

WiFi Based Gas Pipe Leakage Detector Insect Robot using PI3

Nyan Phyto Aung, Mo Mo Myint Wai, Lwin Lwin Htay

Department of Electronic Engineering, Technological University, Mandalay, Myanmar

How to cite this paper: Nyan Phyto Aung | Mo Mo Myint Wai | Lwin Lwin Htay "WiFi Based Gas Pipe Leakage Detector Insect Robot using PI3" Published in International

Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-5, August 2019, pp.558-564, <https://doi.org/10.31142/ijtsrd26381>



IJTSRD26381

Copyright © 2019 by author(s) and International Journal of Trend in Scientific Research and Development Journal. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (<http://creativecommons.org/licenses/by/4.0>)



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 [1]. These will essential to sustain economic growth, political stability and also safety. Gas is a leading source of energy used for cooking and heating in our homes. It provide an economical and clean source of energy compared to other source of energy like firewood. It is also used as a source of energy in industry and fueling our cars. The two major type of gas used are Natural Gas and Liquefied Petroleum Gas(LPG) both of which are hydrocarbons gas. Natural Gas is basically methane gas while LPG gas is a mixture of butane and propane gas or purely butane or propane gas. Natural gas is extracted from underground while LPG gas is a by-product of Natural Gas and crude oil processing. These gases have a characteristic of being highly flammable and can cause suffocation in high concentration. It is because of this, the usage of gases should be done with great care and safety standards are put in place to ensure everyone using the gas is safe. Both Natural and LPG gas burns to produce clean energy, however there is a serious problem of their leakage. Being heavier than air,

ABSTRACT

Security has been major issue in industry and house. 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 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 work for security and alerting peoples or specially workers those working on that environment. The aim of this work is to detect gas line leakage in under pipeline through Wifi connectivity and monitoring it with web. In the proposed system, the robot keeps moving along the metal pipe it keeps monitoring for any gas leakage, on detection it send data to computer via WIFI. It is automated insect-like a robot that moves with the gas pipe and detects gas leakages instantly at the real time. This system is a sample project that how is leakage is been detecting and monitoring. This system may be applied in industrial applications for detecting pipeline leakages with large size kit. This system consists of gas detection using Raspberry pi and real time monitoring on web via WIFI.

KEYWORDS: Raspberry PI3; Gas Sensor; LPG; WIFI; Leakage

these gases do not disperse easily. It may lead to suffocation when inhaled and may lead to explosion. Due to the explosion of LPG, the number of deaths has been increased in recent years. To avoid this problem there is a need for a system to detect the leakage of LPG. Gas leak detection is the process of identifying potentially hazardous gas leaks by means of various sensors. Several designs of LPG detection and alert system have been proposed in the literature. This paper presents a LPG leakage detection and alert system to avoid fire accidents and to provide house, industry and pipe line safety.

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 PI3 will detect and send these signal to monitoring system through WIFI.

Thus, a gas detector is invented to ease human on detecting the presence of those dangerous gases within an area to prevent any disaster happen. The gas detector is a gas detecting device that used to be applied in dangerous place. To design such a detector, a gas sensor (MQ-2 LPG gas sensor), controller, are required. The MQ-2 sensor uses Tin Dioxide as the sensing material and as is highly sensitive to Propane and Butane gas and less sensitive to other gases like carbon Monoxide and smoke. The success of designing the LPG gas leakage detector will help to efficiently detect the leakage of LPG gas and avoid risk of fire and pollution, saving life and property. In oil and gas industry, a gas leak is hazardous to personnel and industrial operation. A quick detection and alert would minimize the dangers of gas leak. Besides, in certain time, the proper person that responsible of monitoring the gas leakage in the workplace may have meeting or other outside works that could make him or her cannot access the alert on the information of gas leakage. Traditionally, the gas pipeline leakage monitoring system is realized by communication cable system, therefore the limitation range of coverage could occur.

In order to overcome these restrictions, wireless sensor network is chosen as the best choice in the situation above. Nowadays, the world has become full of new technology. The gas detector has been innovated into various ways of detection, for example infrared thermal imaging gas leak detection, gas leakage detection with monitoring system, and wireless gas sensor network.

Wireless technologies are used in many areas and widely used in many applications and services. 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. This paper presents the implementation of a wireless gas leakage monitoring system by using Raspberry Pi and monitoring on web through WIFI.

