iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** VIII **Month of publication:** August 2022

DOI: https://doi.org/10.22214/ijraset.2022.46160

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue VIII Aug 2022- Available at www.ijraset.com

Biometric Vehicle Ignition System

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Abstract: ***The project's purpose is to develop a smart ignition security system. A fingerprint sensor is used for motorcycle access in the proposed system, and a relay will be used for controlling ignition. The fingerprint sensor is a dependable fingerprint sensor that collects accurate fingerprint data. For added convenience and security, it's designed to fit inside electrical devices. The device, which is secure, fast, and easy to use, replaces credentials, PINs, and other types of user authentication. The system's principal controlling device is a microcontroller. A fingerprints sensor, a relay, as well as an LCD display are all included. The Micro - controller acts as something of a passcode to the ignition if the fingerprint device's input is legitimate. The status will be displayed on the LCD. This brilliant achievement is accomplished with the help of a microcontroller. The micro - controller grants access to the ignition switch if the information from the fingerprint scanner is valid. The information is displayed on the LCD. A pic micro-controller with a strong c software developed in embedded 'C' code is used to carry out this innovative activity. If the user cannot be identified, the cam32 modules is triggered, which takes an image of them and transmits it to the owner.***
Keywords: Fingerprints, security, biometrics, Ignition system, anti-theft vehicle.

I. INTRODUCTION

Self - identity is a crucial topic that has progressed significantly throughout time. Biometric authentication is a crucial and extremely precise means of identifying people. Fingerprints are unique to each person. As a result, this helps in a person's identification or the increase of system security. A unique type of sensor is utilised to scan any person's fingerprint. A PIC18f452 microcontroller serves as the system's overall controller. A fingerprint sensor, a Lcd screen, a switch, a DC Motor driver, and an ESP32 camera are all attached to the microcontroller. The user must put his / her finger on the fingerprint scanner to obtain access to the automobile. After the biometrics have been verified, the PIC microcontroller uses a relay to drive the vehicle. When an unidentified user attempted to access the automobile, the esp32 starts sending a snapshot of the unauthorized individual to the registered owner through mail. Fingerprints are considered to be the greatest qualifications for encryption or opening any gadget because they can distinguish any person and thus are impossible to imitate. The project's status will be displayed using the OLCD module. Enrolling and deleting fingerprints are done using two buttons on the fingerprint module. The relay acts as a switch to turn the vehicle on and off, whereas the DC motor acts as the vehicle. To do this, a micro - controller program code in embedded C was loaded into the microcontroller.

II. LITERATURE SURVEY

Omidiora E. O. etal's study focused on the replacement of login details with biometric technology, particularly fingerprint authentication systems in automobiles, even though fingerprints are the largest and most commonly utilized biometric technology , and also a reliable secure protocol for a wide range of security areas. Their prototype includes a fingerprint software package that stores a library of genuine users, a hardware interface device, as well as an ignition module that starts the car. The module keeps track of legitimate users in a database. When a person is trying to use the car, the Micro - controller compares the individual's fingerprint to the database, and the machine illuminates if the id is correct; if the id is incorrect, the device remains dark. External devices can be controlled using the parallel connection on a PC (hardware). The circuit-level portal is a low-cost, simple-to-use component used in pc sensors and systems. Computer robots and Atmel/PIC programmers are further examples. Visual Basic, Visual C, as well as Visual C++ can all be used to program. After that, a user mode program is written to connect with the newly formed device driver. Visual Basic 6.0 Commercial Version was used to create this prototype. Twenty test photographs are loaded to the databases to test the prototype. The results are good, indicating that the controller can distinguish between legitimate and imposter users. Using minutiae extraction, the recognition system was able to identify among good, moderate, and low-quality test pictures. When a condition is met, logic 1 is communicated; when a condition is not met, logic 0 is being sent. Karthikeyan. Because each person's fingerprint is unique, A etal [2] focuses on fingerprint security in his studies. Allowable users can also be added and deactivated from the module using the keyboard. This is done with the NITGEN FIM3030 fingerprint module.

