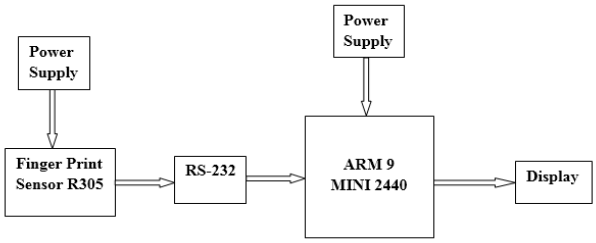

Figure 1. Block Diagram of Proposed System using ARM 9

3. System Description

The Hardware Devices used in implementation of the Intelligent system are mentioned and discussed with implementation method.

3.1. Fingerprint sensor R305

Finger impression transforming incorporates two sections: unique mark enlistment and unique finger impression matching (the matching can be 1:1 or 1: N). At the point when selecting, client needs to enter the finger two times. The framework will transform the two time finger pictures, create a format of the finger focused around preparing comes about and store the template.when matching, client enters the finger through optical sensor and framework will produce a layout of the finger and contrast it and formats of the finger library. For 1:1 matching, framework will pose as a viable rival the live finger with particular format assigned in the Module; for 1: N matching, or seeking, framework will hunt the entire finger library down the matching finger. In both circumstances, framework will furnish a proportional payback result, achievement or disappointment.

Figure 2. Fingerprint sensor R305

3.2. ARM 9

The Friendly ARM Mini2440 is a solitary board machine focused around a Samsung S3c2440 Arm9 chip. The board measures 10 cm x 10 cm, perfect for learning about arm [12] frameworks or coordinating into various items. The S3c2440a isdeveloped with Arm920t center, 0.13um CMOS standard cells and a memory complier. Its low power, basic, rich and completely static outline is especially suitable for expense and influence touchy applications. It receives another transport structural engineering known as Advanced Micro controller Bus Architecture (Amba).the S3c2440a offers exceptional gimmicks with its CPU center, a 16/32-bit Arm920t RISC processor [9] outlined by Advanced RISC Machines, Ltd. The Arm920t executes MMU, AMBA BUS, and Harvard store structural planning with particular 16kb instructionand 16kb information stores, each with a 8-statement line length [11].

Difference between ARM 7 and ARM 9:

a) The ARM7 core has a Von Neumann–style architecture where ARM9 has Harvard architecture.
b) ARM7 core has a three-stage pipeline. ARM9 core has 5-stage pipeline. This improves the Clock frequency
c) ARM7 operates in region of 20-60 Mhz where 200Mhz in ARM9.
d) ARM9 is faster than ARM7.

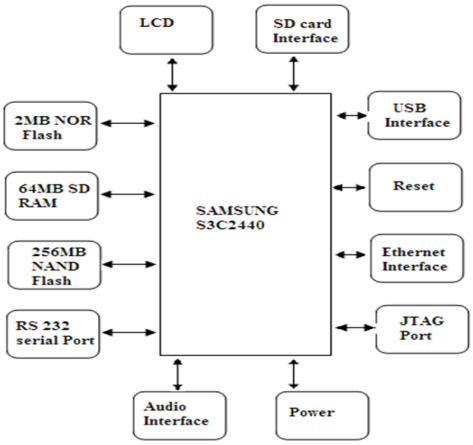

Figure 4. ARM 9 block diagram

Its frequency ranges from 400MHz to 533MHz .It has two 32M bytes (64M bytes in total) SDRAMs commonly known as memory. The LCD interface is coordinated 4-wire resistive touch screen [10], which can be straightforwardly associated with four wire resistive touch screen. It is a 41-pin connector.

4. Methodology

In Present day's colleges/affiliated universities are redesigning the participation frameworks utilizing most recent innovations, as a piece of this mechanization, Biometric unique finger impression gadgets are utilized to secure the participation of the framework. In this paper, the proposed framework is outlined in such a route, to the point that, the obtained unique mark of the understudy is at first put away in the database with complete understudy profile and photo. What's more, when the understudy puts his unique finger impression it contrasts and put away database. In the event that unique finger impression matches it shows the understudy photograph. The proposed keen framework incorporates R305 unique mark sensor and ARM 9 processor.

The implementation methodology is discussed and represented in the flow chart format. This Flow process provides the information about the working process of the proposed Intelligent System.

4.1. Flow Chart

The flowchart is implemented in two parts:

1) Sensor connected to PC
2) Sensor to ARM 9 to search the finger library

1) Sensor connected to PC

In this fingerprint device can be directly connected to PC COM port. When the device is success we should put our finger. At the point when enlisting, client needs to enter the finger two times. The framework will handle the two time finger pictures, produce a format of the finger focused around preparing comes about and store the layout.After enrolling we added image and store in database.

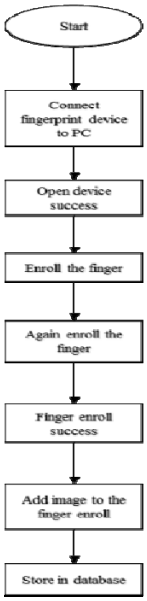

Figure 5. Flow chart of Enrolling process

2) Sensor to ARM 9

This fingerprint sensor is connected to ARM 9 and result is displayed in LCD.

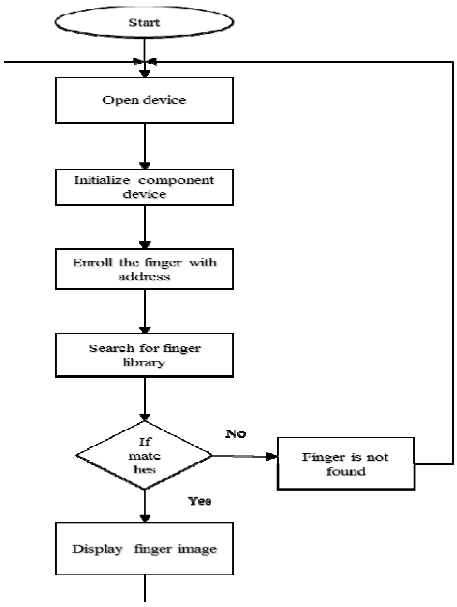

Figure 6. Flow Chart of proposed Intelligent System

The Implementation process carried in two modules through which the authentication of the candidate is performed. And, In this process the biometric finger enrollment and the authentication of the candidate is done and his complete profile is displayed, such that proxying of the attendance or duplicating the candidate while writing the examinations can be eradicated. The whole software interfacing implementation and designing the windows is implemented using Visual Studio software. The results of the proposed intelligent system are shown in the next section.

5. Results and Discussion

The proposed intelligent system is tested for a class of 50 students. These students initially were enrolled into the database by taking their finger prints initially. Then the database is updated with the students details such as photograph, Roll number, Date of birth these metrics are updated as to authenticate the student while attending any examinations or providing him attendance, this information being displayed on ARM 9 eliminates the proxy or duplication of candidate and such this can also be a proof for the invigilator for the candidates attendance. The respective results of the System are displayed below along with the hardware system design.

Figure 7. Prototype of Intelligent system with results

6. Conclusion

In this paper we designed the Intelligent Sytem for figure authentication and execute the equipment configuration and programming needed for a finger impression validation system. This paper incorporates both the fittings interfacing outline and the product programming in installed visual Studio and using ARM 9 processor. At the point when the finger impression locator recognizes any finger on its screen its sweeps it, and checks for the client id of the unique mark in its database, if that the unique mark is located then prints the client id on the lcd screen, confirming the individual is legitimate and allows the access.

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