

Two Factor Authentications of Automatic Teller Machine (ATM) Users via Radio Frequency and Face Identification

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Abstract—The main objective of this project is to develop an embedded system, which is used for security applications. In this Automatic Teller Machine (ATM) system we give access to the authorized people through the RFID tags and Face recognition using IOT technology. This method suggests for a technical innovation which aims at preventing all the financial fraud. In this method mix two type of security (Face Recognition and Radio Frequency Identification) which make the security stronger and reliable. If unauthorized person access the ATM we get notification from IOT. We supposed to block the operation the web camera automatically on and capture the corresponding person image in front of the ATM and store the images in server with ATM code. We focus on the scenario and the platform, and report tests with the proposed system under challenging conditions, obtained from ATMs placed in the field.

Index Terms— PIC16F877A, Lcd , Iot module, RFID tag and reader, Buzzer.

I. INTRODUCTION

ATM is one such machine which made money transactions easy for customers to bank. Our paper proposes an automatic teller machine security model that would combine a physical access card, a PIN, and electronic facial recognition. By forcing the ATM to match a live image of a customer's face with an image stored in a bank database that is associated with the account number, the damage to be caused by stolen cards and PINs is effectively neutralized. Further, a positive visual match would cause the live image to be stored in the database so that future transactions would have a broader base from which to compare if the original account image fails to provide a match thereby decreasing false negatives. Biometric systems using face recognition are now being extensively used for user authentication in banking applications as well as for access control in high security buildings. An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.

A. Working Principle

Radio Frequency Identification technology is used data sense can be wirelessly interrogated when operating the money transaction. And face identification is to identify the particular person or user identification. This paper used this principle to model, optimize and design a radiometric mode based bio sensor which uses relative received signal strength indicator to measure and detect different concentration levels of target analysis. Integrating protection of transaction capabilities with face detection and passive RFID tags ensure that the

sensors are low cost and because these sensor tags operate without batteries their shelf life comparable to the products being monitored. This program should be compliable on multiple systems, including Linux and Windows variants and should be customizable to the extent of allowing for variations in processing power of the machines on to which it would be deployed. We will then need to familiarize ourselves with the internal workings of the programs so that we can learn its strengths and limitations. Simple testing of this program will also need to occur so that we could evaluate its effectiveness.

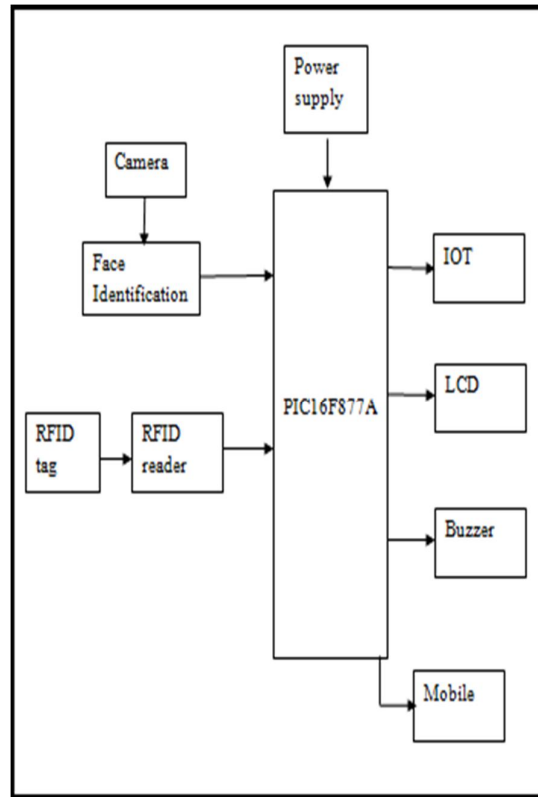


Figure 1.1 Block Diagram of Power Supply

II. SYSTEM STUDY

A. Existing System

In existing method ATMs give, but they can also take. They can malfunction and simply not be available when you need them. Some will also retain damaged cards, or any card if its owner fails to enter a correct PIN after three attempts. A cardholder can usually reclaim card if it's been retained by a machine owned by her bank. However, if the card is kept by another bank's ATM, there's no guarantee ever see it again. The Authentication Process based Security is low.

