

Implementation of Billing System, Theft control and Accident notification Systems Based on GSM and GPS Technologies

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Abstract – According to Government act, everyone should follow the traffic rules. If a person violates any rules then the authorized person will charge penalty. Hence in this paper a billing system is implemented and the bill to be paid will automatically send to corresponding person's phone and to RTO Office.

The Security system now-a-days become a need for vehicles and available with many modern features. Here, in this paper a car security system comes with extra secure access i.e. accident detection, theft detection and message on GSM network is to be implemented. When accident happens, the intruder alert message will be sent to the user identities, to the hospital and to the police station also. After that, with the help of GSM network and Global Positioning System technique, it is easy to identify the accident location. When a car theft then the owner can stop the car ignition by sending a 'stop' message through GSM network communication. After that, with the help of Global Positioning System technique it is easy to identify the car parked location. To implement this choose ARM7 as the core, the new intelligent mobile vehicle Tracing system integrated with hardware modules such as RFID, GPS, wireless and GSM. The design of the system software used the embedded software developing platform based on ADS integrated development environment. By the hardware/software co-design, the new smart mobile vehicle tracing system is implemented which includes Automatic billing, RFID identification, Car accident detection, Car theft detection and GPS positioning.

Key words – Mobile vehicle Tracing, Automatic billing, GPS, GSM

1. Introduction

In the past decades, the issue of security has become more significant and the need for effective security systems has intensified. Many areas were marked as restricted, since illegal access can have serious

consequences for homeland security and can even result in the loss of lives in the case of heavy traffic. The systems use several vehicle features to identify the vehicle from different aspects and their combination could improve the overall system effectiveness and identify attempts of fraudulence. Typical applications would include high-traffic areas such as airports, embassies, power plants and military camps such that everyone should follow the traffic signalling lights. If anyone crosses the zebra crossing even when the red light ON (Fig 2) automatically the person details will send to nearby RTO Office. With the development of technology, people have higher expectation of living, country has invested a huge amount of money to the capital construction, especially on roads infrastructure. In these regarding, the roads infrastructure is developing fast, the highway mileage has enormous increase and there is an increasing number of vehicles. However, the huge number of cars raises problems of its own, there are more and more car accidents and violations of rules which are given serious attentions. For this, in this paper Car detection also implemented. However, most departments take care of this problem in traditional way, such as manual judgment and road checking. This traditional vehicle checking way has some faults such as leak checking, false checking, and is a heavy work for vehicle checking people, so it needs to find a smart mobile vehicle Tracing system to replace the traditional one.

2. System Function and Composition

As shown in Fig 1, this system builds a new vehicle tracing system based on ARM7, embedded processing technology, automatic billing system, GSM Wireless mobile telecommunication technology, GPS position technique As shown in the figure 1, this system builds a new Tracing to vehicles which break the rules or owe the charge. This system has the following features.

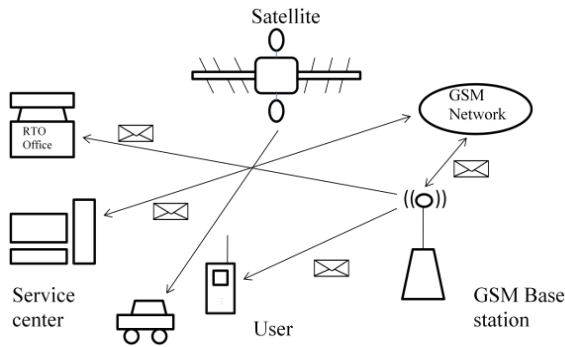


Fig 1 System Composition

A. Billing System

When the system works, the RFID reader reads the data in the Tag and then sends the information to RTO Office and user through GSM net.

B. Accident Detection

The system recognizes the vehicle when an accident happens by using the vibration sensor. So by using this ARM collects the data and then a message is send to user identities, to the hospital and to the Police station also.

C. Theft Detection

When the vehicle is theft then the vehicle's Owner can stop the vehicle ignition by sending a stop message through GSM network. By using GPS Technology the car stopped location will send to the Owner's Mobile.

D. GPS Positioning

The system can correctly send the position and time of the checking vehicle to the server centre by GPS positioning.

3. Hardware Implementation

Smart Mobile Vehicle Tracing System is composed of two sections of peripheral equipment , GPS, GSM, RFID and Communication Modules. The detailed hardware is shown in **Fig 2 & Fig 3**.

