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Prototype of Car Ignition through Fingerprint Identification

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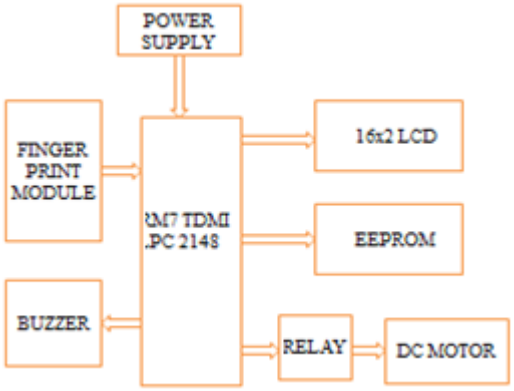
Abstract: ***Human fingerprints have been considered as a unique signature certifying one's identity. Fingerprint verification is currently the most popular technique of biometric personal identification. As a biometric proof of identification, an alignment-based minutiae matching algorithm has been widely investigated, however, not many have considered fingerprint identification using image based verification. An image-based approach does not use minutiae features for fingerprint matching. This project investigates fingerprint-scanned image verification via scanning process. The input fingerprint image and the stored enrolled template are compared and preprocessed before making a decision, with higher computational efficiency than the minutiae-based method. It has the ability of robust fingerprint verification subject to external conditions.***

Keywords: Micro-controller, Car Ignition, Fingerprint.

1. Introduction

Overwhelming statistics clearly indicate that single-factor authentication especially the use of systems that rely largely on keys and ID cards no longer work. It's simply too easy for one person to pretend to be another by compromising keys or stealing, borrowing or forging ID cards. Fingerprints are by far the most popular biometric choice for a number of reasons. They are the latest and most accepted biometric modality and tend to be one of the easiest characteristics to capture and verify. This reality, along with three global megatrends globalization, decentralization and mobility are driving a worldwide adoption of biometrics. Because, while keys, tokens and ID cards can be faked, forged, stolen or otherwise compromised, biometrics are inextricably tied to individuals. Determining true identity in a physical or virtual environment empowers organizations to protect what are important to them and at the same time increases efficiency and service levels. Biometrics-based solutions can speed processes and improve accuracy in programs such as banking and government entitlement benefits. Auto is a security device installed inside the car, which does not allow your car to be started without fingerprint verification even if right key is used. It immobilizes your car in your absence and prevents it from theft or use by un-authorized personnel. You can register yourself (fingerprint) as master and can also register fingerprints of your family, friends who are authorized to use your car.

2. Block Diagram Description



2.1 Micro-Controller

LPC2148 microcontroller board based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontrollers with embedded high-speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate.

2.2 Fingerprint Module

The main modules of a fingerprint verification system are: fingerprint sensing, in which the fingerprint of an individual is acquired by a fingerprint scanner to produce a raw digital representation. Preprocessing, in which the input fingerprint is enhanced and adapted to simplify the task of feature extraction. Feature extraction, in which the fingerprint is further processed to generate discriminative properties, also called feature vectors; and d) matching, in which the feature vector of the input fingerprint is compared against one or more existing templates. The templates of approved users of the biometric system, also called clients, are usually stored in a database.

2.3 Power Supply

There are many types of power supply. Most are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. In this we are using a 230v a.c to 15v DC converter.

2.4 Liquid Crystal Display

A liquid crystal is a material (normally organic for LCDs) that will flow like a liquid but whose molecular structure has some properties normally associated with solids. The Liquid Crystal Display (LCD) is a low power device. The LCD is used for the purpose of displaying the words which we are given in the program code. This code will be executed on microcontroller chip.

2.5 D.C Motor

A direct current (DC) motor is another widely used device that translated electrical pulses into mechanical movement. In the DC motor we have only + and – leads. Connecting them to a DC voltage source moves the motor in one direction. By reversing the polarity, the DC motor will move in the opposite direction. One can easilyexperiment with the Dc motor. For example, small fans used in many motherboards to cool the CPU are run by DC motors. By connecting their leads to the + and – voltage source, the DC motor moves. While a stepper motor moves in steps of 1 to 15 degrees, the DC motor moves continuously. In a stepper motor if we know the starting position we can easily count the number of steps the motor has moved and calculate the final position of the motor. This is not possible in a DC motor. The maximum speed of a DC motor is indicated in rpm and is given in the data sheet.

