Vehicle AntiTheft System Using Fingerprint Technique.

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Abstract:
This project is focused on the safety of two-wheeler vehicles from unauthorized persons and to ensure the safety of vehicles from being stolen. security system is developing and to be used for the safety of the world. As in many schools and colleges, biometrics will be maintained to ensure whether that a particular student is attending the class or not, whether they are entering into a hostel or not, to ensure the safety of children and also in offices also biometrics will be maintained whether that the particular employee is present or not. like this, a fingerprint module will be placed, which reads the fingerprint of the owner and can also be accessed to him and for registered fingerprint users. In place of key and starter, fingerprint module will be used, without the key, the process of unlocking the bike will be done. But with this fingerprinting technique, it can ensure the safety of the vehicle and also start the bike by using a fingerprint sensor too, suppose people sometimes forget the key, this may become problematic in needy situations, this type of problems can be solved with this project.

Keywords: Fingerprint sensor, Atmega Microcontroller, LCD Module, Engine ignition system, MAX 232.

Introduction:
A biometric machine is a technological gadget that makes use of records about someone (or other biological organism) to identify that individual. biometric systems rely on specific records about specific organic traits to work efficiently. a biometric machine will involve running information via algorithms for a particular end result, typically associated with an effective identity of a consumer or other person. The specific nature of now a days’s biometric structures is related to a specific use of the term “biometrics.” in trendy, biometrics is any use of organic information in era. Biometric structures focusing completely on the identification of people have emerge as the principal kind of biometric device in these days’s it global.

Governments, corporations and groups can use biometric structures to get extra information approximately individuals or approximately a populace as an entire. Many biometric systems are developed for Safety programs. an airport scanning device, a "bio-password" gadget, or an inner information amassing protocol is an example of a biometric system that uses figuring out facts for a security end result.

Related Work:
“Anti-Theft System For Vehicles Using Fingerprint Sensor” The preventing car theft using microcontrollers and GSM modules, to achieve the incorporating security by including biometrics, i.e a fingerprints[1].

"Fingerprint based authentication and security system using GSM and GPS technology” Fingerprint sensor captures the fingerprint images, matches the uniqueness of each print read by the sensor and compares it to the one stored in its module or local system database[2].
"A Study of Biometric Approach for Vehicle Security System Using Fingerprint Recognition" vehicle security system using person identification techniques. The survey mainly emphasizes on major approaches for automatic person identification, namely fingerprint recognition and various existing vehicle security system[3].

"A Review of Bike Security System Using Fingerprint GSM&GPS" The Fingerprint matching is done by utilizing the minutiae based Fingerprint recognition scheme. The vehicle is became on only with the bike key. If finger matches failed, it will result in vehicle getting immobilized and an alert message is sent to the mobile number of the owner[4].

"Fingerprint Based Vehicle Security Monitoring and Tracking Using GSM & GPS Technology" The level of supervision and management for cargo transport vehicles, especially trucks carrying coal it is important to develop transport vehicles remote monitoring module[5].

“GSM and GPS Survey of Bike Security system using Biometric" Biometric installment framework is much sheltered and secure and simple to utilize and even without utilizing any watchword or mystery codes to recall as contrast and past framework like Visa installment framework, remote framework and versatile framework[6].

" Vehicle Ignition using Fingerprint Sensor" The ignition of vehicle using fingerprint sensor and liquid crystal display, we are generating the same results along with same proficiency and accuracy in it by reducing its cost factor, so that it is easily affordable by customers and we can widely spread and implement the security in different domains[7].

Methodology:

![Block Diagram of Proposed Model](image)

**Figure 1. Block diagram of Proposed model**

This figure represents the block diagram of Proposed model of how this model gonna work in real time, the main requirements are Atmega328P Microcontroller, MAX232, Fingerprint Module, LCD display, Driver, Dc motor, this model has been proposed to prevent from theft. Bike’s will turn on without the keys by connecting the wires down the handle of the bike, so to prevent it from antitheft this model has been proposed so without the fingerprint of owner the bike will not unlock and the engine will not start.