II. BACKGROUND THEORY

Mukesh Mahajan and Vishal Date [1] expressed the system which detects the gas leakage and can be monitor on IOT. The authors tell about the detector robot and new technology such as IOT. In their system, PI 3 may be used. But the authors only express about the system in theory. They did not show the results.

Ch. Manohar Raju and N. Sushma Rani [2] describe 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 aneroid 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.

A. Mahalingam, R.T. Naayagi, N. E.Mastorkis [3] 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 these 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 warring to user and it will issue these early warring 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 warring 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 leak aging area will be detected either (0 or 1). 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.

Zhao Yang, Mingliang Liu, Min Shao, and Yingjie Ji [4] 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.

The authors 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.

Falohun A. S., Oke A.O., and Abolaji B. M [5]expressed 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.

S Shyamaladevi, V G Rajaramya, P Rajasekar and P Sebastin Ashok [6] 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 willdisplay 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 theses 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. THE PROPOSED SYSTEM

The block of the proposed system is as shown in figure 1. From the figure 1, there have the two portions to implement the system that they are hardware and software. In the hardware portion, the Raspberry PI 3 is the main control

unit in the system. The MQ-2 is sensing the gas and send the signal to the PI3. The motor is used to move forward, backward and other direction of robot. The direction command is received by PI 3 form the PC or mobile phone through WIFI network. The status of leakage gas can be monitored on PC or Phone with web server via WIFI. to implement the whole function of the system, PI3 os and web server must be developed.

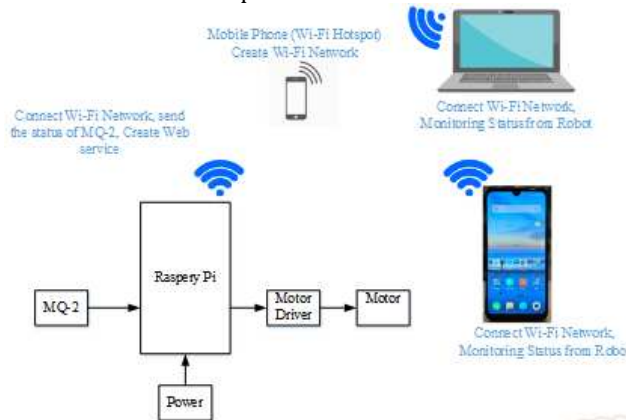


Figure1. Block Diagram of Proposed System

IV. SYSTEM METHODOLOGY

As described in previous section, there are two portions to implement the proposed system. The Raspberry Pi 3, MQ-2 sensor, motor driver and motor are the hardware requirement of the system. The meaning of these device are as described below.

A. Raspberry Pi-3 Model B

Raspberry pi is the credit size low cost as well as low power computing device. Motivation for building such a tiny computer with HDMI out is to build the skills in the young generation in somewhat more interesting way. Some students (6 in numbers) of University of Cambridge, United Kingdom analyzed the data of student enrollment of past few years in two parameter, one was number of student applying in computer science technology and the second parameter was computer skills. They evaluated the data and further concluded that number of applicants (students) for Computer Science are decreasing every year due to lack of skills in Computer Technology. By keeping this problem for the background of motivation, theses six students decided to build a small computer device which can do the physical computation. Physical computation means to make the personal computer capable for being interact with the real world hardware such as sensors, web servers, robots, locks and much more. For this physical computation, Raspberry has provided the GPIO (General Purpose Input Output) pins. These pins are like those standard input output pins which were dedicated in your personal computer for standard devices like Mouse and Keyboard etc. This GPIO module has made Raspberry different from other computer devices. This inspiration of raspberry Pi is more than enough to drive the Internet of Things (IoT) concept into the reality. Raspberry is a microprocessor; therefore it requires an operating system to deal with it. Raspberry is the open source hardware and it has the compatibility with most well-known operating systems like Windows 10, Linux, UNIX and many others. But for the sake of convenience, raspberry has launched two its own operating system which are Linux based i.e. Raspbian and NOOBS. Here we have described the steps to how we can get and install Raspbian to Raspberry Pi-3. Raspbian has built-in different IDEs (Integrated Development

Environments) Like Python, Mathematica, and Java etc., in which we can write code for versatile Integrated Circuits. These IDEs requires interpreters to generate the machine code for particular ICs. The pictorial representation of these steps is as shown in figure 2. The figure 3 shows the photo of the PI3 board configuration.



