



Special Issue of Second International Conference on Advancements in Research and Development (ICARD 2021)

Gas Leakage Monitoring System Using IOT

Jijusasikumar S¹, Kaviya K², Logida R³, Chinmaya S⁴, Sangeetha K⁵

^{1,2,3}UG Scholar, Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, India.

^{4,5}Assistant Professor, Department of Computer Science and Engineering, SNS College of Technology, Coimbatore, India.

jijussathyan@gmail.com¹, kaviyamalarvizhi2839@gmail.com², reethiraj2000@gmail.com³, chinmayasb1993@gmail.com⁴, Sangithaprakash@gmail.com⁵

Abstract

Gas leakages result in serious problems in households and other areas where household gas is used. We are using many household appliances frequently but we are not servicing all of it, we are servicing only our luxurious and costly items in regular intervals, we are not taking care of essential appliances. Gas stove is one of it, using for a long period of time in kitchen the spills of oils and water fall over the cylinder tube, they become rust and cause hole in it through which gas gets leak and can cause a fire accident. The aim of this paper is to monitor and detect the gas leakage. The sensor is fixed in the cylinder used to detect gas leakage. During working in the kitchen if the gas leakage is sensed the lcd monitor displays a alert message and gives an alarm alert. If the gas leakage is found during the absence of peoples in home, sensor sense the leakage and sends the alert message to the user mobile through an application. The status of gas leakage is fed into the controller, using wi-fi connection the wi-fi module sends the alert message to the cloud and it is redirected to the application over the internet.

Keywords: Gas leakage monitoring, Gas detection, Gas sensor, MQ-sensor, Arduino

1.Introduction

A gas cylinder and the gas stoves are essentially found in Indian household kitchen. Nowadays the number of fire accidents caused due to the gas leakage was becoming high and they grow at very high rate. This fire accidents not only causes us financial problems sometime it causes severe damages to human lives and it leads to death also. These problems are caused due to a similar reason. That is, we are using gas stoves simultaneously, we are not servicing it regularly like other things like car, motorbike and even though air conditioner. Yet we are not servicing it for a long period of times the tube may get older is a chance of formation of rust over the tube Due to this rust there is a formation of holes in the tube. By thoseholes the gas get leaked the consumption of

the gas get wasted and sometimes it causes fire accident too. Even though we have many solutions in IOT to detect the gas leakage it is difficult to monitor when we go for a trip or vacation. So, we have come up with a solution.

2.Gas leakage monitoring system

In our project we are going to give a solution for gas leakage monitoring during cooking and monitoring leakage during when we are way from our house. We develop an android application which is connected to the cloud. A gas sensor is fixed to a gas cylinder sense the status of the gas leakage and sends the data to the microcontroller. With the respective obtained data, the micro controller sends the message to a cloud using the wi-fi module coupled in it. The message send to the mobile can be tracked at real time with the use of

internet or the wi-fi. In case of working in the kitchen we are able to detect the leakage by lcd monitor attached to the controller

3.Literature survey

Some of the recent study shows the gas leakage monitoring and detection methodologies. The core idea about the project is based on the Suma V[1],Abhishek P[8], developed the gas leakage detector,controller,booking system and theweightage of the cylinder,in her system she focussed on huge variety of sensors and the variety of embedded systems.This was the product with all the features but the cost and maintainence of the system was too high,because the size of the product was large and heaviouir. NagibMahfuz[2] has developed a system based on the two different sensors for detecting the gases and this product was based on the real time tracking of the system with the help of the internet /wifi connection,it was designed for the multi purpose gas detection

methods. The S.M.Zinnuraai[3] has built the gas detection alert system coupled with the SMS notification to a registered mobile number at the time of gas leakage with the help of GSM module. Shrestha V[4] has developed a system with the additional feature with the fire sensor attached to it, which is designed on the basic to detect the gas and fie accidents. Panjay’s [5] has designed a system in which he had given a clear idea about the long transmission of gas through a pipeline and its gas leakage detection flow. Kalpesh Gupta[6] has designed a automatic window opening system when the gas is being leaked at certain amount of volumecontinuously. Kavitha B [7] has designed an alarming system for the industrybased on thehuge amount of leak of gas from the container.P. M. Vidya [9] hazardouspreventiononthe industrial safetyforthe precaution methods.

