

# GAS PIPELINE AND FIRE DETECTION ROBOT USING MOBILE IOT: A REVIEW

Kavya V<sup>1</sup>, Seema P R<sup>2</sup>, Rajalakshmi<sup>3</sup>

<sup>1,2</sup>Engineering Students, Dept of Information Science and Engg, VidyaVikas college of Engg, Mysore.

<sup>3</sup>Assistant. Professor, Dept of Information science and Engg, VidyaVikas college of Engg, Mysore.

**ABSTRACT:** Most of the population in India widely use LPG (Liquified Petroleum Gas) as a fuel for cooking, vehicle usage, industrialpurposous.LPG being a highly inflammable gas it is must to store away from source of ignition. When leakage occurs it is very important to fix it thoroughly and fastly, if it is not handled properly it can even be life taking. People lack in safeguarding it due to its high cost and labor requirement .It cant be detected easily because it is odourless in its natural state. This paper proposes a system wherein an alternative to the existing traditional method of finding the leakage of gas and fixing it can be seen. This method involves an insect like tiny robot which travels through the gas pipeline and finds for any leakages in it.This robot has a gas detection sensor which helps in detecting even a small amout of gas leakage in the pipeline. The usage of GPS is seen here for leakage detection. We also see how human beings are replaced by a tiny robot to find the leakages which is more advantageous than the old system. This system also proposes that it sends an alarm to the concerened authority incase of leakage detection. In this paper we see how the existing new system is safer and ecomical compared to old manual gas leakage detection method.

**Keywords:** buzzer; Gas detection robot;GPS, Gas detecting sensor; IoT; LPG; Manual gas detection system;

## I. INTRODUCTION

"IOT based Gas Leakage Detection System with Database Logging, Prediction and Smart Alerting" will distinguish gas leakage utilizing MQ5 sensor (utilized for recognizing regular gases) and check the presence of more amount of harmful gases and cautioning through alarms. With the assistance of IOT, it will alert concerned people about the condition through SMS utilizing GSM module and an email will be sent utilizing NodeMCU. It will likewise forward the sensor values to the database for gathering and analyzing the information. The Internet of things (IOT) is a system of electronic gadgets, which are related to embedded systems and furthermore different domain through the internet[1]. Majority of the people in India use Liquified Petroleum Gas (LPG) as a fuel for cooking, but in India the technology applied in this field (security) is very less. Therefore it is important that the properties and safe handling of LPG are understood and applied in the domestic and commercial/industrial situations[2]. Gas pipes play very important roles for cities, industries and thus in growing economies. So gas leakages lead to losses as well as are a threat because they can also lead to fire accidents. Placing sensors at each section of pipe is very costly. So here we

propose an innovative robot that clings on to the outer surface of the gas pipe and moves with the pipe to check for leakages.

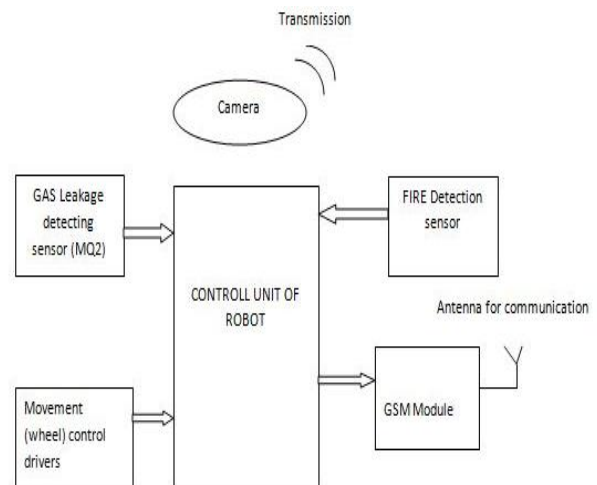
## II. CURRENT SCENARIO

In the current system, the LPG leakage which is handled in a manual procedure requires more time and it requires enormous labor. The pipeline way must be dug into the underground to discover the leakage zone, which likewise gives rise to plenty of social issues, for example, traffic management while burrowing the streets, if there are any blasts while burrowing it may even cause the death of individuals which is troublesome to deal with. The way of the pipeline is first recognized and afterward people move as indicated by the way through sniffing. This strategy requires tremendous speculation because of the huge use of manpower, to burrow streets the expenses must be paid in accordance with the distance to be dug in the road separation which requires enormous capital. Due to such a significant number of disadvantages in the currently existing system, it isn't so feasible to utilize this technique. We can rather rely upon innovation to conquer such issues wherein IoT plays a prominent role.