B. Proposed System

The objective of this project is to improve the security performance in the bank by using RFID card. This project is very much used to improve the security and performance in the bank. In this project RFID card is used as bank pass book or ATM card. Now day's some person makes the duplicate ATM card. But in this project RFID card is used for accessing the banking applications. So this project improves the security and performance because we Cannot make the duplicate RFID card. Proposed paper uses face recognition technique for verification in ATM system. A facial recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame from a video source.

III. SYSTEM DESIGN AND DEVELOPMENT

A. Transformer

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.

B. Bridge Rectifier

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow.

C. Device Overview

The PIC16F887 is one of the latest products from Microchip. It features all the components which modern microcontrollers normally have for its low price, wide range of application, high quality and easy availability, it is an ideal solution in applications such as: the control of different processes in industry, machine control devices, measurement of different values etc. Some of its main features are listed below.

D. Input /Output Design

- Risc Architecture
 1. Only 35 instructions to learn
 2. Operating frequency 0-20 MHz
- Precision Internal Oscillator
 1. Factory calibrated
 2. Software selectable frequency range of 8MHz to 31KHz
- Power Supply Voltage 2.0- 5.5v
 1. Consumption: 220uA (2.0V, 4MHz), 11uA (2.0 V, 32 KHz) 50nA (stand- by mode)
- Power-Saving Sleep Mode
- Brown-out Reset (BOR) with software control option
- 35 input/output pins
- High current source/sink for direct LED drive
- Software And Individually Programmable *Pull-Up* Resistor
- Interrupt-on-Change pin
- 8K ROM memory in FLASH technology
- Chip can be reprogrammed up to 100.000 times
 1. Chip can be programmed even embedded in the target device
- In-Circuit Serial Programming Option
- 256 bytes EEPROM memory
- Data can be written more than 1.000.000 times
- 368 bytes RAM memory
- A/D converter:
 1. 14-channels
 2. 10-bit resolution
 3. 3independent timers/counters
 4. Watch-dog timer
 5. Analogue comparator module with system
 6. Two analogue comparators
- Fixed voltage reference (0.6V)

- Programmable on-chip voltage reference
- PWM output steering control
- Enhanced USART module
- Supports RS-485, RS-232 and LIN2.0
- Auto-Baud Detect
- Master Synchronous Serial Port (MSSP)
- Supports SPI and I2C mode

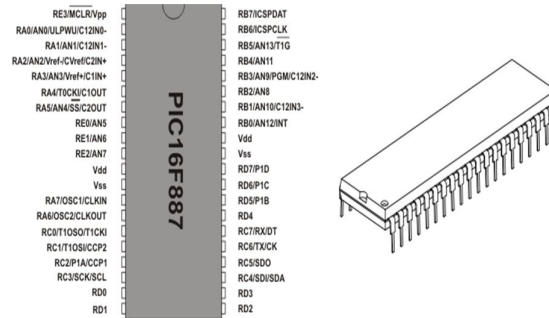


Figure 3.1 Pic16f887 Pdpip 40microcontroller

E. Pin Description

The most pins are multi-functional. For example,designator RA3/AN3/Vref+/C1IN+ for the fifth pin specifies the following functions:

1. RA3 Port A third digital input/output
2. AN3 Third analog input
3. Vref+ Positive voltage reference
4. C1IN+ Comparator C1positive input

This small trick is often used because it makes the microcontroller package more compact without affecting its functionality. These various pin functions cannot be used simultaneously, but can be changed at any point during operation.

