

# **A SURVEY PAPER ON GAS LEAKAGE MONITORING AND ALERTING SYSTEM**

## **INTRODUCTION :**

In our daily life we may face many chances to face fire accidents because of gas leakage. This can occur in places like apartments, houses, gas industry, chemical industry, food industry, gas pump, welding shops, hospitals, schools and college laboratories. This can be ignored by some safety measures like installing gas leakage monitoring and alerting system. This will monitor the gas leakage and alert when the gas leakage occurs. Gas leakage can cause global warming and some toxic gases are harmful to health and some gases are dreadful gases like carbon monoxide. Some flammable gases are able to get fire and get burst easily by a single spark of fire. Some gases are harmful to lungs and some are harmful to asthma patients. In hospitals gases like helium oxygen are stored in a cylinder and also stored in a large sized cylinder. And in some chemical reaction harmful gases are formed by reaction. And the acetylene gas used in welding is a combustible gas that can cause a fire accident. To avoid these situations and to avoid these fire accidents a monitoring system must be installed everywhere. Wherever the gas leakage may take place, they must be monitored to protect people and other workers. In this busy world people don't have time to notice and monitor everything on their own. That leads to gas leakage and it causes a fire accident by gas combustion. The gas monitoring and alerting system helps people to be aware and let them know when gas leakage occurs. This will protect them from fire accidents. This is the most essential system in the places where gas leakage or gas storage occurs.

## **Literature Review**

In the year of 2008, LIU Zhen-ya, WANG Zhen-dong and CHEN Rong, "Intelligent Residential Security Alarm and Remote Control System Based On Single Chip Computer", the paper focuses on, Intelligent residential burglar alarm, emergency alarm, fire alarm, toxic gas leakage remote automatic sound alarm and remote control system, which is based on 89c51 single chip computer. The system can perform an automatic alarm, which calls the police hotline number automatically. It can also be a voice alarm and shows alarm occurred address. This intelligent security system can be used to control the electrical power remotely through telephone. In the year of 2008, Chen Peijiang and Jiang Xuehua, "Design and implementation of Remote Monitoring System Based on GSM", this paper focuses on the wireless monitoring system, because the wireless remote monitoring system has more applications a remote monitoring system based on SMS through GSM. In the year of 2002, K. Galatsis, W. Wlodarsla, K. Kalantar-Zadeh and A. Trinchì, "Investigation of gas sensors for vehicle cabin air quality monitoring", this paper focuses on, car cabin air quality monitoring can be effectively analyzed using metal oxide semiconducting (MOS) gas sensors. In this paper, commercially available gas sensors are compared with fabricated  $\text{MoO}_3$  based sensors possessed comparable gas sensing properties. The sensor has response 74% higher relative to the best commercial sensor tested. A number of reviews on the subject of gas leakage detection techniques were done in the past either as

part of research papers/technical reports on a certain leak detection method and other gas related subjects.

**A.Mahalingam, r. T. Naayagi, n. E. Mastorakis;** they introduce design and implementation of an economic gas leakage detector. They gave the formulation of many problems in previous gas leakage detectors. They told that several standards have been formulated for the design of a gas leakage detection system such as IEEE, BS 5730, and IEC. For this work, the recommended UK safety standards have been adopted. The proposed alarm system is mainly meant to detect LPG leakage, which is most commonly used in residential and commercial premises. The system detects not only the presence of gas (gas leak), but also the amount of leakage in the air, and accordingly raises an appropriate audio visual alarm. The objective of the system is to detect LPG gases such as propane and butane. The allowed UK level for is 600 ppm above which it is considered to be of high level and poses a danger. The proposed system ensures a continuous monitoring of the gas levels. If the gas level increases above the normal threshold level of 400 ppm butane (LPG), the system starts to issue early warning alarms at 100ms interval, which implies low level gas leakage. If the leakage level increases to 575 ppm of butane (LPG), the system activates high severity audio alarms at 50 ms intervals warning the occupants to run to safety. **Prof. M.Amsaveni, A.Anurupa, R.S.Anu Preetha, C.Malarvizhi, M.Gunasekaran;** they told in their research paper on “GSM based LPG leakage detection and controlling system” the leakage of LPG gas is detected by the MQ-6 gas sensor. Its analog output is given to the microcontroller. It consists of predefined instruction set. Based on this, the exhaust fan is switched on. So, the concentration of gas inside the room gets decreased. Then, the stepper motor is rotated thus closing the knob of the cylinder. Because of this process, the leakage of gas is stopped. The relay is switched to off the power supply of the house. The buzzer produces an alarm to indicate the gas leakage. Then, the user is alerted by SMS through the GSM module. They proposed their methodology that the system takes an automatic control action after the detection of 0.001% of LPG leakage. This automatic control action provides a mechanical handle for closing the valve. We are increasing the security for human by means of a relay which will shut down the electric power to the house. Also by using GSM, we are sending an alert message to the users and a buzzer is provided for alerting the neighbors about the leakage.

