SMART MOTORCYCLE SYSTEM USING FINGERPRINT

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Abstract
This paper is about building a real time vehicle ignition using fingerprint sensor. The starting of the bike's engine needs protection and access restriction. Two wheeler vehicles with common locks do not provide adequate security for the bike holder. Thieves are aware of the standard locks used on motorcycle and they may easily break the locks. As a result, more security options for the motorcycle which are unique and should be different from common key locks are required. The use of a biometric system can be a good and reliable security option. Unique finger impression ID is a reliable method for identifying people because each person's fingerprints are unique. Hence we are focusing on implementation of the motorcycle system using fingerprint with an alerting system using buzzer in this paper.
Keywords: Arduino, Relay, Fingerprint sensor, Biometric system, Alarming system.

1. Introduction
The prime factor of implementing this model is to secure the bikes from the vehicle thefts using biometric system. Biometric technology is the technique that requires the presence of a particular person. Biometric system includes various types such as face recognition, voice recognition, fingerprint recognition etc. Among all these techniques the fingerprint recognition is the effective one [1] as it is the unique impression of each person. The fingerprint recognition allows the users to store their fingerprints in the memory. The stored fingerprints are remained in the memory even in the presence of power failure [1][2]. This project focuses about developing a real time fingerprint based vehicle starter. The fingerprint technology eliminates the need for keeping the keys and allows only the authorized persons to access it. The main advantage of using a fingerprint pattern is that it is very low in cost as compared to other biometric systems. In this proposed model we are implementing an alarming unit using buzzer and it gets enabled when the unauthorized person is trying to access it. Arduino IDE software is used to store the fingerprints and to start the ignition of the bike.

2. Hardware Details
2.1 Arduino: Arduino is an open-source electronics platform based on easy to use hardware and software. Arduino boards are able to read inputs as light on a sensor, a finger on a button, or a Twitter message and turn it into an output as activating a motor, turning on an LED, publishing something online [3]. This board contains a USB interface i.e. USB cable is used to connect the board with the computer and Arduino IDE (Integrated Development Environment) software is used to program the board [4].

Fig2.1. Arduino UNO

2.2 Fingerprint Sensor: Fingerprint detection utilization has existed for identification. Every person has a separate model of the fingerprint made with ridges, which create whirls and loops that are unique to every person [5]. The features of fingerprint recognition systems include faster speed,

lower costs as well as more consistency. The fingerprint sensor is used in a fingerprint detection device. The R305 is one kind of fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. R305 biometric fingerprint module is a high precision, high performance matching algorithm and high capacity flash chip used to send data packets to get photos, notice prints, search and hash. It works based on fingerprint image processing, matching, memory search and performing desired functions. It uses serial communication in order to communicate with microcontroller [5][6]. The enrolment of new fingers can be stored directly within the flash memory of on board.

Fig2.2. R305 Fingerprint sensor

2.3 Relay Module: A relay is an electrically operated switch. Relays were first used in long distance telegraph circuits as signal repeaters and they refresh the signal coming in from one circuit by transmitting it on another circuit. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were used extensively in telephone exchanges and early computers to perform logical operations [7].

Fig2.3. Relay Module

2.4 Buzzer: The buzzer is a sounding device that can convert audio signals into sound signals. It is usually powered by DC voltage. It is widely used in alarms, computers, printers and other electronic products as sound devices. It is mainly divided into piezoelectric buzzer and electromagnetic buzzers. According to different designs and uses, the buzzer can emit various sounds such as music, siren, buzzer, alarm, and electric bell [8].

Fig2.4. Buzzer

3. Software Details

3.1 Arduino IDE: This is the software which is used in proposed model. We use the Arduino IDE (Integrated Development Environment) for programming of Arduino. It is used for writing code, compiling the code to check if any errors are there and uploading the code to the Arduino [10]. Arduino consists of a both physical programmable circuit board and piece of software, or IDE that runs on your computer, used to write and upload computer code to the physical board [9].

