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**R.V. COLLEGE OF ENGINEERING, BANGALURU-560059
(Autonomous Institution Affiliated to VTU,Belgaum)**

SMART LIVING SYSTEM: (EXPERIENTIAL LEARNING REPORT)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

It is certified that the **Experiential Learning** titled **Smart Living System** is carried out by **Prashant Ronad, Pratham Chib, Manoj Reddy and Preethi C** who are Bonafede students of R. V. College of Engineering, Bengaluru, during the first semester, in the year **2022-2023**. It is also certified that for the Internal Assessment have been incorporated in the report. The report has been approved in the report. The report has been approved as it satisfies the academic requirements in respect of the experiential learning.

Signature of staff in-charge

INTRODUCTION

The LPG gas detector project is an essential safety system that detects the presence of LPG gas in the air and automatically cuts off the power supply to the entire home circuit. LPG gas is commonly used as a fuel source in homes for cooking, heating, and other purposes. While LPG gas is a convenient fuel source, it can also be extremely dangerous if a gas leak occurs.

- Gas leaks can result in explosions, fires, and other hazards that can cause extensive damage to the property and put the lives of people at risk. Therefore, it is crucial to have a reliable and efficient system in place that can detect any gas leaks and quickly take action to prevent any harm.
- The LPG gas detector project uses advanced sensors to detect the presence of LPG gas in the air. These sensors are placed at strategic locations throughout the home, such as the kitchen, living room, and other areas where gas appliances are used.
- The sensors continuously monitor the air for any signs of gas leaks, and if a leak is detected, the system immediately triggers a relay that shuts off the power supply to the entire home circuit.
- The system is designed to be easy to install and operate, and it requires no special skills or expertise to use. It is also cost-effective, making it an ideal safety solution for homeowners who want to ensure the safety of their families and their property.
- In summary, the LPG gas detector project is a crucial safety system that provides peace of mind to homeowners and their families.
- It offers a reliable and efficient means of detecting gas leaks and ensuring that the power supply is immediately cut off, minimizing the risk of accidents and ensuring the safety of everyone in the home.
- With its advanced sensors and automatic power cut-off feature, the LPG gas detector project is a must-have safety system for any home that uses LPG gas as a fuel source.

