Student Monitoring using An Embedded Real Time Finger-Vein Recognition System

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Abstract: In the academic institutions especially in professional institutions, attendance is a very important criterion which is used for various purposes. But, at the same time attendance status of the students should also be important to their Parent/Guardian, because of the mode of travel they use, which may be own/public vehicle and of course sometimes fraudulence by the words, becomes essential to track their ward. In the present traditional method, attendance involves the use of sheets of paper or books in taking student attendance, leads towards various challenges like time consuming, complexity of the calculations, occurrence of human errors, and could be stolen, damaged or lost. Thus, there is a need for a system that would eliminate all of these trouble spots. Our finger print recognition system would provide the needed solution. In this attendance management system Rather answering for attendance individual has to pass his/her thumb over the fingerprint scanner and the fingerprint is compared against a list of preregistered users, and once a match are made, the individual will be registered. As soon as the attendance of a student is registered, a message would be sent to his/her Parent/Guardian. at the moment itself about his presence in the class, which makes them the avoidance of tracking or worrying about their ward. And also we are adding time table alert system for department. Here we design an embedded system to store the time table of a class and send an alert message to the faculty just few minutes before the commencement of the class.

Keywords: LCD, GSM, ISP/IAP.

I. INTRODUCTION

Generally, it is consisted of a computer, biometric device, GSM modem, and cellular phone connected in the wireless network. The system could generate automatic alert message sends to the parent/guardians as the pupils performed the login and logout in the system. Likewise, an inquiry and reply messages could be done on the system particularly when the parents/guardian received no texts after the expected logged-in or logged-out of the pupils. All the texts messages must not exceed 160 characters, no graphics and were local texting only. The project kit has shown in Fig.1.

II. BLOCK DIAGRAM

Block diagram is as shown in bellow Fig.2.

A. Hardware Components

- LPC2148
- Power Supply
- Finger print module
- GSM module
- LCD display
- MAX232

Fig.1. project kit.

Fig.2. Block Diagram.
B. Software Tools
- KEIL micro vision
- Embedded ‘C’ Language
- Flash magic

III. METHODOLOGY
In this proposed system, a fingerprint scanner is used as the biometric device. The fingerprint is a unique human characteristic and hence this is used in the attendance system to make it fool proof. This will be installed in every classroom, where the student needs to get the finger swiped once in the day to make sure that the student himself is present. When the student swipes the finger which would be same as the one which was swiped while registering then the swiped finger will be matched with the finger database, once matched the attendance of the student for the day will be finalized and stored completely. The same will be notified and intimated by an SMS for the confirmation of the same.

A. LPC2148 Features:
- 16-bit/32-bit ARM7 TDMI-S microcontroller in a tiny LQFP64 package.
- 8 kB to 40kB of on-chip static RAM and 32kB to 512kB of on-chip flash memory.
- 128-bit wide interface /accelerator enable high-speed 60MHz operation.
- In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400ms and programming of 256 bytes in 1ms.
- Embedded ICERT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high-speed tracing of instruction execution.
- USB2.0 Full-speed compliant device controller with 2kB of end point RAMS. In addition, the LPC2146/48 provides 8kB of on-chip RAM accessible to USB by DMA.
- One or two (LPC2141/42vs.LPC2144/46/48)10-bit ADCs provide a total of 6/14 analog inputs, with conversion times as low as 2.44µs per channel.
- Single10-bit DAC provides variable analog output (LPC2142/44/46/48only).
- Two32-bit timers/external event counters (with four capture and four compare channel search), PWM unit (six outputs) and watchdog.
- Low power Real-Time Clock (RTC) with independent power and 32 kHz clock input.
- Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 kbit/s), SPI and SSP with buffering and variable data length capabilities.
- Vectored Interrupt Controller (VIC) with configurable priorities and vector addresses.
- Up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.
- Up to 21 external interrupt pins available.

• 60 MHz maximum CPU clock available from programmable on-chip PLL with settling time of 100 µs.
• On-chip integrated oscillator operates with an external crystal from 1 MHz to 25 MHz
• Power saving modes include idle and Power-down.
• Processor wake-up from Power-down mode via external interrupt or BOD.
• Single power supply chip with POR and BOD circuits.

B. LCD
In our project we are using LCD to display different messages. Liquid crystal display is very important device in embedded system. It offers high flexibility to user as he can display the required data on it. But due to lack of proper approach to LCD interfacing many of them fail. Many people consider LCD interfacing a complex job but according to me LCD interfacing is very easy task, you just need to have a logical approach. This page is to help the enthusiast who wants to interface LCD with through understanding is as shown in bellow Fig.3.

Fig.3. LCD.

GSM: In this project we are using gsm to send the sms to related person the gsm operating frequencies are given below Fig.4.

Fig.4. GSM.
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GSM Specifications-1: RF Spectrum

GSM 900:
Mobile to BTS (uplink): 890-915 MHz
BTS to Mobile (downlink):935-960 MHz
Bandwidth: 2* 25 MHz

GSM 1800:
Mobile to BTS (uplink): 1710-1785 MHz
BTS to Mobile (downlink) 1805-1880 MHz
Bandwidth: 2* 75 MHz

GSM Specification-II:
- Carrier Separation : 200 KHz
- Duplex Distance : 45 MHz
- No. of RF carriers : 124
- Access Method : TDMA/FDMA
- Modulation Method : GMSK
- Modulation data rate : 270.833 Kbps

IV. SIGNIFICANCE OF STUDY

The researcher is confident that the results of the study were deemed beneficial to the following stake holders. Results of the study provided the parents/guardians a most affordable mobile monitoring and inquiry system which enabled them to check and monitored their children’s attendance to school/college through cellular phones, provided peace and security; checked as they would be automatically informed about the school attendance of their children. Consequently, it would promote a strong and effective partnership between the parent and the school administrators.

V. CONCLUSION AND FUTURE SCOPE

The present study proposed an end-to-end finger-vein recognition system based on the blanket dimension and lacunarity implemented on a DSP platform. The proposed system includes a device for capturing finger-vein images, a method for ROI segmentation, and a novel method combining blanket dimension features and lacunarity features for recognition. The images from 600 fingers in the dataset were taken over long time interval (i.e., from summer to winter) by a prototype device we built. The experimental results showed that the EER of our method was 0.07%, significantly lower than those of other existing methods. Our system is suitable for application in mobile devices because of its relatively low computational complexity and low power consumption. In the enhanced version of this proposed work, energy saving concepts can also be incorporated to manage the particular classroom intelligently. Mobile application software can be developed in order to track the student using GPS (Global Positioning System) in case of his absence within the institution premises.

VI. REFERENCES