4.Block Diagram and Explanation

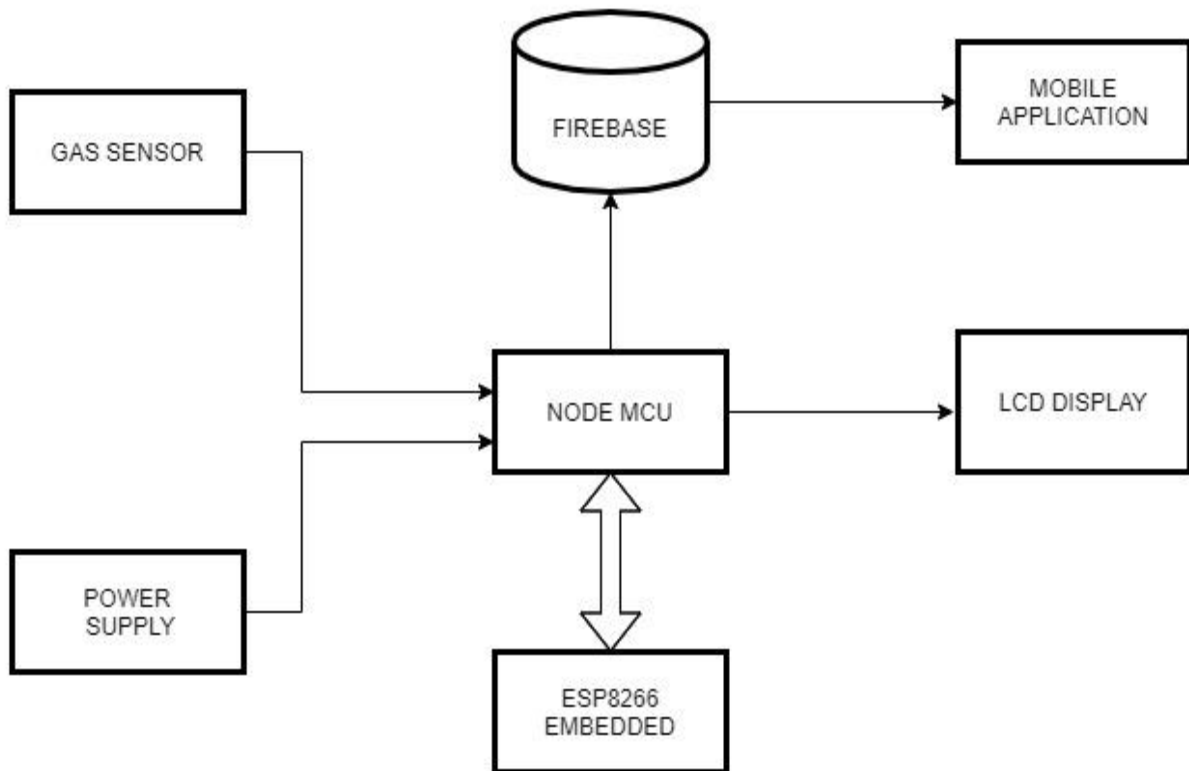


Fig.1 Block Diagram

4.1 Node MCU:

The NodeMCU (NodeMicroControllerUnit)is opensource software and hardware development environment that is built around a

very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266 contains all crucial elements of the modern computer: CPU, RAM, networking (wi-fi), and even a modern operating

system and SDK. It has a build-in powerful wi-fi module.

4.2 Power Supply:

It is a basic need for any IOT devices. It is the basic source of working of components such as MCU, displays, buzzers, relay, speakers etc. For the node MCU the power source is a AC supply or the power supply via data cable connected to any devices or the power source.

4.3 Gas Sensor:

Gas sensors also known as gas detectors are electronic devices that detect and identify different types of gasses. They are commonly used to detect toxic or explosive gasses and measure gas concentration. We have used here MQ-2 gas sensor. MQ-2 gas sensor is used to detect the concentrated gases such as lpg, hydrogen, propane, carbon and smoke gases

4.4 LCD:

Lcd (Liquid Crystal Display) is a display panel or flat panel display that uses a light-waves to display the message or the contents on the screen. They were widely used in calculators, watches and in computer monitors. In our project we have used the display that is used for the calculator.

4.5 Firebase:

Firebase is an opensource database available for the developer to perform some database operations. When the device regains connection, the Realtime Database synchronizes the local data changes with the remote updates that occurred while the client was offline, merging any conflicts automatically.

4.6 Mobile Application:

It is a computer program or software application that is enabled to run on the mobile operating system supported devices such as smartphones, tablets, smart watches, android televisions.

5.Flowchart and working:

When the power supply is given the microcontroller, it starts it working. The sensor senses the status of the gas leakage and feed the data into the microcontroller. Based on the data the status message is displayed in the lcd monitor. If the gas is leaking it displays the message as "GAS LEAKAGE DETECTED", if the gas not get leaked the message in the monitor will be as "NO LEAKAGE DETECTED". Using the android application, we can also monitor the leakage. For

this we need an internet/wi-fi connection for the microcontroller and an android mobile connected to the internet or the wi-fi connection. The leakage status is sent to the firebase cloud. We can use the application to monitor the leakage status. It shows Leakage level with the percentage of leakage. If there is no leakage found, then the leakage percent will be 0.

