Design and Implementation of Biometric Based Smart Antitheft Bike Protection System

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***Abstract* – A lot of research are going on in the field of biometrics. The proposed idea in the paper concentrates on the application of biometric for two wheelers especially, motor bikes and scooters. In our day to day life, a lot of motor bikes are missed and it is very difficult to find the location. This paper provides an effective solution in order to ensure more security and avoid unauthorized use of motorbikes. In this project, a finger print based simple and efficient electric engine starter is proposed. Simple and effective hardware has been designed, implemented and tested with motorbikes. Test results show that the developed system identify the correct person and allows the right person to start the bike**

Keywords—Biometrics, Fingerprint scanner, Arduino

I. INTRODUCTION

In recent days, security plays a major role, especially vehicles. Typically the two wheelers are stolen in the parking areas. To counteract the problem, the only solution is to implement some security system in the two wheelers. As the cost of existing system is very high, the manufacturing companies are not ready to implement in the vehicle. So there is a need to design a low cost security system for the two wheelers. The proposed security system uses a Arduino microcontroller and a fingerprint scanner.The main objective of this paper is to present a system to address the above problem. The proposed system develops an electrical engine starter combined with a finger print identification module. This will increase the security aspect of the vehicles [1]

II. OBJECTIVE

Proper comapitibility of the finger print unit with the microcontroller unit is carefully designed. Due to this, starter unit associated with the engine can be anble to provide proper security for the vehicles. The proposed finger print based vehicle security bsystem differs from existing electric engine starting system in the way of increased security.

III. EXISTING SYSTEM

When key is turned on, the key switch will be short circuited By pressing the self starter ,the electro motive force will be induced in the relay.Due to the induced emf,the metal rod get's in contact with the terminal.Thus,the motor starts rotating. There is a solenoid assembly to open the contacts and to stop the motor if necessary. This is because; the usage of the starter consumes more electrical power and dries the battery as quickly as possible.

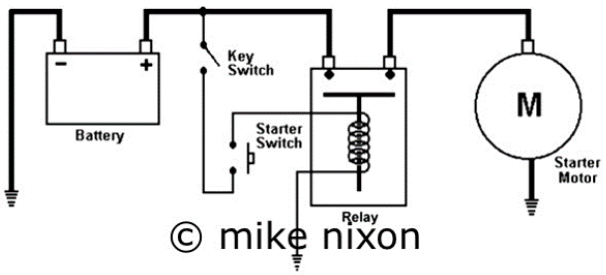

Fig.1. Existing Ignition System

So, ultimately, the starter system produces rotation of flywheel, and hence rotation of crankshaft, and thus the reciprocating motion of piston start. After suction of charge, the first compression and first power stroke will occur due to starter and thereafter the flywheel will do its job to continue the rotation of the crankshaft [2].

A. Limitations Of Existing Model

- Duplicate Keys may be used to start the vehicle.
- No security to the owner.

IV. METHODOLOGY

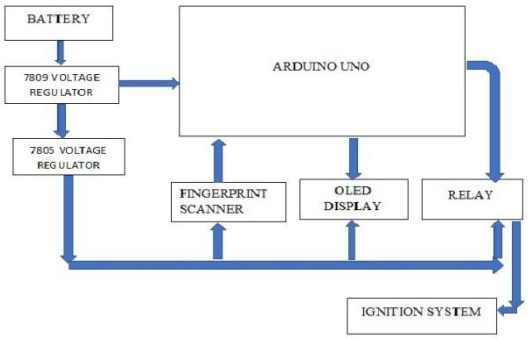

Fig. 2. Block Diagram

V. PROPOSED SYSTEM

Proposed system consists of the following stages

1.Arduino uno microcontroller.
2.Finger print scanner.
3.OLED display.
4.Battery.
5.Relay.
6.Voltage Regulator.

The battery provides the continuous power supply to the ignition system. The 7809 voltage regulator is used to regulate the voltage to 9v which is required for the Arduino board. The 7805 voltage regulator is to provide 5v supply to the fingerprint scanner module, OLED display, Relay. The fingerprint module is to verify the fingerprint of the authorized person and the OLED is used to display whether the fingerprint is matched or not .If the fingerprint is matched, the control of Arduino will move to relay. The relay in turn ignites the ignition system [9]. If key is turned on and fingerprint is matched then the ignition system will be turned on and bike gets mobilized.

