Embedded GSM Message Interface Hardware and Software design using ARM9

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Abstract: **The main aim of this paper is to design an "Embedded GSM message interface hardware and software design using ARM9". In the existing system we are using the finger scan technology, which takes a sufficient amount of time for the process of recognizing the fingerprints to be completed. For example in a class of 60 students, the whole process takes around 15 to 20 minutes, which if think in terms of the new technology we could incorporate, would stand out to be an ample waste of time.In my paper, one class of 60 students is taken as a sample to conduct the experiment. the faculty has 60 QR images of the students with him. The images corresponding to each student who is present in the class will be scanned by the faculty by mobile which has QR reader software installed in it, which confirms the attendance of the students. This data will be sent to the ARM memory through GSM. Then through Ethernet, this data will be sent to the PC, using which the data is collected and maintained. The students who has less than 75%attendence ,their data will be sent to the ARM processor through Ethernet again at every two weeks .Then the ARM processor will send the students attendence to their respective parents through the GSM (or) free SMS services like way2sms.com, which saves time and manpower which is the scope of my project.**

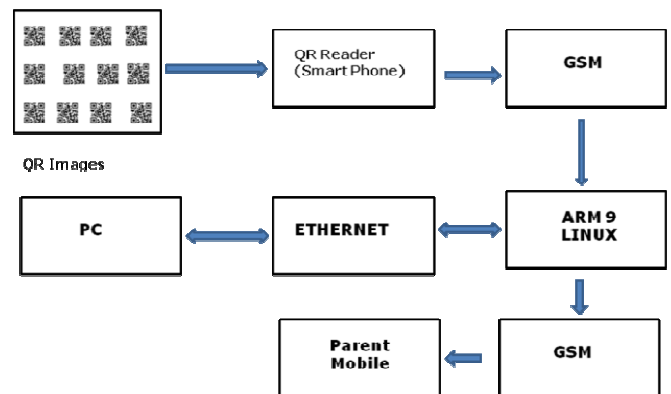**Key words: ARM, GSM, SMS, QR, DBMS, SQL**

1. INTRODUCTION

In many institutions and organization the attendance is a very important factor for various purposes and its one of the important criteria that is to follow for students and organization employees. The previous approach in which manually taking and maintains the attendance records was very inconvenient task. After having these issues in mind we develop an automatic attendance system which automates the whole process of taking attendance and maintaining it.

1.1. Existing system: The main aim of this paper is to develop an accurate, fast and very efficient automatic attendance system using fingerprint verification technique. We propose a system in which fingerprint verification is done by using extraction of minutiae technique and the system that automates the whole process of taking attendance, Manually which is a laborious and troublesome work and waste a lot of time, with its managing and maintaining the records for a period of time is also a burdensome task. For this purpose we use fingerprint verification system using extraction of minutiae techniques. The experimental results how's that our proposed system is highly efficient in verification of user fingerprint.

1.2. Proposed system: In this paper, one class of 60 students is taken as a sample to conduct the experiment. the faculty has 60 QR images of the students with him. The images corresponding to each student who is present in the class will be scanned by the faculty by mobile which has QR reader software installed in it, which confirms the attendance of the students. This data will be sent to the ARM memory through GSM. Then through Ethernet, this data will be sent to the PC, using which the data is collected and maintained. The students who has less than 75%attendence ,their data will be sent to the ARM processor through Ethernet again at every two weeks .Then the ARM processor will send the students attendence to their respective parents through the GSM (or) free SMS services like way2sms.com, which saves time and manpower which is the scope of my paper.

BLOCK DIAGRAM
Figure 1. Block Diagram

2. QR CODE

2.1.1. *INTRODUCTION TO QR CODE:* A QR code is a 2-dimensional bar code. This means that pieces of information are encoded horizontally and vertically instead of being only horizontally encoded like a standard bar code.
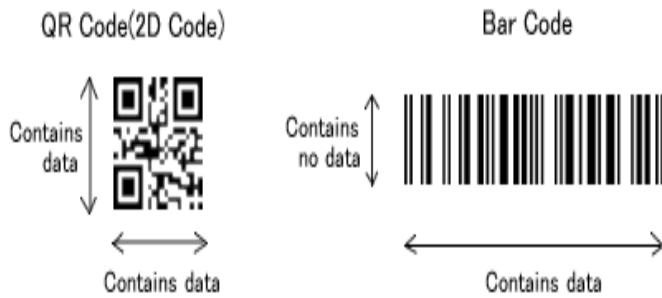
Figure 2. QR Code and Barcode

The acronym *QR* is derived from the term Quick Response. The company Denso Wave originally spawned the term 'QR' as the creator intended that such barcodes and their contents were to be decoded at high speed electronically.