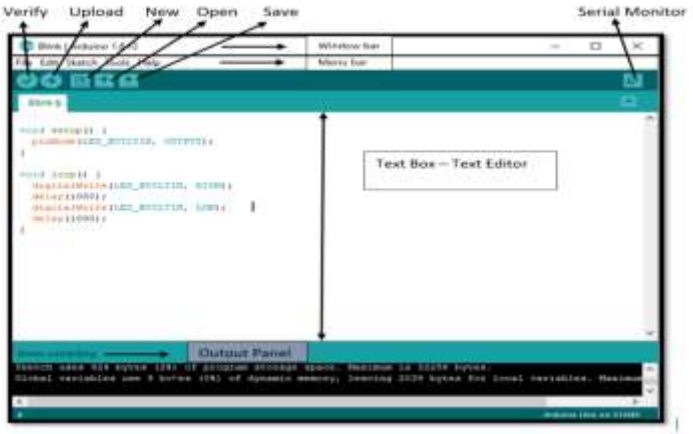
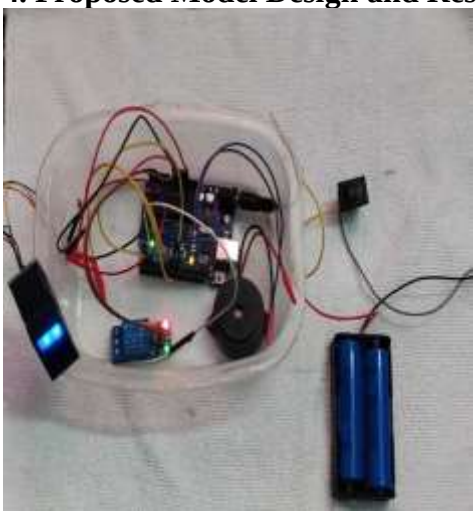


Fig3.1. Arduino IDE software

4. Proposed Model Design and Results



5. Block Diagram

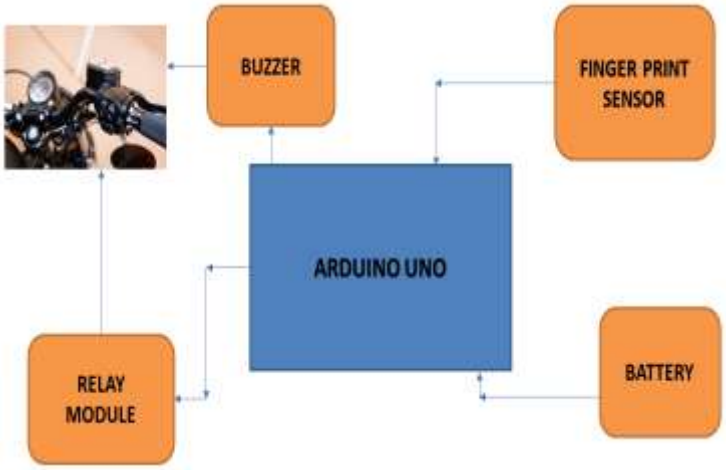


Fig5. Block Diagram of Proposed model

6. Working

The motorcycle will be ignited only when the authorized person scans his/her finger on the fingerprint sensor module. The finger prints of the authorized persons are stored in the fingerprint module. When any person put his/her finger on the fingerprint module then the data of the placed finger is checked whether it is matched with the stored data in the module. If the fingerprint data is found in the module then the microcontroller in Arduino UNO ignites/starts the bike through relay otherwise bike will give beep sound produced by the buzzer. The Arduino board powered from battery.

7. Conclusion

Biometric system improves the security of a vehicle and makes it easier to start the bike only for the authorized people whose fingerprints are stored in the memory. It does not allow access to the unauthorized persons to start the bike and produces the buzzer sound when they try to access it. In this paper, we have implemented a low cost and easy available system on a vehicle which provides more security than the normal locks. This implementation of two wheeler vehicle security can be extendable to four wheeler vehicles by using the improved version.

8. Acknowledgement

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9. References

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