International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

ELECTRONIC PERSONAL DETAILS VERIFICATION SYSTEM

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***Abstract*—** Automation is the most frequently spelled term in the field of electronics. One of the technologies which had greater development is RF communications. The result is the RFID cards and fingerprints that transmit the unique identification number. This number transmitted by the RFID can be read with the help of an RF reader. The project aims in designing a system that helps in getting personal details instantaneously using RFID technology. This is very helpful for the officers to extract the details of the registered person instantaneously and identify non-registered persons. The data is uploaded from the universal computing device to an approving machine which decrypts the documents. The digital license and electronic signature involved in the document are confirmed for authenticity. Smart card provides portable containers for an account, public key, and biometric data. An electronic license is attached to the document and the whole data is encrypted, increasing the integrity.

Keywords—Automation, RFID cards, RF reader, PIC16F877A Microcontroller, Fingerprint module, Reset button.

I. INTRODUCTION

This system uses smart card methods to automate and popularize the electronic system. The RFID tag is a small microchip designed for wireless data transmission. The RFID tag stores the personal data of the registered owner. The RF reader reads the details of the tag and sends the data to the controller. It improves the integrity of the system by the need to match the information contained in the chip to the one printed in the document. The data from the microcontroller is continuously sent to LCD. The LCD gives guidance to the person. It enables machine-assisted verification of biometric information to confirm identity.

II. METHODOLOGY

This project can be used for security purposes where it gives information about authorized and unauthorized persons. This can be applied in real-time systems as such in recording the attendance, in the companies, and airports, for accessing the identities to know who is authorized. RFID is increasingly used with biometric technologies for security. Primarily, the two main components involved in an RFID system are the transponder (tags) that are attached to the object and the Interrogator (RFID reader).

III. COMPONENTS REQUIRED

The following components are necessary for the system:

MICROCONTROLLER:

Microprocessors and microcontrollers are widely used in embedded systems products. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O Ports, and a timer embedded all on a single chip. The fixed amount of on-chip ROM, RAM, and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical. The microcontroller used in this project is PIC16F877A. The PIC families of microcontrollers are developed by Microchip Technology Inc. There are four families of PIC microcontrollers:

PIC12CXXX 12/14-bit program word
PIC 16C5X 12-bit program word
PIC16CXXX and PIC16FXXX 14-bit program word
PIC17CXXX and PIC18CXXX 16-bit program word

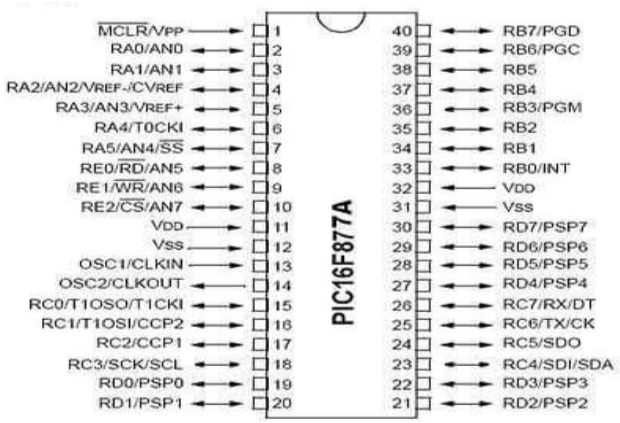

Fig. 1 Pin diagram of Microcontroller

The above is the Pin diagram of Microcontroller PIC16F877A. Most of them can be used as an IO pin. Others are already for specific functions.

RFID readers are usually on, continually transmitting radio energy and awaiting any tags that enter their field of operation. The RFID reader sends a pulse of radio energy to the tag and listens for the tag's response. The tag detects this energy and sends back a response that contains the tag's serial number and possibly other information as well. In simple RFID systems, the reader's pulse of energy functions as an on-off switch; in more sophisticated systems, the reader's RF signal can contain commands to the tag, instructions to read or write memory that the tag contains, and even passwords.

