# Leakage Detection in Gas Pipelines Inspection Robot Using IOT

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**Abstract— The range of accidents are increasing day by using day and we have considered many examples in our everyday lifestyles about these accidents that are being passed off due to fuel leakage in industrial area. The purpose of the undertaking is to discover the gas leakage. This leakage leads to losses as properly as a risk lead to hearth accidents. Placing sensors at every area of pipe is very costly. So we advise an innovative robot that clings on to the outer surface of the fuel pipe and moves with the pipe to take a look at for leakages. The robot has gas sensor used to realize gasoline leakage. As the robot keeps shifting alongside the steel pipe it keeps monitoring for any gas leakage, on detection it makes use of an interface GPS sensor to transmit region of the leakage detected over to the IOT login system, here we use IOT gecko to get hold of and show the gasoline leakage alert and region over IOT. Thus, we have a wholly automatic insect like robotic that strikes with the fuel pipe and detects fuel leakage right away at a low budget. This gadget consists of gas detection using IOT and actual time monitoring on internet with the aid of GPS sensor.**

## INTRODUCTION

Pipelines are a primary handy and environment friendly capability for gas transportation. It is crucial to find an environment friendly and convenient way for leak detection and region in fuel pipelines. Present, a number of strategies have been proposed for leakage detection and area in fuel pipelines. Leak detection techniques can be roughly divided into hardware and software-based systems. The leakage detection techniques mentioned above frequently supply leak area at the rate of high hardware costs, complexity of set up and lack of accuracy and late notification of gas leakage. We become aware of gasoline leakage detection approach in the pipeline the usage of strain sensor and fuel sensors such as (MQ-2, MQ-5). Gas sensor is excellent for detecting LPG, CH4, CO, ALCOHOL, Smoke and propane.MQ-3 fuel sensor is used for sleuthing gases like Alcohol, Benzine,. This device will automate the pipeline fuel detection administration and will supply safety alert to the supposed customer. Even small outflow of gases in the pipeline can be sensed precisely and recovery measures can be taken to forbid the loss of existence due to blowup of gases or fireplace that go on due to fuel outflow .The pressure stage rank of the fuel tour will be immediate for judgment the swiftness of the glide fee of the gases in the gossip .The sensors are placed in the pipeline if any leakage of gases happens then it will be detected and facts such as title of the gas, pressure price of the fuel and undertaking the place the outflow go on is detected. On discovery of fuel leakage, it uses GPS to convey region of the outflow detected over the IOT login system. Here we use IOT human action to get and show off the gas outflow alert and region over IOT. The pipeline will be divided into zones and every area will have a gas sensor and then if there is outflow in the pipeline it will be detected, and records will be exceeded to the licensed people mobile phone and will also be up to date in the server with the position where leakage occurs.

## LITERATURE SURVEY

A literature review is a scholarly paper that present the current knowledge including substantive finding as well as theoretical and methodological contributions to a particular topic. Tanzila Younas, Deepak Kumar Mukhi, Mufaddal Saifuddin, S M Faiz Hassan Zaidi, M Mahad Fayyaz and Hamzah Ahmad Khan Mechatronics Department, SZABIST, 100 Clifton,75600, Karachi, Pakistan

This paper especially objectives to minimize the dangers of Liquefied Petroleum Gas (LPG) leakage anywhere be it home, office, industries or

offering pipelines. Furthermore, this paper intends to formulate a system that can observe the leakage with no human interference and reduce the chances of any hazard prompted via such leakage by means of alerting the concerned authorities and authorized persons. Thus, Arduino or Raspberry pi will be installed to control the different installed circuits or units that will help in making this goal of reducing misadventure by means of gas leakage feasible and it will disseminate information regarding leakage.

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This paper investigates the leak detection and location for gas pipelines using AE technique. AE technique as one of nondestructive examination method has gained considerable attentions in many applied areas, which is an effective, true real-time, on- line and in-service detection method. Though, it is reported that dynamic pressure sensors are used in AE leak detection for gas pipelines, they need to be inserted into gas pipelines for picking up leak noise, which is quite inconvenient in practical application.

ARDUINO:


Fig 1: Arduino

Arduino could be a device for making laptop structures that can feel and manipulate a whole lot of the physical international than your private laptop. it's far an opensource bodily computing stage based on smooth microcontroller board, and the improvement putting for writing software program on the board.

Arduino is used to develop interactive gadgets, taking inputs from several switches or sensors, and dominant a variety of lighting stuffs, motors, and special physical outputs. Arduino projects may be stand-on my own, or they'll communicate using software package running for your pc The boards are assembled through hand or bought prefabricated; the open-supply IDE is downloaded free.

DTH SENSOR

The DHT11 may be a basic, radical low-priced digital temperature and wetness sensing element. It uses an electrical phenomenon wetness sensing element and a semiconductor device to live the encompassing air and spits out a digital signal on the info pin (no analog input pins needed). It's easy to use, however requires careful temporal order to grab information.

