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

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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.

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 for society which having Smart Alerting techniques involving sending text message to the concerned authority and an ability performing data analytics on sensor readings.

1. INTRODUCTION:

The Internet of Things is an emerging topic of technical, social, and economic significance. Consumer products, durable goods, cars and trucks, industrial and utility components, sensors, and other everyday objects are being combined with Internet connectivity and powerful data analytic capabilities that promise to transform the way we work, live, and play.

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 has always been an important criterion while designing home, buildings, industries as well as cities. The increased concentration of certain gases in the atmosphere can prove to be extremely dangerous. These gases might be flammable at certain temperature and humidity conditions, toxic after exceeding the specified concentrations limits or even a contributing factor in the air pollution of an area leading to problems such as smog and reduced visibility which can in turn cause severe accidents and also have adverse effect on the health of people.

Most of the societies have fire safety mechanism. But it can use after the fire exists. In order to have a control over such conditions we proposed system that uses sensors which is capable of detecting the gases such as LPG, CO2, CO and CH4.

This system will not only able to detect the leakage of gas but also alerting through audible alarms. Presence of excess amounts of harmful gases in environment then this system can notify the user.

System can notify to society admin about the condition before mishap takes place through a message.
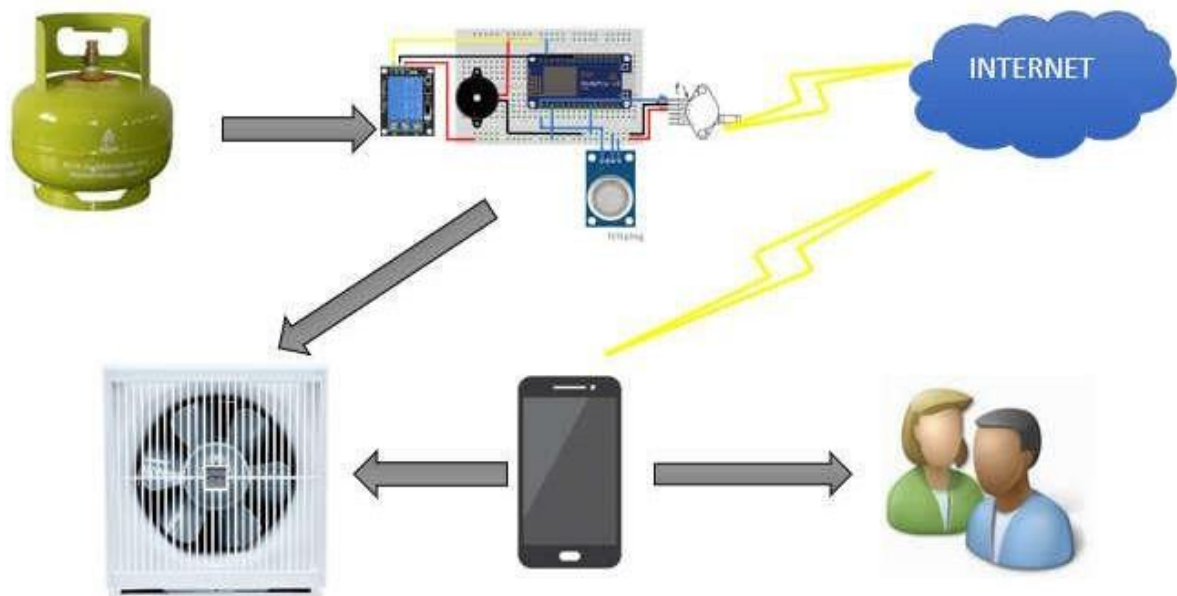
2. LITERATURE SURVEY:

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.

Internet of Things is being used everywhere in order to ease our daily tasks and improve the quality of life. There are innumerable modules that could be thought of for smart homes and cities and one of them are discussed below:

A. 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.

System consists of gas detector sensors, Arduino board, ESP8266 and Cloud server. One Society authority person can register the all flat member user to our system. Society admin can add the details of per flat user such as user name, mobile number, per user flat sensor details information. Society admin can configure the threshold value of each sensor. System hardware can be deployed on each flat. Sensors can sense the value per time. System can send the values to cloud server. Server can Check that the sensor values was existed the threshold value. If sensor value can cross the limit the server can send the command to hardware for buzzing the alarm. Server also sends the notification message to user.

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.

A.   *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).

B.   *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:

Gas detection sensors are most commonly used to develop an IoT-powered system and identify the variation of toxic gases around an industrial facility. It helps benefit the factories and refineries by keeping them safe against any unexpected threats like explosions.

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:

In this paper we use IOT technology for enhancing the existing safety standards. While making this prototype has been to bring a revolution in the field of safety against the leakage of harmful and toxic gases in environment and hence nullify any major or minor hazard being caused due to them. 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. This system will be able to detect the gas in environment using the gas sensors. This will prevent form the major harmful problem.

6. REFERENCES:

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