Fig.3: RFID Reader

RFID Tag:

RFID Tag is the basic building block of RFID. Each tag consists of an antenna and a small silicon chip that contains a radio receiver, a radio modulator for sending a response back to the reader, control logic, some amount of memory, and a power system. The power system can be completely powered by the incoming RF signal, which is known as a passive tag. Alternatively, the tag's power system can have a battery, in which case the tag is known as an active tag. The primary advantages of active tags are their reading range and reliability. The tags also tend to be more reliable because they do not need a continuous radio signal to power their electronics.

FINGERPRINT MODULE:

The Fingerprint module is the most popular among all identification devices because of its ease of acquisition, and also the number of sources that are available for its data collection. The fingerprint identification process will change slightly between products and systems. Standard systems are comprised of a sensor for scanning a fingerprint and a processor which stores the fingerprint database and software which compares and matches the fingerprint to the predefined database. Within the database, a fingerprint is usually matched to a reference number, or PIN which is then matched to a person's name or account. The uniqueness of each fingerprint is due to the peculiar genetic code of DNA in each person. This code causes the formation of a different pattern in our fingerprint

Fig. 2 RFID Tags

Fig. 4 Fingerprint Module

RFID Reader:

LCD Display:

An LCD is one of the most popular accessories for microcontrollers. 16x2 and 20x4 LCD screens are some of the most popular LCDs attached to the numerous microcontrollers. According to this, there are 16 characters per line by 2 lines and 20 characters per line by 4 lines, respectively. It is simple to connect to the Arduino. Here 20x4 LCD module is used.

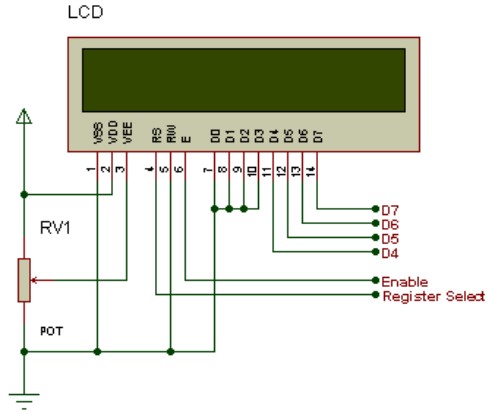

Fig. 5 LCD Display

BUZZER:

The piezoelectric BUZZER is set to produce intermittent sounds. This is because of the failure of verification. To interface a buzzer transistor interfacing circuit is used.

Fig. 6 Buzzer

IV. WORKING

The project is a two-step verification system. The first step is Verification using RFID. An RFID system consists of three components: an antenna and transceiver (often combined into one reader) and a transponder (the tag). The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna. The data is used to notify a programmable logic controller that an action should occur. The next step is Fingerprint verification. When the finger is kept for scanning, the scanned fingerprint is then compared with a stored fingerprint. The comparison is carried out by the microcontroller. If it matches then the access will be given to the particular person. If not, access will be denied and the buzzer will be rung.

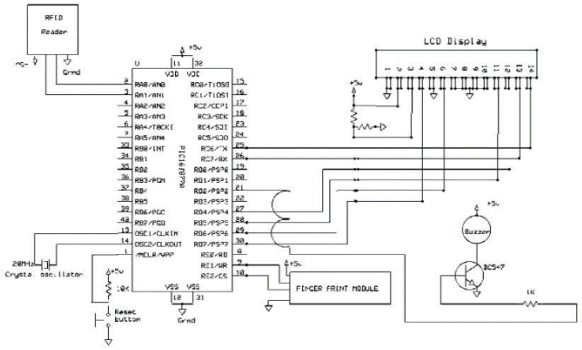

Fig. 7 Schematic Diagram

The above schematic diagram of the electronic personal details verification system explains the interfacing section of each component with the microcontroller, RFID, and fingerprint. Crystal oscillator connected to 13 and 14 pins of the microcontroller and regulated power supply is also connected to microcontroller and LEDs also connected to microcontroller through resistors.

