Intelligent Car Security System Using Dynamic Generation of Random Security codes

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ABSTRACT *Now-a-days lots of accidents happen on highways due to increase in traffic and also due to rash driving of the drivers. And in many situations the family members or the ambulance and police authority is not informed in time. This result in delaying the help reached to the person suffered due to accident. Our project Vehicle Detection with GPS and GSM modem is designed to avoid such situations. Road safety is an all-time global concern. Everyday a large number of human lives are lost due to accidents and delay in calling the rescue services. Researchers are looking for a solution to reduce the loss of such lives. This delay is caused due to various reasons. The most common one is the lack of proper communication to the emergency services. We propose an efficient system that automatically notifies these services about the accident and also guides them to the spot. When an accident occurs, it is detected by the Crash Sensor of the Air Bag System installed in the vehicle. If these observations are above a preset critical point, a controller triggers a message to notify the Emergency Services. We Employ Vehicular AD-Hoc network (VANET) to deliver this message to the rescue services. VANET also helps these services in finding the optimum route to the accident spot, using ABEONA algorithm and a traffic signal module.*

INTRODUCTION

Observing the present day conditions, it is well known that the number of vehicles rolling out on road is rapidly increasing. In accordance to that, the accident rate and pollution levels are also greatly increasing. Apart from this, there are several other factors causing the loss of life. Such factors include carelessness of the driver, delay in reaching the accident spot etc. It is shocking to realize that in most cases causalities occur due to improper or no communication to the rescue team. We are now looking forward to solve these issues by proposing an efficient idea and reduce the loss of human life as much as possible. Every driver knows the situation: you hear a siren of an emergency vehicle and struggle what to do next. It is often hard to locate the emergency vehicle, to decide where it is driving to, and what would be the best manoeuvre to give way. Therefore, drivers often react too late or in a wrong way, which can lead to severe accidents with exactly those vehicles that should bring help and relieve. During emergency response trips, emergency vehicles have a much higher risk of being involved in accidents than other cars. With emergency vehicles, we mean all kinds of vehicles that are authorized to use emergency signalling equipment (e.g., blue lights and sirens) to be exempt from certain traffic regulations. Examples for emergency vehicles are police cars, ambulances, fire trucks, or vehicles of other emergency response organizations. The German Federal Highway Research Institute (BASt) [1] found out that such vehicles have an 8 times higher risk of being involved in traffic accidents with serious injuries and a 4 times higher risk with respect to lethal accidents compared to an average vehicle. The risk of involvement in accidents with high property damage is even 17 times higher. Analysis in [2] reveals that in 60 percent of all cases, accidents are caused by errors of the driver of the emergency vehicle. In 30 percent, wrong behaviour of other drivers is the root cause. 44 percent of such accidents happen at intersections where the traffic situation is often complex and unclear. In addition to the high accident risk, wrong behaviour of other drivers also slows down the emergency vehicle and prevents it from reaching the emergency scene earlier For example in traffic jams, confused drivers often do not know how and where to form a suitable corridor to let the emergency vehicle through. To support these findings, we have conducted a video survey in cooperation with a local emergency service organization.

DESCRIPTION:

RELAY UNIT:

The switches at our home need to be operated manually by hand or "mechanically triggered" in order to work. If we need to control the switch using a microcontroller which does nothing but produces 5V or 0V at its output pins then we would require extra mechanical arrangements like a servo with an arm, to press the switch. Instead of building such complicated arrangements we can go with a relay. These can directly be controlled by electrical means. The below shown diagram is of a SPDT (Single Pole Double Throw) Relay. It consists of 5 terminals. Two of them are from the coil where the input to drive the relay is supposed to be given. The other three are NO (Normally Open), NC (Normally Closed) and COM (Common).When no input is given to the coil, there is no magnetic field produced. So the "NC" and "COM" terminals are connected and the "NO" terminal is left free. When the input is given, the current flowing through the coil produces magnetic field and thus attracting the lever, which breaks the connection between "COM" and "NC" and makes a connection between "COM" and "NO" terminals. Again when the input is removed, the spring attached to the lever pulls it back and "COM" and "NC" connection is re-established.

