

IOT Base Gas Pipe Leakage Detection System Using Insect Robot

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ABSTRACT:- As we know, industrial security has been major issue in present scenario. Here number of Accidents are increasing day by day. Here, we saw many examples in our day to day life about those accidents that are being occurred due to combustible gases Like A LPG, CNG. Frequently we hear, explosion of household cylinder which Domestic uses, travelling vehicles and many more industries. In some situation many people have been injured and several got dead because of explosion. So we are making this project for security and alerting peoples or specially workers those working on that environment. Now a day's, Gas leakage detector's comes in the market with the sensor that only senses any gas leakage and sends an E-mail to the operator and also start alarm to alerts the user. We are on a project in which we are using a stepper motor for to move the Robot Forward and Backward on pipe in addition to the normal Gas leakage detectors which helps in give indication to user an emergency in our absence and Start Buzzer. Instead of only Gas leakage detector here we are using Stepper Motor because Robot can move easily on pipe. Sensor we are using here has very high accuracy sensitivity combined with a quick response time. The sensor can sense isobutene, propane, LNG. The report consists of a background into the area of Raspberry pi and Wi-Fi communication module, how they are interfaced to each other and AT commands are used for communication.

KEYWORDS:- Raspberry pi2 Model B, Gas Sensor, Temperature- Humidity Sensor, MQ-6Gas sensor, WIFI Model, Buzzer, LED Light

I. INTRODUCTION

Gas, oil, and water are the natural resources that have a key to late and source of economy for most countries in the world. These natural resources are transported from its original plants or storage through extended pipelines which spread throughout the countries. In some countries, pipelines also being used to supply gas directly to users. These pipelines serve as the backbone between producers and consumers. Maintaining pipelines is so costly. For human being it's so difficult to get exact position of leakage on pipe area. These locations locate by Robot with help of altitude and latitude concept send that Data to user or operator and he get exact location. So user OFF the switch we can avoid a future accident. These will essential to sustain economic growth, political stability and also safety. Wireless technologies are used in many areas and widely used in many applications and services with the concept of IOT. There are several technologies are present For Monitoring and Analysis These Given Technologies to overcome these Problem and protect pipelines. Many more system is used in to locating the place Where Leakages occur. Some of the technologies allow some remote system to identified leakage or detect and to report the positions of any leakage to the operator.

The gas main distribution method is using the pipeline; however, several issues and problems have been discussed related to the use of wireless sensors in pipeline monitoring system. One of the issues is to detect leakage of the pipeline as early as possible particularly in a gas pipeline. It is very important that we detect the signs of pipeline leakages as early as possible because if that allows it to go on it could cause some serious problems later on such as endanger the environment and is the pipeline near human population area can become a disaster. Structural defects on gas pipeline may cause several factors such as corrosion. Several factors have been identified that lead to the event of buried pipeline corrosion and cracks such as pipe coatings, soil conditions, changing of temperature, stresses, pipe pressure and cyclic loading effects LPG consists of a mixture of gases like propane and butane. These gases can catch fire easily. Basically here, Robot sense Leakage Gas With Help of sensor MQ6 that sensitivity is Depend upon sensor conductivity and concentration of the gas so it may detect not only combustible gas but also smoke, butane, isobutene, After sense Gas microcontroller will Give activate signal to LED and Buzzer These Parameter gets ON. Subsequently, the stepper motor turns off the switch of the cylinder.

II. LITERATURE SURVEY

A number of papers on the content of gas leakage detection techniques which are done in the previous either as part of research paper on a certain leak detection method and other gas related subjects.

1. Author: Ch.Manohar Raju and N.Sushma Rani.

In These Paper Authors are used a Mini Robot Technology. In these System Author Try to Control using mobile phone Android Application. Using App controls a Mini –Robot and Find the Leakage in Insecure places. Such Places Where Is Transpire of gas Leakage. in Some Area If Leakage Is Occur Mini Robot Presently read and send Signal to The Receiver Section Like On Mobile App. Using GSM Technology Wireless communication Is Possible. Here, Author Developed Android Mobile app these will Receive Information from mini robot directly wireless communication using Bluetooth. These application Advise with indication Where there is befall of gas leakage in any specific area and also control to the mini robot movement via Bluetooth by using the specific command .as well as voice command in the previous paper they are using some diverse content which is not giving a proper places or idea of leakage. Some of them like GSM; GPS here are some of the disadvantage of if we used this type technology is absence of communication in particular area. so, with rapid development and tremendous difference in development of technology so lots of technique we have like a Bluetooth, WIFI , Zigbee etc. With help of all these system here authors' are using a application like mobile android app to monitor the gas leakage and controlling.