TABLE I : CONT. PIN ASSIGNMENT

Name	Number (DIP 40)	Function	Description
RD4	27	RD4	General purpose I/O port D
RD5/P1B	28	RD5 P1B	General purpose I/O port D PWM Output
RD6/P1C	29	RD6 P1C	General purpose I/O port D PWM Output
RD7/P1D	30	RD7 P1D	General purpose I/O port D PWM Output
Vss	31	-	Ground (GND)
Vdd	32	+	Positive Supply
RB0/AN12/INT	33	RB0 AN12 INT	General purpose I/O port B A/D Channel 12 External Interrupt
RB1/AN10/C12INT3-	34	RB1 AN10 C12INT3-	General purpose I/O port B A/D Channel 10 Comparator C1 or C2 Negative Input
RB2/AN8	35	RB2 AN8	General purpose I/O port B A/D Channel 8
RB3/AN9/PGM/C12IN2-	36	RB3 AN9 PGM C12IN2-	General purpose I/O port B A/D Channel 9 Programming enable pin Comparator C1 or C2 Negative Input
RB4/AN11	37	RB4 AN11	General purpose I/O port B A/D Channel 11
RB5/AN13/T1G	38	RB5 AN13 T1G	General purpose I/O port B A/D Channel 13 Timer T1 External Input
RB6/ICSPCLK	39	RB6 ICSPCLK	General purpose I/O port B Serial programming Clock
RB7/ICSPDAT	40	RB7 ICSPDAT	General purpose I/O port B Programming enable pin

IV. GENERAL-PURPOSE REGISTERS

General-Purpose registers are used for storing temporary data and results created during operation. For example, if the program performs a counting (for example, counting products on the assembly line), it is necessary to have a register which stands for what we in everyday life call “sum”. Since the microcontroller is not creative at all, it is necessary to specify the address of some general purpose register and assign it a new function. A simple program to increment the value of this register by 1, after each product passes through a sensor, should be created.

Therefore, the microcontroller can execute that program because it now knows what and where the sum which must be incremented is. Similarly to this simple example, each program variable must be preassigned some of general-purpose register.

A. Stack

A part of the RAM used for the stack consists of eight 13-bit registers. Before the microcontroller starts to execute a subroutine (CALL instruction) or when an interrupt occurs, the address of first next instruction being currently executed is pushed onto the stack, i.e. onto one of its registers. In that way, upon subroutine or interrupt execution, the microcontroller knows from where to continue regular program execution. This address is cleared upon return to the main program because there is no need to save it any longer, and one location of the stack is automatically available for further use. It is important to understand that data is always circularly pushed onto the stack.

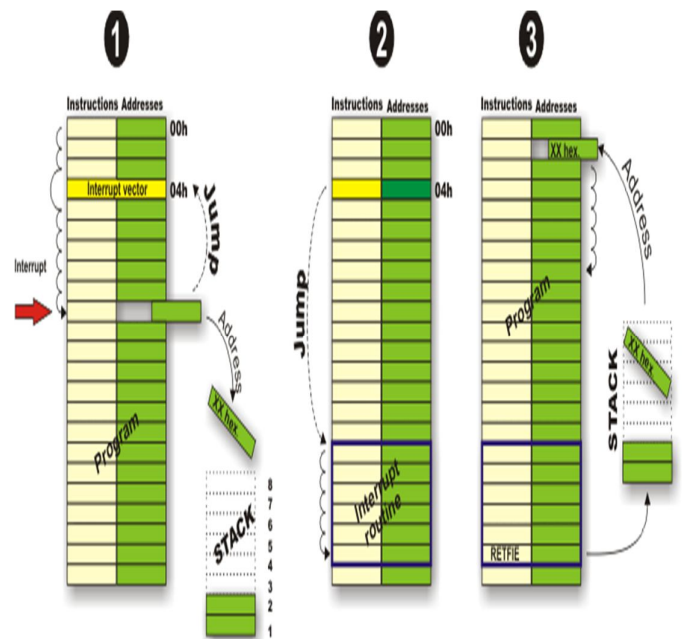


Figure 4.1 Interrupt System

B. Liquid Crystal Display

LCD is used to display the results of the system operation such as sensed values, motor status etc....A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. The LCD standard requires 3 control lines and 8 I/O lines for the data bus. The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.