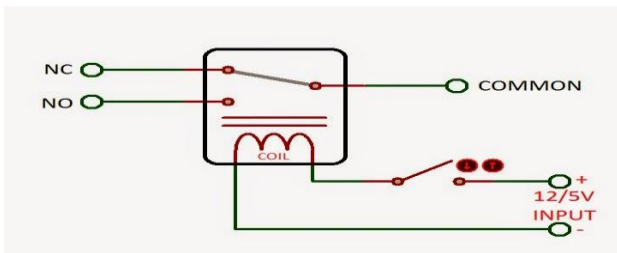

Fig 2.1 Relay unit

LCD DISPLAY:

LCD (Liquid Crystal Display) screen is an electronic display module and it has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

Pin No.	Name	Description
Pin no. 1	**VSS**	Power supply (GND)
Pin no. 2	**VCC**	Power supply (+5V)
Pin no. 3	**VEE**	Contrast adjust
Pin no. 4	**RS**	0 = Instruction input 1 = Data input
Pin no. 5	**R/W**	0 = Write to LCD module 1 = Read from LCD module
Pin no. 6	**EN**	Enable signal
Pin no. 7	**D0**	Data bus line 0 (LSB)
Pin no. 8	**D1**	Data bus line 1
Pin no. 9	**D2**	Data bus line 2
Pin no. 10	**D3**	Data bus line 3
Pin no. 11	**D4**	Data bus line 4
Pin no. 12	**D5**	Data bus line 5
Pin no. 13	**D6**	Data bus line 6
Pin no. 14	**D7**	Data bus line 7 (MSB)

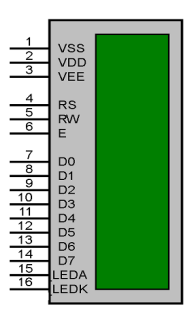

Fig: 2.1: LCD Display

Above is the pin details and description of a 16 X 2 LCD display In this project design all the data pin of LCD display are connected to port 2 of microcontroller, controller pins RS, RW, EN are connected to first 3 pins of port 1.

ARM PROCESSOR:

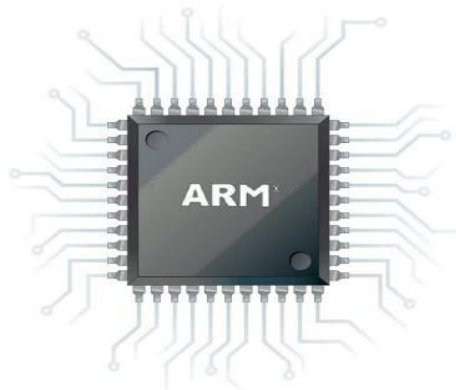

Fig 2.3 ARM Processer

ARM is computer processor based RISC architecture. A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical processors in average computers. This approach reduces costs, heat and power use. The low power consumption of ARM processors has made them very popular: The ARM architecture (32-bit) is the most widely used architecture in mobile devices, and most popular 32-bit one in embedded systems. ARM7 family includes the ARM7TDMI, ARM7TDMI-S,ARM 720T ,and ARM7EJ-S processors.TheARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power-sensitive applications, the ARM7TDMIsolution provides the low power consumption, small size, and high performance needed in portable, embedded applications. The ARM7TDMI-S core is the synthesizable version of theARM7TDMI core, available in both VERILOG and VHDL, ready for compilation into processes supported by in-house or commercially

GSM MODEM:

Fig 2.4 GSM Modem

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller through MAX232. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and

control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging. The TX pin of modem is connected to RX pin of 8051 and RX pin of modem is connected to TX pin of 8051 so that the communication is established between them. AT commands are used to initiate GSM modem in order to do any job. The list of some important AT commands used in this design is given below

Command	Description
ATA	Answer command
ATD	Dial command
ATH	Hang up call
ATL	Monitor speaker loudness
ATM	Monitor speaker mode
ATO	Go on-line
ATP	Set pulse dial as default
ATT	Set tone dial as default
AT+CSTA	Select type of address
AT+CRC	Cellular result codes

SMS PDU mode:

Command	Description
AT+CMGL	List Messages
AT+CMGR	Read message
AT+CMGS	Send message
AT+CMGW	Write message to memory

SMS Text mode:

Command	Description
AT+CSMS	Select message service
AT+CPMS	Preferred message storage
AT+CMGF	Message format
AT+CSCA	Service centre address
AT+CSMP	Set text mode parameters

AT+CSDH	Show text mode parameters
AT+CSCB	Select cell broadcast message types
AT+CSAS	Save settings
AT+CRES	Restore settings
AT+CNMI	New message indications to TE
AT+CMGL	List messages
AT+CMGR	Read message
AT+CMGS	Send message
AT+CMSS	Send message from storage
AT+CMGW	Write message to memory
AT+CMGD	Delete message

