CMR UNIVERSITY

Private University Established in Karnataka State by Act No. 45 of 2013

SCHOOL OF ENGINEERING AND TECHNOLOGY

A Project Report

On

"AUTOMATION GAS LEAKAGE DETECTION"

Submitted in partial fulfillment of the requirements for the award of degree in

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE ENGINEERING

SUBMITTED BY -

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Chagalahatti, Bengaluru, Karnataka-562149

Department of Electronics and Communication Engineering

CERTIFICATE

This is to certify that the Project entitled "**Automation gas detection**"has been successfully carried out by **SWAPNIL SUNIL HERAGE(21BBTCS241) AND SURAJ KUMAR SAW(21BBTCS239)** in partial fulfillment of the requirement for the award of the degree **Bachelor of Technology in Making with Electronics of CMR University,** Bengaluru during the academic year **2021-2022.** The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

Signature of the Guide

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Signature of HOD

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Examiners Signature with date:
1.
2.

ABSTRACT

The Internet of Things aims to automate the lives of the world by giving the direction with or without the human intervention which will automate the tasks which may be bigger or smaller that we encounter. Because the Internet of Things intends to simplify operations, it is also feasible to use its benefits to reinforce present security standards. The essential goal of every project, protection, has not gone ignored by IoT. In open or closed situations, gas leakage may be dangerous and lethal. While traditional gas detection systems are quite accurate, they are unaware of a few key aspects in the area of warning people of a leak. As a result, we've built the application for both industry and the society which will detect the leakage of gas and also monitor the gas availability. Alerting techniques that include sending text messages to the relevant authorities as well as the ability to analyze sensor reading data. Nowadays, gas leakage and detection are major concerns in our daily lives. Carbon pollution is a major issue that must be addressed. LPG gas is very flammable, posing a risk to both people and property. To avoid such catastrophes, a significant amount of effort has gone into developing reliable systems for detecting gas leaks. Some leak detection techniques were created to cause the leak to be discovered since it is not always essential to know about the presence of a leak in order to take corrective action. Our major objective is to recommend a gas detection equipment that includes gas leakage detecting hardware to households in the area. This can monitor and warn about harmful chemicals in the air at workplaces such as factories, and it may also be used in households by alerting through an LCD display and sending a message to a registered phone number.

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of this project would be incomplete without the mention of the people who made it possible, without whose constant guidance and encouragement would have made efforts go in vain.

I would like to express my thanks to **Dr. Satheesha T Y, Professor and Head**, Department of Electronics and Communication Engineering, School of Engineering and Technology, CMR University, Bangalore, for his encouragement that motivated me for the successful completion of Project work.

I express my thanks to my Internal Project Guide **Prof. Elakkiya, Assistant Professor**, Department of Electronics and communication Engineering, School of Engineering and Technology, CMR University for her constant support.

Swapnil Sunil Herage (21BBTCS241)

Suraj kumar saw (21BBTCS239)

DECLARATION

I Swapnil sunil herage(21BBTCS241) and suraj kumar saw(21BBTCS239) student of 3stsemester B.Tech. Computer Science Engineering, School of Engineering and Technology, Bangalore, hereby declare that the project work entitle**"***AUTOMATION GAS LEAKAGE DETECTION***"** has been carried out by both under the guidance of Prof. **Elakkiya**, Assistant Professor, Department of Electronics and Communication, School of Engineering and Technology. This report is submitted in partial fulfillment of the requirement for award of Bachelor of Technology in Computer Science Engineering by CMR University, Bangalore during the academic year 2022-2023. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

Place: Bangalore — Swapnil sunil herage (21BBTCS241)

Date: 29/12/2022 — Suraj kumar saw (21BBTCS239)