2.6 EEPROM

EEPROM (Electrically Erasable Programmable ROM) offer users excellent capabilities and performance. Only one external power supply is required since the high voltage for program/erase is internally generated. Write and erase operations are performed on a byte per byte basis. The EEPROM uses the same principle as the UV-EPROM. Electrons trapped in a floating gate will modify the characteristics of the cell, and so a logic “0” or a logic “1” will be stored. The EEPROM is the memory device that implements the fewest standards in cell design. The more common cell is composed of two transistors. The storage transistor has a floating gate (similar to the EPROM storage transistor) that will trap electrons. In addition, there is an access transistor, which is required for operations. Figure 9-10 shows the voltages applied on the memory cell to program/erase a cell. Note that an EPROM cell is erased when electrons are removed from the floating gate and that the EEPROM cell is erased when the electrons are trapped in the floating cell. To have products electrically compatible, the logic path of both types of product will give a “1” for erase state and a “0” for a programmed state.

2.7 BUZZER

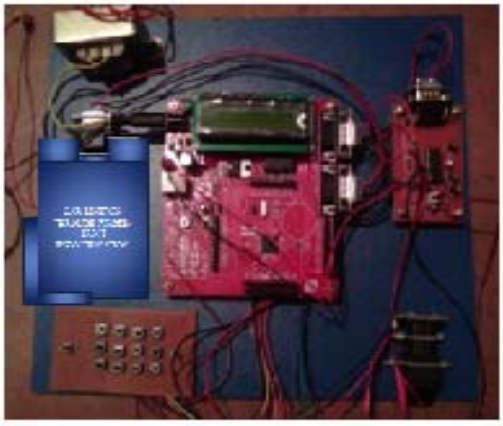
The PB series are high-performance buzzers. They exhibit extremely low power consumption in comparison to electromagnetic units. They are constructed without switching contacts to ensure long-life with no electrical noise and are compact.

2.8 RELAY

A relay is an electrically operated switch and it isolates one electrical circuit from another. In its simplest form, a relay consists of a coil used as an electromagnet to open and close switches contacts. It is used to switch a device which draws more current than is provided by an output of a switch or component.

3. Design Framework

3.1 Hardware Design



In this section we are interfacing microcontroller to co-ordinate the entire system. This system consists of Finger-print module, DC motor, Buzzer and 3X3 MATRIX switches, among which three of them are used for entering the secret password. One switch is for addition of Finger-print (password) and another is for deleting the Finger-print (password). Firstly the LCD shows as “set the password” for placed Finger-print and then asks for number of Finger-prints. Now we can set password for our Finger-print and only those who are registered only those can open the car lock. If the password is correct then it shows on the LCD as “Entered password is correct” otherwise it shows as “Wrong password”. When the Finger-print is matched then DC motor is powered and it start’s rotating. Power supply is interfaced to provide 5V supply to ARM7 and to other modules in the system. Finger-print module is interfaced to micro-controller Port (1.24 -1.31) for Finger-print authentication. P1.24 to P1.27 pins are configured as output pins and P1.28 to P0.31 pins are configured as input pins. DC motor isinterfaced to Port (0.15) through relay for ignition. Buzzer is interfaced to Port (0.16) to initiate alarm in case finger-print verification is unauthorized. Six switches are interfaced to the controller Port (0.0-0.5). Which are used for entering the password and for adding/deleting/entering finger-prints (passwords).In this

finger-print module we can store around 150 to 200finger-prints.

