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Electronic Voting Machine with Security Algorithm and Password Protection Using Biometric System on ARM Microcontroller and GSM

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ABSTRACT:

Elections are required in every country for people to select whose government will be ruling in the coming years. So for every election a huge amount of man-power, ballot papers, casings etc are required and in this system rigging is also possible. To save all these unnecessary things an embedded solution can be made possible.Now a day's biometrics is gaining increasing attention. Security systems, having realized the value of biometrics, use biometrics for two basic purposes: to verify or identify users. There is a number of biometrics and different applications need different biometrics. Biometrics is the most secure and convenient authentication tool. It cannot be borrowed, stolen, or forgotten and forging one is practically impossible.

Biometrics system measures individual's unique physical or behavioral characteristics to recognize to their identity.A fingerprint is made of a series of ridges and furrows on the surface of the finger. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points.In this project we are implementing a finger print identification based EVM using ARM7 Based LPC2148 Microcontroller. When this module is interfaced to the microcontroller, we will be using it in user mode. In this mode we will be verifying the scanned images with the stored images. When coming to our application the images of the citizens will be stored in the module with a unique id. To poll their vote the citizens have to scan their image which is then verified with the image present in fingerprint module and their vote will be updated.

This scanner is interfaced to microcontroller through max232 enabling serial communication. By using this controller we will be controlling the scanning process. After the scanning has been completed the result is stored in the microcontroller.

By simply pressing a switch we can get the details of the polling and the final result is sent to the central counting station using GSM (global system for Mobile communication) which is interfaced to microcontroller with serial protocol and is a SIM300 model.The application code will be developed in C programming language. The Keil4 IDE software will be used to build the hex file for these C programs.

Software Requirements:

Keil cross compiler for ARM software development
Flashmagic

Hardware Requirements:

- ARM7 based LPC2148 development board
- Fingerprint Sensor
- Switches for selection of vote
- SIM-300 GSM Module
- PC
- LCD

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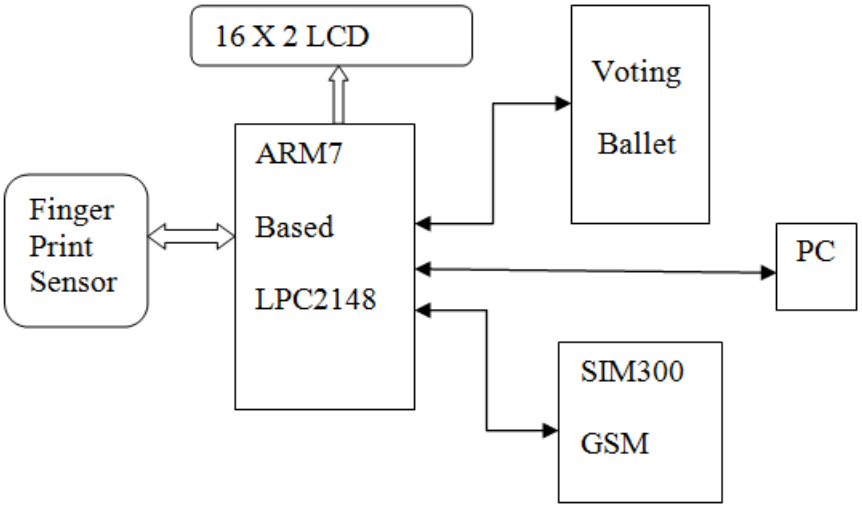
Block Diagram:



1. INTRODUCTION:

India is world's largest democracy. It is perceived to be charismatic one as it accommodates cultural, regional, economical, social disparities and still is able to stand on its own. Fundamental right to vote or simply voting in elections forms the basis of Indian democracy. In India all earlier elections be it state elections or centre elections a voter used to cast his/her vote to his/her favorite candidate by putting the stamp against his/her name and then folding the ballot paper as per a prescribed method before putting it in the Ballot box. This is a long, time-consuming process and very much prone to errors. This situation continued till election scene was completely changed by electronic voting machine. No more ballot paper, ballot boxes, stamping, etc. all this condensed into a simple box called ballot unit of the electronic voting machine.EVM is capable of saving considerable printing stationery and transport of large volumes of electoral material. It is easy to transport, store, and maintain. It completely rules out the chance of invalid votes. Its use results in reduction of polling time, resulting in fewer problems in electoral preparations, law and order, candidates' expenditure, etc. andeasy and accuratecounting without any mischief at the counting centre. It is also eco friendlThis project is based on Biometric authentication.