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1.INTRODUCTION

The Internet of Things (IoT) is a technology where the things are embedded which is connected over the internet like software and the internet enabled sensors which is collecting the data in the cloud. The data can be retrieved when it is required. The data is retrieved for the requested data only where as other data will be stored in the cloud which is hidden. Seamless connection between people, processes, and things is now feasible because to the capacity to link common goods such as kitchen appliances, automobiles, thermostats, and baby monitors to the internet via embedded devices. Physical objects may trade and capture each other. The characteristic of the IoT are connectivity which is internet connectivity over the hardware to the system controls; things which is any object which is connected over the internet; data which is collected from the sensors or any electronic devices; communication which the device is communicating with the data and analyze the data generated; intelligence which is based on the analysis of the data and the responding capability for the generated data for further process; action which linked to the intelligence where the manual actions may or may not be required ; and lastly, ecosystem which is important characteristics where the system or application should be designed based on the effective results in environment where there is harm from the application. The gas detection Operators in the area where the leak is occurring can be alerted by a gas detector, giving them the chance to evacuate. Because many gases may be hazardous to biological life, such as people or animals, this sort of equipment is essential. Increased levels of these gases in the atmosphere will be highly hazardous. These gases may be combustible at particular temperatures and humidity levels, toxic once they exceed the required limits, or a contributing element in an area's air quality, creating issues like smog and impaired visibility, which can lead to significant injuries and even harm to people's health. Many civilizations have built-in firefighting systems.

2. Hardware requirements

2.1 Hardware components

(a) Arduino UNO

Fig (2.1): Arduino Uno board

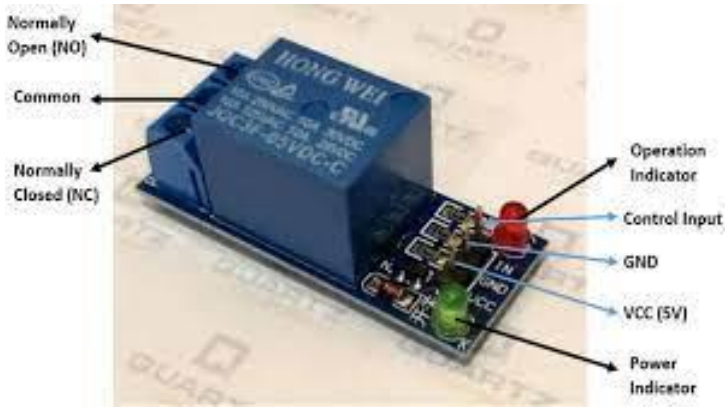
Arduino / Genuine Uno is a microcontroller board based on ATmega328P(datasheet).It has 14 digital input/output pins(of which 6 are used as PWM outputs),6 analog inputs, a 16 MHz quartz crystal a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started .You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

(b) Gas Sensor

Fig(2.2): Gas sensor

MQ-2 gas sensor module is shown in fig.2.2. It is a sensor detector used to detects the flammable gas and smoke concentration of the combustible gas in the air, and output is read in the analog voltage and digital value output. Supply input voltage is 5v. it is very sensitive to H2, LPG, CH4, CO, SMOKE, PROPANE. It has three pins for transmitter, receiver, ground and sensitivity can be adjust by the potentiometer. Detects LPG from 200ppm to 10000ppm.

(c)Relay



Fig(2.3): Relay

Relay having 220V as well as a 5V input, when needed, is utilized in the circuit to turn off electricity. There are 5 pins in the relay. The digital pins including its Arduino board are linked with one pin. One is linked to the switch to connect the 220V power source. This power is redirected to the devices through to the other pin. Other 2 are grounded, one in the main energy source and another one for the Arduino board

(d)Exhaust Fan

Fig(2.4):Exhaust Fan

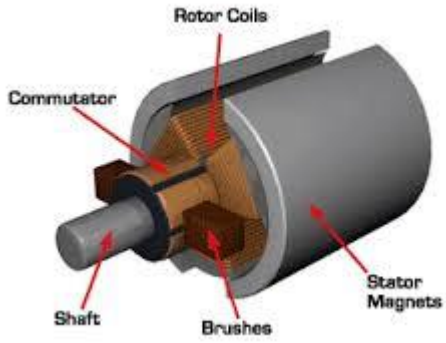
If the excessive gas released already makes it more likely of missing in order to counteract it, an exhaust fan is used for evacuation. Exhaust fans usually able to extract hot or wet air from the a small, localized zone to let clean air from another place (maybe a door or a ventilation) in order to replace it. The heated air extracted by an electric fan is pushed via a heat exchanger and driven out outside

(e)LED bulb

Fig(2.5):LED bulb

LED stands for **light emitting diode**. LED lighting products produce light up to 90% more efficiently than incandescent light bulbs. How do they work? An electrical current passes through a microchip, which illuminates the tiny light sources we call LEDs and the result is visible light.

(f)DC Motor



Fig(2.6):DC Motor

A DC motor is defined as **a class of electrical motors that convert direct current electrical energy into mechanical energy**. From the above definition, we can conclude that any electric motor that is operated using direct current or DC is called a DC motor.