**Ch. Manohar Raju and N. Sushma Rani,** 2008, they introduce an android based automatic gas detection and indication robot. They proposed prototype depicts a mini mobile robot which is capable to detect gas leakage in hazardous places. Whenever there is an occurrence of gas leakage in a particular place the robot immediately read and sends the data to android mobile through wireless communication like Bluetooth. We develop an android application for android based smartphones which can receive data from robot directly through Bluetooth. The application warns with an indication whenever there is an occurrence of gas leakage and we can also control the robot movements via Bluetooth by using text commands as well as voice commands. The previous mobile robots are based on heterogeneous technologies like GSM, GPS, internet based etc., but the main disadvantage of those prototypes were the absence of communication in particular areas. So, with the rapid developments and tremendous changes in technology we have lots of techniques to eradicate previous problems. Wireless communication protocols play a vital role in present trends. Bluetooth, WI-Fi, Zigbee etc., we use one of the best feature of smartphone, i.e., the Bluetooth technology to control and monitor parameters driven by a robot. They introduce a robot and mobile application for In the meantime, the system prototype has imposingly demonstrated its use and capability in intensive series of tests. The drive unit, the navigation system and, therefore, the complementary sensor systems performed superbly throughout the tests. The robot facilitates independent gas detection and leak

localization in sites that are otherwise troublesome to access. Moreover, it helps to avoid mistreatment of human inspectors in probably dangerous environments. However, before ready-ing in industrial settings, more development is needed (e.g., in explosion protection, package development, etc.), and in fact leg a problems should be processed before ready-ing in business settings. Still, it is certain that an autonomous, mobile gas detection and leak

localization robot is possible today and can significantly enhance safety. **Hina Ruqsar , Chandana R , Nandini R , Dr. T P Surekha**, have proposed a system that along with monitoring and detection of gas leakage, real time data is made available through real time feed over internet They have used Xively IOT platform to provide real time sensor data over the internet.

## **FUTURE SCOPE:**

1. A Mobile Application can be created for this system which can give information about the concentration of gas present in the area, setting reminders to check gas level, also to predict the gas leak

by giving values.

2. The use of Pressure sensor along with the system can provide an extra feature of Automatic Gas

Booking. Like other sensors, the pressure sensor can constantly monitor the amount of gas present in

cylinder and send a booking SMS if it reaches certain level.

3. Relay motors can be added into the system to provide more safety. These motors can switch off the

Main Gas Supply and Main Power supply in case the gas concentration exceeds certain limit.

## **CONCLUSION:**

Internet of Things is a new revolution of the Internet & it is a key research topic for researcher in

embedded, computer science & information technology area due to its very diverse area of application & heterogeneous mixture of various communications and embedded technology in its architecture. In our modern scenario the usage of LPG has increased in a greater manner. As a result of this, the damages caused by the leakage of gas is increasing day by day. So as to eradicate this problems we are introducing highly advanced system known as Internet Of Things(IOT) . It is used in wide range of applications in present day society and introducing a vast scope to the future. Our proposed system is more effective and eco friendly due to the reason of detecting the leakage of gas and controlling the gas valve. So it is mainly designed for the safety of people and property. Using IOT ,it also allows us to book the gas from the gas agency ,when the weight of the gas cylinder reduces below a threshold value .Thus people could easily use their time effectively. It also uses to alert the consumers about the wastage of gas while removing the utensils from the burner by using an object detection sensor.