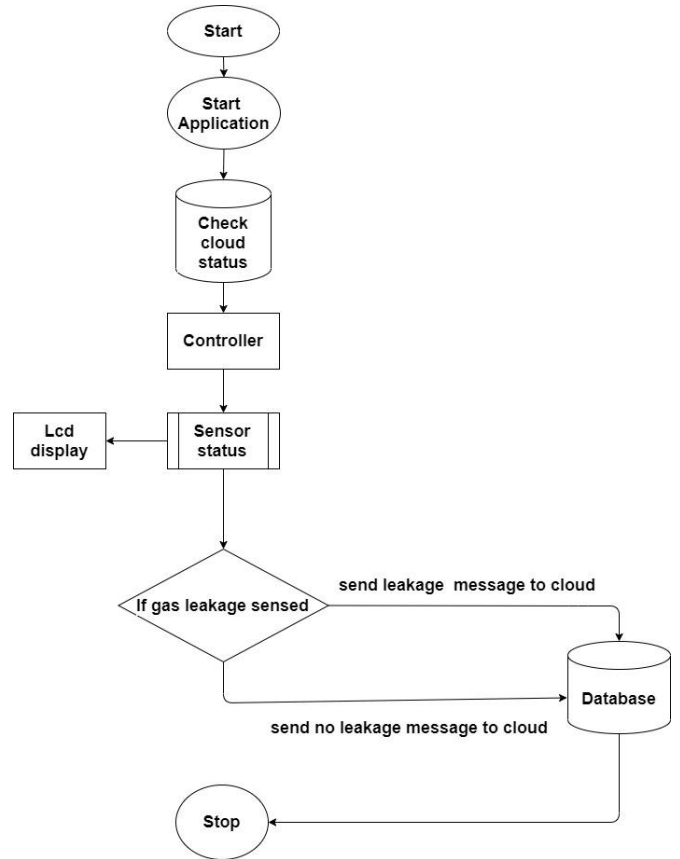


Fig.2Flow Chart

6.Working Model

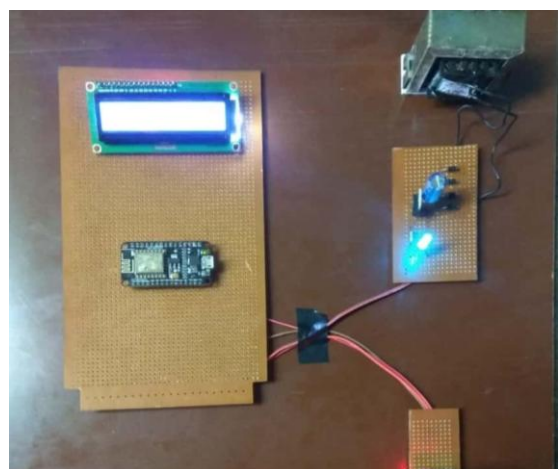


Fig.3Working Model



Fig.4 Application UI

Conclusion

This is the system proposed by us to monitor and detect the gas leakage. It focusses mainly to avoid the fire accidents caused by gas leakage, avoid the financial damages. This system displays the status of the leakage with the live tracking of the leakage with the accurate percentage, it is far better than the system that has the SMS notification because it doesn't show the live tracking of the leakage status in SMS notification system only, we get alert and not the live tracking.

References

Journals

- [1].Suma V, Ramya R Shekar, Akshay Kumar A "Gas Leakage Detection Based on IOT-ICECA 2019"
- [2].NagibMahfuz, Shawan Karmokar, Md. Ismail Hossain Rana "A Smart Approach of LPG Monitoring and Detection System Using IOT-AIBU 2020"
- [3].S.M. Zinnuraaain1, Mahmudul Hasan,Md.AkramulHakque,Mir Mohammad NazmuArefin "Smart Gas Leakage Detection withMonitoring andAutomatic Safety SystemAIBU 2019"
- [4].Shrestha,V.P.Krishna Anne,R.Chaitanya "IOT Based Smart Gas Management System- ICOEI 2019"
- [5].M.Pajany,A.Hemalath "Pipeline Gas Leakage And Detection AndLocation Identification System-ICSSAN 2019"
- [6].Kalpesh Gupta, Gokul Krishna G and Anjali T "An IOT Based System for Domestic AirQuality Monitoring and Cooking Gas Leak Detection for A Safer Home- International

Conference on Communication and Signal Processing, 2020"

- [7].Kavitha B C,VallikannuR "IOT Based Intelligent Industry MonitoringSystem –SPIN 2019"
- [8].Abhishek, P. Bharath "Automation of lpg cylinder booking and leakage monitoring system-IJCRD"
- [9].P. M. Vidya, S. Abinaya, G. G. Rajeswari, and N. Guna "Automatic lpg leakage detection and hazard prevention for homesecurity-National Conference on VLSI, Embedded and Communication & Networks"
- [10].AsmitaVarma, Prabhakar S, KayalvizhiJayavel "Gas Leakage Detection and Smart Alerting and Prediction Using IoT-Second International Conference on Computing and Communications Technologies-2107"