Here, they introduce a mini robot and mobile application for controlling and monitoring these system .mean area of system has magnificent expression its used efficiency in vigorous series of test. The main unit of following a route so here integrant sensor system performed extremely well throw to performing the task. The mini robot easier subsistence gas detection and leakage are or location in sites that are otherwise troublesome access.

Drawback: Before practically used in industrial area more settings and development is needed in Detection and Indication on Mini-Robot Simulation.

2. Author: A. Mahalingam, R.T. Naayagi, N. E.Mastorkis

In These Paper Authors Introduced Design and implementation of economically suitable gas leakage detection system. Authors Told That there some standards ideas and innovation on designing and implementation of these system likes a IEEE,BS5730,and IEC for using theses formula UK standards have been adopted. Consideration of given system assure a continuous monitoring and checking the gas level and detection. Here they are using a sensor when level of gas is increases a and it will reached a threshold level like here it will be 400ppm butane which is nothing but LPG .So system start buzzer and it will give a warning to user and it will issue these early warning alarms at 100ms interval, which will caution of low level of gases When the system will shown high level then 575ppm of butane which nothing but LPG , the system high grimness audio alarm will be 50ms interval warning the resides to run a system to safely to assure a user safety. Given alarm not be switch OFF where the level of gas will grasp the normal value of 400ppm.

Here authors told that when any gas leakage will detected by a detection sensor that signal applied on microcontroller as well as the voltage output in these process AN system is applicable for the audio visual alarm when the microcontroller will receive the signal that voltage level will be adjusted to a large area of that gas leakage area will be detected either (0 or1).and these will drive a further system like LED, LCD, alarm Behaviour of mind of user facilitation and vantage, the system will create a some audio and visual alarm here we can differentiated by LED represented visual alarm and Buzzer represented a sounding alarm. These two alarm will attracted there contemplation toward a accidental area here author using MQ-6 gas sensor for detection leakage gas and also in MQ-6 gas detector cover of thin layer of thin and SnO₂ having a conductivity of these sensor is very low in clean air.

Drawback: This system is applicable Only for Restricted area Where Leakage will found or Occur beyond that These System Not Applicable.

3. Author: Zhao Yang, Mingliang Liu, Min Shao, and Yingjie Ji,

In theses author told that analysis and researched on leakage detection in gas pipeline system .Here author told about many idea and technology regarding theses system here SCADA system is used for communication to obtained the data from pipeline system to volatile transcript for every 30 seconds. This model will use for transferring data with SCADA. a constant progress of parameter are collects a very 30 second. Likes pressure and temperature are volatile simulation Model. Volatile blow is simulated make a practical a perfect expressed as number method based on authentic information. Here pressure and temperature performed as not depend upon any variables are giving in a sequence manner for to getting mean of temperature and mean of pressure .so the set of define system of the gas in the pipeline system will be Achieving. In Leakage detection system here, that detection will convey out by estimate the given information will be obtain one by one itself. In this paper author prefer a SCADA system use these system with a transient simulation model. Here system will

find out leakage area after finding and raise and caution of based on transient simulation and volume balance.

Here, they told that regarding detection of gas system which based on a consistence equation, brief period of time equation strength equation, condition equation, volume mass body equation. For leakage detection system contains some module like an I/F, SCADA, Dada bass Transient simulation, leakage detection, output. Leak as small as 0.3% of the nominal gas flow can also be detected at time testing detection leakage point will near to the cove, at that time high pressure, so differential the pressure between gas and atmosphere and leakage is still, and extend and leakage is more. When the pipeline contour pressure and there leakage area is almost the exhibit the sequential relation. Here there relation shows that in leakage area pressure is important parameter as estimate between coefficient friction resistance on the pipeline and its diameter. In computer here system is designed for to understand and identify the leakage detection area for that there range is almost 0.2% to 94% of the normally acceptable gas flow will present.

