

## Accident identification using GPS and GSM in Smart Vehicles

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**Abstract-** Day by day man improving technology and introducing new technologies to make human lifestyle so simple, safety and secure. But still we have some problem whenever we face some sudden unexpected situation occurs like accident. We are losing so many lives because of delay in reaching the hospitals or intimating to ambulances. This project is designed to inform about the accident location that has occurred to concerned persons. The main application of this system is track the vehicle using the GPS modem. This modem gives the information about its position whenever required in the form of latitudes and longitudes. This is done with the help of the GPS satellite and the GPS module attached to the vehicle which needs to be tracked. The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS[3] works in any weather conditions, anywhere in the world, 24 hours a day. Whenever the accident occurs to any vehicle with any other vehicle or with something else, it will be detected by the MEMS sensor, this information is sent immediately to the controlling unit i.e. to the ambulance using a GSM modem by. The provision to change the mobile number to which the message has to be sent is also provided in this system. A 16X2 LCD is also provided to display the location of the accident occurrence.

### I. INTRODUCTION

Vehicle tracking system main aim is to give Security to all vehicles. Accident alert system main aim is to rescuing people in accidents. This is improved security systems for vehicles. The latest like GPS are highly useful nowadays, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of vehicle.

This new technology, popularly called vehicle Tracking Systems which created many wonders in the security of the vehicle. This hardware is fitted on to the vehicle in such a manner that it is not visible to anyone who is inside or outside of the vehicle. Thus it is used as a covert unit which continuously or by any interrupt to the system, sends the location data to the monitoring unit.

When the vehicle is stolen, the location data from tracking system can be used to find the location and can be informed to police for further action. Some Vehicle tracking System can even detect unauthorized movements of the vehicle and then alert the owner. This gives an edge over other pieces of technology for the same purpose.

This accident alert system in it detects the accident and the location of the accident occurred and sends GPS coordinates to the specified mobile, computer etc. The fire detector circuit in it is used to detect fire in the vehicle, if the temperature inside the vehicle goes above a certain limit then a warning will be automatically send to the intend receiver. The infrared sensor which is additionally interfaced to the microcontroller is used to detect the obstacles

and accidents, in any case if any mishap occurs then its warning will be directly send to the intended receiver.

## II. LITERATURE SURVEY

The Rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. This paper will provide an optimum solution to this draw back. This paper presents vehicle accident detection and alert system with SMS to the user defined mobile numbers. The GPS tracking and GSM alert based algorithm is designed and implemented with LPC2148 MCU in embedded system domain. The proposed Vehicle accident detection system can track geographical information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy is indeed achieved using this project. EEPROM is interfaced to store the mobile numbers permanently. This made the project more user-friendly and reliable.

This paper proposes a new dimension in order to allow early response and rescue of accident victims; saving lives and properties. Proposed system uses the capability of GPS and GSM along with the android phone to provide a solution which can be used to precisely detect the accident spot and to send the emergency notification to the nearby hospital's ICU and to the victim's relatives Sensors and the switches/other components used in system is distributed throughout the car hence provides more flexibility while mounting into the vehicle. Using the open source android adds another advantage as we can work on top of some already built APIs for GPS and GSM interfacing hence decreasing the total project completion time. Overall the system performance is increased.

In highly populated Countries like India, everyday people lose their lives because of accidents and poor emergency facilities. These lives could have been saved if medical facilities are provided at the right time. This paper implies system which is a solution

to this drawback. Accelerometer sensor can be used in car security system to sense vibrations in vehicle and GPS to give location of vehicle, so dangerous driving can be detected Automatic accident detection and reporting system is designed in this paper. When accident occurs, it is sensed by Accelerometer. Short message including location of accident obtained using GPS, is sent via GSM network. It provides more than 70% safety for four wheelers.[4]

