

IGNITION BASED ON FINGERPRINT RECOGNITION

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ABSTRACT

Normally available locks in the bikes do not provide enough security to the bike owners. Traditional locks available in the bikes are well known to thieves and they can be easily broken by them.

Thus there is a need for more security options to be available for the motorcycle which is unique and must be different from the traditional key locks. Biometrics system can be used as a good and effective security option. An important and very reliable human identification method is fingerprint identification. As fingerprint of every person is unique thus it can be used in various security options.

In this paper we are focusing on the use of finger print recognition to start or ignite the motorcycle against the use of conventional methods of key locks. A detailed comparison is shown in the paper related to this work. In this paper the work done before in this field is shown. Various other methods that can be used to enhance the security have been shown in a comparative way. Related work include enhancing the security of the bikes by adding different types of locks and alarming unit to alert owner of the bike in case of danger.

KEYWORDS: *Fingerprint module, Microcontroller, Keypad, Relay, Ignition system*

I. INTRODUCTION

Because of increasing number of theft cases of the two wheelers there is a need to enhance the security level of the bikes [3]. Traditional and commonly used key locks available in the bikes are well known to the thieves and thus it can be easily unlocked by the professional thieves. With the help of master key it becomes very easy to unlock the lock of the bikes by the thieves

This creates the demand of such type of lock which is new and provides an additional security level. The new and modern lock must be unique in itself i.e. it must be only unlocked by special and specific key. This type of feature is available in the biometrics locks i.e. the lock which can only be locked and unlocked by the human body features. Biometrics can include: face recognition, voice recognition, fingerprint recognition, eye (iris) recognition. Of all these type of special biometric recognition techniques the fingerprint recognition is the most widely used because fingerprint of every person on the earth is unique and can provide good reliability. Also the implementation of the fingerprint recognition system is easy and cheap than the other ones. Thus fingerprint recognition locking system can provide better reliability than the traditional locks and also is cheaper and easy than the other biometric locking system.

Thus here we are proposing a model which utilizes the concept of fingerprint recognition in the motorcycles to enhance the security level of the vehicle. Some other related work to this model is also reviewed in the next section.

The paper is divided in 5 sections. First section provides introduction about the idea of the paper. Second section is dedicated to the literature review which provides the related work done about the proposed idea. Third section gives the comparison between the existed models based on the literature review. Fourth section is about the design implementation of the idea and the fifth section is the conclusion

II. LITERATURE REVIEW

Omidiora E. O. etal [1] in his paper basically focuses on the replacement of keys with the biometric specially fingerprint based lock systems in the vehicles because fingerprints are the oldest and most widely used form of biometric identification and also provide a robust security mechanism for various security domains. Their prototype consists of fingerprint software module used to store the database of the valid users, a hardware unit for interfacing and the ignition system module to ignite the vehicle. Database of the valid users is stored in the module. Now when a person tries to operate the vehicle then the CPU matches the fingerprint of the person with the stored database if the match result is successful then the vehicle is ignited and otherwise not. External devices (hardware) can be controlled through the PC parallel port. The parallel port is a simple and inexpensive tool for building computer controlled devices and projects. It is often used in computer controlled robots, Atmel/PIC programmers.

Programming can be done with the help of Visual Basics, Visual C and Visual C++. The user mode program is then made to communicate with the written device driver. The programming of this prototype was done in Visual Basic 6.0 Enterprise Edition.

The prototype was tested with 20 test images stored in the database. The results were successful and the controller was able to differentiate between the authentic user and the false user. The recognition software was able to distinguish high, medium and low quality test images on the basis of the minutiae extraction. Logic 1 was transferred on the matched case and the logic 0 was transferred when the mismatch occurs.

Karthikeyan.A etal [2] in his paper focuses on the fingerprint security as every person has unique fingerprint. A keypad is also used to add or delete the valid user in the module. FIM3030 fingerprint module by NITGEN is used in this purpose. Microcontroller AT89C52 is used for controlling the whole driving unit. LCD is used as a displaying unit for showing the information about the authorized and unauthorized user. Decoder DM742S138 is used for data routing and for interfacing with fast memory units as the decoder have short propagation delay. Latch 74HC373 is used which are high-speed Si-gate CMOS devices. A relay is used as a interfacing circuitry between the microcontroller output and the ignition system of the car. The amount of current required to drive the relay is amplified with the help of the transistor.

Because of the limitation in the initiation of the spark plug and safety reasons only a prototype is developed whose success only depends on the ignition of the car battery.