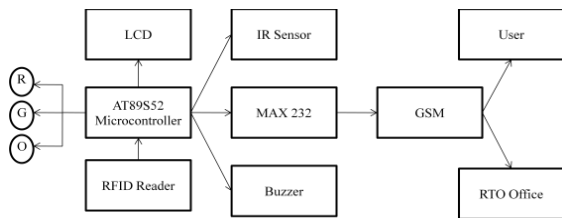


Fig 2 Transmitter

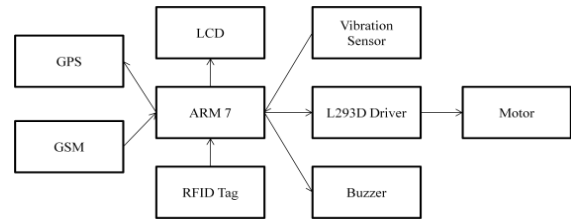


Fig 3 Receiver

The system contains two sections

- 1) Transmitter Section
- 2) Receiver Section

The Transmitter Section Contains AT89S52 Controller, RFID Reader. The yellow light is used to indicate that the Red light is going to be ON, after that when the Red light is ON, the reader will be activated. so when any vehicle cross the zebra crossing then reader reads the data present in the Tag and sends the data to ARM. So the data received by RFID Reader is send to GSM network through Max 232 serial communication. Then the penalty bill will send to the corresponding person through GSM network in the form of sms. When ever the Green light ON the system will be deactivated itself. The Receiver Section Contains ARM 7 Controller, GSM,GPS, RFID Tag, vibration Sensor, Motor, and Buzzer. When an accident happens the vibration sensor identify it and sends that signal to ARM7 and hence it will stop the motor running and then send sms to user identities, hospital and to police station by using GSM net and inform about the car accident. When a Car theft is identified by the owner then he can stop the car by sending a stop message on GSM network and then by using GPS technique he can find out the car location.

4. Software Design

The development of the software is based on ADS integrated development environment discussed below.

4.1 Software Implementation

The ADS integrated development environment is a microcontroller for ARM which is developed by the ARM Company, its full name is ARM Developer Suit and the mature vision is ADS1.2. ADS1.2 supports all the ARM microcontroller before ARM10, supports the software debug and JTAG simulate, supports the assembly language, C and C++ language. It has the merits of high compile efficiency and rich system libraries. The environment can run on Windows98 Windows XP Windows 2000 and Red Hat Linux.

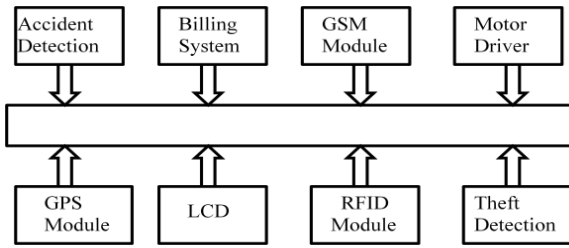


Fig 4 Software Composition

4.2 Implementation

The design of this system software can be divided into three modules they are billing system module, accident detection module and the Theft detection module are executed in the main program and the communication module is executed in a program alone. The communication between each module depends on the message passing.

