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Fingerprint Based Security Locker System

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ABSTRACT:
The major objective of this project is to develop and put into use a fingerprint-based security system that can be set up in businesses, residences, and banks. We'll be using an Arduino Mega and a biometric locker technique to put this idea into action. To create an impenetrable security system, we are using fingerprint technology. In order to prevent outsiders from gaining access to the controlling systems, the fingerprint sensor will be installed inside the locker panel, facing the exterior of the locker. It is our job to secure our possessions because thefts are on the rise. Only the authenticated person may retrieve the documents or cash from the locker using this system. Clients' fingerprints are saved, and when
KEYWORDS: Fingerprint , Security , locker panel, sensor, bio metric locker.

I. INTRODUCTION

In the actual world, people are more concerned about the safety of their costly possessions, such as jewellery.Money, essential documents, and so on. As a result, bank lockers are the safest place to keep them. Because places such as offices and other public places are not safe, difficulties regarding the security of our documents and valuables have arisen.As a result, we decided to create this form of security system that will be more valuable to everyone. This technique ensures that fingerprints are accurately used to unlock and close doors. We can give users with strong security with this initiative. Most banks have lockers with one key in the user's possession and a master key in the bank's possession. They also have a password that the user must enter.

Theft is a serious issue in today's society. Because places such as offices and other public places are not safe, difficulties regarding the security of our documents and valuables have arisen.As a result, we have chosen to create this form of security system that would be more effective.Everyone will find it handy. This mechanism ensures that fingerprints are used correctly for door opening and closing. We can give users with strong security with this initiative. Most banks have lockers with one key in the user's possession and a master key in the bank's possession. They also have a password that the user must tell the bank before entering the locker room; if the user loses the key, it is a problem.

II. LITERATURE SURVEY

These are some of the existing Smart Security designs used by

(a) GSM Based Security System. The PIR sensor detects motion by measuring the difference in temperature. Heat levels emitted by nearby objects in the infrared or radiant spectrum. When the PIR sensor senses motion, the output gets high. A common PIR sensor has a range of roughly 6 metres (30 ft). When the PIR sensor detects motion, the sensor's output is high. The Arduino detects this. Then, using serial communication, it communicates with the GSM module to make a call to the preprogrammed mobile number.

(b) An infrared-based security alarm system. Any movement can be detected and triggered by an IR-based security alarm circuit. This circuit is quite useful.

III. PROPOSED SYSTEM

In the suggested system, the biometric system scans the finger with an Arduino uno microcontroller attached to an optical fingerprint sensor R305.

A 16x2 LCD is used to provide instructions to users. The user can register fingerprints with various ID numbers. The biometric security system has been improved to make it more user friendly by including four push buttons: one for deleting enrolled finger prints, one for enrolling new finger prints, one for confirming fingerprints, and one for incrementing and decrementing id locations.

ARDUINO MEGA

A microcontroller board based on the ATmega2560 is called the Arduino Mega 2560. It contains 16 analogue inputs, 4 hardware serial ports (UARTs), a 16 MHz crystal oscillator, 54 digital

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input/output pins (of which 15 can be used as PWM outputs), a USB connector, a power jack, an ICSP header, and a reset button. It comes with everything needed to support the microcontroller; to get started, just plug in a USB cable, an AC-to-DC adapter, or a battery. The majority of shields made for the Uno and earlier boards like the Duemilanove or Diecimila can be used with the Mega 2560 board.
The Arduino uno, which the Mega 2560 is meant to replace, has been updated.

Fingerprint Module

The R305 biometric fingerprint module features a high-precision, high-performance matching algorithm and a high-capacity memory chip. It operates on the basis of fingerprint image processing, matching, memory search, and performing and required functions. To connect with the microcontroller, R305 employs serial communication. The default Baud Rate is 57600 and cannot be changed. This module can store up to 980 fingerprints. It comes with a USB cable for direct connection to a PC.
This sensor has four pins:
VIN: Module power supply - 5 V GND: Ground
RX: Receive data from serial communication
TX: Send data from serial communication

Climbing wires

Small metal connectors known as jumpers are typically employed to open or close circuit components.
A circuit board's control is provided by its two or more connection points.

They set up the settings for hardware components like the motherboard and other computer peripherals. If your motherboard had intrusion detection, it would be great. You can configure a jumper to make it active or inactive.

Jumper wires are electrical cables having connector pins on either end. Without the need for soldering, they are utilised to link two points in a circuit. Jumper wires are useful for both circuit modification and circuit troubleshooting. They are also most effective when utilised to bypass a suspected-faulty area of the circuit that lacks a resistor. A wire or switch is an example of this.What if all

Control Motor

A rotary actuator or linear actuator, a servo motor enables precise control of angular or linear position, velocity, and acceleration.In applications like robotics, CNC machinery, or automated manufacturing,It is made consisting of a suitable motor connected to a position feedback servo motor sensor.

Lcd Display16x2

It is a 16x2 electrical display module that creates a visual display using liquid crystal. It can show 16 characters per line, and since there are 2 lines, it can show 32 characters at once.

