A System for Car Accident Sensing, Indication and Security

[1]**Asst. Prof. Amol Sapkal**[*], [2]**Asst. Prof. Monish Jaiswal,** [3]**Akshay Warghane**
[1]Department of E&TC, DMIETR Wardha, Maharashtra, India
[2]Department of Electronics, RGCER Nagpur, Maharashtra, India
[3]DMIETR, Wardha, Maharashtra, India

Abstract— As human life is more valuable than anything else, here a system is proposed in a way to save human lives in a timely manner. When a car meets with an accident, immediately the car's number and the GPS co-ordinates of the location are messaged to the owner family and nearby police station, thereby ensuring timely help to the needy. The system is designed to find the vehicle accident location by means of sending a message using a system which is placed inside of vehicle. It also provides vehicle security against theft. In this system the AVR microcontroller ATmega328 is used for cost effective and easy programming purpose, GPS module to trace the vehicle and GSM module to send alert message to an authorized numbers. This system is also provided with emergency switch which can be turned off through a SMS; in case of vehicle theft situations the owner can know vehicles current location and based on that he can stop the vehicle by sending a predefined SMS message to this system. After receiving SMS message from owner this system stops the ignition system hence the vehicle will not function anymore. Again it will come to the normal condition only after entering a secured password.

Keywords: — GPS, GSM, AVR Microcontroller, SMS.

I. INTRODUCTION

Many people make the assumption that car theft only occurs in seedy areas of town, but car theft can occur anywhere in any area of town. People need to be careful not to entice thieves by making common mistakes. Theft is one of the most common behaviours. Where the ownership of a physical possession can be altered without the rightful owner's consent, theft prevention has been introduced to assert the ownership whenever the rightful owner is physically absent. An anti-theft system is any device or method used to prevent the unauthorized appropriation of items considered valuable. In addition it can also perform accident detection in order to provide the security to the users. In that case message will be sent to nearest police station or hospital. The existing system are Car alarm, flashing light techniques which makes use of different type of sensors, for example pressure, tilt and shock & door sensors, but the drawbacks are cost and it only prevents the vehicles from theft but can't be used to trace the thief. In case of wheel and steering lock system, they are visible from outside the car and prevent the wheel from being turned more than a few degrees. The proposed antitheft system for smart cars used to prevent them from theft using AVR microcontroller. Here, the proposed system is a low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller & a mobile for the communication purpose. [1] Tracking of the stolen vehicle can be done through the internet interface. Once the position of the stolen vehicle is found out using the GPS, a location request is sent back to the central processing system, which takes care of the event to be performed using remote functions. Control functions of the tracking system allow us to perform many functions such as stop ignition system, automatic position reporting based on time or distance, etc.[2] The Global System for Mobile communications (GSM) is the most popular standard for mobile phones in the world. Over billion people use GSM service across the world. The usability of the GSM standard makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world. Road accidents constitute the major part of the accident deaths all over the world. According to the Insurance Institute for Highway Safety (IIHS), new cars and its high-tech safety features have helped to lessen auto related deaths over the past 12 years. Though it credits technology for lessening auto accidents, yet the IIHS cannot help accusing bad driving behaviours like drunken driving, speeding and not using seatbelts for still causing major traffic deaths.[3] This system is an embedded intelligence implanted into the auto-mobile. Our purpose is to find the vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system. Most of the time exact location of accident could not be found because we don't know where the accident has happened. In order to give treatment for injured people, first we need to know where the accident happened through location tracking and sending a message to your related one or to the emergency services. System also used ultrasonic sensor which detect another vehicle when it come in a range of ultrasonic sensor and the Beep get turn ON. Beep activate only when another vehicle come very near and in a range of ultrasonic sensor.

