SMART DOOR UNLOCK SYSTEM USING FINGERPRINT

K.Rajesh#1,ASST. PROFESSOR,
B.Venkata Rao#2,P.AV.S.K.Chaitanya#3,A.ruchitha Reddy#4,

Department of ECE, Chalapathi Institute of Engineering and Technology, Lam, Guntur, AP, India -522034

Abstract

Human detection and recognisation field is very significant and has undergone rapid changes with time.An important and very reliable human identification method is fingerprint identification. Fingerprint of every person is unique. So this helps in identifying a person or in improving security of a system. Finger print of a person is read by a special type of sensor. Finger print sensor can be interfaced with a microcontroller. Through keypad we can add new user and delete the existing user, also identify the user by selecting corresponding option through keypad. In this project we use a fingerprint sensor to read ones identity to automatically operate the door of the car. For this, we use a microcontroller to enable the door opening or closing if the matching between scanned data and the already existing data is correct. Comparison is done inside the fingerprint module itself and its output is given to microcontroller. Result is displayed in a LCD display whether the user is authorized or not.LCD also helps to make troubleshooting easier. Alarming option is provided to warn about an unauthorized usage. Microcontroller used is PIC16F877.

KEYWORDS: Sensor, LCD.

INTRODUCTION

Biometrics refers to the automatic identification of a living person based on physiological or behavioural
characteristics for authentication purpose. Among the existing biometric technologies are the face recognisation, fingerprint recognition, finger-geometry, hand geometry, iris recognition, vein recognition, voice recognition and signature recognition, Biometric method requires the physical presence of the person to be identified. This emphasizes its preference over the traditional method of identifying what you have such as, the use of password, a smartcard etc. Also, it potentially prevents unauthorized admittance to access control systems or fraudulent use of ATMs, Time Attendance Systems, cellular phones, smart cards, desktop PCs, Workstations, vehicles and computer networks. Biometric recognition systems offer greater security and convenience than traditional methods of personal recognition.Fingerprint recognition represents the oldest method of biometric identification which is dated back to 2200 BC. The use of fingerprints as a personal code has a long tradition and was already used. This system focuses on the use of fingerprints for door opening and closing. The fingerprint recognition software enables fingerprints of valid users of the vehicle to be enrolled in a database. Before any user can use the vehicle, his/her fingerprint image is matched against the fingerprints in the database while users with no match in the database are

prevented from using the vehicle. A microcontroller stores the data equivalent of fingerprint of the master user. Comparison between this enrolled fingerprint and the fingerprint of the person who is about to use the vehicle is done by the micro controller. If both the fingerprints are identical control circuitry of the microcontroller send appropriate signals to the motor relays operating the door of the vehicle. If the fingerprints are not identical microcontroller sends signals to alarm circuitry to warn about an unauthorised use.

OVERVIEW

Omidiora E O(A prototype of a fingerprint based ignition systems in vehicles) Database of the valid users is stored in the fingerprint module. When a person tries to operate the vehicle then the CPU matches the fingerprint of the person with the stored database if the match result is successful then the vehicle is ignited and otherwise not. External devices (hardware) can be controlled through the PC parallel port. The parallel port is a simple and inexpensive tool for building computer controlled devices and projects. The user mode program is then made to communicate with the written This paper focuses on the fingerprint security as every person has unique fingerprint. A keypad is also used to add or delete the valid user in the module. FIM3030 fingerprint module by NITGEN is used in this purpose. Microcontroller is used for controlling the whole driving unit. LCD is used as a displaying unit for showing the information about the authorized and unauthorized user. Latch 74HC373 is used which are high- speed Si-gate CMOS devices. A relay is used as a interfacing circuitry between the microcontroller output and the ignition system of the car. Because of the limitation in the initiation of the spark plug and safety reasons only a prototype is developed whose success only depends on the ignition of the car battery. C O Folorunso (Design and development of finger print based car starting system) Fingerprint matching techniques are of two types: graph based and minutiae based. The template size of the biometric information based on minutiae is much smaller and the processing speed is higher than that of graph-based fingerprint matching. Modern vehicles uses computer controlled battery ignition system; no matter the type of mechanism used, all ignition systems use battery, switch, coil, switching device and spark plug . However, in this modern technology dispensation, biometrics has been employed for the ignition and security process.

