Bio-Metric Vehical Locking System Using GPS Module

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***Abstract*- In this current world, the vehicle usage is necessity for everyone, protecting the vehicle against theft is also very important. Available lucks in the vehicle do not provide enough security to the vehicle owners. Traditional locks available in the vehicle 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 vehicle which is unique and must be different from the traditional key locks. Biometrics vehicle locking 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. Th - in' ii goal of our project is to protect the vehicle from any unauthorized access, using fin2 r rin recognition technique. This vehicle security system intimates the status of the vehicle to the authoritative person using GSM. In our project we are focusing on the use of finger print recognition and tracking of vehicle using GPS and GSM to access the vehicle against the use of conventional methods of key locks.**

***Index terms*- fingerprint module, GPS and GSM Module, Arduino mega 2560**

I.INTRODUCTION

The automobile production is increasing widely, simultaneously the theft ratio of the automobile is also increasing. Because of increasing number of theft cases of the Automobile there is a need to enhance the security level of the vehicles. Traditional and commonly used key locks available in the vehicles are easily unlocked by the professional thieves. With the help of master key, it becomes very easy to unlock the lock of the vehicles 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. But we are using biometric finger print technology to lock and unlock the vehicle. Leaving that conventional method behind came in the concept of igniting the vehicles using key. And now, Keys are being replaced by Push start buttons. The system starts with the sole purpose of eliminating keys as conventional method of starting the vehicle. With the introduction of Biometrics in the 18th century, security advancement in technology has gone up to various levels. In the 18th century it was used to verify the employees working in IT Company.

Since then Biometrics has taken its toll. Biometrics is formed from the Greek words 'Bio' and 'Metrics' where 'Bio' Means 'life' and 'Metrics' means 'to measure'. Finger of a person is read by a special type of sensor. Finger print sensor can be interfaced with a microcontroller. Through keypad we can, also identify the user by selecting corresponding option through keypad by the specific operational password. Fingerprint recognition technology allows access to only those whose fingerprints that are pre stored in the memory. Stored fingerprints are retained even in the event of complete power failure or battery drain. These eliminates the need for keeping track of keys or remembering a combination password, or PIN. It can only be opened when an authorized user is present, since there are no keys or combinations to be copied or stolen, or locks that can be picked.

The fingerprint based lock therefore provides a wonderful solution to conventionally encountered inconveniences. In order to prevent unauthorized access to these devices, passwords and other pattern based authentication method are being used in recent

time. The password-based authentication has an intrinsic weakness in password leakage. While the patterns are easy to steal and reproduce. Vehicle security system has been a topic of great interest over the years due to the increasing vehicle theft cases reported all over the world. Most of the advanced vehicle security systems best suit the two wheelers.

Nowadays the vehicle theft has increased due to the low security in the vehicle it needs to enhance the security level in the vehicles. Traditional and commonly used key locks available in the vehicle 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 vehicle by the thieves this creates the demand of such type of lock which is new and provides an additional security level.

II PROBLEM DESCRIPTION

1. Issues In The Existing Systems

The security of template data in a biometric based system is one the central issue for the overall operation of the system. The biometrical information in a BMS needs security at multiple levels right from raw patterns, feature vectors before storage till template after storage in the system database. The security of template database is particularly of more importance as it can lead to severe degradation of performance or complete failure of the system. There are two important issues associated with the design and performance of a Multi-modal biometric system. The first issue is regarding the security of the templates stored in the database. The second issue is related to the storage and retrieval of templates in/from template database while dealing with large number of users. A biometric based application deals with various types of biometrical information of the prospective users. The biometrical information flows among various modules and have different formats.