II. EXISTING SYSTEMS

The number of cars is increasing rapidly and so is the number of car theft attempts. There are lot of car security systems that had been produced lately, but the result is still disappointing as the number of cases still increases. The

thieves are inventing cleverer and stronger stealing techniques that need more powerful security systems. It also shows that the alarm itself does not contribute much in preventing a car theft.[4] The existing system are Car alarm, flashing light techniques which makes use of different type of sensors, for example pressure, tilt and shock & door sensors, but the drawbacks are cost and it only prevents the vehicles from theft but can't be used to trace the thief. In case of wheel and steering lock system, they are visible from outside the car and prevent the wheel from being turned more than a few degrees. The proposed antitheft system for smart cars used to prevent them from theft using AVR microcontroller.

III. PROPOSED SYSTEM
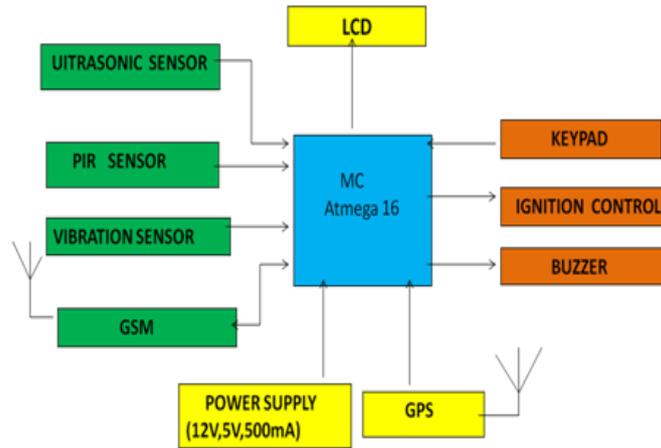
A. Architecture of the Proposed System.

Figure 1: Block diagram of Car Accident Sensing, Indication and Security with Alert System

Fig.1 shows the block diagram of Car Accident Sensing, Indication and Security with Alert System. Our proposed system is a combination of two different systems which are Car Security System as shown in figure 2 and Car accident detection System as shown in figure 4. We discuss both separately as follows.

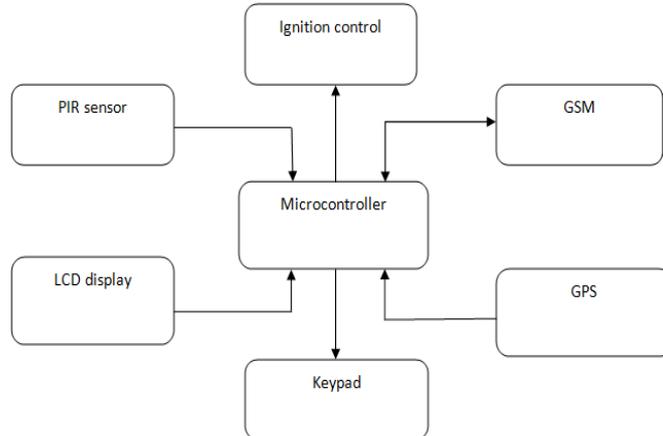**B. Car Security System**

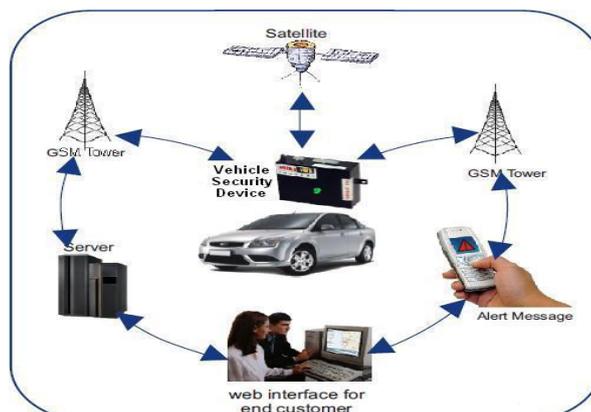Figure 2: Block diagram of Car Security System