BLOCK DIAGRAM:

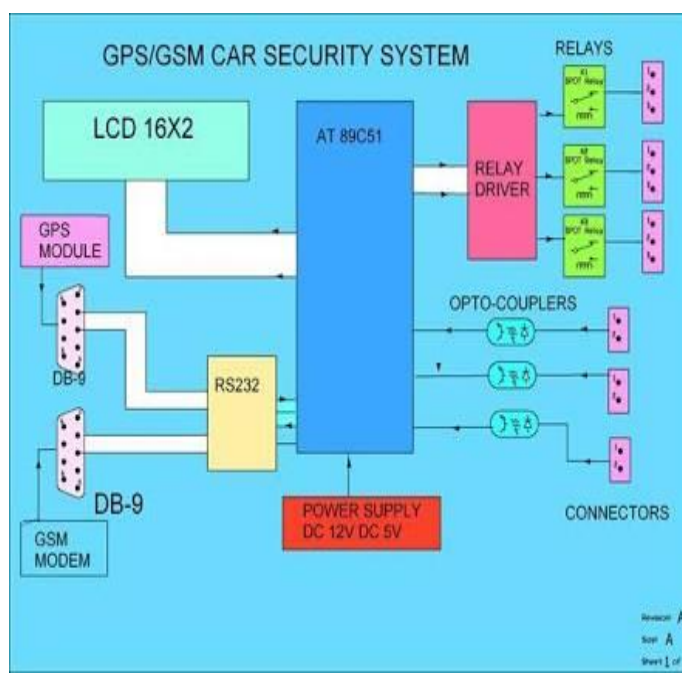

Fig. 2.5 Block diagram

PRINCIPLE OF OPERATION

This project is used to send location information to concern person in case of accidents and this module broadcast that accident information to nearest vehicle unit as well.In case of accidents the sensor will detect that signal. Sensor sensed signal will be digitised by the help of monostable multivibrator and then multivibrator sends that sensed signal to ARM via Interfacing unit(Buffer, Driver and Relay). ARM

activates GPS to read co-ordinates of current location. ARM in turn sends that location information to concern person via GSM module. VANET stands for Vehicular Ad-Hoc Network. VANET will be having IR Broadcasting network to establish communication between vehicles. Accident detection information will broadcasted by using IR transmitter. Sensor sensed signal will be send to IR Broadcaster for broadcasting. The IR Receiver which is located in another vehicle receives the broadcasted signal and sends to buffer for temporary storage, driver to get inversion of the signal with high gain and then relay to provide alert regarding accident detection.

ADVANTAGES:

- This application is easy to install and easy to operate.
- More reliable than manual Operation
- Complete automation system.
- Sensors based input measuring and control.
- ARM microcontroller based reliable design.
- Automatic control and alerting through GSM.
- Live status displays on LCD.
- Easy to operate and less manpower based design.
- Efficient design and Easy to operate.
- Eliminates Manual operations.
- Fast response
- Useful for multi industrial automation.

DISADVANTAGES:

1. Periodic monitoring is needed.
2. Careful handling of Sensors is required.

APPLICATIONS:

1All kind of industries and automatic industries like
2. Steel industries/factories.
3. .Food making automobile industries.
4. Automobiles like (cars, vans and heavy industry)
5. Small scale spare part design industries.
6. Embedded system

FUTURE APPLICATIONS:

- Effective in implementation.
- Low power consumption, and compact size,
- High reliability, due to the usage of power semiconductor devices,
- Greater control range due the usage of Frequency Modulation with a PC.
- Vehicles monitored from a remote area (no need of 'line-of-sight' arrangement).

CONCLUSION:

In this paper, we have proposed a novel method of tracking the accident happened vehicle by using GPS and GSM technology. This paper gives a design which has many benefits like low cost, portability, small size. This system uses the microcontroller in conjunction with vibration GPS and GSM. Interfacing which reduces the alarm time to a large level and give the location of accident accurately. It can also overcome the issue of lack of automated system for the detection of the site of accident. As a result, the time for detecting the site is reduced and the person can be treated as soon as possible which will save many lives.

LIMITATIONS:

The proposed system only works in the places of good reception of signal and remote areas where there is no strong GSM signal, the equipment does not respond always

There should be always continuous power supplied to the equipment so that the microcontroller and phone connected to it works.

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