2. Security of Template Database

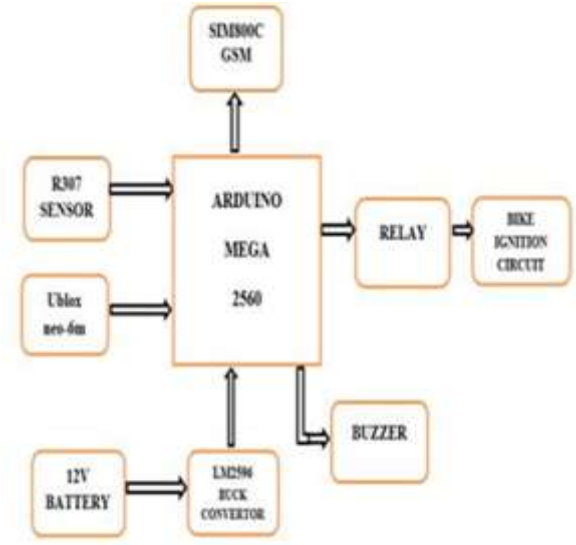
The template of is a set of numerical values denoting the unique feature points in the biometric modality of a user. The feature vectors are captured multiple times for a user during the enrolment phase. In this way, a template database of the biometric based system is built and is dynamic in nature. In the testing phase, proposed feature vector of the user is matched with all the corresponding sets of template of the same User. If the proposed template is matched closely with at least one of the available set then the user is accepted. In order to deal with increasing number of users in an application, one of the challenges for the research community is to design robust multimodal biometric system by ensuring the recognition accuracy of the system. In order to design a robust MBS system, the key issue is to select the type and number of modalities.

3. Template Storage And Performance Issues

For designing a multi-modal biometric system one of the important design issues for template database is to provide an efficient storage and retrieval mechanism to deal with large number of user. In the light of rapid generation of huge amount of data in various applications, researchers have got more attention towards scalability and speed of operation of a BMS. In such large BMS, besides the accuracy, search time, response time, storage and retrieval efficiency are important performance parameters.

III METHODOLOGY PROPOSED

A. BLOCK DIAGRAM OF BIOMETRIC VEHICLE LOCKING SYSTEM



The above diagram shows the block diagram of biometric vehicle system using GPS module. In our project the main aim is to prevent the vehicle from probable theft. To achieve this we are incorporating

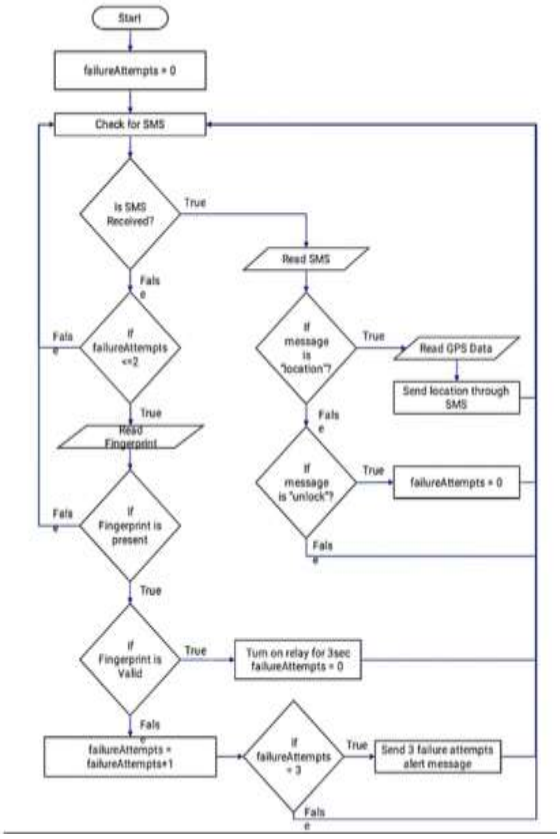
security by including biometrics, i.e. a fingerprint. In the beginning the owner of the vehicle must store his/her own fingerprint in the finger print module. The GSM modem is used to send and receive messages to and from the owner. The owner's mobile number has to be set fixed during the coding. To start the two wheeler one should enter the authorized fingerprint. If anyone enters an unregistered fingerprint, the owner will immediately receive a message and the local alarm system will be turned on. For theft prevention, we can also trace the two-wheeler by giving a call to the GSM modem which is embedded on the system. Then real time tracking begins and the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehicle can also be controller through notifications to the system. In this proposed project we are using GPS module to find the current latitude and Longitude of the present location.