## III. HARDWARE DESCRIPTION

Accident identification using GPS and GSM

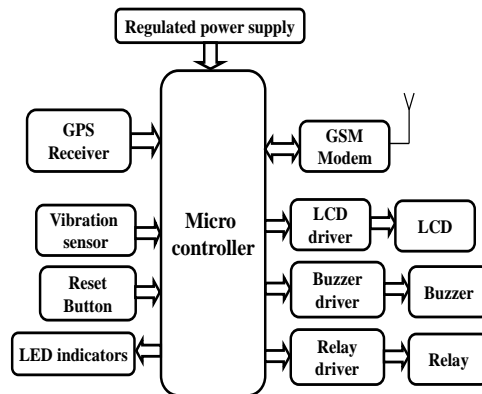


Fig1: Block diagram of Accident identification using GPS and GSM

### Microcontroller:

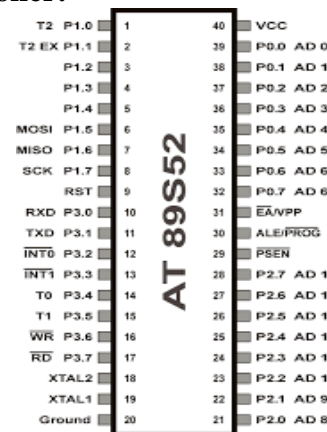


Fig2: Pin diagram of 8051 microcontroller

The generic 8051 architecture supports a Harvard architecture, which contains two separate buses for both program and data. So, it

has two distinctive memory spaces of 64K X 8 size for both programmed and data. It is based on an 8 bit central processing unit with an 8 bit Accumulator and another 8 bit B register as main processing blocks. Other portions of the architecture include few 8 bit and 16 bit registers and 8 bit memory locations.

Each 8051 device has some amount of data RAM built in the device for internal processing. This area is used for stack operations and temporary storage of data.

This bus architecture is supported with on-chip peripheral functions like I/O ports, timers/counters, versatile serial communication port. So it is clear that this 8051 architecture was designed to cater many real time embedded needs.

### AT89S52 Microcontroller Features

- Compatible with MCS®-51 Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory
- Endurance: 10,000 Write/Erase Cycles
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-bit Timer/Counters
- Eight Interrupt Sources
- Full Duplex UART Serial Channel
- Low-power Idle and Power-down Modes
- Interrupt Recovery from Power-down Mode
- Watchdog Timer • Dual Data Pointer
- Power-off Flag • Fast Programming Time
- Flexible ISP Programming (Byte and Page Mode)
- Green (Pb/Halide-free) Packaging Option

### Description

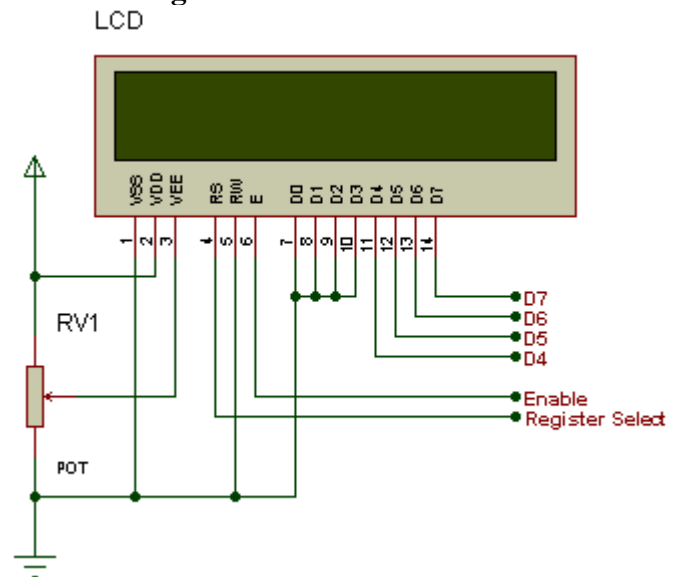
The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a

conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

### LCD DISPLAY:

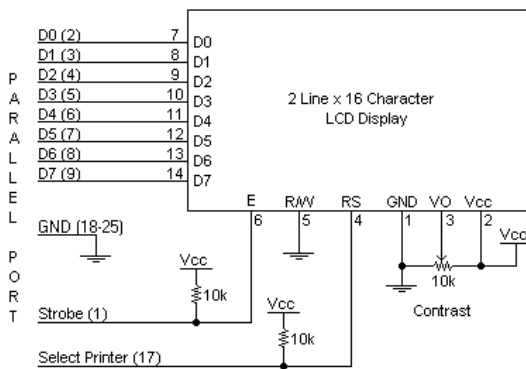
One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

### LCD Pin diagram



**Fig: LCD pins description**

The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus). The three control lines are referred to as EN, RS, and RW.



**Schematic of 16\*2 LCD display**

**BUZZER**

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.



**Fig: picture of buzzer**

**GPS-** GPS satellite transmits data that indicates its location and the current time. GPS continuously sends latitude and longitude values to microcontroller.



**Fig: Picture of GPS**

**GSM-** GSM SIM 300 is used. GSM receives coordinates from microcontroller and sends message to mobile number store in our system.



**Fig: Picture of GSM module**

**MEMS-** The MMA7260Q is 3-axis accelerometer. An accelerometer measures acceleration (change in speed) of anything that it's mounted on. Single axis accelerometers measure acceleration in only one direction. Dual-axis accelerometers are the most common measure acceleration in two directions, perpendicular to each other. Three-axis accelerometers measure acceleration in three directions. Accelerometers are very handy for measuring the orientation of an object relative to the earth, because gravity causes all objects to accelerate towards the earth. A two-axis accelerometer can be used to measure how level an object is.



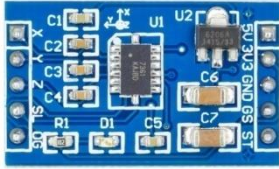


Fig: Picture of MEMS sensor

#### IV. ADVANTAGES & APPLICATIONS

##### Advantages-

1. Easy to detect the exact location of the vehicle.
2. It provides security to the vehicle in very reasonable cost.
3. Intelligent high-tech safety system.
4. It saves the precious time required to save the accident victims.

##### Applications-

1. Used in automotive and transport vehicles from lighter vehicles like cars, to heavier automotive like ships and aero planes.
  2. Security and remote monitoring of vehicles especially during military operations.
  3. This system is also can be interfaced with Vehicle airbag system such that when the sensors detect the accident, the air bags get opened.
  4. School transport vehicle accident detection.
- This project can be used for cab or car of companies.

#### V. RESULTS



Fig.: Experimental hardware setup

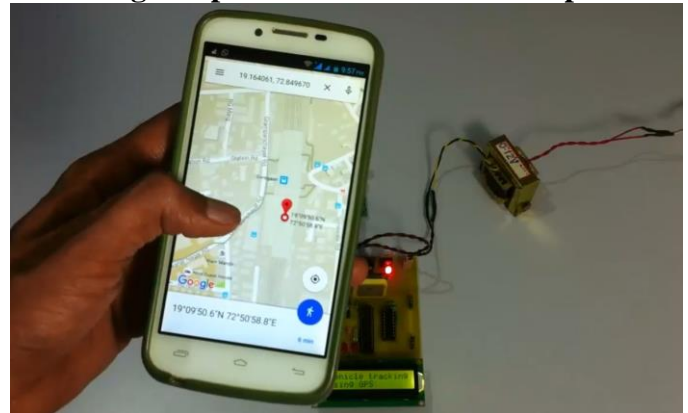


Fig.: Tracking location of vehicle

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- [4] Asaad M.J. Al-Hindawi, Ibrahim Talib, "Experimentally Evaluation of GPS/GSM Based System Design", Journal of Electronic systems, Volume2 Number2, 2June,2012.
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