

GAS LEAKAGE SYSTEM BASED ON IOT USING ARDUINO

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ABSTRACT

The Internet of Things (IoT) aims to automate the world's lives by providing a path with or without human intervention that will automate tasks that may be larger or smaller than we encounter. Because the Internet of Things (IoT) aims to make work easier, it is also useful to use well-being to reinforce current security standards. IoT has not overlooked the most important goal of any project. Gas leakage can be severe in both open and closed situations. While traditional gas detection systems are quiet and accurate, they overlook a few critical aspects of warning people of a leak. A great deal of effort has gone into developing dependable systems for detecting gas leak. As a result, we created an implementation for both industry and society that will detect gas leaks and monitor gas availability. Techniques for alerting that include sending messages to the appropriate command as well as the ability to analyze sensor reading data. Gas leakage and detection are major concerns in our daily lives these days. LPG gas is highly flammable, posing a threat to both people and property. To avoid such mishaps, considerable effort has gone into developing reliable systems for detecting gas leaks. Our main goal is to recommend a gas detection system that includes gas leakage detection hardware to local residents. This can monitor dangerous chemicals in the air at workplaces and it may also be used in households by alerting through an LCD and sending a message to a recorded phone number.

Keyword: - LPG-Gas Sensor, Node-MCU, Smartphones, IOT

1. INTRODUCTION

LPG is an abbreviation for a non-renewable energy source. It is extracted from rock oil and gas. LPG is highly flammable and should thus be held on-off from solenoid sources and during a blowy space to ensure that any run is safe. Because LPG vapours contain more steam than air, care must be taken all over storage to ensure that any run does not sink to the bottom and accumulate in a district that is low untruthful and difficult to disperse. LPG gas is an alkane that is odorless in its natural state. The stench that we notice after a run is caused by a completely different agent. This material is added to the gas as it exits the majority of storage terminals. The paper aims to detect gas leaks in homes, restaurants, schools, and other public places and send alerts to nearby residents. Gas sensors are now widely used across the country in fields such as safety, health, and appliances. This paper describes an implementation that makes use of a MQ-5 sensor. The MQ5 sensor detects gas leakage in a variety of applications. The leakage is also displayed on the device's LCD. The MQ6 sensor searches for gas concentration and outputs an analogue value that can be converted to a digital signal using the built-in A to D converter. Based on the same digital measure, the paper allows the user to set low, medium, and dangerous levels of leakage. The strength values

are differentiated by two thresholds and classified into three different classes as a result. Every industry makes use of liquefied petroleum gas (LPG). It is also used in the industrial sector. Many accidents occur as a result of LPG gas leakage, resulting in material, product loss, and human injuries. The main motivation for our framework is to distinguish between gas in houses and other homegrown gases using a gas sensor. The message will be delivered to the individual after identification.

2.LITERATURE REVIEW

This device is used as the detect gas is already present in the market which is commonly used in many places such as industries where there are many chances of detonation which may lead to great destruction and the loss of manpower; in homes, where the LPG gas is used most commonly in our daily lives inevitably where it can detect the leakage of LPG gas; in cars, where most vehicles carry the cylinder and many more places. In 1910, Dr. Walter Snelling was the first to commercialise LPG gas. It combines propane and commercial propane. It's extremely volcanic, and many accidents happen as a result of LPG leaks. As a result, it is critical to connect and prevent gas leakage. Gas detectors can be classified in a number of ways. They are classified according to the type of gas they detect, the automation that powers the sensor's output, and the components that influence the sensor's power (semiconductors, oxidation, catalytic, photoionization, infrared, etc.). In our daily lives, we use a variety of devices for various purposes, and the majority of them can emit any type of gas or chemical when in use in the air. It is difficult for a human to keep track of the levels of application of the leaked gas or liquid in any scheme. If there is a gas leak when no one is around, it may cause a detonation if there is even a spark, or the surrounding area will have the dangerous gas, which may cause suffocation and fitness issues in breathing. There are many applications for observing and monitoring gas leakage, but researchers will still attempt to build the advanced application where the value of the application will be lower.

3.PROPOSED SYSTEM

Microcontrollers or relays, LCDs, and a buzzer power the sensors. This voltage rule sector is in charge of converting alternating current to direct current and lowering the transmitted signal. A gas leak can be detected by the sensors. The MQ-2 sensor is used to detect LPG levels in the air. Gases with concentrations ranging from 200 to 10,000 ppm may be identified, and the reaction time is extremely fast. The sensors' output would be analogue power. A sequential communication circuit converts an analogue resistor to voltage. That voltage is reported by the microcontroller. A 12-bit Analog to Digital converter is used to digitally convert this analogue voltage. The implementation of an advanced gas detection system suppresses both the monitoring and detection of gases that are extremely dangerous to the environment. The sensor used to hear many gases in gas observation is the MQ 2 sensor. After detecting a gas leak, the sensor sends the signal to the Arduino UNO, where other hardware components are connected, for further operation. It sends the signal to the LCD via Arduino UNO to display the alert message as LPG. If the buzzer is activated, the background people will be warned, and the main power supply will be cut off. Using the relay of 5V, the power supply is given to the expend fan to detach the harmful gas from the surrounding. Even the container of the application will accept the message through the GSM module.

