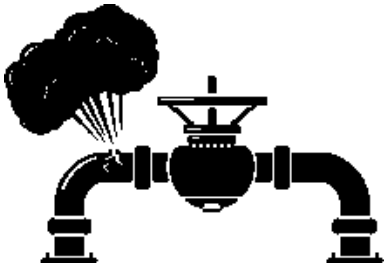
# A SURVEY PAPER ON GAS LEAK MONITORING AND ALERTING SYSTEM USING IOT



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## ABSTRACT

***The interest of things, or IoT, is a system of interrelated computing devices ,mechanical and digital machines, objects ,animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.***

***Combustible gas detection and measurement has become essential in many fields. Combustible gas leakages are capable of reaching large areas, affecting entire neighborhoods or even cities, causing devastating environmental impacts. This documentation presents an industrial monitoring system design using Internet of Things (IOT). This gas sensor which has captured information about combustible gas leakage will be posted into a data cloud. The gas sensor is capable of detecting the leakage of combustible gas under most of the atmospheric conditions.***

***All the components are controlled by an Arduino that acts as a central processor unit in the setup. As soon as a combustible gas leakage was detected by the sensor, the alarm will be raised in the form of a buzzer. This alarm supports a small LCD to show the leakage location, to alert the respected person to turn on the exhaust fans or stop incoming gas in the particular section to extract the gas leakage. The capabilities of this gas detection system are not only to monitor continuously the surroundings but are also to help to prevent the gas leakage and hence minimizing the chances of fire and damage.***

***KEYWORDS:*** *Internet of Things, Gas Leakage Detection, Smart Alerting Techniques*

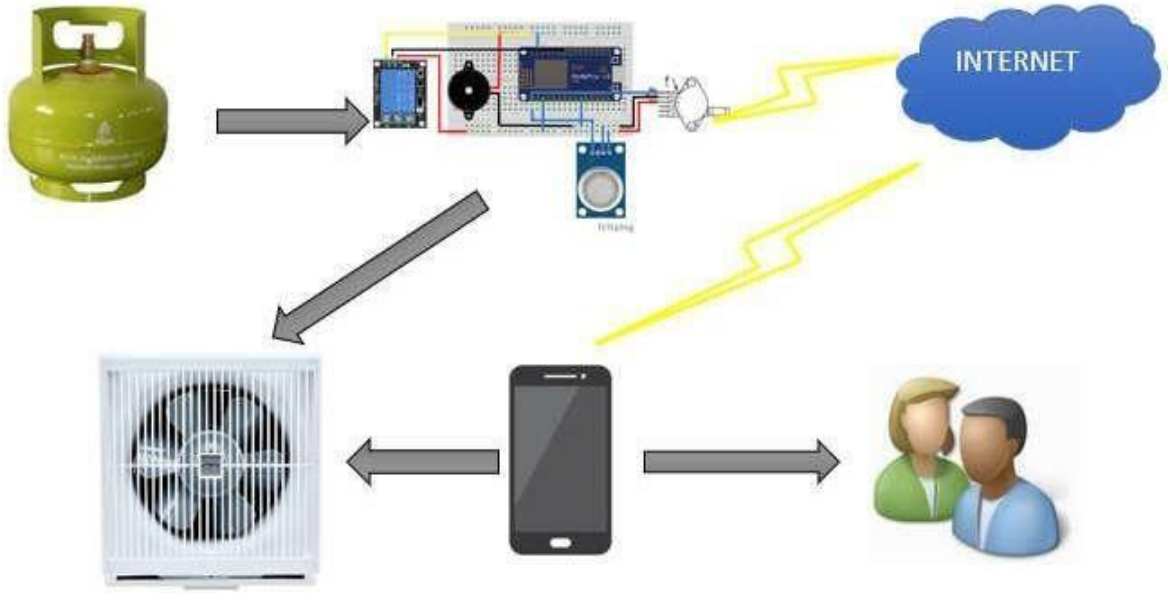
## 1. INTRODUCTION:

The Internet of Things is a developing theme of specialized, social, and monetary centrality. Customer items, tough goods, cars and trucks, modern and utility segments, sensors, and other regular articles are being joined with Internet availability and amazing information systematic capacities that guarantee to change the manner in which we work, live, and play.

