ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 2, February 2019

Highly Secured Vehicle with Theft Protection and Accident Notification Using Bio Metric System

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ABSTRACT: In this present world our technology is growing up day by day, the need for security is also increasing in all areas. Our paper focuses on secured vehicle using fingerprint sensor. Finger print sensor is used for the authentication to start a vehicle. If any unauthorized person will access the vehicle, the location of the vehicle will be send to the owner of the vehicle. If the owner wants to save the vehicle means he will send the SMS to the vehicle unit to activate the shocking segment on steering to panic a culprit. At the same time this project is having an additional unit for identifying accident with location. The location will be sensed by the GPS and send the SMS to corresponding mobile number through the Bluetooth module. This approach would be fruitful to users who want to possess valid and authenticated entry and secured drive.

KEYWORDS: GPS (Global Positioning System), Bluetooth Module, MCU (Micro Controller Unit).

I. INTRODUCTION

In today's world vehicles have become an essential element of our everyday life. Unfortunately, vehicle theft is also increasing day by day. When the vehicle is stolen, no more response or solution could be available to help the owner of the vehicle to find it back. Vehicle Security System is based on GPS technology. We are generating the same results with same proficiency and accuracy by reducing its cost. The wireless communications industry is one of the fastest growing industries.

The theft intimation format in past years was based on only buzzers. By using the buzzer, it is easy to protect your vehicle. But when your car is away from you, the buzzer detection might not be beneficial. Where the technology is developed over the past few years, there is a tremendous increase in the theft of vehicles. It is the reason for creation of Vehicle Security system. So, more efficient protection method is required to protect a vehicle. Now with the help of GPS technology, theft can be prevented at a high security system. There is no problem when your car is in your vicinity or not.

From Times of India, it is found that vehicles are been stolen in India in every 23 minutes. By using vehicle security system, you can protect your vehicle positioned miles away from you. By using GPS technology, vehicle can be controlled by sending a SMS. Hence it is more easier way to protect your vehicle from getting theft.

II. OBJECTIVE OF THE WORK

- To identify the accident with location.
- To send the location of the vehicle to the user, if any unauthorized person will access the vehicle.

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- To save the vehicle means the user can send the SMS to the vehicle unit it will activate the shocking segment on steering.

III. BIOMETRIC SYSTEM

Fingerprint authentication refers to the automated method of verifying a match between human fingerprints. Fingerprints are one of many forms of biometrics which is used to identify individuals and verify their identity. The analysis of fingerprints for matching purposes generally requires the comparison of several features of the finger print pattern. It has unique features found within the patterns. It is also necessary to know the structure and properties of human skin in order to employ some of the imaging technologies.

Patterns

The three basic patterns of fingerprint ridges are listed below:

- **Arch:** The ridges enter from one side of the finger, rise in the center forming an arc, and then exit the other side of the finger.
- **Loop:** The ridges enter from one side of a finger, form a curve, and then exit on that same side.
- **Whorl:** Ridges form circularly around a central point on the finger.

IV. BLOCK DIAGRAM

The block diagram of vehicle theft and accident notification system is shown in Figure 1.

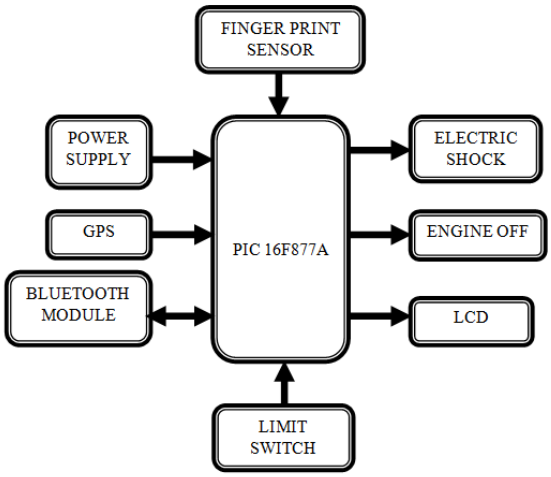

Figure 1. Block Diagram

The components used for this project is LCD, limit switch, finger print sensor, GPS and Bluetooth module.

A. BLUETOOTH MODULE

Bluetooth module is designed for transparent wireless serial communication. Once it is paired to a master Bluetooth device such as computer, smart phones its operation becomes transparent to the user. Data can be received through the serial input is immediately transmitted over the air. When the module receives data, it is sent out through the serial interface exactly at it is received. Some of the features are listed below

- Bluetooth v2.0+EDR
- 2.4GHz ISM band frequency
- Default baud rate: 9600
- Power supply: 3.6V to 6V DC

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- Passkey: 1234

B. FINGER PRINT SENSOR

A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern which is known as live scan. This live scan is digitally processed to create a biometric template which is stored and used to find the correct match. It can be classified as 3 types. They are,

i. Optical based fingerprint sensor
ii. Ultrasonic based fingerprint sensor
iii. Capacitance based fingerprint sensor

Mostly optical type finger print sensor is used widely.