Post Buttons

A pushbutton or switch links two points in a circuit when you press it.
In this illustration, the built-in LED on pin 13 turns on when the button is pressed.

When the pushbutton is open, which is similar to being depressed, we read LOW since the pin is linked to ground (via the pull-down resistor).A connection between the button's two legs forms when it is pressed, connecting the pin to 5 volts so that we may read a HIGH.

Breadboard

For creating temporary circuits, a breadboard is utilised (also known as a plug block).Designers may quickly remove and change components thanks to its usefulness. It is helpful for someone who wants to construct a circuit to show how it works before reusing the parts in another circuit.

GPRS Module

A chip or circuit that will be used to establish GSM or GPRS connections is referred to as ainteraction between a computer or mobile device and a GSM or GPRS network. In this case, the modem (modulator-demodulator) is essential. These modules are made upa power supply circuit, a GSM module, or a GPRS modem, as well as computer connection interfaces (such as RS-232, USB 2.0, and others). GSM modem.

Keypad

The keypad we use in our project is 4X3 Matrix Keypad - Membrane type . 12-button keypad provides a useful human interface component.The OTP is entered here

Installations Required

- ADAFRUIT FINGERPRINT LIBRARY
- SERVO LIBRARY

IV. PROCESS

1.Enroll
2.Place the finger
3. Enter the OTP

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1.Enroll

The user must enroll the biometrics(fingerprints) in a particular location .If the wants to delete the fingerprint he can also delete the unauthorised fingerprints.

2. Place the finger

When the user wants to open the locker.He/she should place the finger on the fingerprint sensor. If the fingerprint matches with the enrolled fingerprint, OTP is sent to registered mobile number for the second verification.

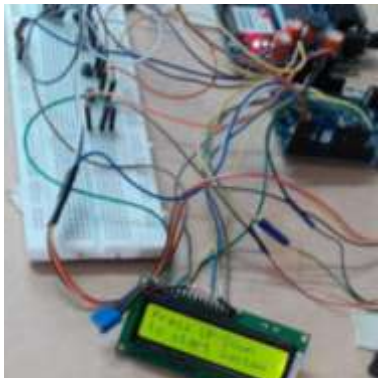
3.Enter the OTP

The user should enter the OTP which is received to registered mobile number.If the OTP entered matches , the gate is opened. Otherwise buzzer is actived, an alaram is generated

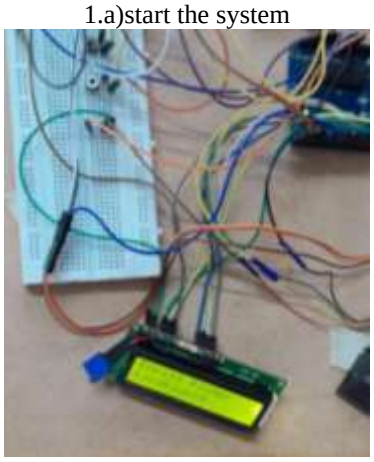
V. RESULTS AND DISCUSSIONS

1. Enrolling the fingerprint

The first two push buttons are for increment or decrement . so, press the increment or decrement buttons to start the system. Then the user should enroll the fingerprint in memory location.



1.a)start the system

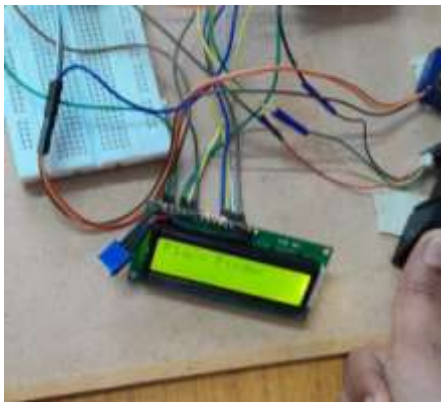


1.b)enroll the finger

2. For authorised user

When the fingerprint perfectly match with registered fingerprint that is stored in memory.

OTP is sent to users mobile. Then, enter the OTP . If entered OTP is right , lock opens.



2.a) place the finger

2.b) OTP is sent to mobile

2.c) enter the OTP

3. Unauthorised User

If the person whose fingerprint is not enrolled tries open, it display fingerprint not found . As the user is unauthorised the lock does not open.

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3.a) fingerprint not found

4.Delete Fingerprint

Only the authorised user can delete the fingerprint.

To delete the fingerprint, press the pushbutton number four.so, that fingerprint is deleted.

4.a) delete fingerprint

VI. CONCLUSION AND FUTURE SCOPE

We introduced biometric-based lockers in this project, which offer a high level of security. The locker won't be accessible to any authorised users. As fingerprint duplication is less likely, we use fingerprints as our verification method. The system is affordable, simple to operate, and can be put anywhere where a high level of protection is required.

The installed system is capable of performing tasks like enrolling a new fingerprint, erasing a fingerprint, confirming a fingerprint against an existing record, and, upon successful match, unlocking a gate. The user will receive a notification regarding the state of their locker via the GSM module utilised in this system. By using fingerprint biometric as the authentication technique, the system has successfully addressed a few issues with the currenttechnologies.

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