4.2.1 Flowchart Implementation of Theft Detection

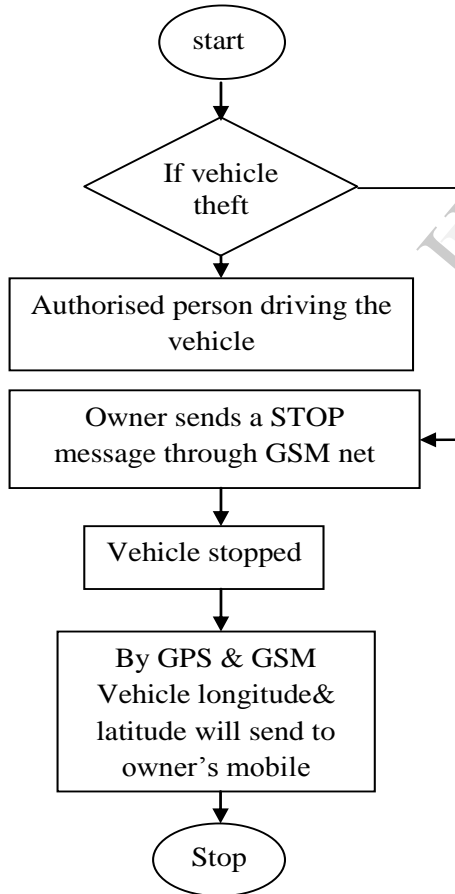


Fig 5 Theft Detection Flowchart

4.2.2 Flowchart Implementation of Billing System

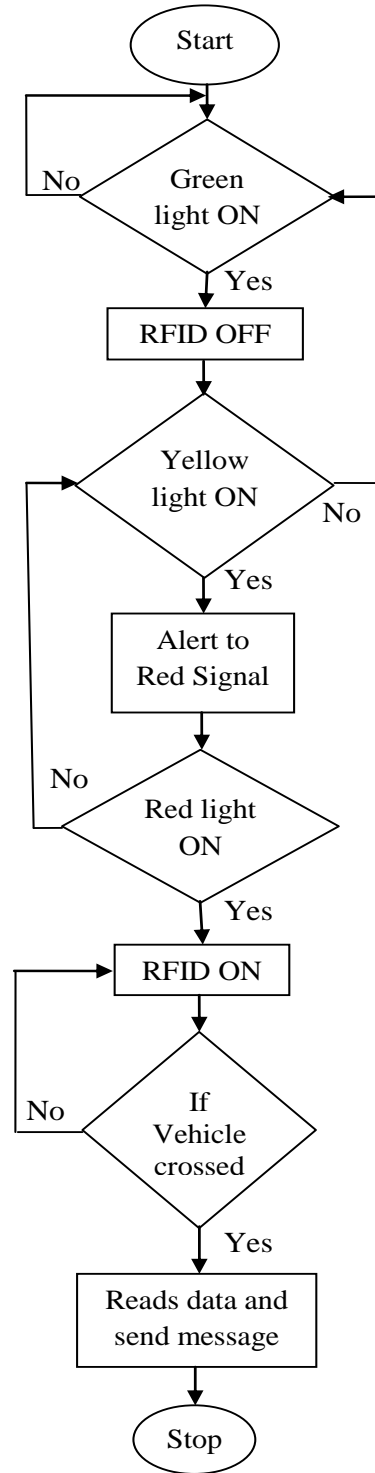


Fig 6 Billing System Flowchart

4.2.3 Flowchart Implementation of Accident Detection

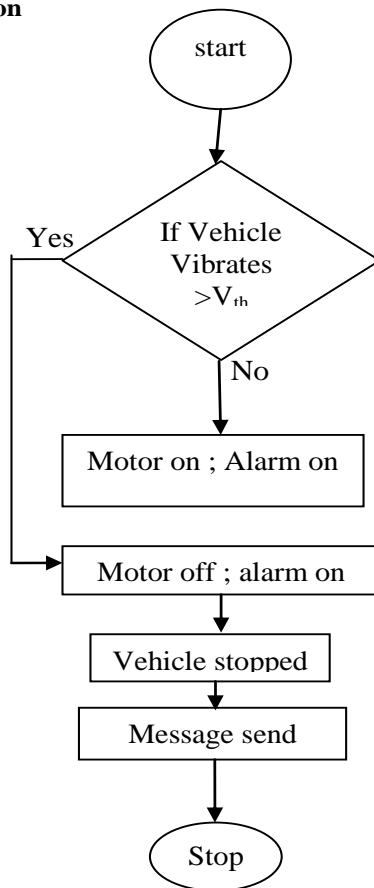


Fig 7 Accident detection Flowchart

5. Conclusions and Further Recommendation

This paper proposes the integration of a vehicle Tracing system, which significantly increases security in vehicle identification by integrating different modules. Three different subsystem implementations were presented, namely the Automatic Billing system, Car theft detection and Accident detection. The Three distinct modules were analyzed and discussed, which in turn indicate that these modules can be used to boost the overall performance. Finally, issues such as installation and operation principles were briefly discussed. The proposed system could be installed in entrance check points that require high security standards, such as government buildings, army camps or country borders and it can considerably facilitate prompt and

effective vehicle tracing. Immediate benefits are the ability to reduce the number of personnel required to operate security gates, as well as to increase their level of awareness, while ensuring their personal safety. The new intelligent mobile vehicle Tracing system uses the automatic billing technique, accident detection technique, the wireless communication technique, meets the traffic auditing department's needs about Mobile Vehicle Tracing. The system has the advantages of small size, low costs, full featured and powerful expansibility.

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