EXISTING SYSTEM

Themostcommonlyusedsystemforlockingandunlockingthedoorisalockandaphysicalkey.The entire process is a mechanical one .Ifthekeyislost,misplaced or stolen, then the entire locking mechanismsshastobereplaced.Thisproblemwiththe physical keys intensifies when it comes to big companies where employees are needed to carry severalkeysfordifferentdoors.ApartfromtheextraThemostcommonlyusedsystemforlockingand unlockingthedoorisalockandaphysicalkey.The entireprocessisamechanicalone.Ifthekeyislost, misplaced or stolen, then the entire locking mechanismhastobereplaced.Thisproblemwiththe physical keys intensifies when it comes to big companies where employees are needed to carry severalkeysfordifferentdoors.Apartfromtheextra

PROPOSED SYSTEM

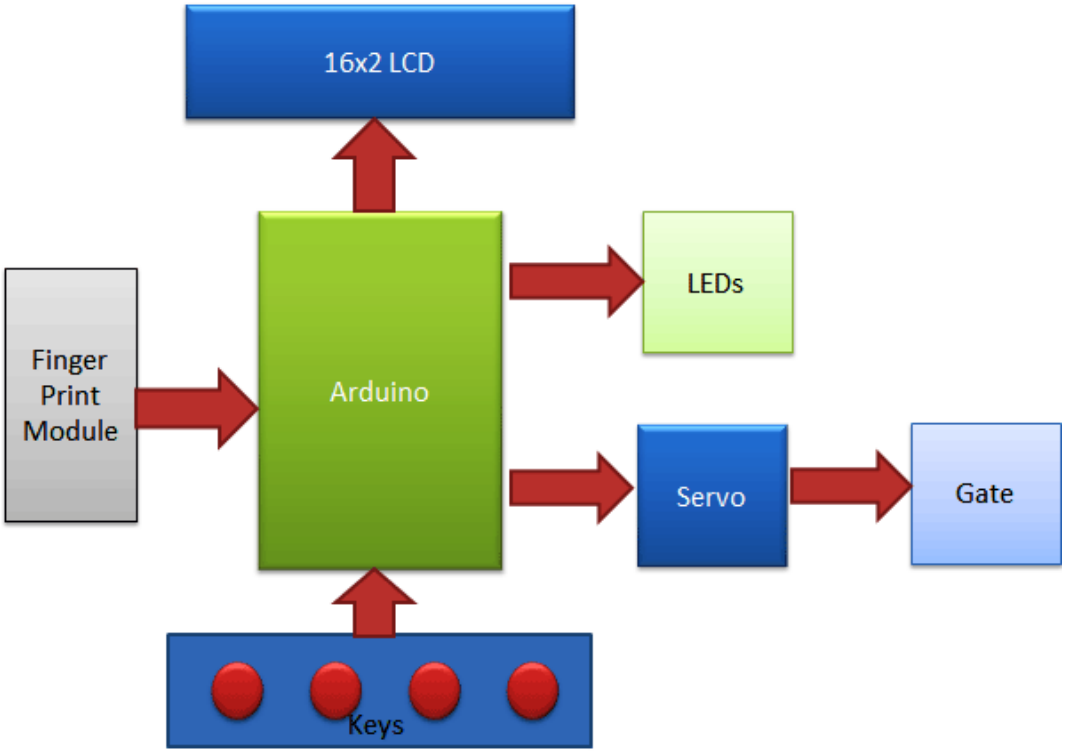


Figure: Block diagram of fingerprint door unock system

Fingerprint based automatic car door lock system. The core part of ourproject is the microcontroller Atmega328.It has a oscillator frequency of 20 MHz .It has RISC architecture.A fingerprintsensor R303A is interfaced to the microcontroller.Two motors are used.One motor is used for operating the door of the
vehicle and the other one is meant for the engine part.LCD is interfaced for display.It helps to make troubleshootingeasier.An alarm circuitry is provided to warn about an unauthorized use.A keypad is provided to select the mode for the fingerprint sensor.Hardware model is shown in the Figure 4.2 and the components are also shown.

MICROCONTROLLER

The microcontroller that has been used for this project is from series. micro- controller is the first RISC basedmicrocontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques. Various microcontrollers offer different kinds of memories.

FINGERPRINT SENSOR

Fingerprint processing includes two parts: fingerprint enrolment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For matching, system will compare the live finger with specific template designated in the Module; for 1:N match- ing, or searching, system will search the whole finger library for the matching finger.

CIRCUIT AND WORKING

The circuit shown in Fig. 1 operates using a 12V power supply. An Arduino microcontroller (MCU) requires only 5V but the solenoid electric lock requires 12V. As Arduino Uno has an inbuilt 5V voltage regulator, a common 12V supply can be used for the whole system.