Figure2. Installations steps of Raspbian OS

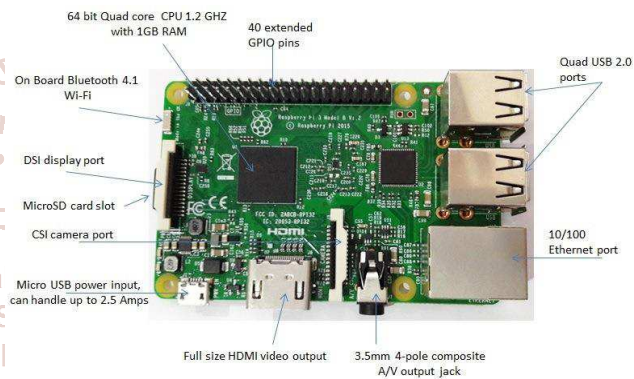


Figure3. Raspberry Pi 3 board configuration

B. DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. It is working between 3V to 12V. The figure 5 shows the photo of DC motor that used in the system. The motors are used to move the robot. And they are driven by PI with L298 Diver module. The part number of the motor is OL-MOTOR-TT [8].



Figure4. DC motor with wheel

The figure 4 shows dc motor that is used to create movement of the robot. In the system, the two dc motor is used and can be driven by PI3 via motor driver module.

C. Motor Drive Module

PI can't drive the dc motor directly. The current and voltage levels are not match with controller and dc motors. So motor driver is needed to drive the motor by PI3. The Uno generate only the pulse to drive the motor via driver. The major motor drive components for DC motors are: a controller, a motor driver IC or a motor driver circuit, the desired DC motor

being used, power supply unit and the necessary connections to the motor. There is circuit that completer function of the driver for dc motor. That is called L298 motor drive module. In this system, there is one L2958 module is used. The photo of L298 module is as shown in figure 6. Motor Driver is a H-Bridge which can rotate motor in both clockwise and anti-clockwise direction. L293D is a typical example of motor driver. It has dual H-Bridge means, can drive two motors at once and it can provide maximum 600 mA current to each channel. So, the L293D motor is used for line follower robot [8].



Figure5. L298 Driver Module

The figure 5 the dc motor driver module (L298N). This is used for to drive the two dc motor that movement for robot. It receives the command signal from PI3 to drive motor.

D. MQ-2 Sensor

This main function of this system is to detect the leakage gas. The gas sensor is required. MQ-2 gas sensor is used in this system as shown in figure 6. The MQ-2 Gas sensor can detect or measure gasses like LPG, Alcohol, Propane, Hydrogen, CO and even methane. The module version of this sensor comes with a Digital Pin which makes this sensor to operate even without a microcontroller and that comes in handy when you are only trying to detect one particular gas. When it comes to measuring the gas in ppm the analog pin has to be used, the analog pin also TTL driven and works on 5V and hence can be used with most common microcontrollers. A sensor can detect or measure gasses like LPG, Alcohol, Propane, Hydrogen, CO and even methane with or without a microcontroller then this sensor might be the right choice. Using an MQ sensor it detects a gas is very easy. Simply power the module with 5V and you should notice the power LED on the module to glow and when no gas it detected the output LED will remain turned off meaning the digital output pin will be 0V. Now, introduce the sensor to the gas you want to detect and it should be seen the output LED to go high along with the digital pin, if not use the potentiometer until the output gets high. Sensor can be introduced to this gas at this particular concentration the digital pin will go high (5V) else will remain low (0V)[9].



Figure6. MQ-2 Sensor

After setting up the hardware, the software is needed to run the system property. The software may be PI3 OS, Python and web server. There are many OS for PI3. In this system, Raspbian is used. It is installed on the SD card that is inserted in PI3 card slot.

E. RASPBIAN

Raspbian is a Linux distribution based on Debian created specifically for the Raspberry Pi (Raspbian, 2014). This operating system was chosen for this study for its compatibility with the Raspberry Pi hardware. The Raspberry Pi has an ARM processor which is incompatible with some other architectures. Raspbian comes with Python installed on the operating system already. Python is heavily used in image processing and web integration in this study.



Figure7. The Raspberry Pi's Operating System Raspbian (desktop view).

F. Python

Python is a free, open source programming language (Python, 2014). Python was chosen for a variety of reasons. Python comes already installed on the Raspberry Pi operating system Raspbian. OpenCV is compatible with Python wrappers for easier development. Python can be used for web development and has the ability to run operating system commands.

