A WIRELESS HOME SAFETY GAS LEAKAGE DETECTION SYSTEM USING GSM TECHNOLOGY

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Abstract - *A wireless safety device for gas leakage detection is proposed. The device is intended for use in household safety where appliances and heaters that use natural gas and liquid petroleum gas (LPG) may be a source of risk. The system also can be used for other applications in the industry or plants that depend on LPG and natural gas in their operations. The system design consists of two main modules: the detection and transmission module, and the receiving module. The detection and transmitting module detects the change of gas concentration using a special sensing circuit built for this purpose***.***

*Key Words***: GSM, LPG, wireless safety device, transmission module, receiver module.**

1. INTRODUCTION

These sensors can be used for various applications, e.g. monitoring and controlling of the explosive level of concentration of gases, finding of various harmful, dangerous, toxic gases, industrial automation etc. The present system is mainly used for the detection of LPG gas. If gas leakage happens at certain place, the present system detects the LPG gas alerts the peoples by buzzering and sending SMS on users mobile phone using Arduino GSM shield compatible to the Arduino board**.**
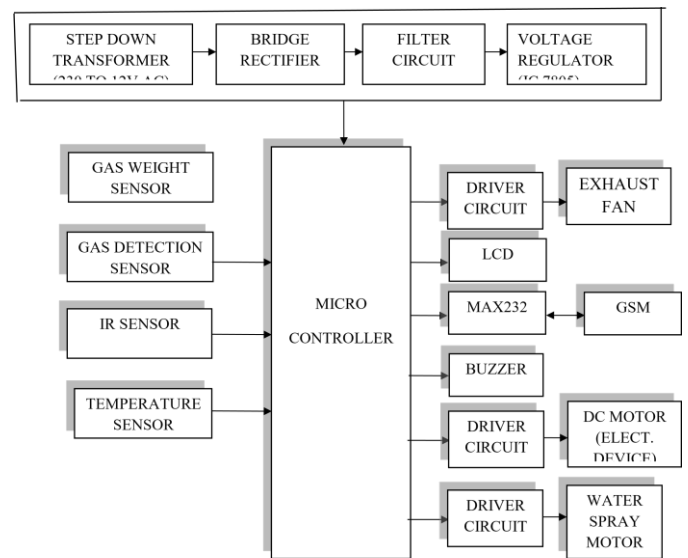
1.1 PIC MICROCONTROLLER

A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

1.2 GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

2.BLOCK DIAGRAM

Fig(3.1).Block diagram

2.1 MICROCONTROLLER

All the functions required on a single chip. A microcontroller differs from a microprocessor, which is a general – purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various task.

A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

2.2 DRIVER CIRCUIT

The ULN2003 is a monolithic high current Darlington transistor arrays. The driver circuit is mainly used for control purpose. In this project gas sensor is used for

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sensing the gas leakage detection and the gas weight concentration can be easily detected. The fire sensor circuit is too sensitive and can detect a rise in temperature of 10 degree or more in its vicinity.

3. DC MOTOR

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homoploid motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source—so they are not purely DC machines in a strict sense. We in our project are using brushed DC Motor, which will operate in the ratings of 12v DC 0.6A which will drive the flywheels in order to make the robot move.

Fig Diagram of DC Motor

4. GSM Modem Application

Fig: GSM modem network

4.1 THE GSM NETWORK

GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).

5. RELAY

A relay is an electrically operated switch. Electric through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and there are double-throw (changeover) switches. It consists of a coil of wire surrounding a soft iron core, an iron yoke, which provides a low reluctance path for magnetic flux, a movable iron armature, and a set, or sets, of contacts. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. The P0_0, P0_1, P0_2 and P0_3 pin of controller is assumed as data transmit pins to the relay through relay driver ULN 2003.
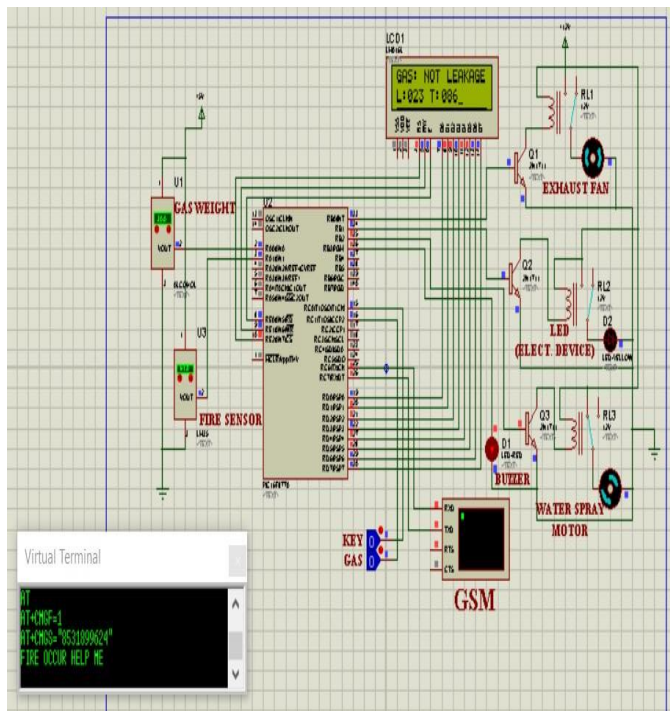
6. SIMULATION