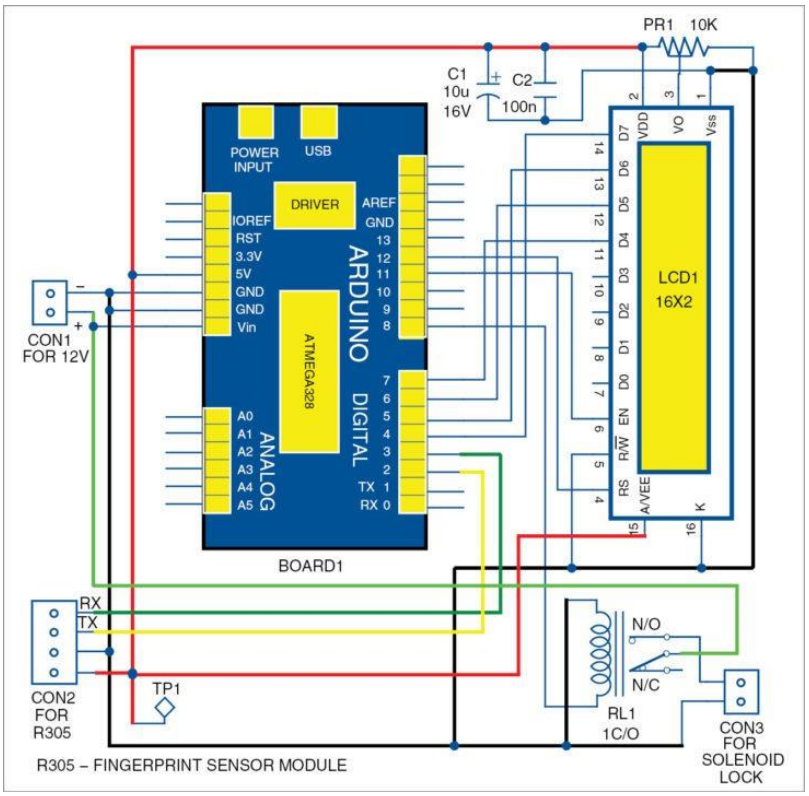


Fig: circuit diagram of the fingerprint door unlock system

The brain of the circuit is Arduino Uno MCU board (BOARD1). It is based on ATmega328/ATmega328P and has 14 digital input/output (I/O) pins, six analogue inputs, 32k flash memory, 16MHz crystal oscillator, a USB connection, power jack, ICSP header and reset button, among others. It can be programmed using Arduino IDE software. Fingerprint sensor module R305 (connected across CON2) has UART interface with direct connections to the MCU or to the PC through max232/USB serial adaptor. The user can store fingerprint data in the module and configure it in 1:1 or 1:N mode for identification. Pins TX and RX of R305 sensor are connected to Arduino digital pins 2 and 3, which are used for

serial communication. The LCD display (LCD1) is used to display messages during action. Here, a 16×2 display is used; each character is made of 5×7 dot-matrix. Pins 3, 4, 5 and 6 of the LCD are the control lines connected to preset (PR1) output, pin 12 (Arduino), GND and pin 11 (Arduino). Pins 11, 12, 13 and 14 are data pins of the LCD that are connected to pins 7, 6, 5 and 4 of Arduino, respectively. Preset PR1 is used to adjust the contrast of the LCD display.

APPLICATIONS

- Very high accuracy.
- Is the most economical biometric PC user authentication technique.
- Easy to use.
- Small storage space required for the biometric template, reducing the size of the database memory required
- It is standardized.