Drawback: doesn't provide fix values of parameters. And also Here SCADA system is used which has High cost and Bulky.

4. Falohun A.S., Oke A.O., and Abolaji B.M.

In these paper author used system for detection of hazardous gas detection using a system like integrated circuit with help of MQ-9 gas sensor. Here, they used an system like embedded type system in these for provide a input as well as output in system they are using a switches, LED, buzzer, relay, LCD display, some of the radio frequency devices, sensor, in additionally temperature and humidity sensor they are uses here we know in the embedded system is not fulfil with the some devices. So we have to add these devices externally in these system author uses theses devices. Some devise like embedded system has no keyboard, screen, disk, printer, and human handle devices. Here the fundamental source of operation is gas detection alarm system is typically making by the depth of promise that the incidence of gas is perfectly detected immediately informed and correctly managed with each other. These system is receive the signal from the gas sensor that receiving signal applied on controller and output devices like buzzer, LED will gets ON. The sensor which use for detection of gas which specifically detection devices like carbon monoxide and CH₄, LPG family and also carbon if any some industry. for these type of detection these MQ-9 sensor will be preferred. It has some of benefit to used these sensor like it has good sensitivity, to combustible gas, high sensitivity to methane, propane and CO, long life and also low cost if we see more then it simple drive circuit the layer of MQ-9 has 6 pin are there in that system 1pin is used for endear the signal and 2are use for providing a heating current we know that sensor work in between 5v to 12v AC or DC. As output those digital sensors producing a Digital signal either HIGH or LOW.

Drawback: Here The System Contain Many Devices Such As switches, relays, solenoids, LED's, small Custom LCD Display, Radio Frequency Devices, and sensors for Data such as temperature, humidity, light level and also some embedded Devices like keyboard, screen Disk, printer, or other recognized devices because all these devices. Complexity of system will increases Also system get bulky.

5. S Shyamaladevi, V G Rajaramya, P Rajasekar and P Sebastin Ashok

In this paper they told about that system is based on the ARM7 which is automated high performance system. For LPG refilled booking and leakage detection technology. in these paper the system will designed which is based on a designed entreat which make easy to examine for LPG system booking unit, gas leakage controlling and monitoring unit the customer section and server system unit will be purchaser. Here sensor MQ-6 is used for detection and monitoring purposed theses generally when the resistance of sensor is decrees increasing its conductivity. In event of leakage will occur then resistance of sensor will get reduced when increasing a conductivity. Equalized pulsed is giving to the microcontroller then microcontroller give signal to the buzzer, LED, alarm that will get ON. At the same time exhaust fan get on after completion of these process microcontroller give message "EMERGENCY ALERT": LPG gas leakage found in your home that required number via GSM module will used and that same message will display on LED displayed. In these system gas detection and booking process done by automatically here in LCD constant monitoring gas cylinder weight that number will continuously show on a LCD displayed when weight of cylinder get reduces below than or equal then 3kg that signal will send to the microcontroller that logic will create and message was sent with help of the GSM module to user mobile phone. User get alert that gas will reduces in another side to words booking centre at same time again message was occur in LCD display that gas booking complete for performed theses operation hardware and software requirement are Load cell, instrument amplifier. Here, in gas leakage detection system they successfully designed and fulfilled the implementation of domestically purposed as well as suitable from gas dealer agency theses system is useful. Also the system can detected a leakage gas. If leakage is present then it will informed to the user via sending message throw GSM system. Along with that it will activated buzzer signal and LED light turn of the power supply. Fully automatic system use for booking gas cylinder. In the real time weight measurement system that will be displayed on a LCD. These all makes the system capability home

security these also applicable for industry and some of the places of gas detection. For these project they use a ARM7 process and simulated using Keil software cost of system is low as compare to some commercial product which are available in market.

Drawback: This system contains many devices. So complexity of system gets increases that will make system bulky. Handle this large system will be critical task.

III. CONCLUSIONS

LPG Gas Leakage is a major problem in many industries and households. We are going to design such a system which can detect Gas Leakages effectively using a gas sensor and alert user by sending a message to their mobile phones and activating the Buzzer. Hence our Project will definitely prove to be a boon for households and industries in preventing future gas.

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