(g)jumper wire

Fig(2.7):Jumper wire

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Fairly simple. In fact, it doesn't get much more basic than jumper wires.

(h)Buzzer

fig(2.8):Buzzer

There are many ways to communicate between the user and the product. One of the best ways is voice communication using warning devices. A buzzer for voice communication is a signaling device that produces sound. This device can be a device that works on mechanical, electromechanical, or piezoelectric principles. This device is typically used in industry to make a buzzing, noise, or beep sound when it is needed

(i)Battery

Fig(2.9):Battery

The nine-volt battery, or 9-volt battery, is **an electric battery that supplies a nominal voltage of 9 volts**. Actual voltage measures 7.2 to 9.6 volts, depending on battery chemistry. Batteries of various sizes and capacities are manufactured; a very common size is known as PP3, introduced for early transistor radios.

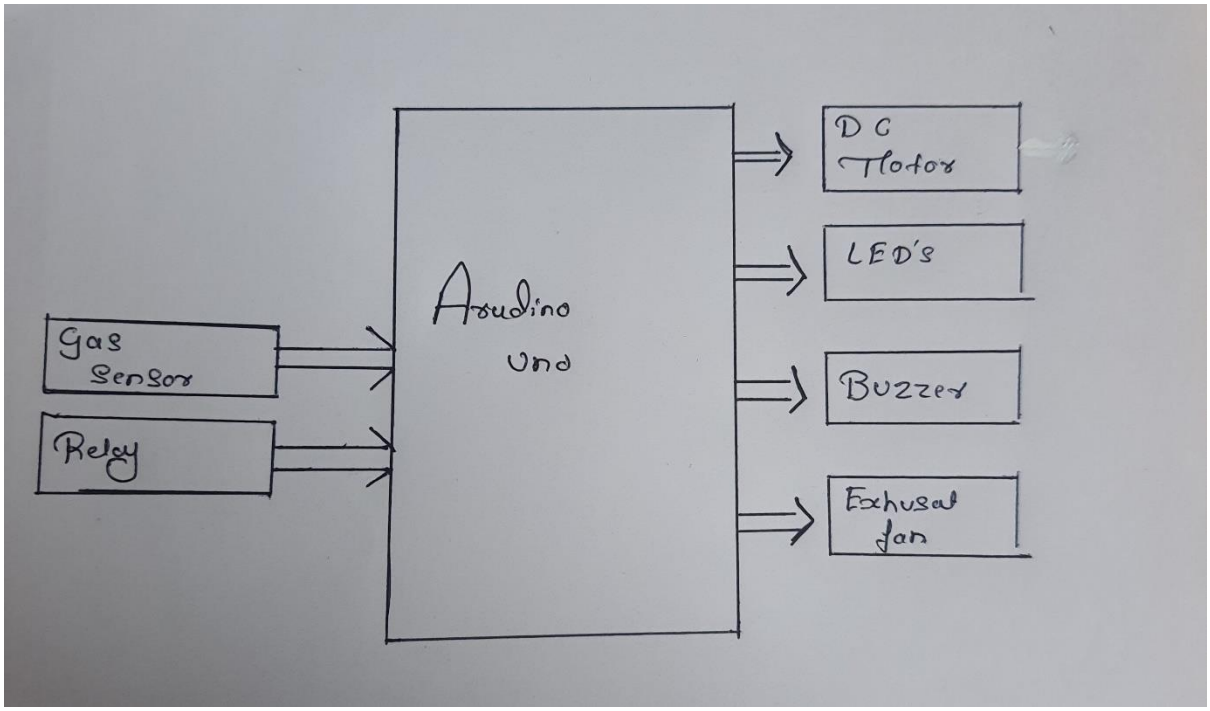
3.Software requirements

(a)Arduino IDE software

Arduino IDE software is an open source software to which a hobbyist can connect the AT mega chips. In this software the code can be written and uploaded to any AT mega chip and then the code can be executed on the chip. Many 3D printed electronics and Arduino-compatible use AT mega chip and hence the user can upload the program. Arduino can also be used firmware any electronics. Sketch is the window in which the program is to be written.

