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Research Article

Gas Detection Using GPS Tracking System

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ABSTRACT
The explosion due to gas leakage has become a serious problem in our country. Now the world is evolving with technology, so it is necessary to use technology, if possible, in every case. The world has seen rapid development of technology in various field due to fast modernization of this world. However, all of that is basically to make human life easier and more hassle-free in every sphere of life. Most of the fire-breakouts in industries are due to gas leaks. These cause dreadful damage to the equipment, human life leading to injuries, deaths, and environment. Gas leakage is a major problem with industrial sector, residential premises and gas-powered vehicles like CNG (compressed natural gas) buses, cars. The system mainly consists of Global Positioning System (GPS) which has been developed in order to allow accurate determination of geographical locations by military and civil users. Global Positioning System is used to track the exact location of gas leakage by understanding of navigation using the lines of latitude and longitude. Global System for Mobile Communications (GSM) technology was developed as a digital system using the time division multiple access technique for communication purposes. Global System for Mobile Communications (GSM) which is used to send the warning message to management and employees who are working in the industry. whenever, gas leakage occurs buzzer will be activated.

Keywords: GPS, GSM

Introduction

India's handling of industrial disasters suffers from systemic apathy. To respond to the currently unfolding Visakhapatnam Gas Leak effectively and sensitively, it must reflect on and learn from its inadequate handling of the Bhopal Gas Tragedy. Gas Detection using GPS tracking system is used to detect the exact location of gas leakage with the help of gps tracking system and SMS is sent through GSM. At the same time, whenever the gas leakage is detected, buzzer will be activated. This type of equipment is used to detect a gas leak. The buzzer is used to alert the operators in the area giving them the opportunity to leave. This is important because there are many gases that can be harmful to organic life, such as humans or animals. Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion. Gas leakage also impacts the outer layer of tissues in the skin causing erosion and bleeding in the short term. Long-term effects include central nervous system dysfunction, depression, hearing loss and peripheral neuropathy (a numb feeling in the hands and feet). leaks of gases associated with industrial operations and equipment are also generally known as fugitive emissions. Natural gas leaks from fossil fuel extraction and use are known as fugitive gas emissions. Such unintended leaks should not be confused with similar intentional types of gas release.

Proposed Method

In the proposed system, when the gas leakage occurs the sensors will sense the gas leakage. With the help of GPS, we can find the exact location where the gas leakage occurs. Also send alert SMS to the people who are working in the industry and to the management whose numbers is saved in SIM card by using the Global Positioning System (GPS). The buzzer will be activated to alert the nearby people. The detection result displayed on LCD.

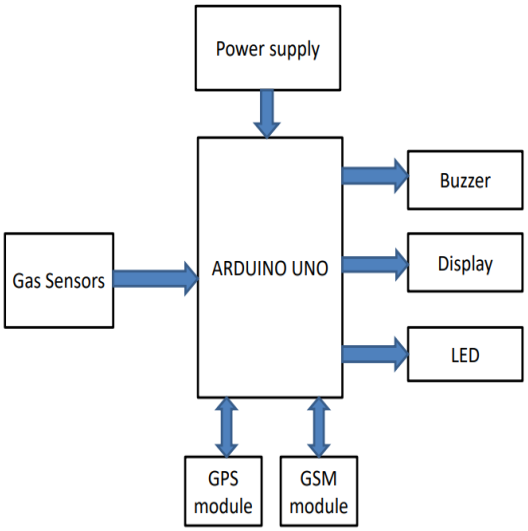


Fig.1: Block Diagram

A. Buzzer

Digital systems and microcontroller pins lack sufficient current to drive the circuits like relays, buzzer circuits etc. While these circuits require around 10milli amps to be operated, the microcontroller's pin can provide a maximum of 1-2milli amps current. For this reason, a driver such as a power transistor is placed in between the microcontroller and the buzzer circuit.