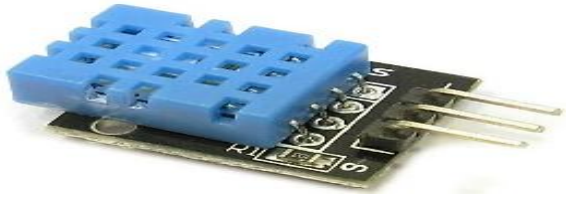

Fig.2: DTH sensor.

GAS SENSOR

Sensors are the electronic devices used for interaction with the outer surroundings. There are varied styles of sensors out there that may discover lightweight, noise, smoke, proximity etc… With the appearance in technology, these are out there as each analog and digital forms. Besides forming a communication with the outer surroundings, sensors also are an important a part of safety systems. Hearth sensors are wont to discover the fireplace and take acceptable precautions on time. For sleek functioning of management systems and sensitive physical science, wetness sensors are used for maintaining wetness within the unit. One amongst such detector utilized in safety systems to discover harmful gases is MQ2 Gas detector. It finds gasses like LPG, propane, methane, hydrogen, alcohol, gases within the smoke and CO Range up to 100000ppm.

Fig.3: Gas sensor

GSM

A GSM modem exposes an interface that allows programs now presently SMS to ship and get hold of messages over the modem interface. The cellular operator costs for this message sending and receiving as though it honestly turned into achieved at once on a cellular cell phone. To perform these duties, a GSM modem must aid accomplice "extended AT command set" for sending/receiving SMS messages. GSM modems will be a fast and inexpensive way to get started with SMS, due to a special subscription to an SMS carrier dealer isn't wished. In maximum components of the globe, GSM modems are a rate effective answer for receiving SMS messages, due to the fact the sender is procuring the message shipping.

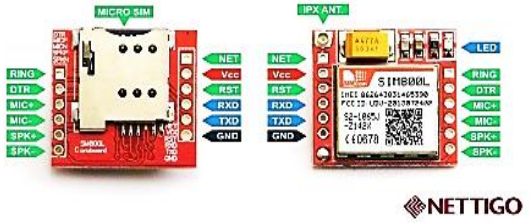


Fig.4: GSM

GPS

The global Positioning gadget (GPS) is that the maximum vital recent strengthen in navigation and positioning generation. within the past, the stars were used for navigation. nowadays global wishes larger accuracy. the brand-new constellation of with radius up to the gap to the satellite. If 2 satellites are used, then the receiver must air the floor of every sphere, that is that the intersection of the 2 spheres or the perimeter of a circle. If a 3rd satellite tv for pc is hired, then the scenario of the user is narrowed proper right down to the 2 points wherever the three spheres cross. three measurements rectangular measure enough for land receivers because the decrease of the 2 factors could be selected. 4 satellites rectangular measure needed; the intersection of all 4 spheres is the receiver's location. as soon as over four satellites square degree used, bigger accuracy is often performed.

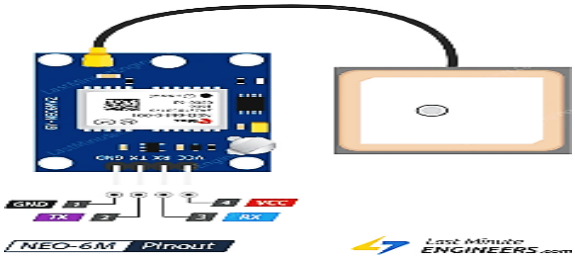


Fig.5:GPS

Block Diagram:

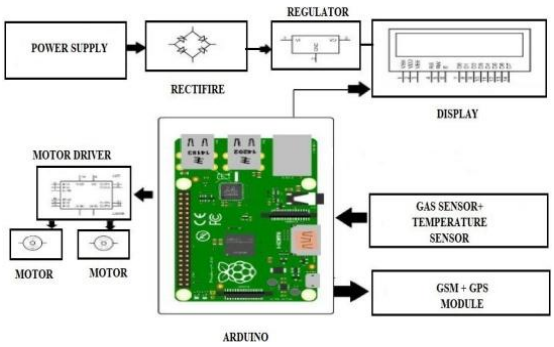


Fig 6: Block Diagram

WORKING:

The heart of the project is Arduino because it is the interface between all the hardware and it is also the control unit. Power supply is used to supply power to all the hardware components in the robot. It is connected through the rectifier to convert AC into DC supply. We need 12v DC supply for the system to work.

LCD shows the concentration of gas that is leaked at the pipeline that is detected by the gas sensor after leakage was detected GSM module sends the message to the respective number which is given in the program. GPS module will give the correct location of the leakage and sends the location as a message to the respective number. Motor IC driver will drive the motor wheels to move. For delay after detecting the leak we give the program.

IOT is used to walk the substance about the outflow of gases in the pipeline and it can be viewed at anytime from anywhere in the world. Aggregation such as name of the gas, pressure rate of the gasoline and its position where leakage of gases occurs detected and passed to the user using IOT. They can view the notification either in laptops, mobile phones etc. And direct curative measures can be appropriated to forbid loss of life due to burst of gases and fire from the gas out flow.