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The Research Articles Volume 7 Issue No.3 International Journal of Engineering Science with Computing, March 2017 5732 is controlled by a miccrocontroller AT89C52. The entire driving unit is available at http://ijesc.org. On an LCD screen, information about permitted and unauthorised users is displayed. The Decoder DM742S138 will be used for packet transmission and communication with rapid memory units due to its short propagation delay. It can be utilised for transmission with rapid memory units due to the low propagation delay. The latch used is the 74HC373, that is a high-speed Si-gate CMOS device. The output of the microcontroller is connected to vehicle's ignition switch via a relay. The amount of electricity required to set up the relay is raised when the transistor is used. Only a prototype has been built due to restrictions in ignition switch and safety issues, and its success is solely dependent on the igniting of the automotive battery. In this work, Prashantkumar R et al. propose good and practical strategies for protecting two-wheeler automobiles by combining a variety of locking choices available in the vehicle. This project is not using fingerprint identification, but it does contain additional security features that might be used to trace down the stolen motorcycle and provide real-time monitoring systems to the bike owner. An engine immobilizer plus warning device is used to isolate the fuels from the ignition system. The owners can obtain a warning signal about the beginning of the bike and maybe even lock the bike completely with the help of Alert message for surveillance as a warning system. RKS (Remote Keyless System) could also be used to remotely lock and unlock a vehicle. In this project, the RKS system employs the Mobile number as that of the vehicle's main key. The project also includes a side stand caution, which warns the owner whenever the side stand is still in the downward direction after the vehicle has been started, preventing any driver injury. This project makes use of an ATMEGA-328 microcontroller. The Arduino IDE (Integrated Development Environment) v 5.2 is used to write the programming code. This equipment module was put through its paces on a number of different two-wheeler types. This module is designed to be cost-effective because raising the module's price will raise the vehicle's price. Because the device's overall power consumption should be low, the device's primary power source is the motorcycle's 12V battery. Because there isn't enough space in the bike for the entire module, it was placed within the vehicle's seat. Visa M. Ibrahim et al, Provide the vehicle owner with a security/alarming choice if the vehicles are in risk in their study. In this proposal, GSM technology is used to monitor and safeguard the vehicle. Sensors are put in the vehicles' doors and trunks. If the car is tampered with, an alert signal is transmitted to the microcontroller. An Intel AT89C51 micro - controller serves as the device's controlling unit. The GSM module's frequency signals are converted to different dc voltages, that are used as input to the microcontroller, using a DTMF (Dual Tone Multi Frequency) decoder IC. When there is a risk of car theft through the apertures and boots, this microcontroller activates the Network and sends out a message to a cellphone number associated with the circuit. In this example, the microcontroller turns off the vehicle by withdrawing the plug from battery. The test findings were judged to be satisfactory, indicating that the project's goal had been met. The device effectively disconnects the engines from the battery, immobilizes the vehicle, sends the warning message to the designated receiver, and activates an alarm. The module's primary power source is the vehicle's 12V battery. Because there isn't enough place for it in a two-wheeler, the entire modules was implanted inside the vehicle's seat.

III. PROJECT GOAL

A embedded system is the set of software and hardware that works together to complete a task. Two of the most common forms of embedded electronics are microprocessors and microcontrollers. Microprocessors are considered to as overall processors because they only let an input , process it, and produce the results. A microcontroller, on either hand, not only takes data as inputs, but to manipulate, interacts, controls, and, as a result, produces the outcome. The "Biometric Vehicle Ignition System," which employs the PIC18f452 micro - controller, is a one-of-a-kind project that can detect vehicle theft no matter where user is on the planet. The user sends this information to us via email. Fingerprint technology is used to gain entry to autos.

IV. METHODOLOGY

This chapter covers the project's block diagram as well as the distinct module design concept.

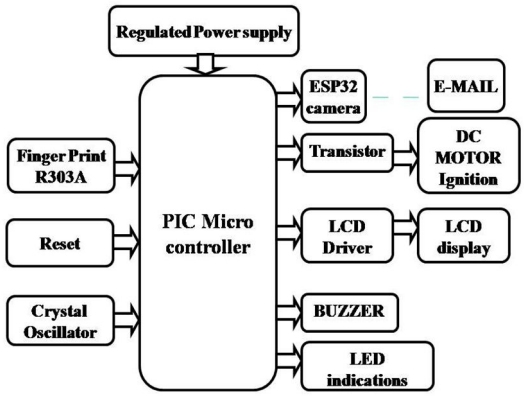
The following are the primary components of this project:

1) Regulated Power Supply.
2) Microcontroller based on the PIC microchip.
3) Finger Print Sensor.
4) Crystal Oscillator.
5) LED Indicators.
6) Reset.