V. RESULTS

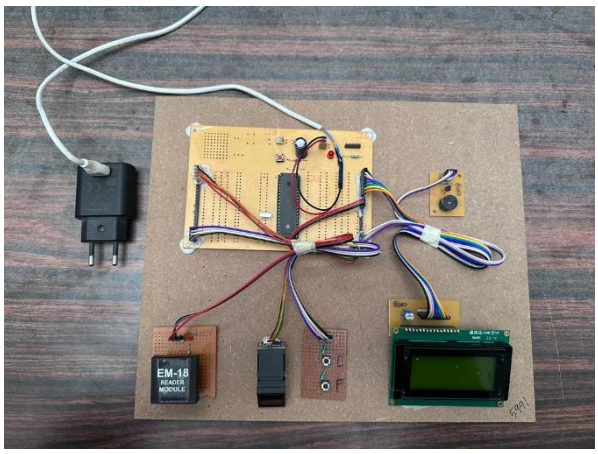

Fig. 8 Hardware Arrangement

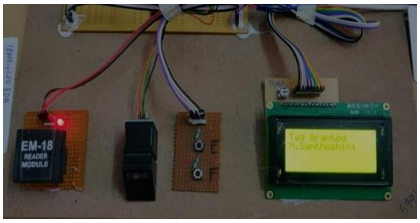

Fig. 9 Access granted for user1

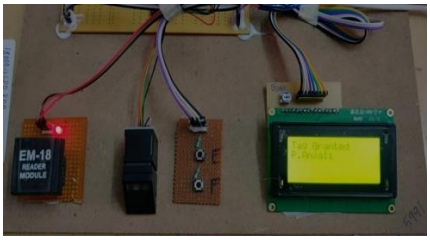

Fig.10 Access granted for user2

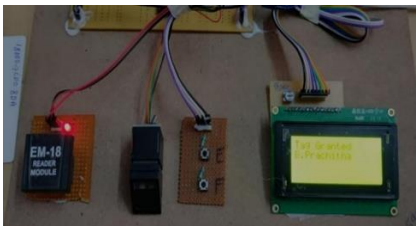

Fig.11 Access granted for user3

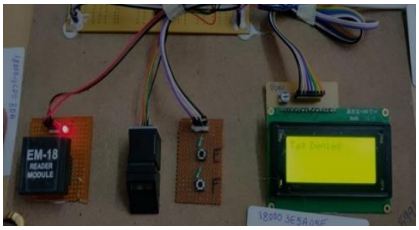

Fig. 12 Access denied for user4

Consider the above Fig. 9, Fig. 10, and Fig. 11, two verification process is passed and access is granted for user1, user2, and user3 respectively.
Consider Fig. 12, two verification process is not passed so the access is denied for the user4.

VI. CONCLUSION

The work represents an attempt to acknowledge and account for the presence of electronic identification using biometrics recognition towards their improved identification. The project has analyzed the major current and potential uses of RFID in identifying documents. The important feature of this project is security and time wastage involved in the validation of personal details. The application of biometrics provides high accuracy rates.

VII. FUTURE SCOPE

Based on the present scenario, the project can be extended using a GSM modem. GSM modems send an alert message to the respective authorities when an unauthorized card is detected by the RFID reader. The system can also be extended using wireless communication like zig-bee technology, Bluetooth, and Wi-fi. OTP option can be provided if the biometric fails to work. More than one biometric technology can be used at a time like iris recognition, palm print, facial recognition, and fingerprint this provides high security.

ACKNOWLEDGEMENT

We would like to convey our sincere gratitude to our supervisor, E.V. Nagalakshmi, for her unwavering support, constant direction, and willingness to share her insightful opinions during this major project work. The conversations we had improved our comprehension of how the project operated and aided in accomplishing the objective. We would like to extend our sincere gratitude to Dr. S Suryanarayana, Professor, and Department Head, and our Principal Dr. G. Kanaka Durga for their unwavering support, Inspiration, and provision of essential resources to complete this project work. We would also want to extend our appreciation to the department's whole professors and staff for their direct and indirect contributions to the project's success. We want to express our sincere gratitude to our parents for their unwavering encouragement, support, and blessings.

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