Figure 3: Process of Car Security System

When the key is inserted inside the keyhole, the PIR sensor detects the obstacle and triggers the microcontroller and SMS is send to the owner number. When the car starts running, the client receives a confirmation SMS that car is running now. If this is illegal or any intruders try to run the car, then the change in location is traced by the GPS and sends the message to the owner that 'car location change' and after few minutes the ignition system get turned off and send some predefined codeword or password and GPS location by SMS using GSM. The SMS will give the information of longitude and latitude values. Using these values the position of the car can be estimated as shown in figure 3. The ignition system can be started again when the owner enter that password which is predefined in the system.
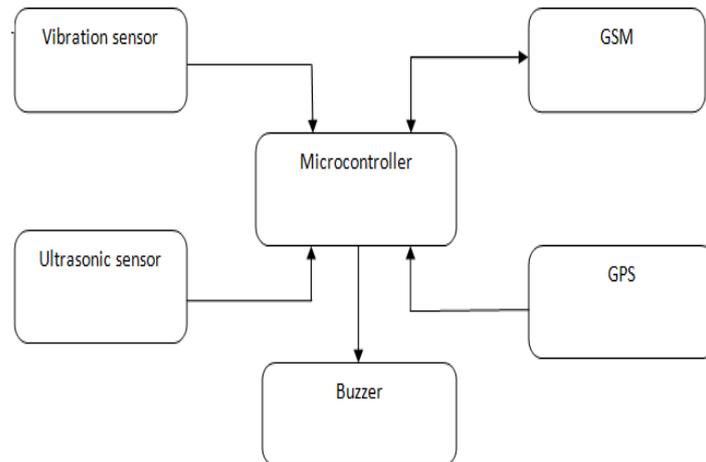
C. Car Accident Detection System

Figure 3: Block diagram of vehicle accident detection system

The GPS receives the location of the vehicle that met with an accident and sends its location to a predefined mobile number through a message. This message will be send using GSM modem present in the system. The message will give the information of longitude and latitude values. Using these values the position of the car can be estimated. The block diagram of Car Accident Detection System is shown in figure 3.
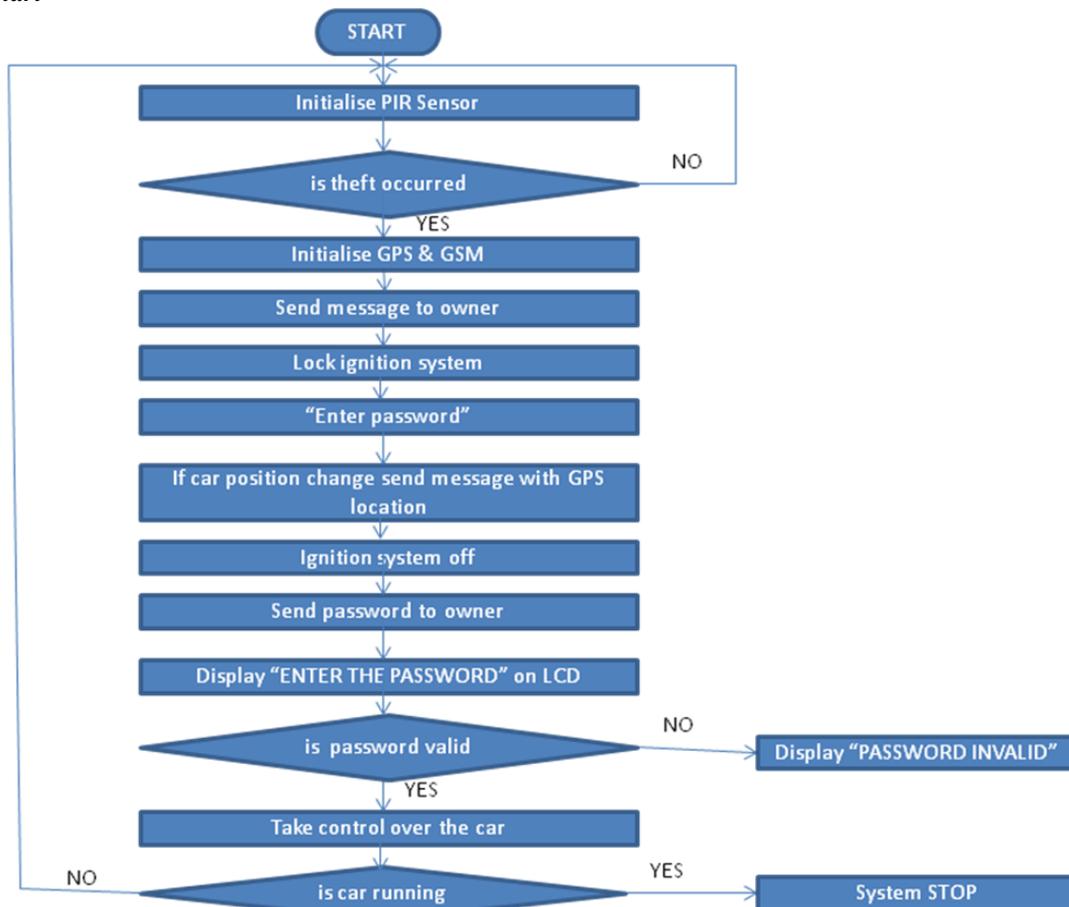
D. Flowchart