Fig(3.1):Arduino software tool

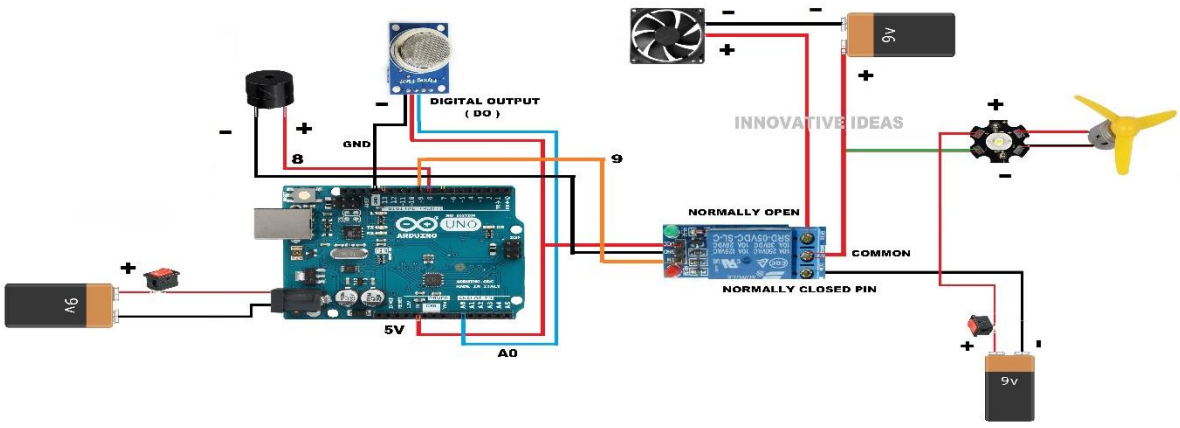
4.Block Diagram



Fig(4.1):Block diagram of the Automatic gas leakage detection

The above figure is the block diagram of the automatic gas leakage detection. It works in accordance with the presence of a the hazardous. Whenever there is a hazardous gas in its surroundings, the GAS sensor can recognize and all home apllinces will goes OFF and it will start buzzering and gas will goes out through exhaust fan.

5.circuit diagram



Fig(5.1):circuit diagram of the automatic gas leakage detection

The components are connected as shown in the above circuit diagram

- Gas sensors work on the principle of **transforming the gas adsorption effects on the surface of the active material into a detectable signal**
- The tool is designed to detect gas leaks that are then legible on the LCD screen and alarm, and in certain circumstances, the buzzer will sound
- When we will turn on the circuit power supply between 5v to 12v, then the 7805 voltage regulator IC converts the input voltage into 5v output. Because MQ2 Gas Sensor Module operates on 5v input voltage. The MQ2 gas sensor module can sense LPG. So when it gets a **LOW (Ground)** trigger pulse at its trigger pin, then the IC OUTPUT becomes **High**.
- After turn on the power supply MQ2 gas sensor start sensing LPG gas is present in the air or not. If LPG gas leaks from a cylinder then the MQ2 gas sensor detects it and provides LOW (Ground/0v) output voltage from the “D0” pin. This output voltage goes to the Base terminal of the BC557 Transistor and the transistor becomes active. Now it starts conducting ic trigger pin (IC pin 2) connects to the ground. Then the IC produces High out from Pin 3. This output voltage goes to the LED and Buzzer. Then the LED starts glowing and the buzzer generates Sound.