## III. PROPOSED SYSTEM

The invention of Gas pipeline Detection Robot can make the Gas pipeline leakage detection by improving to a greater level, and reduce the setbacks brought by mine accident. We propose a Robot which can go into explosive condition and identify gas content and temperature.

## IV. ARCHITECTURE OF THE PROPOSED SYSTEM



Proposed System Architecture

## V. COMPONENTS REQUIRED

### Hardware Requirements

#### GSM Modem

A GSM modem is a specific kind of modem which accepts a SIM card and works over membership to a mobile operator, just as same as a cell phone. From the mobile operator point of view, a GSM modem looks simply like a cell phone. At the point when a GSM modem is associated with a PC, this enables the PC to utilize the GSM modem to communicate over the mobile system. While these GSM modems are widely used every now and then are used to give portable mobile internet network, likewise be utilized for sending and accepting SMS and MMS messages. A GSM modem can be a committed modem device with a sequential, USB or Bluetooth connection, or it can is a cell phone that gives GSM modem capacities[4]



#### Microcontroller

A microcontroller is a small integrated circuit used to monitor a particular task in an embedded system. A microcontroller comprises of a processor, memory and input/output (I/O) peripherals on a single chip.

It is an embedded controller or microcontroller unit (MCU), microcontrollers are found in vehicles, robots, office machines, medical gadgets, mobile radio handsets, vending machines, and home appliances among different gadgets[5].



#### Bluetooth

Bluetooth versions make it feasible for a client to do hands-free telephone calls through a cell phone or interface wireless earphones to a cell phone's music playlist, for instance. Bluetooth innovation can simplify tasks that are recently included among peripheral gadgets. For example, with a Bluetooth-empowered printer, one can interface remotely with a PC or cell phone and print out reports[6].



#### Fire Sensor

A fire detector is a sensor intended to distinguish and react to the presence of fire or flame. Reactions to an identified fire rely upon the installation, can incorporate sounding an alarm, deactivating a fuel line, (for example, propane or a gaseous petrol line), and implementing a fire suppressing system[7].



#### 1. Gas detector

As detectors measure a predefined gas concentration, the sensor response fills in as the reference point or scale. At the point when the sensors outperform a certain pre-set level, an alarm will activate to caution the user. There are different types of detectors accessible and a larger part serves a similar function: to monitor and warn of a risky gas level[8].



#### Buzzer

A buzzer is an indicating device, generally electronic, regularly utilized in vehicles, household appliances, for example, a microwave, or cooking.

It most ordinarily comprises of various switches or sensors associated with a control unit that decides whether and which button was pushed or a preset time has slipped by, and as a rule enlightens a light on the proper button or control board, and sounds a notice as a constant buzzing. At first, this gadget depended on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing commotion). Frequently these units were tied down to a divider or roof and utilized the roof or divider as a sounding board. Another execution with some AC-connected devices was to implement a circuit to make the AC current into a noise loud sufficiently uproarious to drive a loudspeaker and attach this circuit to a shabby 8-ohm speaker. These days, it is progressively well known to utilize a ceramic-based piezoelectric sounder like a Sonalert which makes a high-pitch tone. Generally, these were hooked up to "driver" circuits which changed the pitch of the sound or beat the sound on and off[9].

#### Camera

Wireless cameras which are used in robots are very smaller compared to other cameras which we use. These can be

mounted easily into the robots due to their smaller size. The camera pan and tilt system enables the robot to remotely look into all directions. These cameras consists of plastic domes to protect them from any damage[10]



#### System Requirements

- KeilUv IDE for embedded c programming
- SDK for android.
- Eclipse IDE for application development

#### VI. WORKING

The architecture of the kit resembles a moving robot with two motors and it comprises of a gas sensor to recognize the gas leakages in the pipe. The kit comprises of MQ2 gas sensor to recognize the gas leakages.