G. OpenCV

OpenCV (Open Computer Vision) is computer vision software originally developed by Intel (Laganière, 2011). This software was chosen because it is free and it works with Python and can be implemented on the Raspberry Pi. Since Raspbian comes with Python installed it is easier to implement then other solutions. OpenCV is a collection of libraries which can process images, detect faces, and recognize faces. This is an all in one solution for face recognition. OpenCV has the ability to create Eigenfaces and Fisherfaces for face recognition.

H. IDLE Program

IDLE (short for integrated development environment or intergrated development and learning environment is an integrated development environment for Python, which has been bundled with the default implementation of the language since 1.5.2b1. It is packaged as an optional part of the Python packaging with many Linux distributions. It is completely written in Python and the Tkinter GUI toolkit (wrapper functions for Tcl/Tk). IDLE has two main window types, the Shell window and the Editor window. It is possible to have multiple editor windows simultaneously. Output windows, such as used for Edit / Find in Files, are a subtype of edit window. They currently have the same top menu as Editor Windows but a different default title and context menu.

I. PHP

PHP code may be embedded into HTML code, or it can be used in combination with various web template systems,

web content management systems, and web frame work. PHP code is usually processed by PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications.

PHP is a general-purpose scripting language that is especially suited to server-side web development, in which case PHP generally runs on a web server. Any PHP code in a requested file is executed by the PHP runtime, usually to create dynamic web page content or dynamic images used on websites or elsewhere. The server has activated support for PHP do not need to do anything. Just create some php files, place them in web directory, and the server will automatically parse them for system. They do not need to compile anything or install any extra tools. Because PHP is free, most web hosts offer PHP support. The Raspberry Pi used a Linux-based operating system to operate. In this project, Raspbian operating system (OS) was chosen because it is recommended by the manufacturer. The Raspbian is the modified version of the Debian Cheezy OS. The OS image was extracted to an SD card by using the Win32 Disk Manager. The configurations of the OS such as login details and IP address settings were done. The login at startup was disabled to make sure that if the power supply to the Raspberry Pi was cut down, the Raspberry Pi will never ask for login details. The Apache HTTP webserver was installed to make the Raspberry Pi as a webserver. The development of the programming in the Raspberry Pi is done for using IDEL software. High level programming language selected for writing the OS application program for the system is Python programming language. The IDLE software is the Integrated Development Environment (IDE) for Python and it was already installed in the OS. The system is operated as described in the flow chart. The flow chart of the proposed system is as shown in figure 8.

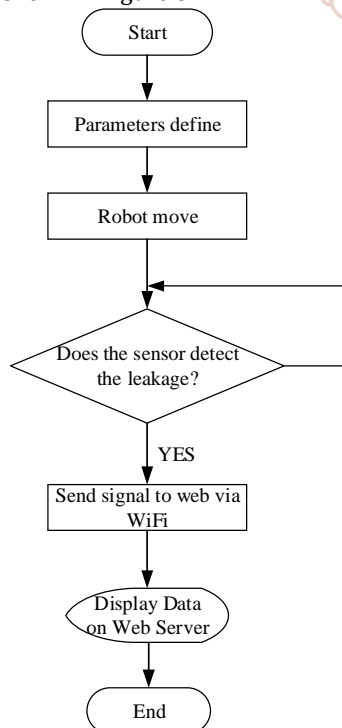


Figure8.Flow Chart of the System

V. EXPERIMENTAL RESULTS

The software and hardware are combined together to get the complete proposed system. The complex system is as shown in figure 9. Testing is important in every system. So this system must be tested in real situation. The gas leakage detection is operated normally. In the figure 9, the proposed system of gas leakage detector robot is illustrated. It can be seen from the figure that the cover from the small gas leakage detector car is removed and integrated hardware components of the system are placed on the skeleton of the car.



Figure9. The Complete of the Proposed System

The system was tested in two different situations; in the first test, the sensor was placed near the gas and in the second test, the sensitivity of the sensor was placed away the gas. The first test is defined as True Warning while the second test is False Warning. The result will be displayed in the webpage. The webpage can be accessed at <http://192.168.43.233> as show in figure 10.

At first, the user will be prompted to fill the login details. After logged on, the user will be redirected to the display webpage as shown in figure11.