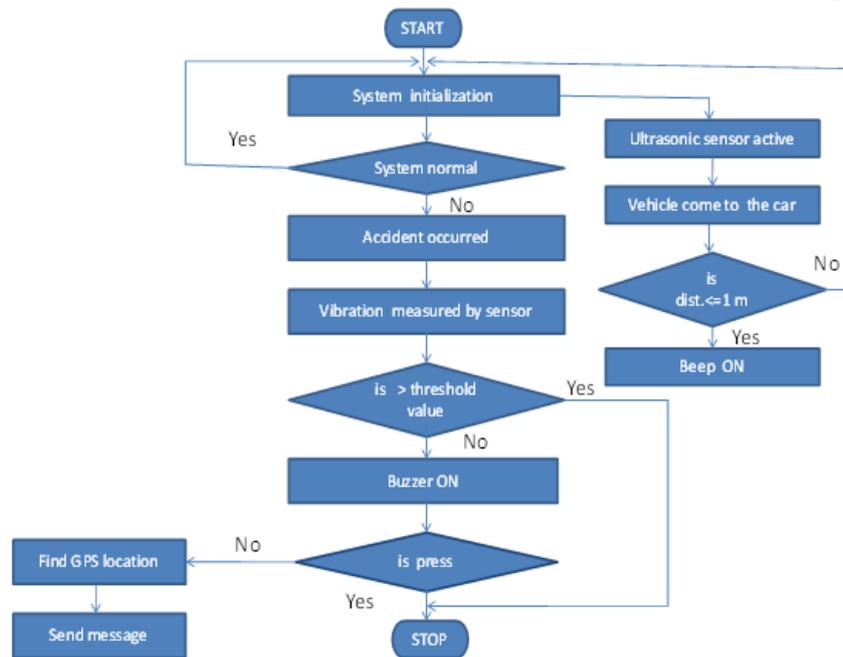Figure 4: Flowchart of Car Security System

Figure 5: Flowchart of vehicle accident detection system

IV. MODULES USED

A. Microcontroller

Atmega328 is the high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.

B. GSM Modem

GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. [1]

C. GPS Modem

The Global Positioning System (GPS) is a space based radio-navigation system consisting of a constellation of satellites and a network of ground stations used for monitoring and control. GPS is operated and maintained by the Department of Defence (DOD). The GPS is a constellation of satellites in orbit around the Earth which transmit their positions in space as well as the precise time. It is the receiver that collects data from the satellites and computes its location anywhere in the world based on information it gets from the satellites

V. RESULTS

The proposed system when hardware implemented has shown following results for various conditions as shown in figure 6.

Figure 6: Results of proposed System

VI.   CONCLUSION

The proposed system is made to bring in a low cost and effective Car Accident Sensing, Indication and Security with Alert System. The major advantage of this system is that the whole work can be made with a meagre amount of investment and can be used in any automobiles and thus bringing in less sophisticated and simple technology. Car Accident Sensing, Indication and Security with Alert System are a landmark of both Technological as well as Social excellence. This system is capable of indicating theft in car so it could help to control the theft rate; also it helps in providing the necessary help to the accident location to save life of people.

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