EXISTING SYSTEM:

- The system allows the Evil Practices held in the manual Voting system.
- Electronic voting systems may offer advantages compared to other voting techniques.
- An electronic voting system can be involved in any one of a number of steps in the setup, distributing, voting, collecting, and counting of ballots, and thus may or may not introduce advantages into any of these steps.

PROPOSED SYSTEM:

- Electronic voting (also known as e-voting) is a term encompassing several different types of voting, embracing both electronic means of casting a vote and electronic means of counting votes.
- It can also involve transmission of ballots and votes via telephones, private computer networks, or the Internet.

The LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory of 512 kB. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces the code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2148 microcontrollers are ideal for the applications where miniaturization is a key requirement, such as access control and point-of-sale. A blend of serial communications interfaces

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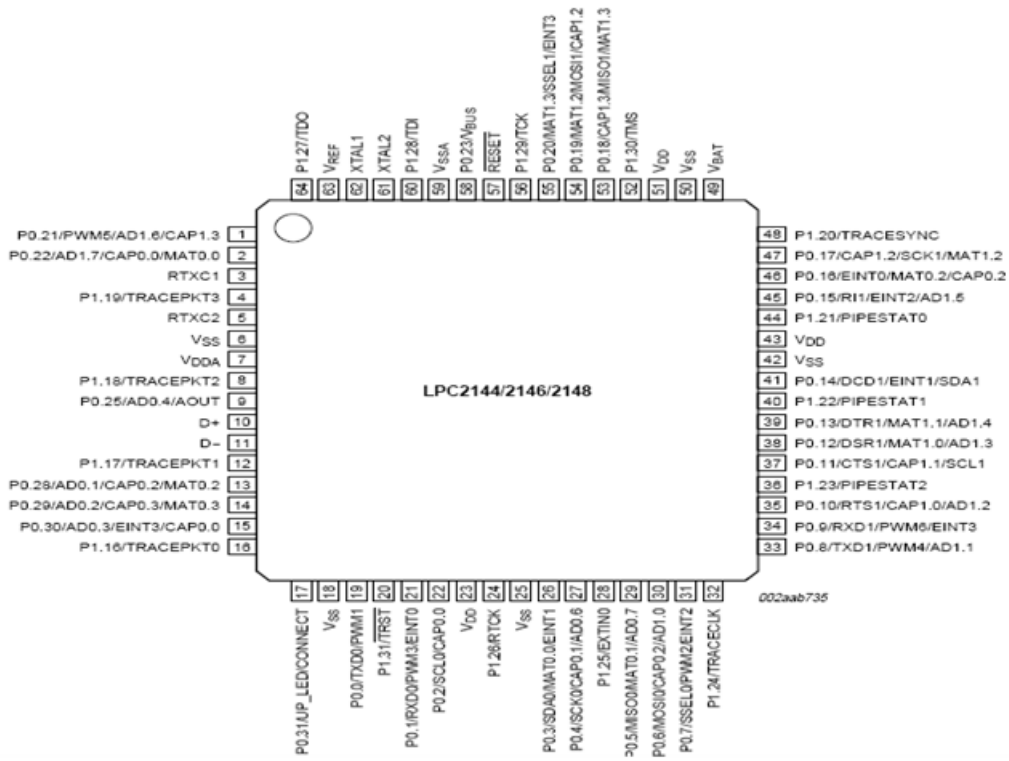
ranging from a USB 3.0 Full Speed device, multiple UARTS, SPI, SSP to I2Cs and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.k source. The PLL settling time is 100 µs.

PIN Diagram of LPC2148



10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.k source. The PLL settling time is 100 µs.