Figure10. Web Sever Access



Figure11. The Default Webpage

MQ-2 gas sensor can be used to detect the presence of LPG, Propane and Hydrogen, also could be used to detect Methane and other combustible steam. This system used Propane. Practical results were obtained using the breadboard implemented gas leakage detector. The circuit was powered on and LPG gas from a lighter on as shown in figure 12. As the sensor detects the gas, it was displayed on the webpage. Figure 13 shows the display of alarm in the webpage.

When the lighter is turn off, the gas sensor do not detect the gas as shown in figure 14. The gas is not detect by the sensor. The result of the monitoring on PC's web page is as shown in figure 15.

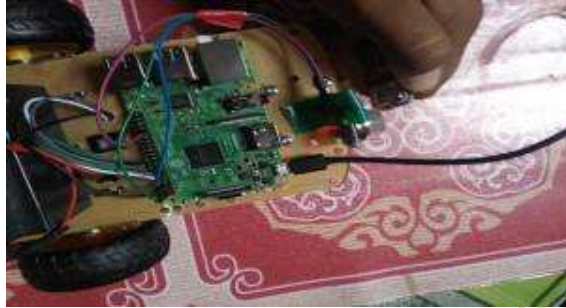


Figure12. The Sensor Detect the Gas from Lighter

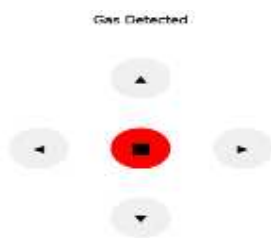


Figure13. Gas Detection Status on Web



Figure14. The Sensor can't Detect the Gas from Lighter

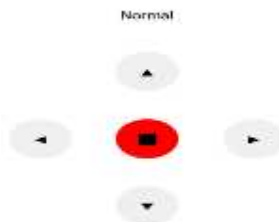


Figure15. Sensor can't detect when lighter is turn off.

VI. CONCLUSION

The objective of the system is to design and implement Wi-Fi gas pipe leakage detector insect robot using pi3. Gas leakage leads to severe accidents resulting in material losses and human injuries. Hence, LPG leakage detection is essential to prevent accidents and to save human lives. This paper presented LPG leakage detection and alert system. This system is very simple yet reliable. This system is sample model of gas leakage detector insect robot.

Acknowledgment

This work is done with my candidate, Mg Phyto Kyaw and Mg Kyaw Zin OO. The authors would like to thank Dr. Lwin Lwin Htay and Daw Mo Mo Myint Department of Electronic Engineering, Technological University (Mandalay) for kindly preparing for this paper.

Reference

- [1] Mukesh Mahajan, Vishal Date, Darshan Derle, Swapnil Pawar, "Iot Base Gas Pipe Leakage Detection System Using Insect Robot," international Journal of Engineering Research And Development, Vol. 14, No.2, e-ISSN: 2278-067X
- [2] Ch. Manhoar Raju N. Sushma Rani, "An android based automatic gas detection and indication robot," In international journal of computer engineering and application. 2014.
- [3] A. MAHALINGAM, R. T. NAAYAGI, N. E. MASTORAKIS, "Design and Implementation of an Economic Gas Leakage Detector," Recent Researches in Applications of Electrical and Computer Engineering, ISBN: 978-1-61804-074-9.
- [4] Zhao Yang Mingliang Liu, Min shao, Yingjie Ji, "Researched on leakage detection and analysis of leakage point in the gas pipeline system," In open journal of safety science and technology, 2011.
- [5] Falohun A.s., Oke A.O., Bolaji B. M, "Dangerous gas detection using as integrated circuit and MQ-9," In International journal of computer application, 2016.
- [6] S shyamaladevi, V G Rajaramya, P Rajasekar, P Sebastin Ashok, " ARM7 based automated high performance system for LPG refill booking and leakage detection," Int. J. Engg. Res. & Sci. & Tech, Vol. 3, No. 2, 2014.
- [7] M. Ehsan Irshad , "Scope of IoT: Performance and Hardware Analysis Between Raspberry Pi-3 And Arduino Uno," International Journal of Computer Science and Mobile Computing, Vol.5, No.6, 2016.
- [8] Lwin Lwin Htay, Nyan Phyto Aung, Mo Mo Myint Wai, "Andriod Controlled Pick and Place Arm with Line Follower Automaton," Vol.3, No.5, IJTSRD, 2019.
- [9] <https://components101.com/mq2-gas-sensor>