The theory consists of gas sensor that is used to observe gas out flow. On catching it uses GPS to convey location of the leakage heard over to the IOT login system. Here we use IOT horizontal surface to get and demonstration the gas out flow alert and position over IOT. Thus we rich person a amply machine-controlled

model which discover gas outflow instantly at a devalued fund.

ADVANTAGES:

- Easy construction.
- Low cost.
- Very accurate location of leakage.
- Very fast response when the leakage was happened.
- Very fast in alerting if there is any leakage.

APPILICATIONS:

- Domestic gas out flow detector
- Industrial Combustible gas perceive
- Transportable gas detector
- Accommodation
- Factories

RESULT

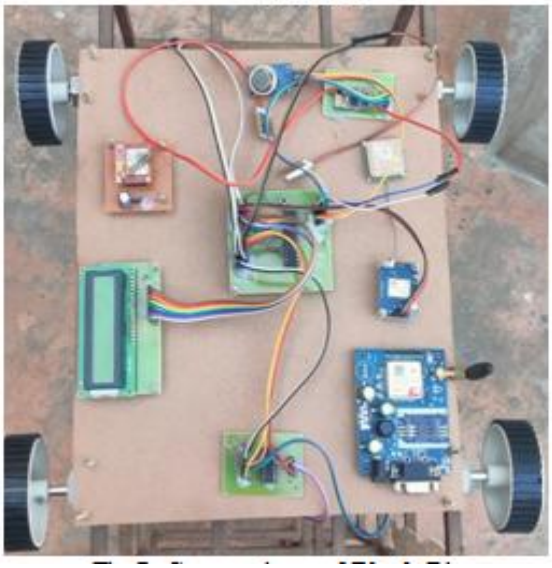

Fig 7: Connections of Block Diagram


Fig 8: Display of LCD when leakage occurs

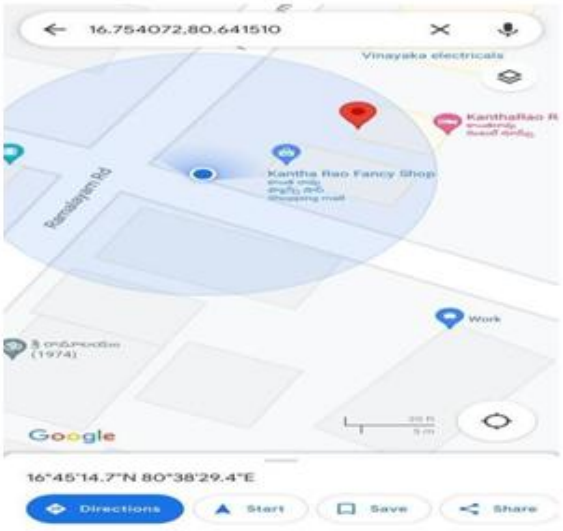


Fig 9: Message


Fig 10: Updated Location

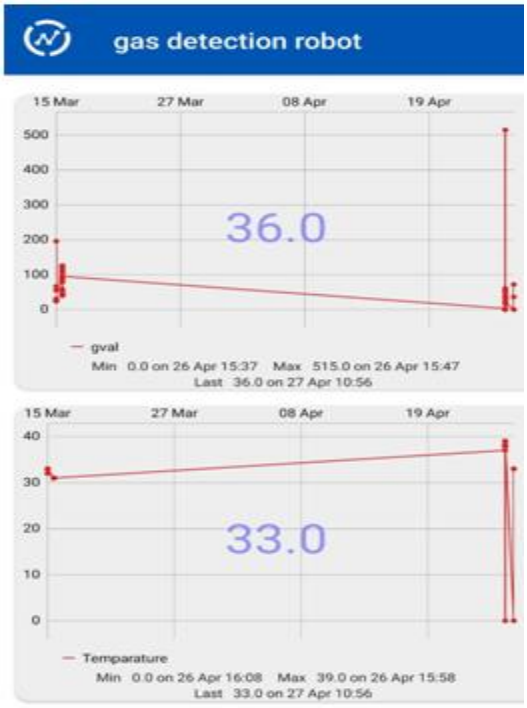


Fig 11: Monitoring various sensor outputs in IOT

## CONCLUSION

Escape of gas sensing in pipe line networks is a ambitious research area involving exact testing and substantiation. This system for leakage in pipeline will be used for the gas leakage in pipeline may cause heavy explosion fire thus damaging the life.

## FUTURE SCOPE

The future scope of this project was, and if we used Raspberry Pi instead of Arduino, we can be able to see the Digital image of that location. We linked to satellite through GPS and GSM modules we can be able to communicate for long distance and further we can also extend the range also. Now it will notify the gas leakage and its location in future the gas flow will be automatically stopped if the gas leakage is identified. This will be very useful for stopping the explosion.

## REFERENCE

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