Prashantkumar R etal [3] in his paper provides good and effective ways of securing the two wheeler vehicle with a combination of different types of locking options provided in the vehicle. This project does not use the concept of biometric identification but provide other security options that can be used in tracing out the vehicle if theft happens and also provide the owner of the bike the real time status of the vehicle.

An engine immobilizer and alarm unit is used for isolating the fuel from the ignition system. SMS service for controlling and as a alarming device, With the help of the SMS the alert message can be received by the owner about the ignition of the bike and also with the help of SMS service the owner can lock the vehicle completely. RKS (Remote Keyless System) is also used for locking the vehicle from a distance the RKS system in this project uses the SIM number as the master key of the vehicle. Side stand alert is also used in the project it alarms the user about the down position of the sides stand after the ignition of the vehicle for avoiding any casualty to the driver.

ATMEGA-328 microcontroller is used in the project. Programming code is written in the Arduino IDE (Integrated Development Environment) v 5.2.

The hardware module was tested on different models of two wheeler vehicles. The module is made in such a way to optimize the cost because increasing the cost of the module can directly increase the cost of the vehicle. The overall power consumption of the whole module should be less because the

main power source of the module is the 12V battery of the vehicle. The size of the whole project is compact because there is not enough space in the two wheeler vehicle for placing the whole module thus the module was place inside the seat of the vehicle.

Visa M. Ibrahim etal [4] in his paper provides a security/ alarming option to the car’s owner when the car is in the danger. In this project GSM technology is used for monitoring and safeguarding the car. There are sensors placed in the doors and the boots of the cars. If any type of tampering in the car happens then an alerting is signal is send to microcontroller.

Intel AT89C51 microcontroller is used as a controlling unit of the device. DTMF (Dual Tone Multi frequency) decoder IC is used to convert the frequency signals from the GSM module to discrete voltage levels which act as input to the microcontroller. When there is any danger of theft of the car through doors and the boots then microcontroller activates the GSM module and sends the message to the mobile phone number attached to the circuit. In this case the microcontroller disconnects the ignition system from the battery and also demobilizes the car.

On testing the units the test result were found to be ok as the purpose of the project was successful. The unit efficiently disconnects the ignition from battery and demobilizes the car simultaneously sending alert message to the programmed person and start up an alarm.

III. COMPARISON OF EXISTED MODELS

| S.no | Advantages | Disadvantages |
|------|--|---|
| 1. | <ul style="list-style-type: none"> Fingerprint module used as an additional security feature in the vehicle.[1] System was efficiently differentiating between the authentic and the fake user.[1] | Option of adding/ deleting user from the memory is not given.[1] |
| 2. | Proposed good system to authenticate the user with the fingerprint recognition.[2] | Unsuccessful to implement[2] |
| 3. | Various features are added in the bike that efficiently enhances the security. Like locating the bike, sms alert, immobilizing unit.[3] | Features added act only as alarming units but does not prevent from theft.[3] |
| 4. | Provides both biometric identification and alerting unit in the vehicle.[4] | Designed for cars not for the bikes.[4] |

IV. DESIGN IMPLEMENTATION OF THE PROPOSED MODEL

Basically skin of human fingertips consists of ridges and valleys and they mixing together form the distinctive patterns and these patterns are called fingerprints. From different researches it has been observed that no two persons have the same fingerprints, so they are unique for each individual .because of the above mentioned characteristic, fingerprints are very popular for biometrics applications.

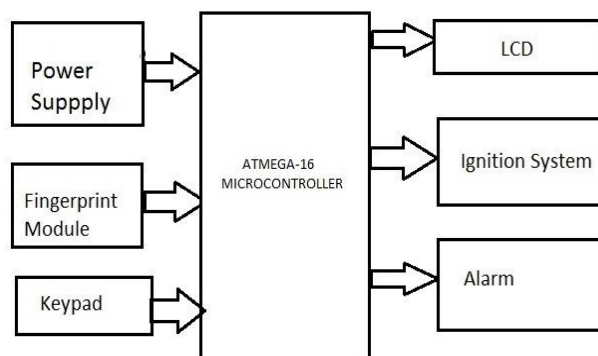


Fig.1 Block Diagram

Fingerprints have remarkable permanency and uniqueness throughout the time. From observations we conclude that the fingerprints offer more secure and reliable personal identification than passwords, id-cards or key can provide.

