

LPG Leakage Detection and Prevention System using IOT

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ABSTRACT

Security is primary concern for everyone. There are numerous ways to give security at homes or in diligence. The main end of this design is to continuously monitor the house or diligence and if any fire accidents occur, the system should warn the tempress. A gas detector will be fixed in the house or in an assiduity. The status of the detector will be continuously monitored by the microcontroller. Whenever the status of the detector changes, microcontroller detects this and incontinent cautions the tempress. The main end of this design is to continuously cover the status of the gas sensor and if its affair triggers, the controlling unit activates the buzzer to warn the surroundings and shoot the SMS to the concern authorities to take necessary action. It's also having weight detector whenever the gas position is less automatically it'll shoot the communication to gas agency for booking of new gas cylinder, and it'll automatically turn off the power of the house. The gas sensor will be connived with the microcontroller through transistor since the microcontroller cannot read the affair of the detector directly. The microcontroller cannot drive the buzzer and cannot give the current needed for the buzzer. Therefore, the buzzer will be connived to the microcontroller through transistor. In this case, the transistor is responsible for passing the current.

Keywords: Arduino, Buzzer, MQ-5 Gas Sensor, Load cell, LCD, GSM, Exhaust Fan.

I. INTRODUCTION

1. In the modern world, safety is crucial, hence it's crucial that effective safety measures are implemented. The creation of toxic gas detection and waking systems using microcontrollers is the major goal of the work.

2. This automatic discovery and waking system have one benefit over the home-made system: it offers quick response times and accurate emergency discovery, leading to the rapid prolixity of the critical situation. An alarm is created, and a communication of alert is sent, if the feasts move beyond the regular position.

3. When the position of the gas reaches the predetermined limit, the system sounds a buzzer, and the gas exhaust vent turns on. The LCD panel shows the current gas value.
 4. To identify the excess of gas in the pronounced terrain, embedded systems—defined as "a computer system with a particular function within a broader mechanical and electrical system, typically with a real-time constraint "are being used.
 5. If a gas leak is discovered, a GSM module is utilized to notify the user by SMS, and the status is shown on an LCD panel.
 6. To inform the user, the MQ5 gas detector activates the GSM module and LCD display.
 7. The networking of "effects" known as the Internet of Things (IoT) enables physical effects to communicate with one another with the use of sensors, electronics, software, and connection.
 8. The Internet of Things-based gas leak monitoring system is not an exception to the rule that systems do not support any sort of mortal commerce.
 9. In addition to alerting us to a leak, this gas detection and warning system will also manually cut off the AC mains power supply and the gas cylinder's knob to stop any leakage of gas.
 10. Automatically counts the amount of fuel in the tank when making a gas reservation. A message is sent to the gas agency through GSM when the gas level drops below the predetermined level, and the user then receives a confirmation message from the gas agency. Users consequently get their cylinders on schedule.
3. The veritably dangerous chemical made its way into and girding the bits communities located around the installation. NOT JUST Bhopal, the recent gas release was in Vizag. The artificial tragedy is regarded as the worst in history.
 4. The "Vizag gas leak" was a manufactured disaster that occurred at the LG Polymers chemical site, which is located outside of Visakhapatnam, Andhra Pradesh, near the R.R. Venkata Puram village.
 5. The performing vapour pall affected adjacent areas and towns on May 7, 2020, early in the morning. It covered a 3 km (1.86 mi) compass.
 6. Almost 2,000 people were ill after being exposed to the gas, according to the National Disaster Response Force (NDRF), and there was an 11 percent chance of mortality.
 7. The main purpose of this design is to exclude these type of gas tragedies in order to cover from these disasters

II. PURPOSE

1. Since the Bhopal gas tragedy was caused by a chemical accident, the primary thing of this design is to chronicle recent chemical gas tragedies.
2. On the evening of December 2- 3, 1984, at the fungicide plant of Union Carbide India Limited (UCIL) in Bhopal, Madhya Pradesh, India.

III. OBJECTIVES

The design's main goal is to lessen gas loss from LPG cylinders.

Also, if any leakage is discovered using IOT, the AC mains are automatically shut down.

In addition to connecting with Arduino, the software may also connect with a stoner's mobile device and social media accounts, such as Twitter, to send out announcements.

For input, a MQ5 LPG gas detector is utilized. GSM is utilized to automatically book LPG and send alert announcements to stoners.

Descry Gas Leakage (like LPG) using MQ5 detector and Arduino.

Setup on SMS grounded Alert Medium using GSM Module.

Shoot SMS (alert dispatches) to 2 specified mobile figures.

Display status in an LCD using a 16x2 LCD module.

IV. EXISTED SYSTEM

The data will currently be transmitted from one location to another using wireless radio communication signals. Radio transmissions will nevertheless affect human health in ways like cardiac stress, fertility, cognitive function, and cell proliferation. Many technologies, including wireless communication protocols like infrared, Bluetooth, and Wi-Fi are used to convey data before voice and data transmission. LDR and laser astronomers also handle the voice and data transmission.