**Atmega328P Microcontroller:**

The ATmega328 is a single chip microcontroller created by Atmel within the megaAVR family (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core. The Atmega328 is one of the microcontroller chips that are utilized with the mainstream Arduino Duemilanove sheets. The Arduino Duemilanove board accompanies either 1 of 2 microcontroller chips, the Atmega168 or the Atmega328. Of these 2, the Atmega328 is the redesigned, further developed chip. Dissimilar to the Atmega168 which has 16K of glimmer program memory and 512 bytes of inner SRAM, the Atmega328 has 32K of blaze program memory and 2K of Internal SRAM.

The Atmega328 has 28 pins. It has 14 computerized I/O pins, of which 6 can be utilized as PWM yields and 6 simple info pins. These I/O pins represent 20 of the pins.
The Atmega328 chip has a analog to-computerized converter (ADC) within it. This should be or, in all likelihood the Atmega328 wouldn't be fit for deciphering simple signs. Since there is an ADC, the chip can decipher simple information, which is the reason the chip has 6 pins for simple info. The ADC has 3 pins put away for it to work AVCC, AREF, and GND. AVCC is the force supply, positive voltage, that for the ADC. The ADC needs its own force supply to work. GND is the force supply ground. AREF is the reference voltage that the ADC uses to change a simple sign over to its comparing computerized esteem. Simple voltages higher than the reference voltage will be doled out to a computerized worth of 1, while simple voltages underneath the reference voltage will be appointed the advanced worth of 0. Since the ADC for the Atmega328 is a 10-cycle ADC, which means it delivers a 10-bit advanced worth, it changes a simple sign over to its computerized esteem, with the AREF esteem being a reference for which advanced qualities are high or low. Subsequently, a picture of a simple sign is appeared by this advanced worth. The last pin is the RESET pin. This permits a program to be rerun and begin once again.

LCD Module:

Liquid Crystal Display also called as LCD is very helpful in providing user interface as well as for debugging purpose. The most common type of LCD controller is HITACHI 44780 which provides a simple interface between the controller & an LCD. These LCD’s are very simple to interface with the controller as well as are cost effective.

Fig:2. 2x16 Line Alphanumeric LCD Display

The most generally utilized ALPHANUMERIC showcases are 1x16 (Single Line and 16 characters), 2x16 (Double Line and 16 character for each line) and 4x20 (four lines and Twenty characters for every line).

The LCD requires 3 control lines (RS, R/W and EN) and 8 (or 4) information lines. The number on information lines relies upon the method of activity. Whenever worked in 8-bit mode then 8 information lines + 3 control lines for example all out 11 lines are required. What's more, whenever worked in 4-bit mode then 4 information lines + 3 control lines for example 7 lines are required. How would we choose which mode to utilize? It's straightforward in the event that you have adequate information lines you can go for 8 cycle mode and if there is a period oblige for example show ought to be quicker then we need to utilize 8-cycle mode in light of the fact that fundamentally 4-bit mode takes twice as additional time when contrasted with 8-bit mode.

Fingerprint Module:

Biometric identification from a print made by an impression of the ridges in the skin of a finger is often used as evidence in criminal investigations. Yes, now we can use the same biometric identification technique to build our own hobby projects like a biometric authenticator/access
control system with the help of readily-available Fingerprint Identification Modules. Here is an introductory article to help you!

This is an optical biometric fingerprint reader/sensor (R305) module with TTL UART interface for direct connections to a microcontroller UART. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. This module can directly interface with any 3.3V or 5V microcontrollers, but a suitable level converter/serial adapter is required for interfacing with the serial port of a PC.

**Working Principle:**
Fingerprint processing includes two parts, fingerprint enrollment 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. Matching system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure. Some features of the sensors are, it contains both Image storage and chip algorithms. The fingerprint reader can grow less and be fixed. In a range of end products, power utilization is low, better performance, small in size, low cost.