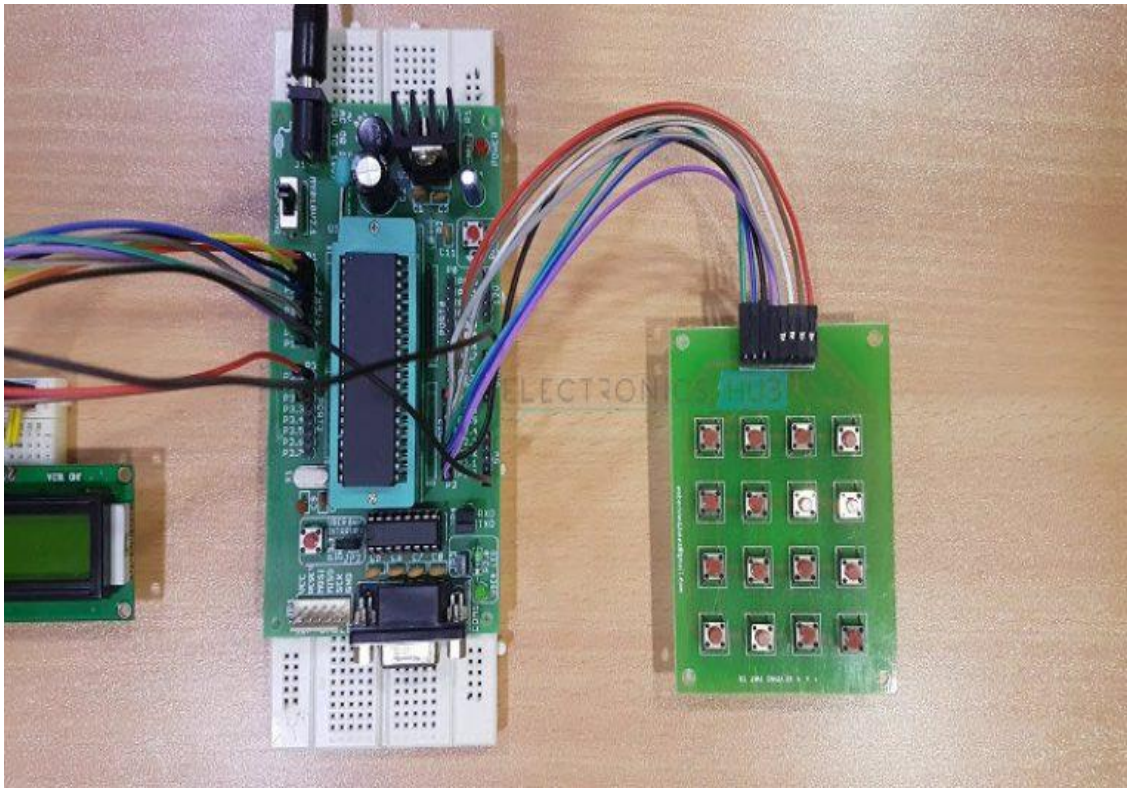
FUTURE SCOPE

In future, alarm will be introduced. When intruder tries to break the door, the vibration is sensed by sensor which makes an alarm. This will inform the neighbors about intruders and this will help to take further action to prevent intruder from entering.

RESULT AND DISCUSSION

First of all user is asked to enrol his fingerprint .After enrolment the user's identification is done .If the person is authorised ,the door automatically opens. After igniting the vehicle, the door automatically closes. When destination is reached ,after a key press, the door automatically opens. After a set time delay ,the door automatically closes. This system focuses on the use of fingerprints for door opening and closing. The fingerprint recognition software enables fingerprints of valid users of the vehicle to be enrolled in a database. Before any user can use the vehicle, his/her fingerprint image is matched against the fingerprints in the database while users with no match in the database are prevented from using the vehicle. A microcontroller stores the data equivalent of fingerprint of the master user. Comparison between this enrolled fingerprint and the fingerprint of the person who is about to use the vehicle is done by the microcontroller. If both the fingerprints are identical control circuitry of the microcontroller sends appropriate signals to the motor relays operating the door of the vehicle.

.



CONCLUSION

Fingerprint identification enhances the security of a vehicle and makes it possible only for some selected people to use the car. Thus by implementing this relatively cheap and easily available system on a car, one can ensure much greater security and exclusivity than that offered by a conventional lock and key. It can be deduced that the use of biometric security systems offers a much better and foolproof means of restricting the use of vehicles by unauthorized users. The developed prototype serves as an impetus to drive future research, geared towards developing a more robust and embedded real-time fingerprint based automatic door lock systems in vehicles.

REFERENCES

[1]Lin Hong. ”Automatic Personal Identification Using Fingerprints”, Ph.D. Thesis, 1998.
[2]D.Maio and D. Maltoni. Direct gray-scale minutiae detection in fingerprints IEEE Trans. Pattern Anal. And Machine Intel.,19(1):27-40, 1997.
[3]Alessandro Farina, Zsolt M.Kovacs-Vajna, Alberto leone, Fingerprint minutiae extraction from skeletonized binary images,Pattern Recognition, Vol.32, No.4, pp877-889, 1999.
[4]N. Ratha, S. Chen and A.K. Jain, ”Adaptive Flow Orientation Based Feature Extraction in Fingerprint Images”, Pattern Recognition, Vol. 28, pp. 1657-1672, November 1995.
[5]Jain, A.K., Hong, L., and Bolle, R.(1997), On-Line Fingerprint Verification, IEEE Trans. On Pattern Anal and Machine Intell,
19(4), pp. 302-314.