As the robot continues moving along the metal pipe it continues observing for any gas leakage. On recognition, it utilizes an interface GPS sensor to transmit area of the leakage over to the IOT login system, Here we use IOT to check , get and show the gas leakage caution and location over IOT.

In this way, we have a completely mechanized insect like robot that moves within the gas pipe and finds gas leakages quickly at a low cost.

- The research of GAS PIPELINE Detection Robot can make the GAS PIPELINE leakage detection works improving to a greater extent, and reduce the setbacks brought about by mine accidents.
- We propose a Robot which can go into blast condition and recognize gaseous substances and temperature.
- The gas and temperature related information are detected through relating sensors, wherein it has a buzzer which demonstrates when a gas leakage is recognized and sends an alarm to the concerned authority.
- The automated development is done by giving portable signals which makes a local application which interfaces with robots movement.
- A camera is utilized with the robot to screen the location and movement of the robot.

#### VII. OBSERVATION

The advantages of this type of dangerous gas detecting modern systems are that they all quickly distinguish unsafe gas and highly affective gasses, great selectivity and quick reaction are got. Else, it might be difficult to carry out such issues manually. But these difficult situations are taken by a

robot in a very straightforward and light approach. Due to a laser discovery range and test it has become an easy job for the robots to work extremely well in these kinds of hazardous, toxic and life taking situations. These new interfaces could be achieved due to the vast usage of IoT. Due to the usage of robots this method is more safer and economical. The cost is mainly of robots and not much labour and other maintainance costs are involved which makes this system more cost effective. This system is also easy to handle because the tracking of robots solve majority of the problems and not much work is involved in it.

#### VIII. CONCLUSION

The conclusion of this paper gives an overview of how IoT incorporated in modern system is being beneficial in detecting the gas leakage. We also see how the disadvantages of the traditional system are took into consideration, and how the new technology used based on IoT is advantageous. This paper concludes that the usages of gas detecting robots are very much safer and economical compared to manual methods. The principle of IoT based gas detection system using MQ2 sensor is seen here. This method is beneficial in many ways due to its easy usage and higher leakage detection rate compared to old methods. The usage of GPS is seen here in detecting the leakage. It is also seen that the notification in case of any leakage is sent to the concerned authority through buzzer or alarm.

#### REFERENCE

- [1] Chaitali Bagwe, Vidya Ghadi, Vinayshri Naik, Neha Kunte, "IOT Based Gas Leakage Detecting System With Database Logging, Prediction and smart Alerting-Review", IOSR Journal of Engineering (IOSRJEN) ISSN (e):2250-3021, ISSN (p): 2278-8791 Volume 1 PP 25-28
- [2] Anandhakrishnan S, Deepesh Nair, Rakesh K, Sampath K Gayathri S Nair, "IOT Based /smart Gas Monitoring System", IOSR Journal of Electrical and Electronic Engineering (IOSR-JEEE) e-ISSN: 2278-1676, P-ISSN: 2320-3331, PP 82-87
- [3] "IoT Gas Pipe Leakage Detector Insect Robot", <https://nevonprojects.com/iot-gas-pipe-lekage-detector-inscet-robot/>
- [4] "What is a GSM Modem? (or GPRS Modem? Or 3G Modem?)", <https://www.newsms.com/faq/what-is-a-gsm-modem>
- [5] Margaret Rouse, Microcontroller, <https://internetofthingsagends.techtarget.com/definition/microcontroller>
- [6] Margaret Rouse, Bluetooth, <https://searchmobilecomputing.techtarget.com/definition/bluetooth>
- [7] Shahsi Kumar, Aug 2018, Interfacing Flame sensor with aurdinoto build a fire alaram system, <https://circuitdigest.com/microcontroller-projects/aurdino-flame-sensor-interfacing>
- [8] How Gas Dector Work, <http://www.thomasnet.com/articles/instrument-control/how-gas-dector-work>

- [9] Advanced acoustic technology corp.  
<http://www.buzzer-speaker.com/faq/what%20is%20buzzer.html>
- [10] <https://www.superdroidrobots.com/shop/category.aspx/cameras/82/>