The GPS module is UART (Universal Asynchronous Receivers/Transmitter) with a baud rate of 9600 bps. We are using two serial ports one, for the GSM modem and another one for the GPS modem. The coding is written in embedded c language and Arduino IDE was used to program it. It is a fitted device on the automobile. The whole monitoring of entire device is done by the mobile phone which delivers wireless connection amongst the vehicle tracking system device and the customer. The vehicle tracking device also has a dedicated sim card slot in which a GSM SIM card is inserted in to receive and send SMS. The user can send an SMS through his mobile phone; know the location of its vehicle and also the facility to safeguard the vehicle. So for the understanding of the whole operation of this vehicle tracking system is distributed in two parts:

1 Tracking the position of vehicle.
2 To provide security to vehicle.

The vehicle locking system consists of GPS and GSM receiver. Which provides real time position of the automobile

B. FLOW CHART



IV. HARDWARE DESCRIPTION

1. ARDUINO MEGA2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analogy inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Mega is

compatible with most shields designed for the Arduino Duemilanove or Diecimila. This board can be protected from the unexpected electrical discharge by placing a base plate.

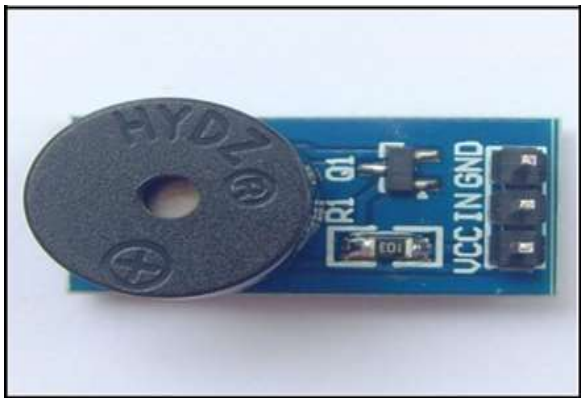
2. R3047 OPTICAL FIGER PRINT SENSOR:

Fingerprints are one of the many unique biometric signatures which we can use to identify people very accurately. But just by holding someone's hand and staring at their fingers can't be practical [grins]; we're not good at it. But computers are good at recognizing and matching patterns very fast and accurately. Before we can process a fingerprint pattern with a computer, we must "capture" it.

3. LM2596 DC-DC CONVERTER:

The LM2596 regulator is monolithic integrated circuit ideally suited for easy and convenient design of a step−down switching regulator (buck converter). It is capable of driving a 3.0 a load with excellent line and load regulation. This device is available in adjustable output version and it is internally compensated to minimize the number of external components to simplify the power supply design. Since LM2596 converter is a switch−mode power supply, its efficiency is significantly higher in comparison with popular three−terminal linear regulators, especially with higher input voltages.

4. 5V BUZZER MODULE:



A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "plug and play."

SOFTWARE DESCRIPTION

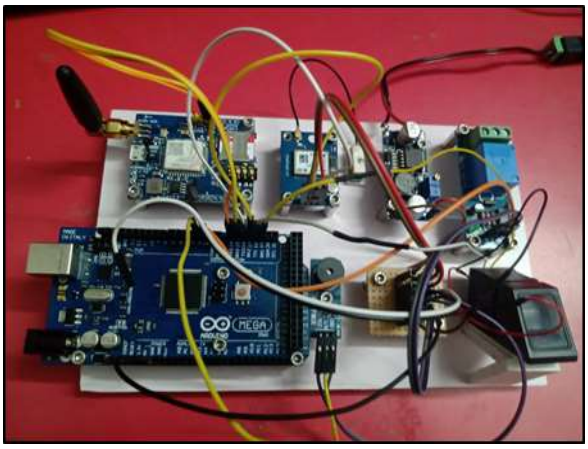
A. Arduino IDE:

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macos, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

B. Getting Start With Arduino Software (IDE):

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

V RESULT AND DISCUSSION



The result which we expect from our project is that the vehicle will be ignited only when the authorized person scans his/her finger on the fingerprint module. The fingerprints 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 matched with the stored data in the module. If the fingerprint data is found in the module then match condition occurs and the Arduino uno ignites the vehicle otherwise vehicle will not start. If unauthorized person placed his/her finger on the fingerprint module the vehicle will not start instead it sends a message using GPS and GSM Module to an authorized person. After attempting for 3 times the vehicle gets locked. Only authorized person can unlock the vehicle .and if the vehicle has been theft an authorized can easy track the location of the vehicle by using GPS which sends a SMS to the authorized person phone.