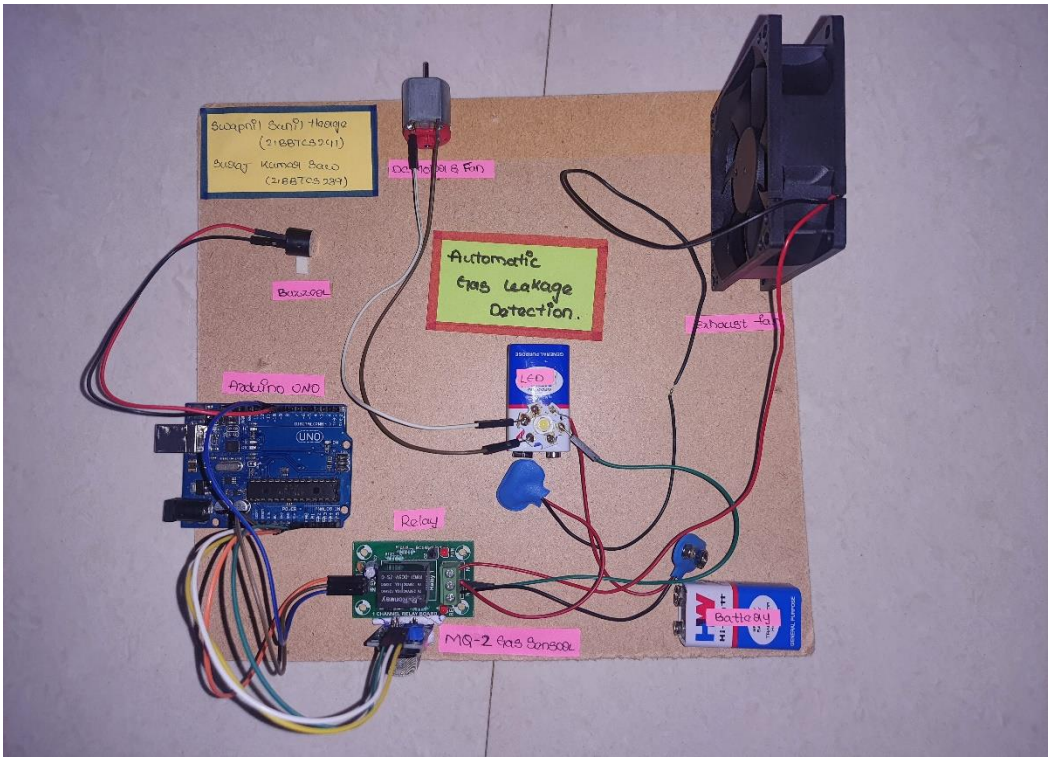
6.Arduino uno code

The code for the project Automatic gas leakage detection System using Arduino is given below.

```
#define Sensor pin = A0;
 #define relay pin = D9;
 #define Buzzer Pin = D8;
 #define sensorDigital A0
 #define relay 9
 #define buzzer 8
#define sensorAnalog A1
void setup() {
pinMode(sensorDigital, INPUT);
pinMode(relay, OUTPUT);
pinMode(buzzer, OUTPUT);
Serial.begin(9600);
void loop() {
bool digital = digitalRead(sensorDigital);
int analog = analogRead(sensorAnalog);
Serial.print("Analog value : ");
Serial.print(analog);
Serial.print("t");
Serial.print("Digital value :");
Serial.println(digital);
if (digital == 0) {
digitalWrite(relay, LOW);
digitalWrite(buzzer, HIGH);
delay(5000);
digitalWrite(relay, HIGH);
digitalWrite(buzzer, LOW);
} else {
digitalWrite(relay, HIGH);
digitalWrite(buzzer, LOW);
}
}
```

7.Snapshot of the project

The block diagram and the circuit diagrams are shown once the components were connected to each other. All the components are connected to each other and thus the system setup which helps one to understand the steps in simple and easy way**.**



Fig(7.1):the system set of automatic gas leakage detection

System design involves developing systems aspects such as structure, subsystems as well as parts, the ranging from various interfaces with information passing through the network. System design might be regarded as an application to research and development of systems approach. The process planning, implementation phases and engineering design professions are inherently overlapping. Flow chart shows the whole range of operations to be carried out by the proposed gas leak detecting system.

The components are started at the right position. The sensors detect gasses in the environment. The simple presence of LPG throughout the air is here sensed with the MQ-2 sensor. These sensors have the quick response time. If the concentration of the gas is present in the air, then all the devices at the place will be powered OFF. The system will ON the exhaust fan in order to pull out the gas present in the environment. The buzzer will alert to the surrounding.

8.Conclusion

After this project performance, can conclude that detection of the LPG gas leakage is incredible in the project system. Applicable usefully in the industrial and domestic purpose. In danger situations we are able to save the life by using this system. An alert is indicated by the buzzer. A sensor node senses gas like CO2, oxygen, propane. The estimated range of transmission and consumption of power is obtained. The simple procedures and Arduino UNO Micro controller area used to build the sensor

The sensor employed in this version is capable to monitor, identify and inform the client to the remainder of the pressurized gas, and to also take certain actions without obstructing the prebooking of the new cylinder. This device may be easily placed into an alert device or an LPG display indicator for extra advantages. It is a low cost but extremely efficient device for detecting gas leakage and may play a key role in avoiding LP Gas leakage exploration. The major aim of this effort is to maintain security and to make it simpler to reserve gasses and detect leaks to prevent tragedies caused by carelessness.

9.References

[1] https://innovativeideasyoutube.blogsp...

[2] https://www.researchgate.net/publication/262380283_Gas_Leakage_Detection_System_GLDS