Ideation Phase
Literature Survey

Title	IOT Gas leakage monitoring and alerting system
Domain name	Internet of things
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ABSTRACT

Internet of Things (IoT) is the networking of things by which physical things can communicate with the help of sensors, electronics, software, and connectivity. These systems do not require any human interaction. Internet of Things aim towards making life simpler by automating every small task around us. As much is IoT helping in automating tasks, the benefits of IoT can also be extended for enhancing the existing safety standards. Safety plays a major role in today's world and it is necessary that good safety systems are to be implemented in places of education and work. This work modifies the existing safety model installed in industries and this system can also be used in homes and offices. The traditional Gas Leakage Detector Systems though have great precision, fail to acknowledge a few factors in the field of alerting the people about the leakage. There by we have used the IoT technology to make a Gas Leakage Detector for society which having Smart Alerting techniques involving sending text message to the concerned authority and an ability performing data analytics on sensor readings.

INTRODUCTION

LPG is extremely combustible. Because of this combustible nature, its leakage could cause harm to life and property. Generally, these gases are stored in cylinders. In Industries LP G is filled only up to 85% in cylinders above which will be vapours. This is due to the expansion property of the LPG. For every 1° rise in temperature, the pressure of LPG inside the cylinder will increase by 15 kg/cm3. This makes LPG a very hazardous and extremely inflammable gas. Apart from storing transmission is risky.

There are more than 40 peoples are lost their lives due to the leakage of gas and also fire accident made by them. To overcame this problem, we are going to build a project 'Gas Leakage Monitoring And Alerting System'. After analyzing many research papers, their pros and cons we have made this literature work.

SENSORS: LM 35(temp sensor)**,** MQ-2(Gas sensor)**,** LPG sensor

[1] METHANE LEAKAGE MONITORING TECHNOLOGY FOR NATURAL GAS STATIONS AND ITS APPLICATION

In this paper they tried to overcame the s of existing leakage monitoring techniques implemented in the natural gas stations. They are high false alarm rate, poor stability, easy to be interfered by background gas, etc. The false alarm r ate can be effectively reduced by simultaneously monitoring the leakage vibration and methane concentration. Results of laboratory tests indicate that the monitoring technology proposed in this paper enjoys such advantages as low cost, easy-to-install and high reliability, and can be extensively applied for monitoring the methane leakage in natural gas stations and valve chambers of long-distance and gathering pipelines.

RECUIREMENTS:

Computer, Signal demodulator, Single-parameter probe, Reflector, Compressor, Dual parameter probe, Regulating valve.

[2] LPG MONITORING AND LEAKAGE DETECTION SYSTEM

In this paper they measure the amount of gas mixed in the air to sense the leakage, the leakage is also confirmed by the reduced pressure and weight with the certain sensors. The presence of LPG in concentrations from 200–10 000 ppm. The sensor has an outer membrane coated with Tin Dioxide (SnO_2). Upon contact with the components propane and butane, in LPG, this coating reacts with them and results in an output which is converted into an electrical voltage. And then this electrical voltage is responsible for the alerting.

RECUIREMENTS:

Weight sensor, Gas sensor, Buzzer, LCD Display, Arduino board, System.

[3] IMPLEMENTATION OF AMMONIA GAS LEAKAGE DETECTION & MONITORING SYSTEM USING INTERNET OF THINGS

This paper implements the ammonia gas leakage detection via a monitoring system with the help of ammonia gas sensor (MQ135), using the concept of the Internet of Things. Ammonia Gas sensor (MQ135) sense and detect a large amount of ammonia gas present in the lab, industries, factories, health care, etc, High concentration of Ammonia results in blindness, lung damage or death. Whenever ammonia gas reaches a threshold level provided in the MQ135 Sensor, the buzzer in the Ammonia Gas Sensor goes off alerting the officials. Electrochemical sensors measure the partial pressure of gases under atmospheric conditions. The system collects data about the various levels of ammonia gas at various times daily.

RECUIREMENTS:

 Arduino, Microcontroller, Gas Sensor – MQ 135 (Ammonia sensor), Ethernet Shield, Buzzer, ADC Process, System.

ADVANTAGES:

- The system will display the ammonia gas level that exceeds its threshold level and provide a comparison on a graphical representation based on the present gas level and historical data in the final report.

[4] ADVANCED MONITORING SYSTEM FOR GAS DENSITY OF GIS

This paper introduces a high-performance gas pressure sensor with high sensitivity and stability, and describes the methodology used in improving the accuracy of measured gas pressure by means of eliminating the influence of external disturbances. A yearlong test of the system, which consists of a new gas pressure sensor and calculation algorithms, was carried out on an 84kV GIS in the field. The system demonstrated its sufficient performance for the detection of the slow leakage of 0.5 % per year, which is maximum allowable value of leakage for GIS.

RECUIREMENTS:
Temperature logger, High performance gas pressure sensor

REFERENCES:

1) Bing Han, Qiang Fu, Hanfang Hou, **'Methane Leakage Monitoring Technology For Natural Gas Stations And Its Application',** *IEEE 5th International Conference on Computer and Communications,2001.*
2) Shruthi Unnikrishnan,1 Mohammed Razil, Joshua Benny, Shelvin Varghese and C.V. Hari, **'LPG Monitoring And Leakage Detection System',** *Department of Applied Electronics and Instrumentation Engineering, Rajagiri School of Engineering and Technology, Rajagiri Valley, Kakkanad, Kochi, India.*
3) J.Vijayalakshmi, Dr.G.Puthilibhai, S.R.Leoram Siddarth, **'Implementation Of Ammonia Gas Leakage Detection & Monitoring System Using Internet Of Things',** *West Tambaram, Chennai.*
4) Makiko Kawada, Tadao Minagawa, Eiichi Nagao, Mitsuhito Kamei, Chieko Nishida and Koji Ueda, **'Advanced Monitoring System For Gas Density Of GIS',** *Mitsubishi Electric Corporation.*