With regarding to the working functions of finger print, there are two types. One is accompanied with focusing a bright light towards the finger print and taking of digital photograph. The finger print scanner actually light sensitive micro chip which consists of either a Charge Coupled Device or a Complementary Metal Oxide Semiconductor image sensor which produces a digital image [3,4]. The micro controller can be easily analyzes the input digital image with the help of stored program.

The second type of the image scanner is made with capacitance principle. This scanner uses the method of measuring the finger electrically. When we kept our fingers over the surface, there is a gap between our ridges and the floor. There is varying distance between floor and the finger, which will be scanned by a capacitive scanner and distance will be converted into electrical signal. [5].

Relay switches are used to open and close the ignition system according to the voltage applied through it. Normally open or normally closed relays are used.

A voltage regulator is a circuit used to maintain a constant output voltage in a circuit, irrespective of the changes in the incoming voltage or load current.. Here Ac or DC voltages can be regulated. The regulator may also be electronic system or electromechanical system.

Relay module for Arduino is one of the most powerful application for Arduino as it can be used to control both A.C and D.C devices by simply controlling the relay by giving 5V. A relay is basically a switch which is operated electrically by electromagnet [6,7]. A relay can be used to control high voltage electronic devices such as motors and as well as low voltage electronic devices such as a light bulb or a fan. The part which powers the relay module is completely isolated from the part which turns ON or OFF. This is why we can control a 220V appliance by simply controlling it using the 5V Arduino. You should also read getting started projects of Arduino.

VI. HARDWARE DETAILS

The main hardware unit used in this project is Arduino Uno, which is a microcontroller which belongs to ATmega family. Totally, fourteen digital input and outputs and six analog inputs are there in this controller.

Fingerprint Scanners is a device used to scan and identify the exact persons finger print with others finger print. This will produce high level signal when the actual person is trying to open the vehicle. It will give a low signal, when activated by other persons.

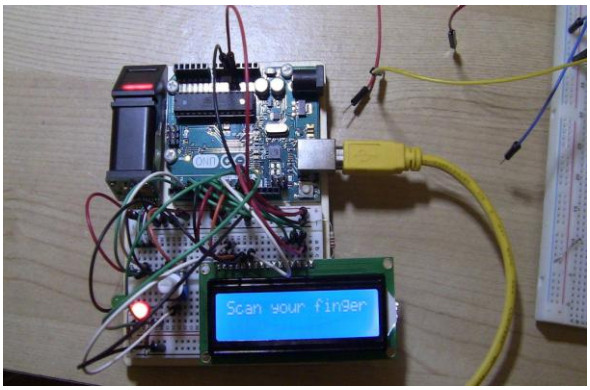

Fig. 3. Hardware Implementation

Organic Light Emitting Diode (OLED) is a display device mostly used in recent days, which is available in different colors and the main features of OLEDs are, high contrast, wide viewing angle, low power consumption and fast response time [8].

VII. Results And Discussion

The performance of the projects is tested with different person's finger prints and also finger prints at different situations and timings.

TABLE I. TEST RESULT

Test. No	No. of attempts	No. of correct identification	No. of False Identification	Success Rate (in%)
Test-1 Right Persons (5 Persons with 10 various positions)	50	49	1	98%
Test- wrong Persons (10 Persons with 10 various positions)	100	100	0	100%

By considering the inference from TableI, it is clear that, the system can identify the mismatched finger print from a large database, thus protect the two wheeler form theft. It is also found that, one failure for the right person at least out of 50. The reason is due to some dust or unrecognized positions of the finger print. Changing the position of the finger solves the problem.

VIII. Conclusion

The completed hardware has been implemented in a two wheeler and tested with right person's finger print in different positions and also wrong person's finger prints. In all the tests, the designed system produced good results. There is 98%success from right person's attempts and 100% success from wrong person's attempts. So, the designed system can be used to secure the two wheelers from theft. The designed system is a better replacement for GPS technology also. In future, the same system with enhanced version can be used for other types of vehicles also.

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