7) DC Motor.
8) Esp32 Camera.
9) LCD Display.
10) Buzzer.
11) Two push buttons

Block diagram is Shown in fig

Block diagram



V. WORKING PRINCIPLE

Fingerprint registrations and fingerprint matching are the two processes in fingerprint processing(the matching can be 1:1 or 1:N). During registration, the user must enter their finger twice. The system will examine the two-time finger images, generate a fingerprint pattern based on the findings of the processing, and save the pattern. When a user uses an optical sensor to input a finger, the system develops a fingerprint pattern and compares it to other fingerprint patterns in the database. For 1:1 matching, the system compares finger to one of the Module's templates; for 1: N comparing, it searches the entire finger collection for the matching finger. The system will deliver the same result in both circumstances, whether success or failure.

VI. PROCEDURE

This article covers the schematic diagram as well as the connecting of PIC18F452 micro - controller with each module.

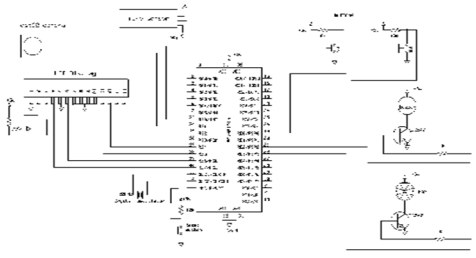


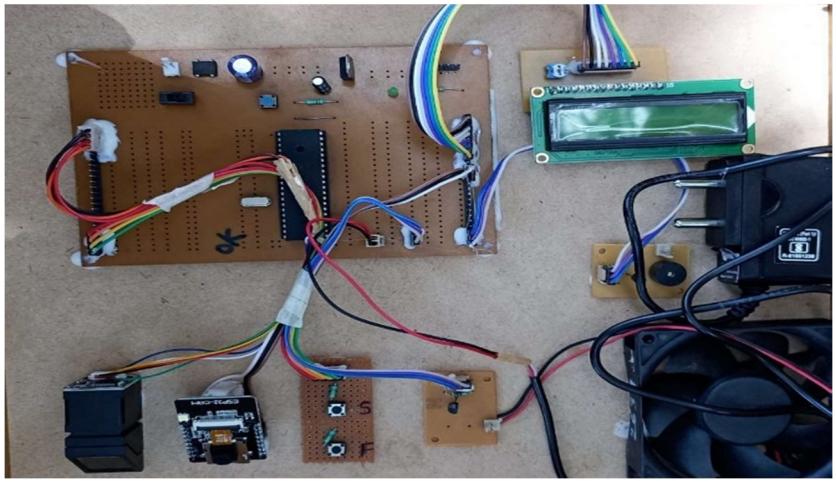
Fig : Schematic diagram of Biometric Vehicle Ignition System

In above schematic design, the interface aspect of the each device, such as Fingerprint, is discussed. Ignition System for Biometric Vehicles.

VII. RESULTS

This module was designed with the objective of using fingerprints to focus on the machine's state. The purpose of this technology is to increase the security and endurance of automobiles in the face of common dangers. The user authenticates himself by laying his fingerprint on the scanner, and the engine begins immediately if they are approved. The sensor is wired directly to engine, and the wires are attached in such a manner that the machine begins to run. The main reason is, it is affordable, and the biometric authentication method used is impossible to reproduce by two persons. As a result, it provides precise data for verifying the car, even when the user only has access to their own vehicle.

The “Biometric Vehicle Ignition System” project was to develop a finger print and IoT-based vehicle activation access and fraud detection system.



Kit figure

Output image sent to email

VIII. CONCLUSION

It was built with the intention of integrating functionality from all of the hardware components used. Each module's existence has been thoroughly considered and structured, leading in the unit's greatest possible operation. Second, powerful integrated circuits and developing technology were used to successfully implement the notion. As a result, the project was built and tested effectively.