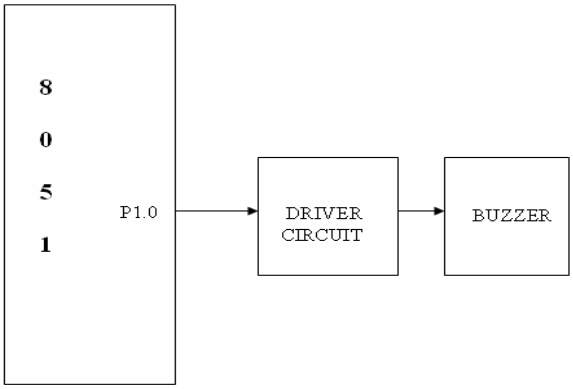


Fig.2: Buzer Interfacing Microcontroller

B . GPS

1) Global positioning system (gps) is a navigation satellite system (gnss) developed by the united states department of defense. it is the only fully functional gnss in the world. it uses a constellation of between 24 and 32 medium earth orbit satellites that transmit precise microwave signals, which enable gps receivers to determine their current location, the time, and their velocity. its official name is navstar gps. although navstar is not an acronym a few backronyms have been created for it.0. the gps satellite constellation is managed by the united states air force 50th space wing. gps is often used by civilians as a navigation system gps receiver calculates its position by carefully timing the signals sent by the gps satellites high above the earth. each satellite continually transmits messages containing the time the message was sent, precise orbital information (the ephemeris), and the general system health and rough orbits of all gps satellites (the almanac). the receiver measures the transit time of each message and computes the distance to each satellite. geometric trilateration is used to combine these distances with the location of the satellites to determine the receiver's location. the position is displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. many gps units also show derived information such as direction and speed, calculated from position changes.

Fig.3 : Gps Satellite

C. **Embedded Systems**

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer.

The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware.

The simplest devices consist of a single microprocessor (often called a "chip"), which may itself be packaged with other chips in a hybrid system or Application Specific Integrated Circuit (ASIC). Its input comes from a detector or sensor and its output goes to a switch or activator which (for example) may start or stop the operation of a machine or, by operating a valve, may control the flow of fuel to an engine.

As the embedded system is the combination of both software and hardware

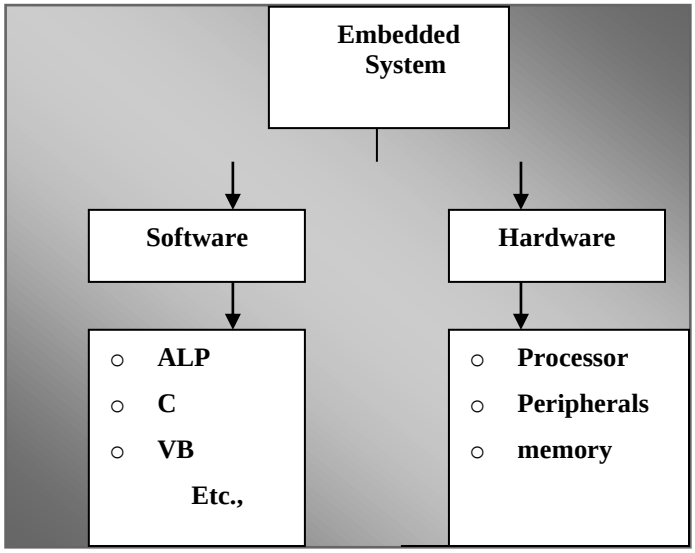


Fig.4: Embedded systems

D . GSM

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).E. Arduino Uno The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converters.

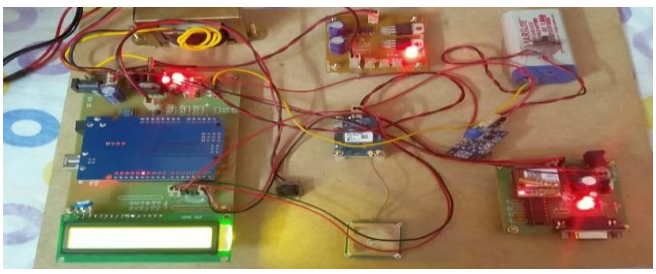
F. MQ2 Sensor MQ2 is one of the commonly used gas sensors in MQ sensor series. It is a Metal Oxide Semiconductor (MOS) type Gas Sensor also known as Chemiresistors as the detection is based upon change of resistance of the sensing material when the Gas comes in contact with the material. Using a simple voltage divider network, concentrations of gas can be detected.

Fig.5: MQ2 Sensor

MQ2 Gas sensor works on 5V DC and draws around 800mW.

Detect LPG, Smoke, Alcohol, Propane, Hydrogen, Methane and Carbon Monoxide concentrations anywhere from 200 to 10000ppm.

Results and discussion



Conclusion

Gas Detection using GPS tracking system is used to detect the exact location of gas leakage with the help of gps tracking system and SMS is sent through GSM. At the same time, whenever the gas leakage is detected, buzzer will be activated. This type of equipment is used to detect a gas leak. The buzzer is used to alert the operators in the area giving them the opportunity to leave. This is important because there are many gases that can be harmful to organic life, such as humans or animals. Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion.

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