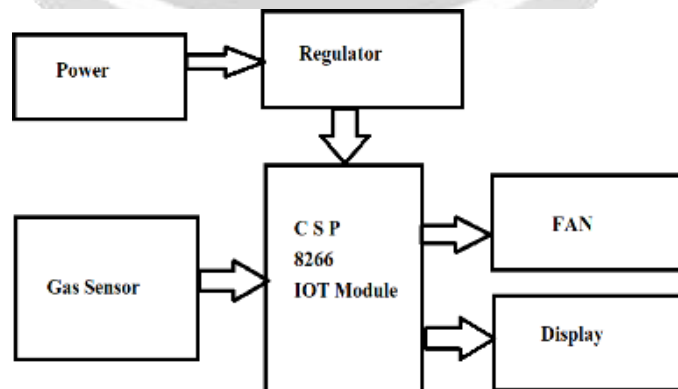


Fig-3.1: IOT based gas leakage system



Fig-3.2: Hardware module

4.COMPONENTS

- Arduino Pro Mini
- MCU Module
- LPG Gas sensor module
- Buzzer
- 16*2 LCD display
- 1K resistor
- Cooling fan
- Connecting wires
- Relay

4.1 Arduino Pro Mini

The Arduino Pro Mini is a microcontroller board with 14 digital input/output pins, 6 inputs, and an onboard resonator. Pin headers are mounted using a restart button and holes. A 6 pin header can be connected to an FTDI cable or to the board for communication. The Arduino Pro Mini is designed to be installed semi-permanently in objects. The panel is delivered without pre-mounted headers, allowing for the use of various loop or direct soldering wires. The pinout is compatible with the Arduino Mini. There are two types of Pro Mini: one that runs at 3.3V and 8 MHz and another that runs at 5V and 16 MHz.

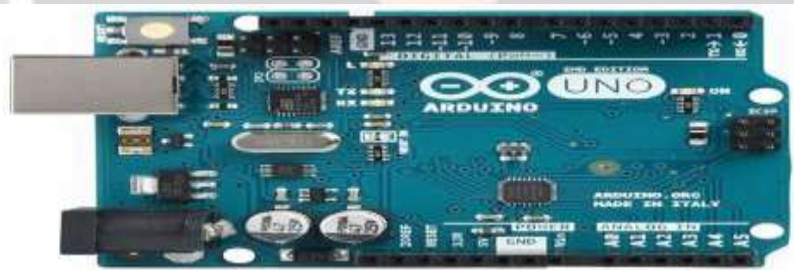


Fig-4.1: Arduino board

4.2 MCU Module

An MCU is a smart semiconductor integrated circuit that includes a processor unit, memory modules, communication interfaces, and peripherals. The Microcontroller Unit is used in a variety of applications, such as washing machines, robots, drones, radios, and game controllers.



Fig-4.2: MCU Module

4.3 LPG Gas Sensor Module

The sensing element works by detecting six different types of combustible gases based on label sensitivity. This sensing element is labelled mistreatment in the potentiometer installed on the MQ6 gas sensing element's jailbreak board. The sensing element generates a degree of analogue output. The MQ-6 (LPG Gas Sensor) can detect gas concentrations ranging from 200 to 10000ppm. The sensor output is a measure of analogue resistance. The combination with the sensing element module is halted by a 4-pin board compatible header.



Fig-4.3: LPG Gas Sensor Module

4.4 Buzzer

A buzzer or pager is an audio signaling device that can be mechanical or electronic. The buzzer has two pins. Its simple design and low cost make it suitable for use in a variety of applications such as car/truck reversing indicators, computers, and decision bells. It is also true that the phenomenon of generating electricity when mechanical pressure is applied to certain materials and vice versa.



Fig-4.4: Buzzer

4.5 16*2 LCD display

It is an LCD (liquid crystal display) It makes use of liquid to provide a visible representation, and each character is made up of 16x2 image element dots. The handling voltage ranges from 4.7V to 5.3V. Without a backlight, current utilization is 1mA.



Fig-4.5: LCD Display

4.6 Cooling Fan

An exhaust fan is used for evacuation if the disproportionate gas released already increases the likelihood of missing. Cripple fans can usually extract hot or damp air from a small, limited zone and replace it with clean air from another location (such as a door or ventilation). The heated air extracted by an electric fan is promoted through a heat exchanger and expelled outside.



Fig-4.6: Cooling Fan

4.7 Relay

When necessary, a 220V relay with a 5V input is used in the circuit to turn off the electricity. The relay contains 5 pins. The digital pins on its Arduino board are linked by a single pin. One is connected to the switch in order to connect the 220V power source. This power has strayed to the devices located between the other pins. The other two are in the main power source and another for the Arduino board.



Fig-4.7: Relay

5 RESULT AND DISCUSSION

After detecting a gas leak, the MQ2 gas sensor sends a signal to the Arduino UNO. Other visible Join devices, such as the LCD, buzzer, and GSM, transmit active signals. The GSM module sends SMS to the provided mobile number. As a result of this. In practice, people in the surrounding area notice the results, which are displayed on the LCD, and a buzzer sound indicates the crisis to the people by making the signal sound.



6 APPLICATIONS

1. It is used in other applications such as Smoke Detector.
2. They are used in a household where the owner has to regulate and detect the gas leakage in the absence of the owner.
3. Gas detectors can be used to detect gases that catch fire easily, that are flammable, and which exhaust the oxygen (oxygen depletion).
4. This system can be used in Firefighting in the Fire Extinguishing Department.

7 CONCLUSION

This system provides a quick and cost-effective solution for preventing gas leaks and lowering the risk to human life. The statistics of the application of gas clam on to the application can be useful in identifying faulty valves and regulators before replacing them. A two-level prevention apparatus, in addition to detecting leakage, increases the system's validity. The system's development costs are extremely low. The use of LPG has recently taken a large giant. From the use of cylinders to the use of petroleum lines, everything is covered. The most serious warning about using this technology is about security. Our project will have an impact on both households and industries.

8 REFERENCES

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