2.1.2. QR Code Generator

1. With this tool you can create QR codes for the following content types: Text, URL, Phone number, SMS number, Email, Business card (vCard), Geographic location
2. After you have selected a content type enter the required data in the corresponding fields. This tool allows you to enter up to 450 characters. You should scan the generated QR code with a camera phone to test if the embedded data can be extracted.
3. This service will give you full control over: The block size, The padding size, the border size, the background color, the block color, the border color, the image below explains each of these values
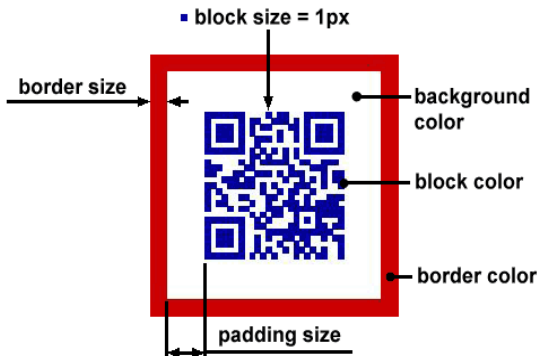

Figure 3. QR code symbol

If the block size is large the generated QR code is more stable and easier to read with a QR code scanner. On the other hand, as the QR code symbol size gets larger, a larger printing area is required.It is recommended to set the block size to 5px. The generated QR code image can be very large depending on the number of characters entered, block size, padding size and border size. To give you an idea how much a pixel (px) is, use the conversion tool to convert the pixel size in millimeters [mm], centimeters[cm],inches[in],points[pt] or picas[pc].

4. The generated QR code can be rotated and converted into other image types.

5. The generated QR code image can be downloaded in the output area.
6. In this output area you also find the QR code in a binary form(qr_code_string). This qr_code_string value together with the code template "Display QR code with Javascript" are used to display the QR code.

2.1.3. QR Code Reader

- If you have a smart phone like an iPhone, Android or Blackberry then there a number of different barcode scanner applications such as *Red Laser*, *Barcode Scanner* and *QR Scanner* that can read and decode data from a QR code. The majority of these are completely FREE, and all you have to do once you install one is to use your phone's camera to scan the barcode, which will then automatically load the encoded data for you.
- To read a QR code, a smart phone set up with a camera and a QR code reader is required. The QR code reader is an application (to install on your smart phone) which uses the camera to capture the code and decode it.

Figure 4. *QR Code Reader*

- A wide range of QR code readers is available, below are the main ones.
- 1.i-nigma
  2.NeoReader
  3.ScanLife
  4.BeeTagg
- 4.GSM
- GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of

user data, each in its own time slot. It operates at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).

3. ARM9 & ETHERNET

3.1. ARM9 : S3C2440A is an ARM9 Microcontroller
SAMSUNG's S3C2440A 16/32-bit RISC microprocessor. SAMSUNG's S3C2440A is designed to provide hand-held devices and general applications with low-power, and high-performance microcontroller solution in small die size. To reduce total system cost, the S3C2440A includes the following components. The S3C2440A is developed with ARM920T core, 0.13um CMOS standard cells and a memory complier. Its low power, simple, elegant and fully static design is particularly suitable for cost- and power-sensitive applications. It adopts a new bus architecture known as Advanced Micro controller Bus Architecture (AMBA). The S3C2440A offers outstanding features with its CPU core, a 16/32-bit ARM920T RISC processor designed by Advanced RISC Machines, Ltd. The ARM920T implements MMU, AMBA BUS, and Harvard cache architecture with separate 16KB instruction and 16KB data caches, each with an 8-word line length. By providing a complete set of common system peripherals, the S3C2440A minimizes overall system costs and eliminates the need to configure additional components. The integrated on-chip functions that are described in this document include:

