Fingerprint Ignition System in Bike (Two wheeler)

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Abstract:
Our project is about the fingerprint based ignition in bikes which includes all two wheeler’s. 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 fingerprint recognition to start or ignite the motorcycle against the use of conventional methods of key locks. 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.

Index words – Arduino, Fingerprint recognition.

I. INTRODUCTION

From past till present scenario, safety and security remains an issue of utmost importance whether it is related to human life or the materialistic things. In this project we are making such a system which is providing more security to two-wheeler systems with the help of biometrics system. Passwords remain the weakest component of many important security systems, so there is a related push from many directions to supplement passwords with less fragile security measures. While pushing it has some effects, particularly in environments that require more security, it has failed to replace passwords the vast majority of computer user’s still use passwords on a day-to-day basis. Since the

Security of passwords relies so heavily on user behaviour, studies that empirically examine patterns of passwords creation and use remain important in the evaluation of security policies. The main focus while developing the bike anti-theft system was to integrate the above features equally. The most significant feature is the vehicle security from theft and it has been ensured by providing three layers of anti-theft protection. First the entry to the vehicle is limited only to the authorized persons are stored into the database before hand and at the time of entry to the vehicle, scanned fingerprints are being cross checked with the database. The biometric scheme is used as the primary layer of protection.

Biometric system includes various types such as face recognition, voice recognition, fingerprint recognition, eye (iris) recognition. Among these techniques the fingerprint recognition is the most widely used. This is because fingerprint of every person on the earth is unique and can provide good reliability compared to the other conventional methods. Fingerprint biometrics are easy to implement. The two significant parts of fingerprint biometric system is Identification and Authentication. Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between multiple human fingerprints. The process of identification tells you who the user is while the process of authentication tells you whether the user is valid or not.

We have used an different technique to access on the fingerprint ignition. A device called adruino is a hardware device manufactured by the Adruino open source computer software and hardware company.

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of
Fig. 1 Arduino Microcontroller kit, an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.

Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced.

II. LITERATURE SURVEY

[1] Omidiora E. O.

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 mis match occurs.


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 Research Article Volume 7 Issue No.3 International Journal of Engineering Science and Computing, March 2017. 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 od 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.

[3] Rahil Khan

Among biometric methods, fingerprint identification is a very reliable method in human identification. This project implements the application of fingerprint identification in the car ignition systems. By Car Ignition System using fingerprint scanning as part of the car security system, it to protect the car from unauthorized access. In order to ignite the engine, the user is required to scan their fingerprint at the fingerprint sensor. The system will process the fingerprint image and compare it with the fingerprint stored in the database. If the fingerprint matches, a signal will be sent by the microcontroller to ignite the car engine. However, if the user has an unrecognizable fingerprint problem, this system will provide an alternative way to start the car, by entering a password. This system also allows the owner to enroll new users into the database or delete the existing user.
as well as changing the password. In this paper we are focusing on the use of fingerprint 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.

III. PROPOSED METHODOLOGY

The methodology is explained in the above block diagram. The arduino device which is the interfacer unit controls and displays the work that is done. And the rest is transferred to the other microprocessors. Relay is as usual the transferring method used to combine with the ignition system of the vehicle.

Generally the main part of this project is Arduino MEGA, fingerprint ZFM-20 module, and interface circuit between microcontroller and dc motor. As shown in Figure 3.1, push button is the input of this system. User would press a button to choose whether to enrol a new user, ignite the bike engine, delete existing user or change the system's password. After that, the main microcontroller for this system which is Arduino MEGA will communicate with the processor on fingerprint sensor ZFM-20 module or keypad to process the input. Then any output process is showed on the Liquid Crystal Display (LCD) screen or a signal will be sent to the motor.

For better understanding, study the literature review, journal and any documented information about the ignition system, biometrics and related work that was carried out. From the studies, an overall overview of the projects system was identified and the ignition system based on fingerprint sensor is designed. Next, after finalizing the system design, the project implementation was carried out by using Arduino MEGA as a microcontroller. Beside hardware implementation, algorithm of the system was developed during this phase, which includes how to program the fingerprint sensor ZFM-20 and control the system using Arduino MEGA. After that, testing towards the system was carried out to make sure that the system was running successfully. If there are any problem or unfulfilled conditions occurred during the system testing, problem solving and modification will determine and applied to improve the system. The cycle of modification will continue if the system testing does not fulfill the project requirement.

Electronic Component System

In this project, there are four main parts of hardware implementation, which is Arduino microcontroller (UNO), interface device with LCD, fingerprint sensor and relay.

Arduino Microcontroller UNO

Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced.

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.
A 3rd-party Arduino board with a RS-232 serial interface (upper left) and an Atmel ATmega8 microcontroller chip (black, lower right); the 14 digital I/O pins are located at the top and the six analog input pins at the lower right.

**Fingerprint Sensor**

A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern. The captured image is called a live scan. This live scan is digitally processed to create a biometric template (a collection of extracted features) which is stored and used for matching. This is an overview of some of the more commonly used fingerprint sensor technologies.

**LCD**

LCD stands for liquid crystal; this is an output device with a limited viewing angle. The choice of LCD as an output device was because of its cost of use and is better with alphabets when compared with a 7-segment LED display. We have so many kinds of LCD today and our application requires a LCD with 2 lines and 16 characters per line, this gets data from the microcontroller and displays the same. It has 8 data lines, 3 control line, a supply voltage Vcc (+5v) and a GND. This makes the whole device user friendly by showing the balance left in the card. This also shows the card that is currently being used.

**Relay (DPDT)**

DPDT stands for double pole double throw relay. Relay is an electromagnetic device used to separate two circuits electrically and connect them magnetically. They are often used to interface an electronic circuit, which works at a low voltage to an electrical circuit which works at a high voltage. Relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc.

![Fig [3] Pin Diagram:](image)

There are two sections input and output. The input section consists of a coil with two pins which are connected to the ground and the input signal. The output section consists of contactors which connect or disconnect mechanically. The output section consists of six contactors with two sets. Each set has three changeover contacts, namely, normally open (NO), normally closed (NC) and common (COM). When no supply is given the COM is connected to NC. When the operating voltage is applied the relay coil gets energized and the COM changes contact to NO.

**IV. DESIGN PROCESS**

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Conceptual Analysis
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Conceptual Design
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Design Analysis
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Fabrication
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Testing
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Recording
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V. RESULT AND DISCUSSIONS

This module was designed to focus on the starting of the engine by the means of fingerprint. The reason for developing this model is to increase the security level and the robustness of the vehicles from day-to-day threatens. The user touches the fingerprint sensor and it authenticates the user, if the user is authorized then it automatically starts the engine. The sensor is directly connected to the engine, the wires are attached in such a way that it starts-up. The main reason for using this, it is low in cost and the fingerprint biometric which is used it cannot be matched of any two people. So it result in the accurate result for verifying the owner of the vehicle who can use only access their own vehicle.

REFERENCE


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