Projections for the effect of IoT on the Internet and economy are amazing, with some foreseeing upwards of 100 billion associated IoT gadgets and a worldwide financial effect of more than $11 trillion by 2025. The Internet of Things (IoT) is an essential theme in innovation industry, strategy, and designing circles [1]. This innovation is encapsulated in a wide range of arranged items, frameworks, and sensors, which exploit headways in processing power, gadgets scaling down, and organize interconnections to offer new capacities.

The expansive scale usage of IoT gadgets guarantees to change numerous parts of the manner in which we live. For shoppers, new IoT items like Internet-empowered machines, home mechanization parts, and vitality the executive's gadgets are pushing us toward a dream of the "savvy home", offering greater security and vitality effectiveness. IoT frameworks like arranged vehicles, savvy traffic frameworks, and sensors implanted in streets and scaffolds draw us nearer to "brilliant urban areas", which help limit clog and vitality utilization.

IoT innovation offers the likelihood to change horticulture, industry, and vitality creation and dissemination by expanding the accessibility of data along the esteem chain of generation utilizing arranged sensors.



## 2. LITERATURE SURVEY:

*Smart Gas Level Monitoring, Booking & Gas Leakage Detector over IoT*

This project proposed the most common problem experienced in our day- to- day lives that is regarding GAS container going empty. We bring this paper to create awareness about the reducing weight of the gas in the container, and to place a gas order using IOT. The gas booking/order is being done with the help IOT and that the continuous weight measurement is done using a load cell which is interfaced with a Microcontroller (to compare with an ideal value). For ease it is even has been added with an RF TX & Rx modules which will give the same information. When it comes it to security of the kit as well as gas container we have an MQ-2(gas sensor), LM 35(temperature sensor), which will detect the surrounding environment for any chance of error. Whenever any change is subjected in any of the sensors (load cell, LM35, Mq-2) a siren (60db) is triggered.

*Gas Leakage Detection and Smart Alerting and Prediction Using IoT:*

IoT is an expanding network of physical devices that are linked with different types of sensors and with the help of connectivity to the internet; they are able to exchange data. Through IoT, internet has now extended its roots to almost every possible thing present around us and is no more limited to our personal computers and mobile phones. Safety, the elementary concern of any project, has not been left untouched by IoT. Gas Leakages in open or closed areas can prove to be dangerous and lethal. 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. Therefore we have used the IoT technology to make a Gas Leakage Detector having Smart Alerting techniques involving calling, sending text message and an e-mail to the concerned authority and an ability to predict hazardous situation so that people could be made aware in advance by performing data analytics on sensor readings.

*A. Gas Detection Systems:*

Gas Detection Systems This is the system which has been discussed in this paper. The versatile nature of this system comes because of the fact that the same system with a change in the type and number of sensors can be used in different places. They can be used at homes, buildings, industries for detecting LPG, Propane, Methane or any other harmful gas leakages (discussed in this paper) and with some changes could be used in cities for detecting air pollution and performing analytics on the sensor readings to predict and prevent dangerous situations.

## 3. SENSORS USED:

When it comes it to security of the kit as well as gas container we have an MQ-2(gas sensor), LM 35(temperature sensor), which will detect the surrounding environment for any chance of error. Whenever any change is subjected in any of the sensors (load cell, LM35, Mq-2) a siren (60db) is triggered.

*LM 35 (temp. sensor):*

For the sensors, if any fire is to be happened then the temperature sensor will sense an high change(positive change) in temperature and will send an pulse to microcontroller which intern will send an update to the internet through IoT, and as well it will trigger an siren alarm in the RF Rx kit(sub board).