V. PROPOSED SYSTEM

This gadget will be a single system with numerous functions for LPG consumers and is created with colorful features that are enforced using Arduino. It is called Gas Position Monitoring and Automatic Booking. The equipment continuously tracks the gas location of the load and displays it on the alphanumeric display. With the use of a gas sensor, it also finds the gas leak. This involves setting aside a fresh LPG cylinder when the gas supply is in danger of running out. Additionally, it uses the GSM module to send an SMS alarm to the registered mobile number, and the alert database is visible in the system monitor.

VI. METHODS AND MATERIAL

5.1 Materials or Requirements

Software Requirements

For application develop, the following are the Software Requirements:

Embedded C

Technologies and Languages used to develop

- Embedded C
- C++

Debugger and Emulator

- Any Browser

Hardware Requirements

For application develop, the following are the Hardware Requirements.

- Arduino
- MQ-5 sensor
- LCD Display
- Exhaust fan
- Fire sensor
- GSM
- Load cell
- Buzzer
- Relay driver

5.2 METHOD

5.2.1 Following are the steps to develop the proposed project

- Studying about sensors & gathering the components required
- Knowing the specification of each component
- Developing the software
- Combing the components
- Testing if it working
- Result

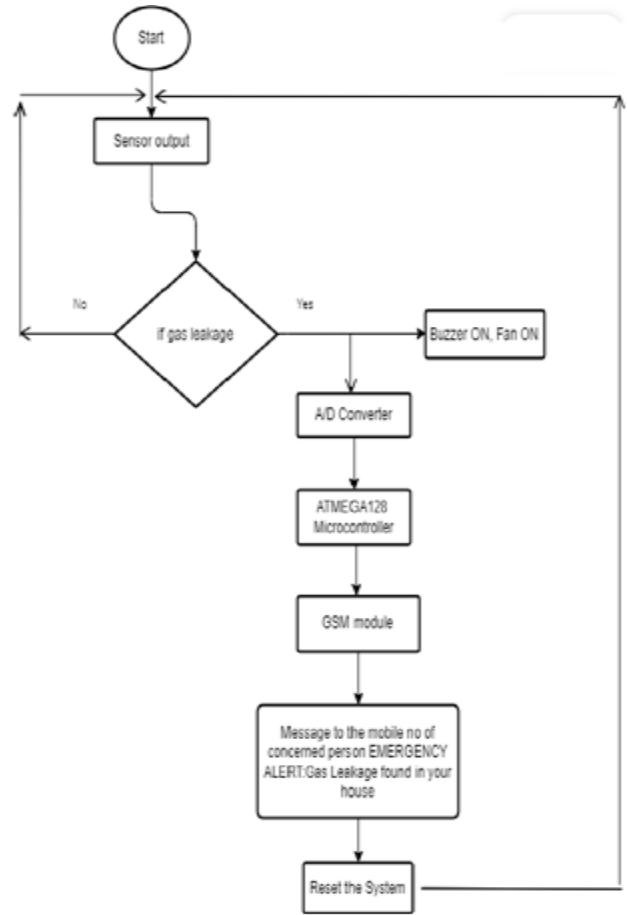
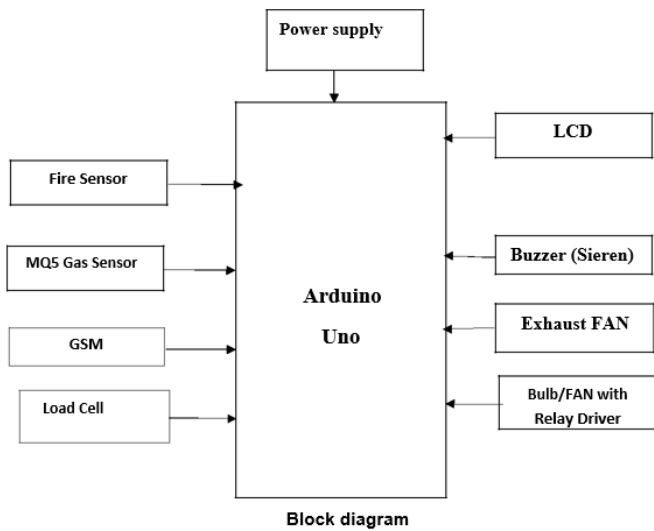
5.2.3 Libraries Used

Liquid Crystal Display:

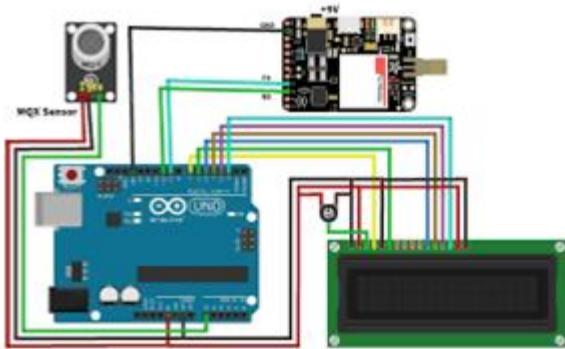
A 2x4 LCD can display 20 characters per line on each of its four lines. Each character in this LCD is presented in a 5 by 7 matrix. Command and data registers are present on this LCD.