4. Software Design

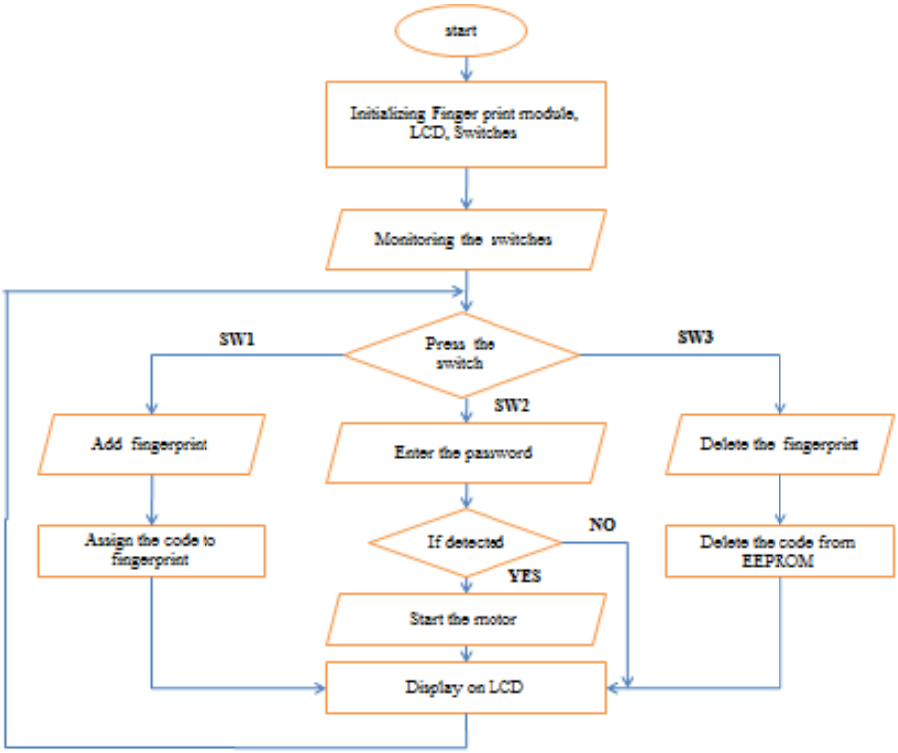
The different software's used to develop the system are

a) Embedded C:
Source code is written in C .Programming in C makes the embedded systems more reliable hence code written for a specific microcontroller can easily be transferred to systems using different micro controllers. It can be reused, easy to maintain and easy to debug and extend. Also writing in C simplifies code development for large projects. It is easier to modify and update.

b) Flash Magic:
Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. This supports the micro-controller of Philips and NXP. To burn a hex code into those controllers flash magic is used, which supports ISP (in system programming) feature.

c) Keil µVision IDE:
The µVision IDE from Keil combines project management, source code editing, program debugging, and complete simulation in one powerful environment. The µVision development platform is easy-to-use and helps to quickly create embedded programs that work. The µVision editor and debugger are integrated in a single application that provides a seamless embedded project development environment.

5. Flow Chart



6. Results

In this paper we present a novel anti-theft security system for cars using FINGER-PRINT MODULE that tries to protect the vehicle from theft by means of multiple levels of security.

Level1

Firstly when we place our Finger-print on the Finger-Print module will check whether it is already present or not and it will ask the secret password tounlock the car. If the entered password is correct then the system goes to next security level.

Level 2

In second level it will asks for “Add user” Finger-print who ever is the owner of that car.And then it will shows as “Finger-print acknowledgement success”.Once the Finger-print is succesfully added then after some time if we place a Finger-print it will asks for password and thenonce the password is typed successfully then motor will roatate automatically.

Level 3

In third level we can delete the finger-print’s successfully by typing the user ID of whichFinger-print we want to delete. If the entered password is wrong it shows as “Wrong password”.

7. Table

S.NO	NAME	ID
1	JOHN	111
2	RAJ	321
3	RAMESH	121

8. Conclusion and Future Scope

Where there is high level of theft, there is need for better security system for automobiles. This paper provides a unique method of designing and assembling a low cost and compact theft control system for car using Finger-print biometrics implemented on ARM7microcontroller. This system provides reliable security for vehicles. By installing this system in cars an unknown person cannot start the car. In future, Camera scan be incorporated into the system to identify the person and also GPS system can be added to keep the track of the vehicle that is being stolen.

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