REFERENCES

The following websites were used to complete this project:

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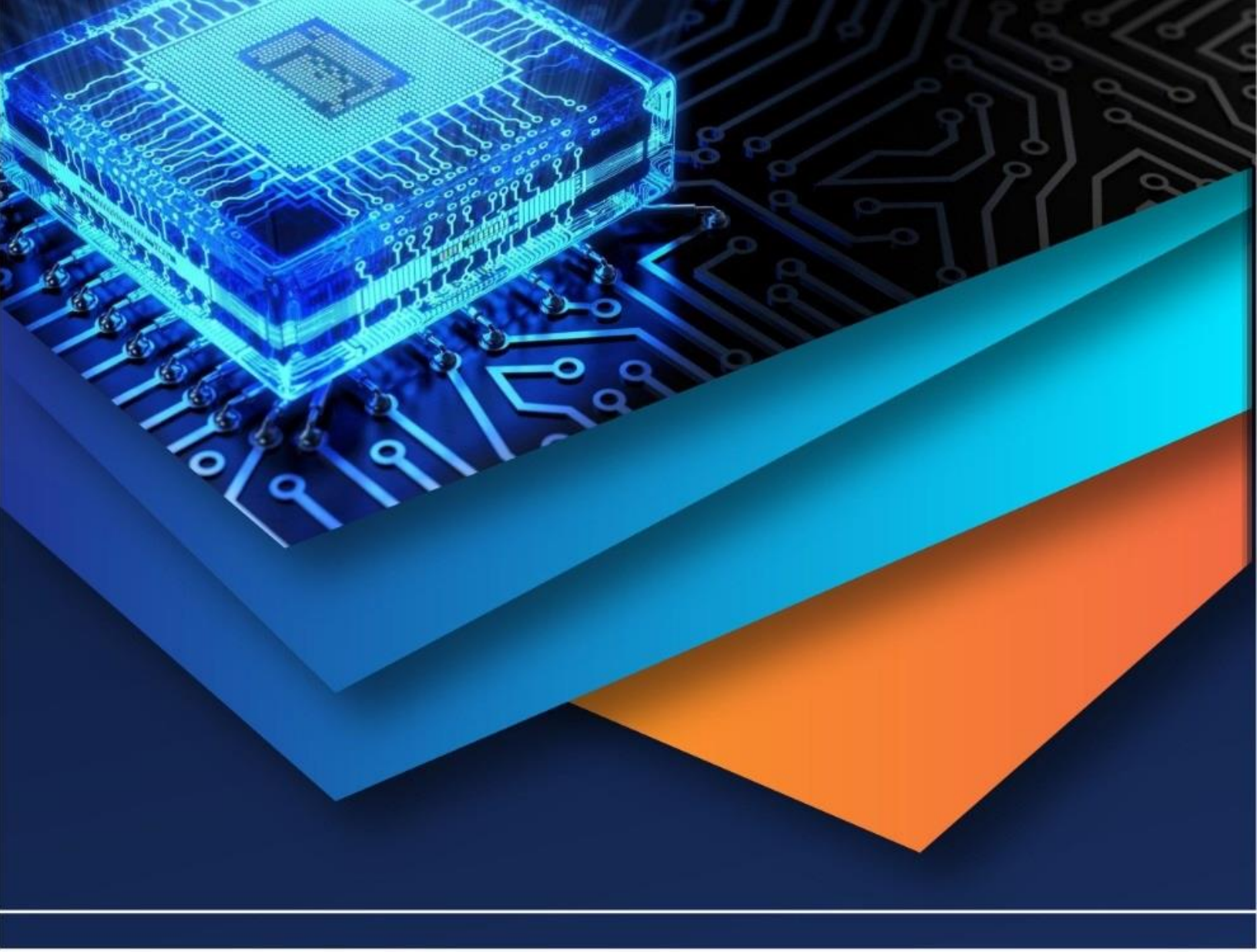
[2] www.allaboutcircuits.com is a good place to start.
[3] Microchip (www.microchip.com)
[4] www.howstuffworks.com is a website that explains how things function.

Books Referred

[1] Microcontroller architecture, programming, interfacing, and system design are all skills Raj Kamal has.
[2] Mazidi and Mazidi –Embedded Systems are two Mazidi products.
[3] David.L.Jones' PCB Design Tutorial.
[4] Microchip's PIC Microcontroller Manual.
[5] Embedded C –Michael.J.Pont.



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