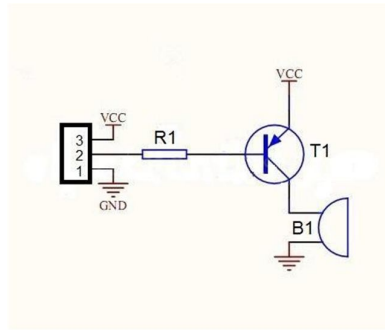


Figure 4.2 Pin Configuration

C. Instruction Register (IR) and Data Register (dr)

There are two 8-bit registers in HD44780 controller Instruction and Data register. Instruction register corresponds to the register where you send commands to LCD e.g LCD shift command, LCD clear, LCD address etc. and Data register is used for storing data which is to be displayed on LCD. when send the enable signal of the LCD is asserted, the data on the pins is latched in to the data register and data is then moved automatically to the DDRAM and hence is displayed on the LCD. Data Register is not only used for sending data to DDRAM but also for CGRAM, the address where you want to send the data, is decided by the instruction you send to LCD. We will discuss more on LCD instruction set further in this tutorial.

V. SYSTEM TESTING AND IMPLEMENTATION

A. Buzzer

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows.

It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board.

B. Buzzer Module

The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep. Some systems, such as the one used on Jeopardy!, make no noise at all, instead using light.

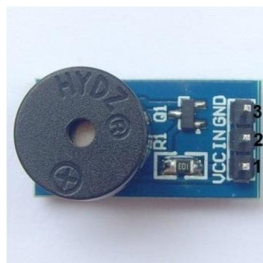


Figure 5.1 Buzzer Module

C. RFID System

An RFID system consists of tags, readers, communication protocols, computer networks, and databases. The tag is a miniature chip containing product information with an affixed radio antenna.

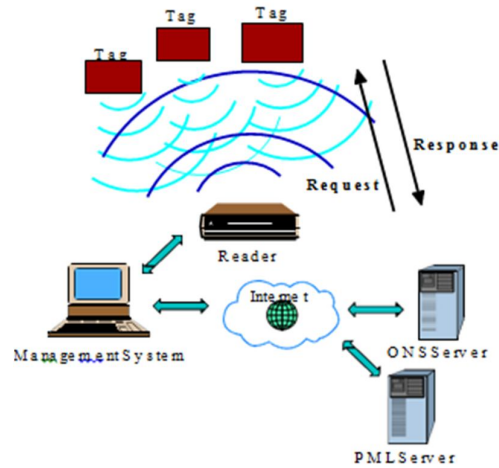


Figure 5.2 Rfid System

D. Data Encoding

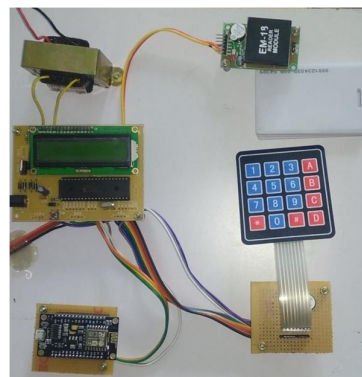
Different encoding schemes such as level and transition codes can represent binary values in an RFID system. Level codes represent binary values by a specific voltage level such as non-return to zero (NRZ). Balanced codes, also known as polar codes, maintain a constant voltage level. Transition codes such as Manchester represent bits by transitions between symbols. A simple code is pulse pause modulation (PPM) in which the length between pulses represent bit values. PPM codes have narrow bandwidth and are easy to implement, but have a low bit rate. Pulse width modulation (PWM) codes represent bit values by varying the width of the pulse.

VI. CONCLUSION

In this work, we proposed a computer vision based ATM user identification framework using face and RFID verification to reduce cash retraction. We evaluated the proposed system under various conditions, and with our own database, based on a real scenario, The experimental results reveal that our proposed system is promising for mitigating the card/cash forgetting issue. It is more important in this application to keep a high true positive rate (convenience) as the impostors cannot be expected to mimic the actual users in CCF. Any improvement in the true positive rate directly translates to money saved for the banking institution, and the worst case (zero true positive rate) corresponds to what the current ATM systems.

APPENDIX

Automatic Teller Machine (Atm) Users Via Rfid And Face Identification



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