VII. FIGURES & FLOW DIAGRAM

a. BLOCK DIAGRAM



b. DATASET



6.3 Flow Diagram

Fig 1. Flow diagram of Leakage Detection

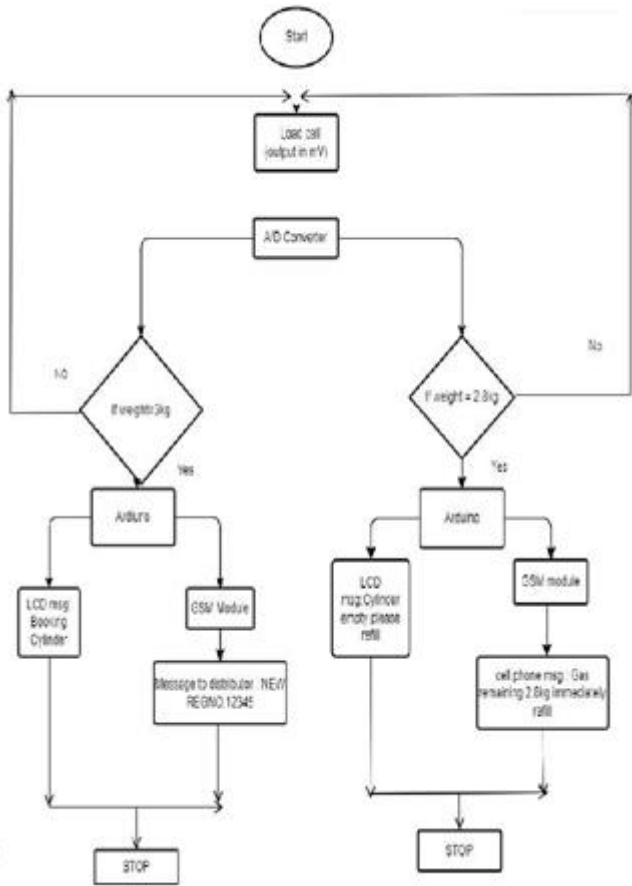


Fig 2. Flow diagram of monitoring and automatic booking system

VIII. RESULTS AND DISCUSSION

The effectiveness of this device is evaluated by gathering gas leaks near the gas detector using a flame. After the technique, if the detector value falls below the threshold value, the micro-regulator will carry out its preprogrammed actions before turning off the regulator knob to halt further leakage. The relay will turn off the main power supply after it has detected the gas leak to stop any more accidents. To alert those in the area, a buzzer begins to sound, and a message is displayed on the LCD screen. All trapped gases are released into the atmosphere using exhaust fans. When the leakage is discovered, the GSM module is utilized to send an SMS message to the affected user.

The user is alerted via message, buzzer, and message displayed on LCD when the amount of LPG reaches below the predefined value.

- a. The automatic refill of the LPG cylinder is booked by sending a message to the gas agency.
- b. The user is alerted if the LPG leakage is more than the threshold value and the main power supply and the regulator knob is turned off.
- c. When the flame detector detects a fire, it alerts users and the fire brigade.

IX. CONCLUSION

The main purpose here is to provide safety to the users of the LPG (Liquefied Petroleum Gas) in various fields like cooking, automobiles, industries, etc. Using this system, we can easily monitor the amount of LPG present within the cylinder and also detect the LPG leakage and fire and alert the user and respective authorities immediately so that the assistance is provided as soon as possible. It uses various sensors such as MQ-5 sensor, Flame sensor and load cell to monitor the LPG being used completely to prevent accidents caused by carelessness or misuse of LPG. As the world is moving towards being smarter every day, we can integrate this system with other home automation systems for creating complete home automation and security systems which can be used in smart houses and smart cities, etc

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XI. Authors' contributions

Tarun Kumar and Santhosh have conceived the idea, Tarun Kumar and Hemanth developed the theory and information related to the project. Hemanth encouraged Santhosh and Tarun Kumar to investigate about the sensors. while both Hemanth and Santhosh studied about the working of the Arduino. Tarun Kumar and Hemanth learnt about the libraries and software used in the project and Tarun Kumar took the lead in authorizing. All authors discussed the results and contributed to the final manuscripts. Surekha also provided valuable guidance with his expert provided valuable guidance with his expert.

XII. REFERENCES

- [1]. Gayatri S. Nair, Anandhakrishnan S., Dipesh Nair, Rakesh K., Sampat K. - "Moniteur de gaz mince basé sur lot".
- [2]. Ashish Srivastava, Ratnesh Prabhakar, Rajiv Kumar and Rahul Verma, GSM based
- [3]. Dr.ice. Rao "Portable Gas Detection Device with Alert System"
- [4]. Asmita Verma, Prabhakar S., Kayalvizhi Jayavel "Gas Leak Detection, Smart Alerts and Prediction Using IoT".
- [5]. "Intelligent Gas Monitoring Systems in the Internet of Things" e-ISSN: 2278-1676, p-ISSN: 2320-3331, PP 82–87, IOSR Electrical Journal an Electronics Ingeniousness (IOSR-JEEE).

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