**MAX232:**

MAX-232 includes a Charge Pump, which generates +10V and -10V from a single 5V supply. Standard serial interfacing of microcontroller (TTL) with PC or any RS232C Standard device, requires TTL to RS232 Level converter. A MAX232 is used for this purpose. It provides 2-channel RS232C port and requires external 10uF capacitors.

**BUZZER:**
A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke.

**Arduino UNO:**
The Arduino Uno is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino.cc. The board is outfitted with sets of computerized and simple information/yield (I/O) sticks that might be interfaced to different development sheets (safeguards) and different circuits. The board has 14 advanced I/O pins (six equipped for PWM yield), 6 simple I/O sticks, and is programmable with the Arduino IDE (Integrated Development Environment), through a kind B USB link. It very well may be controlled by the USB link or by an outer 9-volt battery, however it acknowledges voltages somewhere in the range of 7 and 20 volts.

The Arduino Uno has various complexes to communicate with a PC, another Arduino board, or other microcontrollers. The ATmega328 gives UART TTL (5V) sequential correspondence, which is accessible on computerized pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this sequential correspondence over USB and shows up as a virtual com port to programming on the PC. The 16U2 firmware utilizes the standard USB COM drivers, and no outer driver is required. In any case, on Windows, a .inf record is required.
Arduino Software (IDE) incorporates a chronic screen which permits basic literary information to be shipped off and from the board. The RX and TX LEDs on the board will streak when information is being sent through the USB-to-sequential chip and USB association with the PC (however not for sequential correspondence on pins 0

![Arduino Uno Board](image)

**Fig 6.** Arduino Uno Board

**Fingerprint enrollment in Fingerprint Module and combining with Engine starting system:**

The hardware connection setup. In this relay[8] connected with the biometric fingerprint scanner is added to the ignition line and battery of engine starting system. A relay switch is used to control the power supply from microcontroller to vehicle ignition system. A relay switch is an electrical switch that acts as either a power source or a ground in an electrical circuit. When coil is energized the common terminal and NO terminal have continuity. Anytime the device can be crank to switch on/off a device which draws more current with high voltage. The electric engine system has starter motor that is connected with the ignition switch also a supply from battery is given to the electric engine[9]. When key is inserted the circuit closes and gives supply to starter motor and it cranks the engine. The fingerprint security system is placed here to control the engine ignition system. Power supply is given through regulated power supply board for the microcontroller. This system is connected to the battery of the vehicle. So it draws current supply from battery to the fingerprint sensor. Digital switch used to control high voltage and current than normal board does. When input logic voltage relay will switch to allow current to flow or cut off depending on wiring[10]. When this relay is activated by giving authorized person’s fingerprint as an input the engine is turned on by the starting coil. When the ignition is given, the self-motor starts to rotate and makes the switch coil to rotate. The Bendix gear grabs the switch coil or starting coil after this process and the engine of the vehicle starts. When the engine turns on, the crank shaft begins to rotate continuously. In Arduino Uno IDE software write the entire code and load the program to the Arduino board[11]. After that the fingerprint sensor is connected and ready for enrolment, which is used for authentication purpose. Each person save their fingerprint in different address in fingerprint sensor[12]. This model is fixed in the vehicle and when respective owner scans their finger the vehicle’s engine starts.

**Results:**

Both for authorized and unauthorized people finger impression the yields are gotten. The Arduino board is associated with the microcontroller. At the point when a finger is placed on sensor it checks and correlates with pre-stacked information and assuming the finger impression coordinates, the engine will be turned on, in the event that the finger impression doesn't matches, the engine can't be turned on. When unique mark coordinates, that is approved individual information is given the Arduino regulator makes the relay, to turn on which prompts and turn on the motor of vehicles. At the point when finger impression doesn't coordinate, that is unauthorized individual information is given the Arduino regulator doesn't play out its activity and the relay will be kept in off state. So there is no current stream to the ignition framework and the motor will remains in offstate.

**Conclusion:**

Like this, vehicle cranking system will be secured by using this fingerprint model and it gives better protection for the vehicles from being stolen by unauthorized persons.

**References:**


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