Thus in this paper we are providing an extra security option to the motorcycle by adding a fingerprint module to the bike by which inly the valid or authorized user can access the motorcycle. The ignition system of the bike is connected to the controlling unit i.e. the microcontroller. Following are the basic terminologies that are used in the model.

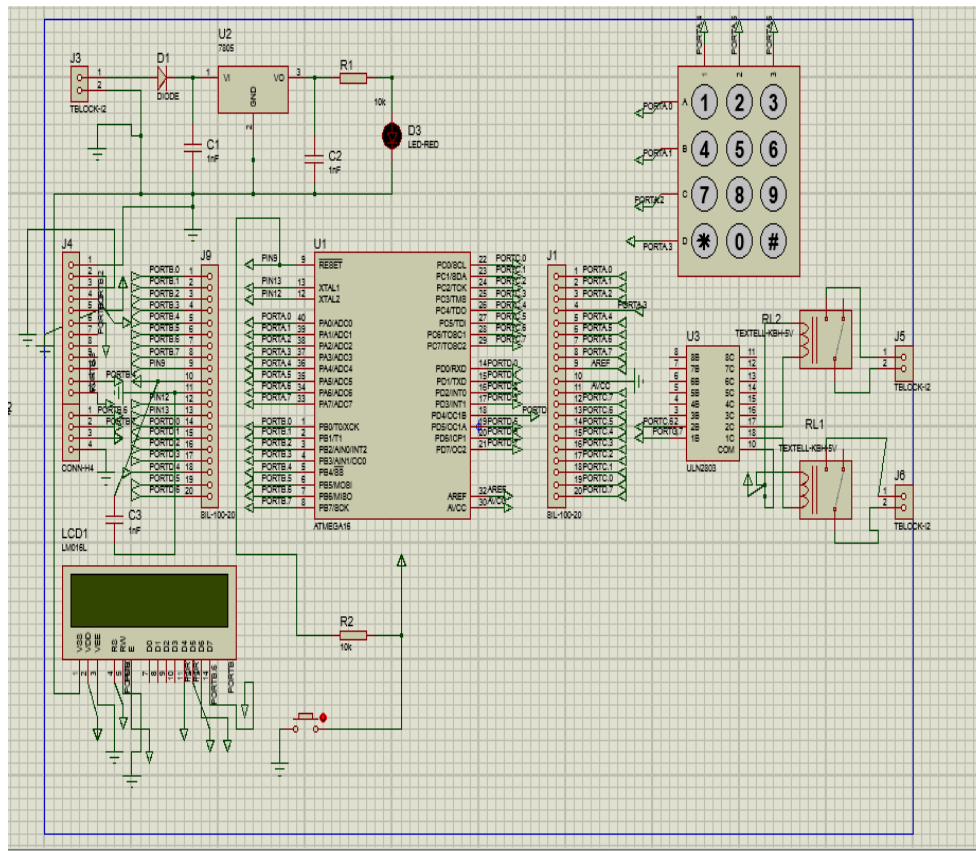


Fig.2 Circuit Diagram

From the block diagram we can see that with the help of fingerprint module and keypad input is provided to the microcontroller and on the basis of the input received from the 2 devices microcontroller drives the output devices i.e., ignition system of the bike and the alarm. Scanning checking of the fingerprint is done with the help of the fingerprint module and the on the basis of the output of the module microcontroller drive the ignition system of bike. Only authorized person(s) record is stored in the module. If match condition occur ignition system of the bike is turn on otherwise alarm is turned on.

V. RESULTS & DISCUSSION

The result which we expect from our project is that the motorcycle will be ignited only when the authorized person scans his/her finger on the fingerprint module. The fingerprints of the authorized person(s) 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 matched with the stored data in the module. If the fingerprint data is found in the module then match condition occurs and the microcontroller ignites the bike otherwise bike will not start.

VI. CONCLUSION

Fingerprint identification enhances the security of a vehicle and makes it possible only for some selected people to start the vehicle.

The expected result by implementing this model on the motorcycle is that only the authorized person will be able to ignite the motorcycle. Not every person with the key will be able to start the bike. There will be matching of the person's data with the stored one and only in the case of match the bike will start otherwise not.

Thus by implementing this relatively cheap and easily available system on a vehicle one can ensure much greater security and exclusivity than that offered by a conventional lock and key. The thief would have to do a great deal of homework to steal the bike, and it is unlikely that they have the fingerprint technology needed to fake your fingerprint.

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