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# Gas Leakage Detector and Alert System

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**ABSTRACT:** As we know Industrial security has been major issue in present scenario. The numbers of accidents are increasing day by day and we have seen many examples in our day life about those accidents that are being occurred due to combustible gases. Frequently we also hear, explosion of household cylinder which are used for domestic purpose, for vehicles and in many industries. In some situation many people have been injured severely and also 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 to save their lives. The aim of this work is to detect gas leakage in the pipeline through GSM connectivity and monitoring it with portable device and give mobile alert. In the proposed system, the device fixed at any position or kip moving along the pipe and keeps monitoring for any gas leakage, on detection it send data to mobile sms via GSM. It is automated with ultrasound like a robot that moves with the gas pipe and detects gas leakages instantly at the real time. This system may be used in industrial applications for detecting pipeline leakages with large size kit. This system consists of gas detection using Raspberry pi and give sms alert or fires buzzer on gas detection.

**KEYWORDS:** Arduino Uno Kit, MQ-2 Sensor, RASPBIAN, UART Interface Module .

## I. INTRODUCTION

The source of economy for most countries in the world are gas, oil, and water. Their natural resources are transported from there storage place to the countries through the pipelines. In some of the countries, pipelines are used for supplying gas. These pipelines are the major source between the producers and consumers and at the same time Maintaining their pipelines is very costly. For human being its really hard to find the exact position of leakage on pipe area These locations locate by device with help of altitude and latitude concept send that data to user or operator and finds the exact location. Thus user will OFF the switch and can avoid a future accident. These are essential to political stability, sustain economic growth and also safety . The emergence of new high speed technology and growing computer capacity provides realistic opportunity for new sensor controls and realized the new methods of control theory. This technical improvement in the robots created faster, accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This paper draws a new economical solution of sensor control systems. The introduced sensor control system can be used for different sophisticated robotic applications. The gas main distribution method is taken place through the pipeline; however, several problems related to the use of wireless sensors in pipeline monitoring system are discussed. One of the problem is to detect the gas leakage in the pipeline as early as possible particularly in a gas pipeline. It is very important to detect the leakages in the pipeline as early as possible. If the detection of the gas leakage in the pipeline fails it could cause some serious issues in the environment and it also effects the human population near the area. Due to the structural defects corrosion occurs in the gas pipeline. Several factors have been identified that lead to the event of buried pipeline corrosion and cracks such as

pipe coatings, soil type, temperature changing, stresses, pressure of the pipe and cyclic loading effects LPG consists of a mixture of gases like propane and butane. And here the robot will sense the leakage of the gas with the help of the gas sensor MQ135. The 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 GSM. Thus, a gas detector is invented to easily detect International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Published by, www.ijert.org NCCDS - 2020 Conference Proceedings Volume 8, Issue 13 Special Issue - 2020 73 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-135 LPG gas sensor), controller, are required. The MQ-135 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 . Nowadays, Wireless technologies are used in many areas and it was used in many applications and several technologies are implemented for monitoring the pipelines. Many system are used in 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 sending SMS within beget of common man.

## II. PROBLEM STATEMENT

Blockchain to provide the transparency and making more secure throughout the process.

Avoiding problems related to a public agents abuse of power and targeting government allocated funds blockchain technology is helpful.

## III. 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 devices . In the hardware portion, the Raspberry PI 3 is the main control International Journal of Trend in Scientific Research and Development (IJTSRD) .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 sensor . The direction command is received by PI 3 form the PC or mobile phone through GSM network. The status of leakage gas can be monitored on PC or Phone with web server via GSM. to implement the whole function of the system, PI3 os.



Figure1. Block Diagram of Proposed System

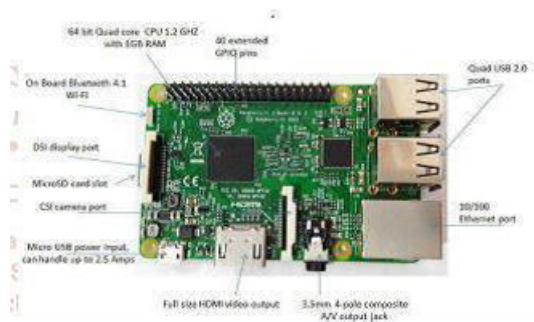
## IV. SYSTEM OVERVIEW

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, these 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



### 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 is 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]. After setting up the hardware, the software is needed to run the system properly. 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.



Figure6. MQ-2 Sensor

### 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)

### Python:

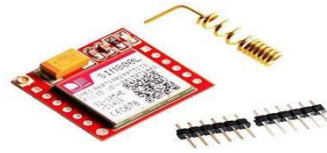
Python is a free, open source programming language (Python, 2014). Python was chosen for a variety of reasons. Python comes already installed on the Raspberry Pi operating system Raspbian. OpenCV is compatible with Python wrappers for easier development. Python can be used for web development and has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

### 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 than 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 Fisherfacesfo .

### UART Interface MODULE:

Arduino Raspberry pi Compatible Quadband with spring AntennaSunRobotics SIM800L GSM GPRS MICRO SIM CARD TTL UART Interface MODULE Arduino Raspberry pi Compatible Quadband with spring Antenna.



## V. 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

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