

Gas Leakage Monitoring and Alerting System

Dani Akash C, Navin Pravin S, Harish Krishnan N, Joseph Sahaya Rijo J

Abstract

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, 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 for society which having Smart Alerting techniques involving sending text message to the concerned authority and an ability performing data analytics on sensor readings. Our main aim is to proposing the gas leakage system for society where each flat have gas leakage detector hardware. This will detect the harmful gases in environment and alerting to the society member through alarm and sending notification.

Introduction

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.

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.[3] Server also sends the notification message to user.

literature survey

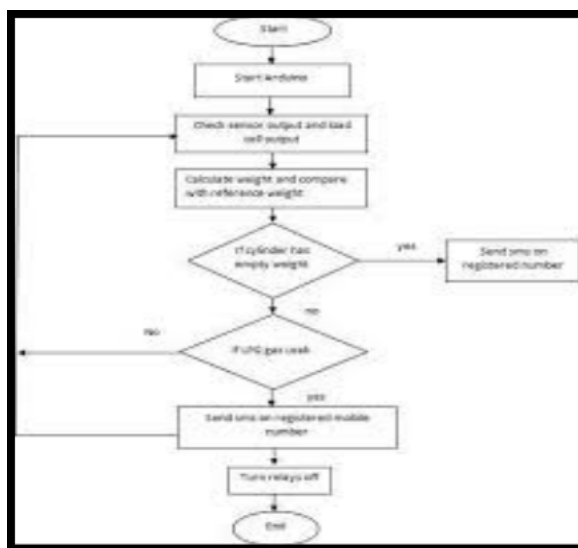
A system was designed to identify and measure methane gas in the zones of flammable gas stockpile sites. The device measures the air and water quality, including every parameter that can have deviation as the result of gas leakage in the water or air. The sensors measure the amount of CH₄ and CO₂ gas in the air while the temperature, pH, and electrical conductivity of the water are monitored. The device is controlled by an Arduino UNO microcontroller that transmits measured data to the database on Raspberry Pi 3.

Different advancements in pipeline leakage detection were put forward. This includes Acoustic emission, optic fiber sensor, ground penetrating radar, Vapor sampling and Infrared thermograph. A system with sensors are connected to arguing for data Collection and it uses Lab view as the GUI (graphical user interface).

A detailed sensor list for flammable toxic and combustible gases and their possible Advantages and disadvantages have been compared. One such example is the SB-95 Sensor, which detects sequentially the variation on the methane and carbon monoxide Gas concentration and modifies its resistance accordingly. The variation in the filament Resistivity is transmitted as a voltage variation on the load resistor. At the same time, Metal oxide sensors have a long response time and even longer recovery time. These Sensors need to extract the gas by making a hole into the pipe for the gas concentration Measurement. Making holes can cause danger such as leakage or explosion of the Toxic gas.

On the other hand, ultrasonic sensors are free from the above disadvantages for the Measurement of gas concentration with fast response time and the device is compact And inexpensive too.

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



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

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 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.