VII.CONCLUSION

The prototype of a fingerprint based vehicle locking system developed has specific sequence that must be followed before it can be used to ignite a vehicle. Basically, the fingerprint recognition software must be first initialized before fingerprint images can be loaded from a file of sample images. The last acquired fingerprint image is then analysed and its minutiae identified, extracted and stored as a template. The next step involves either enrolling the template or matching the template with other templates. The enrolment process button saves the last extracted template into the database. The identity number of the enrolled template is displayed in the log window. The identification process compares the query template against reference templates in a database. For verification, the identity number of the reference template to be matched with the query template must be supplied. In the results, it can be deduced that the use of biometric security systems offers a much better and fool proof means of restricting the ignition of vehicles by unauthorized users. Furthermore, it can be logically derived from the findings of this research work that fingerprint images can be used for motor vehicle ignition system control. Parallel port control codes used with fingerprint analysis codes can provide capabilities for allowing only authorized users, authenticated through their fingerprint images to ignite a vehicle.

ADVANTAGES

- Fingerprint module used as an additional security feature in the vehicle.
- Proposed good system to authenticate the user with the fingerprint recognition.
- Provides both biometric identification and alerting unit in the vehicle.
- Various features are added in the bike that efficiently identification and alerting unit in the vehicle
- Less memory space
- Easy to use and user friendly

DISADVANTADES

- In some places where there is no provision of GSM networks it is difficult for communication
- If the hardware destroy when the accident occur, the communication is difficult
- Injuries or burns to the fingertip can causes a person's fingerprint to become unreadable
- Distortion due to dirt and dust on the fingertip.

APPLICATION

- Motorcycles

- Transport vehicle
- Cars

REFERENCES

[1] Omidiora E. O. (2011) "A Prototype of a Fingerprint Based Ignition Systems in Vehicles" Published in European Journal of Scientific Research ISSN 1450-216X Vol.62 No.2 (2011), pp. 164-171 © EuroJournalsPublishing, inc, 2011, http://www.eurojournals.com/ejsr.htm.

[2] Karthikeyan.A "Fingerprint Based Ignition System" Published in Karthikeyan.A, Sowndharya. J /International Journal of Computational Engineering Research / ISSN: 2250–3005.

[3] Prashant Kumar R. (2013) "Two Wheeler Vehicle Security System" Published in International Journal of Engineering Sciences & Emerging Technologies, Dec. 2013. ISSN: 2231 – 6604 Volume 6, Issue 3, pp: 324334 ©IJESET.

[4] AlphaSigmaura Team (2005) "Computer Interfacing and control", Paper presented at the workshop on Computer Interfacing and Control, LadokeAkintola University of Technology, Ogbomoso, Nigeria.

[5] Visa M. Ibrahim "Microcontroller Based Anti-Theft Security System Using GSM Networks with Text Message as Feedback" Published in International Journal of Engineering Research and Development e-ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com Volume 2, Issue 10 (August 2012), PP. 18-22.

[6] Yang S. and Verbauwhede I. (2003) "A Secure Fingerprint Matching Technique", http://www.emsec.ee.ucla.edu./pdf/2003acm.pd

[7] Anil K. Jain, Arun Ross and Salil Prabhakar ,"An Introduction to Biometric Recognition", IEEE Transactions on Circuits and Systems for Video Technology, Special Issue on Image- and Video-Based Biometrics, Vol. 14, No. 1, January 2004.

[8] Debnath Bhattacharyya, Rahul Ranjan, Farkhod Alisherov A., and MinkyuChoi, "Biometric Authentication: A Review", International Journal of u- ande- Service, Science and Technology Vol. 2, No. 3, 2009,pp.13-27

[9] R. Sanchez-Reillo, C. Sanchez-Avila, A.Gonzalez-Marcos, "Biometric Identification Through Handgeometry Measurements", IEEE Transactions On Pattern Analysis and Machine Intelligence, Vol. 22, No. 10, October 2000, pp. 1168-1171.

[10] http://www.biometricinfo.org/fingerprintrecognition.htm,"Biometrics Information Resource"

[11] http://www.crimtrac.gov.au/fingerprintanalysis.htm, "Fingerprint Analysis– the Basics"

[12] R. K. Singh, "Crime in India 2011 - Statistics", for National Crime Records Bureau 2011.