

Gas Leakage Monitoring and Alerting System

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Abstract:

The Internet of Things (IoT) is an emerging technology in which social environments are connected through various sensors linked together. The sensors can communicate data with each other using an internet connection. Gas leaks can be dangerous, especially in confined spaces. In these cases, a security system with high leak detection capability is required. This is because the gas is volatile and there is a possibility of leakage which will be very prone to explosion or fire hazard. The early gas leak detection device is a very suitable solution for the early detection of LPG leakage to minimize the occurrence. For this reason, a buzzer is used. The buzzer gives an audible indication of a gas leak. After that, it even turns on the GSM modem, continues to send SMS messages to the mobile number specifically mentioned in the source code program to alert people of danger.

Literature Survey

A number of reviews have been done in the past on the topic of gas leak detection techniques, both in research papers/technical reports on a particular leak detection method and other gas-related topics.

A. Mahalingam, r. T. Naayagi, n. E. Mastorakis

Designed a cost economic gas leakage detector adopting UK safety standards for the design of the system. The system mainly detects LPG leakage and also the amount of gas leakage, mainly detecting gases like propane and butane. The safety level of butane gas is 600 ppm above which it is considered hazardous.

When the gas level in the air increases, the system produces audio alarms warning the people/workers in industry about the gas leakage.

Prof. M. Amsaveni, A. Anurupa, R. S. Anu Preetha, C. Malarvizhi, M. Gunasekaran

In this research paper on “GSM based LPG leak detection and control system”, LPG gas leak is detected by the MQ-6 gas sensor. The analog output is sent to the microcontroller.

It Consists of predefined set of instructions. Based on the instructions specified, the exhaust fan gets turned on. The gas concentration in the room will thus be reduced. Then the stepper motor rotates, closing the cylinder knob. Then, the gas leak is stopped. The relay is de-energized. Then The buzzer sounds an alarm that signals a gas leak. The user is then notified by SMS via GSM module. They designed their methodology that the system takes automatic control action upon detection of 0.001% LPG leakage. This automatic control is provided by a mechanical handle to close the valve. They increase safety for humans with a relay that will turn off the electricity supply to the house. They also use GSM to send a warning message to users and a buzzer is available to alert neighbours of a leak.

Falohun A.S., Oke A.O., and Abolaji B.M.

In this paper they proposed gas detection using integrated circuit and MQ-9. In this they basically used a built-in design which includes typical input and output devices such as switches, relays, solenoids, LEDs, small or custom LCDs displays, radio frequency devices and sensors for data such as temperature, humidity, light level, etc.

Embedded systems typically do not have a keyboard, screen, disks, printers, or other recognizable I/O devices personal computer and may lack human interaction facilities. Number and type of detectors and the type of fire alarm system one chooses for property protection will depend on the owner's property protection objectives, property value and the requirements of the owner's insurance company.

Zhao Yang, Mingliang Liu, Min Shao, and Yingjie Ji

In this document they told about the leak detection research and leak point analysis in the gas pipeline system. In this document they gave different models that used SCADA I/F Model: SCADA system has a transmission function acquired data from the pipeline system to the transient simulation model every 30 seconds. This module communicates with SCADA. Various parameters are collected every 30 seconds such as temperature, pressure and flow. Transient Simulation Model: Transient flow is simulated using a perfect numerical calculation method based on real data. Pressure and temperature serve as independent variables to get the average pressure and average temperature. Then all gas parameters in the pipe system can be obtained. Leak detection: Leak detection is done by comparing data obtained through the SCADA system with the Transient Simulation Model. This model could provide leak site assessment and rapid warning based on transient simulation and volume balance.

B. B. Did paye, Prof. S. K. Nanda

In this paper they talked about their research in leak detection and review "Automated unified system for LPG using microcontroller and GSM module". Their paper is designed based on advanced and innovative approach to LPG leak detection, prevention and automation reservation for replenishment. The system ensures in advance the automatic control of the LPG regulator and possibly a leak is detected, the system will automatically turn off the main power switch. That's why it helps to avoid explosion.

Hina Ruqsar , Chandana R , Nandini R , Dr. T P Surekha

In this paper they designed a system that perform both the task that is gas leak monitoring and detection. For this real-time data is available through real-time transmission internet. They used the Xively IOT platform to provide real-time sensor data over the internet.

Srinivasan, Leela, Jeya bharathi, Kirthik,Rajasree

In this research they talked about a gas leak detection and control. In this article, the gas leakage leading to the fatal inferno became serious problem in households and other areas where domestic gas is handled and used. Notifies subscribers via alarm and status display in addition to shutting off the gas supply valve as a primary safety measures.

Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare

In this paper, they gave security problems against hooligans, spills and fire. In these cases, their framework sends an SMS to the emergency number assigned to it.

P.Meenakshi Vidya, S.Abinaya, G.Geetha Rajeswari, N.Guna

This Paper "Automatic detection of LPG and hazards controlling" published in April 2014 proposed a real-time gas leak detection and monitoring system. In this system, gas leakage is detected and controlled by an exhaust fan. LPG level in the cylinder is also continuously monitored.

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