Optical finger print sensor

Optical fingerprint imaging involves capturing a digital image of the finger print using visible light. The top layer of the sensor, where the finger is placed, is called as the touch surface.
The light hitting on the CCD forms pixels which are collectively joined to form an image and is created by electrical signal. These pixels are converted using ADC to make a digital image. Finally the image will be compared with the existing stored images.

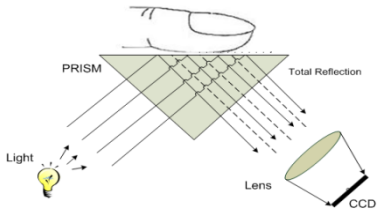

Figure 2. Scanning Device

The scanning device consists of a glass plate; on top of which you are supposed to place your finger is shown in Figure 2. After the scanning takes place, an inverted image of the finger is obtained. Where the ridges can be spotted by the darker areas in which the light reflection is greater and the valleys can be spotted by the lighter areas, where the light reflected is lesser.

The scanner is designed to recheck the image captured. The scanner will check whether the image captured has satisfactory pixel darkness. If any problem is obtained in the checking process, the image will be rejected and the suitable adjustments will be made so as to get a better quality picture.

C. LIQUID CRYSTAL DISPLAY

LCD (Liquid Crystal Display) is an electronic display module which is used in a wide range of applications. A 16x2 LCD display is very basic module and is commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and each character is displayed in 5x7 pixel matrix. Command and data are the two registers of LCD where the command register stores the command instructions given to the LCD. An instruction is given to the LCD for the operation of predefined task like

- Initializing it
- Clearing its screen,
- Setting the cursor position,
- Controlling display & etc.

The data register stores the data that is to be displayed on the LCD. The data is the ASCII value which is displayed on the LCD.

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D. MICROCONTROLLER

PIC16F877 Microcontroller belongs to a class of 8-bit microcontrollers of RISC architecture. It has 8kb flash memory to store a written program. Memory made in FLASH technology can be programmed and cleared which makes the microcontroller suitable for device development. It has data memory that is to be saved when there is no power supply. It is mainly used for storing important data that must not be lost if power supply suddenly stops.

E. LIMIT SWITCH

It can automatically monitor and indicate whether the movement limits of a particular device have been exceeded. A standard industrial limit switch is an electromechanical device that contains an actuator is linked to a series of contacts. When an object meets the actuator, the limit switch triggers the contacts to either form or break an electrical connection.

The contact symbol shows whether the device is normally open or normally closed. The symbol for a “normally open held closed” state indicates the open contact. Likewise, a limit switch has a symbol for a “normally closed held open” will have a closed wiring design but be held open.

V. RESULT AND ANALYSIS

All the modules are power excited by the power supply unit with the help of 7805 regulator. Whenever the accident is occurred the limit switch gives the digital 5V signal to the microcontroller PIC 16F877A. When the microcontroller receives the accident occurrence signal, it activates the transmitter UART unit. This unit sends the message to the corresponding mobile number. Figure 3 shows the experimental setup of the project work.

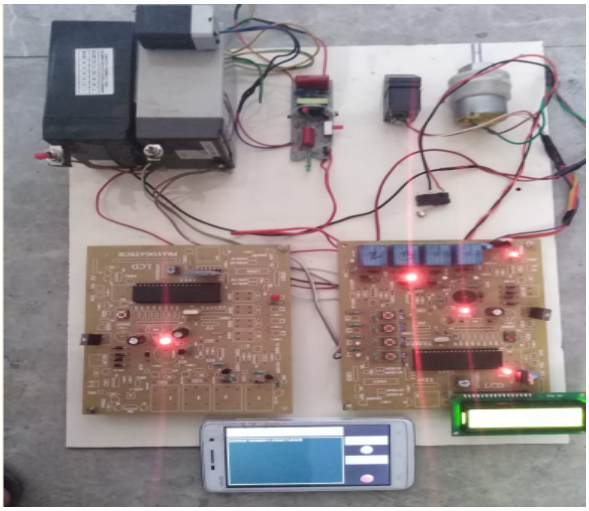

Figure 3. Experimental Setup

Vehicle theft can also be detected when unauthorized person access the vehicle. Where, sensor interfaced with MCU takes control and start collecting the information of the vehicle from the GPS which are sent to the corresponding mobile number. We can allow the unauthorized person by sending SMS as “access” else by sending SMS as “denied” shocking segment will be operated and engine will not get started.

Hence with this project implementation we can detect the position of the vehicle where the accident has occurred so that we can provide the first aid as early as possible.

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VI. CONCLUSION

This project presents vehicle theft protection and accident notification system with SMS to the user defined mobile numbers. The GPS tracking and GSM is designed and implemented with PIC16F887A Microcontroller in embedded system domain. The proposed Vehicle theft and accident notification system can track geographical information automatically and sends an alert SMS. The result shows that higher sensitivity and accuracy is indeed achieved using the project. This made the project more user-friendly and reliable.

VII. FUTURE WORK

In future, adding the driver's activity like using mobile phone, feeling sleepy while driving can be monitored and controlled. This may avoid many accidents on the spot because the life of human beings is more important than anything.

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