*MQ-2 (Gas Sensor):*

MQ 2 sensor is basically an LPG (liquefied petroleum gas) which is composed of propane & butane, so when a gas leakage is sensed by the sensor it will send an high pulse to the MQ-2 which will update it in the IoT, and even an buzzer is heard in the RF Rx kit. And the problem can be sorted & solved. Thus the overall components & sensors play role in the paper as explained above.

## *Applications and Benefits of Using Gas Sensors:*

The work focuses on networks that monitor the production process, to either prevent or detect health and safety issues or to enhance production. WSN applications offer great opportunities for production optimization where the use of wired counterparts may prove to be prohibitive. They can be used to remotely monitor.

## 4. APPLICATIONS:

### *Harmful Gas Detection:*

The sensing of toxic gases such as H2S, Methane, and CO is of great importance in any industry to avoid unwanted leakage and consequences like poisoning or explosions. The presence of these gases can be easily detected in the industrial facilities and commercial buildings with the help of IoT-powered gas monitoring solution. Moreover, a gas detector or sensor device is a crucial part to carry out safe industrial operations. The sensor-enabled solution helps prevent the high risk of gas explosions and affecting any casualties within and outside the premises.

### *Fire Hazard Prevention:*

The gas sensors help detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts. Also, it is an imperative solution to keep the plant workers and equipment safe from fire hazards. It effectively detects the presence of hazardous gases like propane and methane and alerts the plant authorities, preventing the premises from unexpected ignition. Moreover, a gas monitoring solution uses gas analysers to generate alerts regarding the temperature increase. This allows the management to take immediate actions to curb harmful fire explosions.

### *Oxygen Level Measurement:*

Sensing the presence of gases is a necessity to conduct industrial operations as several pitmen had lost their lives due to lack of oxygen in the process of mining explorations. A sudden decrease in the oxygen levels can result in dizziness, brain damage, or even death among the workers working in mines or close-packed industrial premises. A gas monitoring system significantly benefits the industries by maintaining proper oxygen levels that reflect the optimal performance of your workers. This system also creates alerts in real-time about the decreasing oxygen levels, which gives enough time to take necessary measures to evacuate the facilities much before the health gets affected.

***Benefits:***

- Get real-time alerts about the gaseous presence in the atmosphere.
- Prevent fire hazards and explosions.
- Supervise gas concentration levels.
- Ensure worker's health.
- Real-time updates about leakage.

- Cost-effective installation.
- Data analytics for improved decisions.
- Measure oxygen level accuracy.
- Get immediate gas leak alerts.

## 5. CONCLUSION AND FUTURE WORK:

The advantage of this simple gas leak detector is its simplicity and its ability to warn about the leakage of the LPG gas. This system uses GSM technique to send alert massage to respective person if no one is there in the house and then gas leaks occurs, GSM module is there to send immediate messages to the respective person regarding the gas leak.The main advantage of this system is that it off the regulator knob of the cylinder automatically when gas leakage detected.

## 6. REFERENCES:

[1] Mohammad Reza Akhondi, Alex Talevski, Simon Carlsen, Stig Petersen. “Applications of Wireless Sensor Networks In the Oil, Gas And Resources Industries." International Conference On Advanced Information Networking And Applications, IEEE 2010

[2] Ashish Shrivastava, Ratnesh Prabhaker, Rajeev Kumar and Rahul Verma “Gsm Based Gas Leakage Detection System." International Journal Of Technical Research And Applications EISSN: 2320-8163

[3] Tyler Kersnovski, Felipe Gonzalez, Kye Morton. "A UAV System For Autonomous Target Detection And Gas Sensing." Yellowstone Conference Center, Big Sky, Montana, IEEE 2017

[4] Vana Jelicic, Michele Magno, Davide Brunelli, Giacomo Paci, Luca Benini, Fellow. " ContextAdaptive Multimodal Wireless Sensor Network For Energy-Efficient Gas Monitoring" IEEE Sensors Journal · January 2013 DOI: 10.1109/JSEN.2012.2215733, IEEE 2013