3.2. Ethernet: For many years, Ethernet has proven itself as a relatively inexpensive, reasonably fast, and very popular LAN technology. Engineers Bob Metcalfe and D.R. Boggs developed Ethernet beginning in 1972. Industry standards based on their work were established in 1980 under the IEEE 802.3 set of specifications. Generally speaking, Ethernet specifications define low-level data transmission protocols and the technical details manufacturers need to know to build Ethernet products like cards and cables. Ethernet technology has evolved and matured over a long time period. The average consumer can generally rely on off-the-shelf Ethernet products to work as designed and to work with each other. In the OSI model, Ethernet technology operates at the physical and data link layers - Layers One and Two respectively. Ethernet supports all popular network and higher-level protocols, principally IP. Traditional Ethernet supports data transfers at the rate of 10 Megabits per second (Mbps). Over time, as the performance needs of LANs have increased, the industry created additional Ethernet specifications for Fast Ethernet and Gigabit Ethernet. Fast Ethernet extends traditional Ethernet performance up to 100 Mbps and Gigabit Ethernet up to 1000 Mbps speeds. Although products aren't yet available to the average consumer, 10 Gigabit Ethernet (10000 Mbps) also remains an active area of research.
Ethernet cables likewise are manufactured to any of several standard specifications. The most popular Ethernet cable in current use, Category 5 or CAT 5, supports both traditional and Fast Ethernet. The Category 5e (CAT5e) cable supports Gigabit Ethernet.

To connect Ethernet cables to a computer, a person normally uses a network adapter, also known as a network interface card (NIC). Ethernet adapters interface directly with a computer's system bus. The cables, in turn, utilize connectors that in many cases look like the RJ-45 connector used with modern telephones.

4. DATABASE

A database is an organized collection of data. The data are typically organized to model relevant aspects of reality (for example, the availability of rooms in hotels), in a way that supports processes requiring this information (for example, finding a hotel with vacancies). He term *database* is correctly applied to the data and their supporting data structures, and not to the database management system (DBMS). The database data collection with DBMS is called a database system. The term *database system* implies that the data are managed to some level of quality (measured in terms of accuracy, availability, usability, and resilience) and this in turn often implies the use of a general-purpose database management system (DBMS). A general-purpose DBMS is typically a complex software system that meets many usage requirements to properly maintain its databases which are often large and complex.

The utilization of databases is now so widespread that virtually every technology and product relies on databases and DBMSs for its development and commercialization, or even may have DBMS software embedded in it. Also, organizations and companies, from small to large, depend heavily on databases for their operations. Well known DBMSs include FoxPro, IBM DB2, Linter, Microsoft Access, Microsoft SQL Server, MySQL, Oracle, PostgreSQL and SQLite. A database is not generally portable across different DBMS, but different DBMSs can inter-operate to some degree by sing standards like SQL and ODBC together to support a single application built over more than one database. A DBMS also needs to provide effective run-time execution to properly support (e.g., in terms of performance, availability, and security) as many database end-users as needed. A way to classify databases involves the type of their contents, for example: bibliographic, document-text, statistical, or multimedia objects. Another way is by their application area, for example: accounting, music compositions, movies, banking, manufacturing, or insurance. The term *database* may be narrowed to specify particular aspects of organized collection of data and may refer to the logical database, to the physical database as data content in computer data storage or to many other database sub-definitions.

5. RESULT

- The simulation results in the PC:

Figure 5. Result screen shot

6. CONCLUSION

The development process of "Embedded GSM message interface hardware and software design using ARM9" has been successfully designed and tested. In my project, one class of 60 students is taken as a sample to conduct the experiment. The faculty has 60 QR images of the students with him. The images corresponding to each student who is present in the class will be scanned by the faculty by mobile which has QR reader software installed in it, which confirms the attendance of the students. This data will be sent to the ARM memory through GSM, using which the data is collected and maintained. The students who has less than 75% attendance, their data will be sent to the PC through the Ethernet as well as to their respective parents through the GSM. Attendance monitoring system is very important in our daily life. It is possesses a really great advantage. Among the whole types of Finger scanning technology, QR Code attendance monitoring system is the most accurate. In this research paper, we have given an introduction of Attendance monitoring system and its advantage; QR code information will be in the encrypted format, so nobody can be misuse. Our future work will focus on improving the efficiency of the algorithm. Finally, we conclude saying that if we integrating this attendance monitoring system with face recognition system give a general infrastructure for Research into embedded vision, further benefiting society.

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