## **REFERENCES:**

[1]Shital Imade, Priyanka Rajmanes, Aishwarya Gavali , Prof. V. N. Nayakwadi “GAS LEAKAGE DETECTION AND SMART ALERTING SYSTEM USING IOT”

<https://www.pramanaresearch.org/gallery/22.%20feb%20ijirs%20-%20d539.pdf>

[2] Kumar Keshamoni and Sabbani Hemanth. "Smart Gas Level Monitoring, Booking & Gas Leakage Detector over IoT "

- International Advance Computing Conference IEEE, 2017.
- [3] Petros Spachos , Liang Song and Dimitrios Hatzinakos. "Gas Leak Detection and Localization System Through Wireless Sensor Networks" The 11th Annual IEEE Consumer Communications and Networking Conference - Demos. IEEE, 2014.
- [4]"Design and Implementation of an Economic Gas Leakage Detector"National Institute of Health (2004). What you need to know about natural gas detectors.Available:[http://www.nidcd.nih.gov/health/smelltaste/gas\\_dtctr.asp](http://www.nidcd.nih.gov/health/smelltaste/gas_dtctr.asp). Last accessed 12th March 2011.
- [5]Prof.M.Amsaveni, A.Anurupa, R.S.Anu Preetha, C.Malarvizhi,M.Gunasekaran "Gsm based LPG leakage detection and controlling system" the International Journal of Engineering and Science (IJES) ISSN (e): 2319 – 1813 ISSN (p):2319 – 1805 Pages 112-116 March- 2015
- [6]Srinivasan,Leela,Jeyabharathi,Kirthika,Rajasree"GAS LEAKAGE DETECTION AND CONTROL" Scientific Journal of Impact Factor(SJIF): 3.134
- [7]Pal-Stefan Murvaya, IoanSileaa "A survey on gas leak detection and localization techniques"
- [8] Falohun A.S., Oke A.O., Abolaji B.M. "Dangerous Gas Detection using an Integrated Circuit and MQ-9" in International Journal of Computer Applications (0975 –8887) Volume 135 – No.7, February 2016.
- [9]Ashish Shrivastava,Ratnesh Prabhaker, Rajeev Kumar and Rahul Verma "GSM BASED GAS LEAKAGE DETECTION SYSTEM" in International Journal of Technical Research and Applications e-ISSN: 2320-8163, [www.ijtra.com](http://www.ijtra.com) Volume 1, Issue 2 (may-june 2013).
- [10]Sunithaa.J, sushmitha.D,"Embedded control system for LPG leakage detection and Prevention", International conference on computing and control engineering.(ICCCE 2012),12 & 13 April 2012.
- [11]Mr. SagarShinde, Mr .S. B. Patil,Dr. A. J. Patil, "Development of movable gas tanker leakage detection using wireless sensor network based on embedded system",International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 [www.ijera.com](http://www.ijera.com) Vol. 2, Issue 6, November-December 2012, pp.1180-1183
- [12]Johansson, A.; Birk, W.; Medvedev, A., "Model-based gas leakage detection and isolation in a pressurized system via Laguerre spectrum analysis", Proc. of IEEE International Conference on Control Applications, pp. 212-216, 1998.
- [13]C.Selvapriya, S.Sathyaprabha, M.Abdulrahim," LPG leakage monitoring and multilevel alerting system", published in 2013.
- [14] Ch. Manohar Raju, N. Sushma Rani, "An android based automatic gas detection and indication robot. In International Journal of Computer Engineering and Applications. 2014;8(1).
- [15] Zhao Yang, Mingliang Liu, Min Shao, Yingjie Ji Research on leakage detection and analysis of leakage point in the gas pipeline system. In Open Journal of Safety Science and Technology; 2011
- [16] Falohun A.S., Oke A.O., Abolaji B.M. "Dangerous gas detection using an integrated circuit and MQ-9. In International Journal of Computer Applications. 2016; 135(7).

- [17] Ashish Shrivastava, Ratnesh Prabhaker, Rajeev Kumar, Rahul Verma. GSM based gas leakage detection system. In International Journal of Technical Research and Applications. 2013; 1(2).
- [18] Forman, G. 2003. An extensive empirical study of feature selection metrics for text classification. J. Mach. Learn. Res. 3(Mar. 2003), 1289-1305.
- [19] Brown, L. D., Hua, H., and Gao, C. 2003. A widget framework for augmented interaction in SCAPE. [20] Y.T. Yu, M.F.Lau, "A comparison of MC/DC, MUMCUT and several other coverage criteria for logical decisions", Journal of Systems and Software, 2005, in press