Bit	Symbol	Value	Function	Reset value
1:0	P0.0	00	GPIO Port 0.0	0
		01	TXD (UART0)	
		10	PWM1	
		11	Reserved	
3:2	P0.1	00	GPIO Port 0.1	0
		01	RxD (UART0)	
		10	PWM3	
		11	EINT0	

The PINSEL0 register is used to configure P0.0 to P0.15 pins of Microcontroller. Similarly PINSEL1 is to configure P0.16 to P0.31. And PINSEL2 Register is used to configure P1.16 to P1.31 as P1.0 to P1.15 are not accessible.Similarly remaining registers

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4.5.3 Universal Asynchronous Receiver/Transmitter:

Features:

• Register locations conform to '550 industry standard.

• Receiver FIFO trigger points at 1, 4, 8, and 14 bytes.

• Built-in fractional baud rate generator with autobauding capabilities.

• Mechanism that enables software and hardware flow control implementation.

16 byte Receive and Transmit FIFOsUART0 contains registers organized as shown in Table 96. The Divisor Latch Access Bit (DLAB) is contained in U0LCR[7] and enables access to the Divisor Latches.

UART0 Receiver Buffer Register (U0RBR - 0xE000 C000, when DLAB = 0, Read Only)

The U0RBR is the top byte of the UART0 Rx FIFO. The top byte of the Rx FIFO contains the oldest character received and can be read via the bus interface. The LSB (bit 0) represents the "oldest" received data bit. If the character received is less than 8 bits, the unused MSBs are padded with zeroes. The Divisor Latch Access Bit (DLAB) in U0LCR must be zero in order to access the U0RBR. The U0RBR is always Read Only. Since PE, FE and BI bits correspond to the byte sitting on the top of the RBR FIFO (i.e. the one that will be read in the next read from the RBR), the right approach for fetching the valid pair of received byte and its status bits is first to read the content of the U0LSR register, and then to read a byte from the U0RBR.

UART0 Transmit Holding Register:

The U0THR is the top byte of the UART0 TX FIFO. The top byte is the newest character in the TX FIFO and can be written via the bus interface. The LSB represents the first bit to transmit.The Divisor Latch Access Bit (DLAB) in U0LCR must be zero in order to access the U0THR. The U0THR is always Write Only. The UART0 Divisor Latch is part of the UART0 Fractional Baud Rate Generator and holds the value used to divide the clock supplied by the fractional presale in order to produce the baud rate clock, which must be 16x the desired

The UART0 Divisor Latch is part of the UART0 Fractional Baud Rate Generator and holds the value used to divide the clock supplied by the fractional presale in order to produce the baud rate clock, which must be 16x the desired baud rate . The U0DLL and U0DLM registers together form a 16 bit divisor where U0DLL contains the lower 8 bits of the divisor and U0DLM contains the higher 8 bits of the divisor. A 0x0000 value is treated like a 0x0001 value as division by zero is not allowed. The Divisor Latch Access Bit (DLAB) in U0LCR must be one in order to access the UART0 Divisor Latches. Details on how to select the right value for U0DLL and U0DLM can be found later on in this chapter.

Desired Baud rate=PCLK(Hz)/16*(UODLL+U0DLM)

RESULTS:

In our project, the system "THE ELECTRONICS PASSPORT BASED EVM USING FINGERPRINT MODULE AND PIC MICROCONTROLLER" when initialised, verifies the password of the module. The system shows an acknowledgement as "C_P" indicating correct password. After verification of the password, it shows a message "success fully installed". The system then asks for the time duration of the complete voting process by displaying "ENTER THE TIME DURATION". It has been given predefined amount time for voting.Then it displays a messagee "ENTER THE Maximum number of people". The total no. of voters is given. Then the voting process starts. The LCD displays "voting started". Now the fingerprint module asks for finger to be placed on the module by giving a message "PUT YOUR FINGER".

If the fingerprint is already enrolled it displays a message "Image is Matching with Database with id no:"If the fingerprint is not enrolled a message "Image is not matching with Database" is shown. After verification of the fingerprint, the voter is ready to vote. He gets a message "READY FOR VOTE". When he receives the message "PRESS THE BUTTON", he can poll his vote. Then the voter gets a message "your vote polled". If the same person tries to access again, the process stops after verification of fingerprint and displays "Image is Matching But voting completed". When the presetvoting time finishes or when all the voters poll their vote, the voting process is completed. This is shown as "voting completed".Then the system prompts for a password to display the results of voting.

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