6.1 SIMULATION MODULE 1
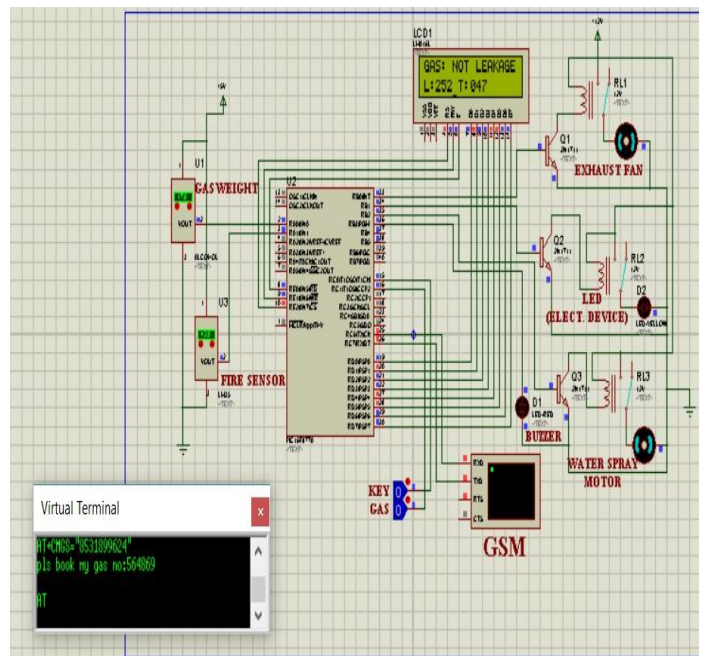
In this condition, the concentration of the gas is below 20%. So please book my gas number message will be send to the agent. The Exhaust fan and water spray motor will be in OFF condition. The message will be send with the help of GSM.

6.2 SIMULATION MODULE 2

The simulation explains about the gas weight detection when the gas is below 20% concentration it will indicate that your gas is reduced and will automatically book the gas. We are using GSM technology which will make phone call when the fire accident occurs to nearby fire stations.

6.3 SIMULATION MODULE 3
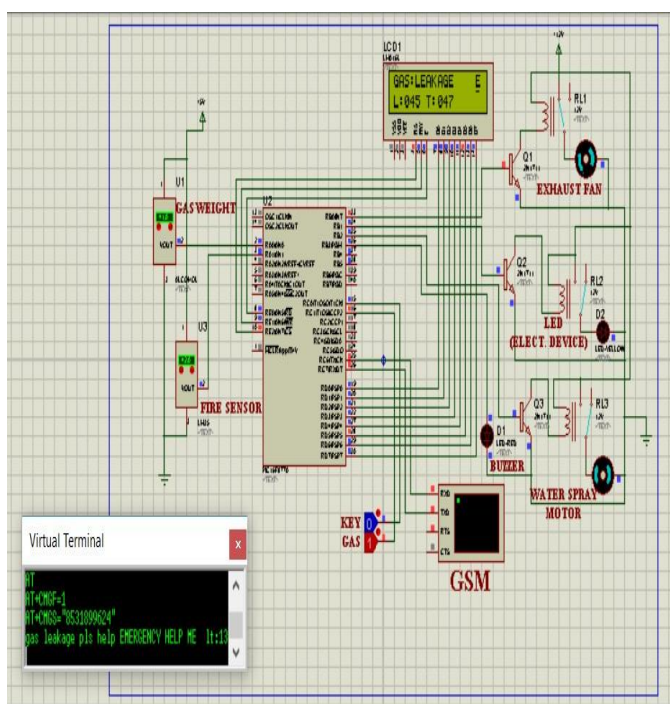
In this condition, the concentration of the gas is high. The fire sensor detects the rise in temperature. Gas leakage please help EMERGENCY HELP ME will be displayed in the virtual terminal box. In this condition, the Exhaust fan and the water spray motor will be in ON condition. The gas leakage detection system is mainly user friendly and saves the human life before the destruction occurs.

HARDWARE
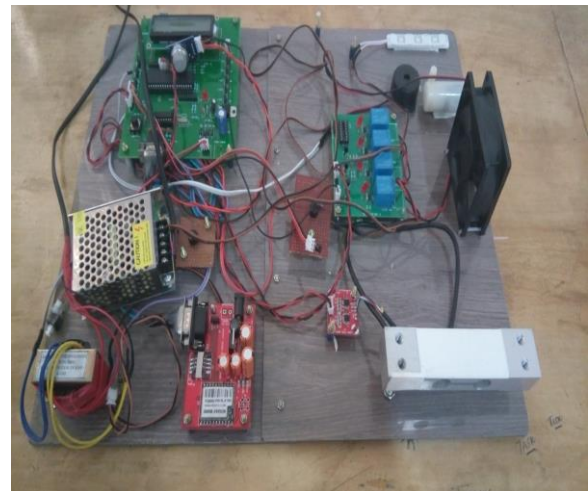
When we decrease the load cell, there will be no leakage in the GAS and it will be displayed in the LCD. The fire sensor will sense the GAS leakage when the temperature increases. when there is a leakage in gas automatically phone call will be send to the fire station. In GAS leakage condition and fire occur condition the exhaust fan and water spray motor will be ON.

7. CONCLUSION

The wireless home safety gas leakage detection system using GSM technology is recently invented. In this project, the main advantage hazardous gas can be easily detected. If the concentration of the gas is less than 20% automatically the gas will be booked. If any leakage has been occurred in the home automatically phone call will be go to the nearby fire station using GSM technology.

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