

## “Petroleum and Natural Gas Leakage Information Monitoring System Using GPS and Wi-Fi”

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### ABSTRACT

Gas leakage detection is a very challenging task so the collection and control system of gas information is developed. A network that includes gas stations, gas storages, gas pressure regulating stations, the strategic positions where gas can leak be made by GPS. The functions of the system include remote monitoring of the pressure on the pipe network, flow, environmental parameters, and real-time collection of information, alerting, reporting, and printing. The successful development of the system is significant for the safe operation of the gas industry, to improve efficiency and automation level. The system detects the leakage of the LPG using gas sensor and alerts the consumer about the gas leakage by sending information through Wi-Fi. The proposed system uses the GPS to alert the person about the gas leakage via Wi-Fi.

**Keywords:** *buzzer, flow sensor, gas sensor, Lcd display, Pressure Sensor.*

### I. INTRODUCTION

A gas leak refers to a leak of natural gas or other gaseous product from a pipeline or other containment into any area where the gas should not be present. Because a small leak may gradually build up an explosive concentration of gas, leaks are very dangerous. In addition to causing fire and explosion hazards, leaks can kill vegetation including large trees and may release powerful *green-house* gases to the atmosphere. The LPG or propane which is flammable mixture of hydrocarbon gases used as fuel in many applications like homes, hostels, industries, automobiles, vehicles because of its desirable properties which include high calorific value, which produce the less smoke, produces less soot, and does not cause much harm to the environment. Natural gas is another widely used fuel in homes? Both gases burns to produce clean energy, however there is a serious problem about their leakage in the air. The gases being heavier than air do not disappear easily and may lead to suffocation when inhaled also when gas leakage into the air may lead to explosion. Due to the explosion of LPG gas the number of deaths has been increased in recent years.

To avoid this problem there is a need for a system to detect and also prevent leakage of LPG. Gas leak detection is the process of identifying potentially hazardous gas leaks by means of various sensors. These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected.

## **II. LITERATURE SURVEY**

Baranov. A, Savkin.A, Ivanov.M, proposed a optically based gas detector system[1]. The proposed system employs photo acoustic spectroscopy making it tunable to various species. This system achieves a reduction in power consumption as well as a reduced manufacturing cost. This system is based on wireless battery powered devices. Their methane sensor is a planar catalytic one built on gamma alumina membranes. Their boiler room deployment consists of nine wireless methane sensors and a gateway.

Baliga.S, Bic.L, Dillencourt.M, proposed a distributed network of MEMS ultrasonic sensors for gas leak localization[2]. In this system they have compared energy decay and time difference of arrival methods. With a distributed network of four devices they attempt to localize a gas leak. They employ maximum likelihood and least squares techniques to find closed form solutions for the diffusion differential equations.

Sinopoli.B and Krogh.B proposed a system which considers gas leaks in wide and dense wireless sensor networks[3]. The problem being addressed here is one of large scale leaks with high concentration of gases. This system concerns sub sampling of sensors which are in close proximity in order to reduce network wide energy consumption.

Nofsinger.G and Smith.K, proposed a system using inverse diffusion modeling to localize leaks[4]. By assuming a diffusion model they consider a large network of sensors surrounding the source of leak. This allows the system to find the location of the source of leaks.

Bibliogov proposed a system which concerns pipeline diagnosis of the system which gives rise to ultrasonic sensors[5].The operation of the proposed system relies on the fact that gas leaks come from punctured pipes which results in the emission of acoustic tone signals in the ultrasonic band.

## **III. PROPOSED SYSTEM**

The remote monitoring and control to gas pipelines and gas storage facilities at places such as gas leakage can be realized by using this proposed system. This proposed system contains the data acquisition section and the collection section. Data acquisition section contains the pressure sensor, flow sensor, gas sensor for monitoring the pressure, speed, and leakage of the gas. The sensor values will be in analog format so we go for the analog to digital converter to convert the value into digital. The values will be uploaded in internet via GPS modem using the PC. When any abnormality occurs in the sensor value then the buzzer will be invoked and alert the person. In this system, we are going to monitor and transmit the industrial parameters such as gas leakage. These parameters are monitored using gas sensor, flow sensor and pressure sensor. The analog outputs are converted into digital form using analog to digital converter and then given to microcontroller. This data is sent to the

control room through a GPS and WI-FI via UART and is also displayed in the LCD display for workers. Corresponding to the sensor outputs the relay is activated using microcontroller to operate the precaution devices. With this a buzzer alert is also given.

In the receiver side a PC is used to view all the parameter conditions. The relays can be activated from the remote area too via GPS and WI-FI communication. In addition to this, this system integrates person locating with gas concentration checking system effectively, and realizes functions of person attendance Distance measurement positioning, even gas concentration detecting and data communication. This system is an open system, and it permits developing different applications there on. It provides a lot of spatial gas concentration knowledge with the timestamp for follow-up gas prediction research. The field device can be a fixed device or a portable device. The portable device is carried by the worker whenever he enters the plant area. The fixed device is fixed in the plant area. It also detects gas leak age and transmits information to the control room.

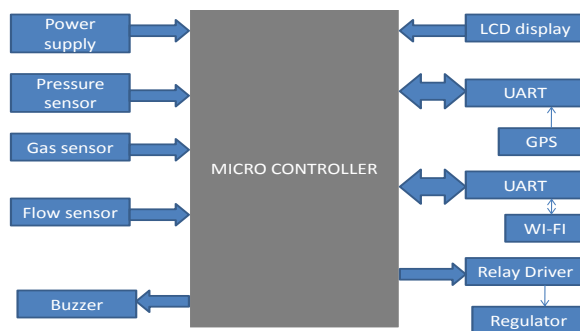
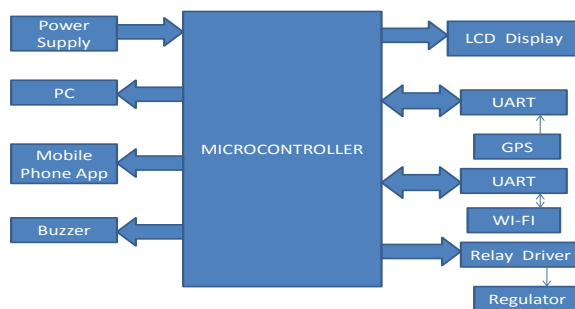


fig 1: block diagram of data acquisition section



**fig 2: block diagram of collector section**

#### **IV. CONCLUSION**

A new gas leak detection and location system is developed. It comprises sensitive sensors and WSN which is smart, low-cost, low-power and low maintenance. This system can monitor the gas leakage sensitively, get the data from a scene of the accident and locate the leakage point. The system is easy to be deployed and overcomes the shortcomings on current systems. It is used to improve the rescue quality and shorten the time for rescue. Therefore it can compensate for the weakness of current system.

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