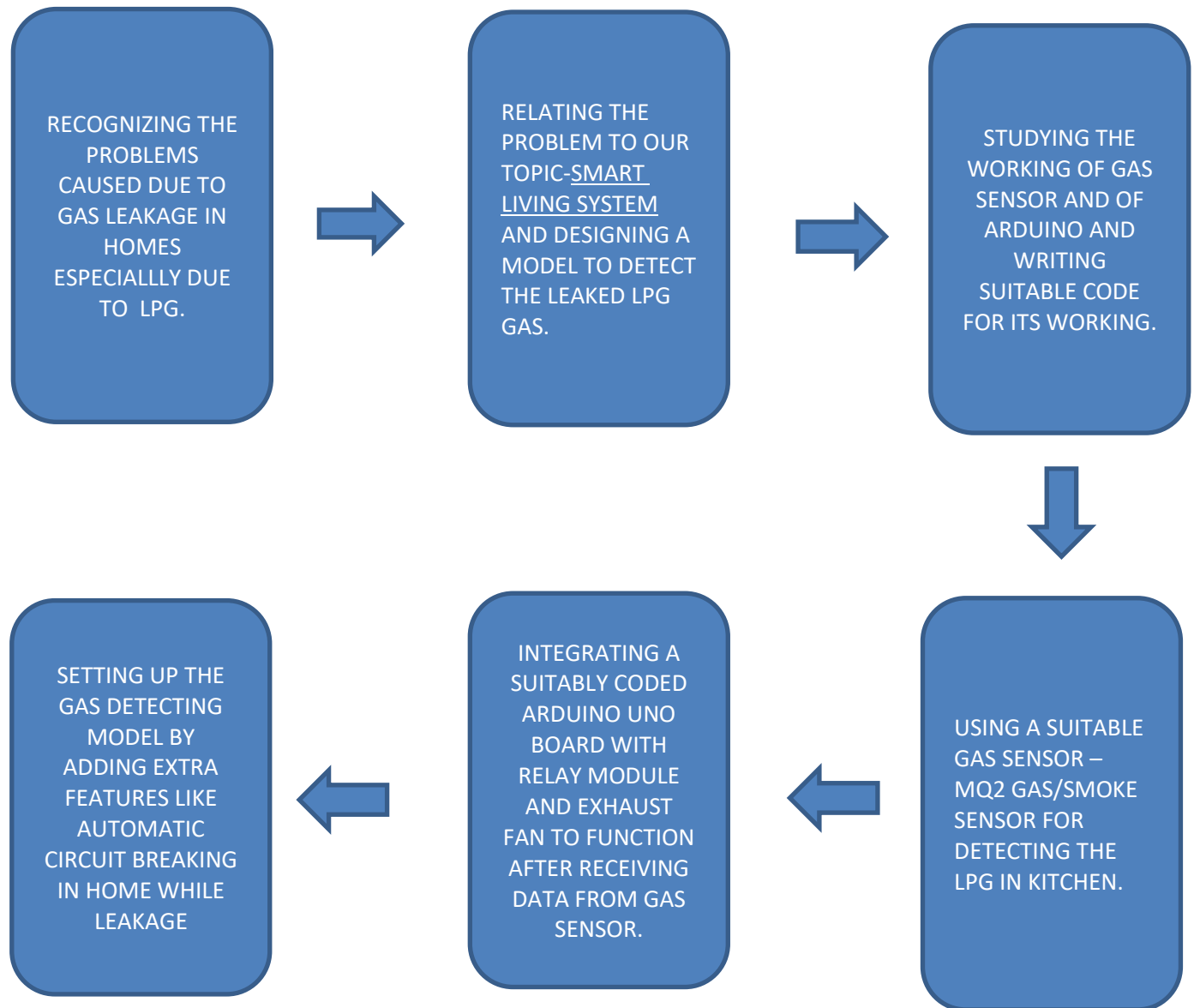


LITERATURE SURVEY

Author	Title	Publication Details	Summary
1. Aayushi Gautam Gaurav verma Shamimul Qamar Sushant Shekhar	Vehicle pollution monitoring, control and challan system using MQ2 sensor based on IOT.	Wireless personal communications. November,2019.	<ul style="list-style-type: none"> • It is a prototype embedded system built on a Raspberry Pi board that employs sensors and actuators to simulate an internet of things scenario. • By keeping the level of gases within predetermined limits, the system can assist. • create challans to filter and manage air contaminants.
2. Hao Wang Yong Zhao Hanyang ji Zhenyu Yuan Lu	Detection of precursor chemicals based on semiconductor gas sensor.	IEEE Transaction on Instrumentation and measurement August,2022.	<ul style="list-style-type: none"> • Since commercial semiconductor gas sensor signals of PC gases frequently exhibit weak discrimination, it is challenging to correctly identify PC gases using the current intelligent recognition algorithms. • Commercial semiconductor gas sensor (MQ2) collects the signals while using square wave temperature modulation. • The combination of semiconductor sensors and artificial intelligence technology will significantly advance the field of gas recognition research.
3. Metta Santiputri Muhammad Tio	IOT-based Gas leak detection device.	IEEE International conference on Applied Engineering. December,2018.	<ul style="list-style-type: none"> • Because LPG gas has been leaking, there have been numerous accidents. • The device performs area monitoring continuously. • A warning is then given to the user on an Android-based smartphone after NodeMCU receives data from the petrol sensor. • Users of this equipment will be able to stop accidents brought on by petrol leaks in order to avert accidents..

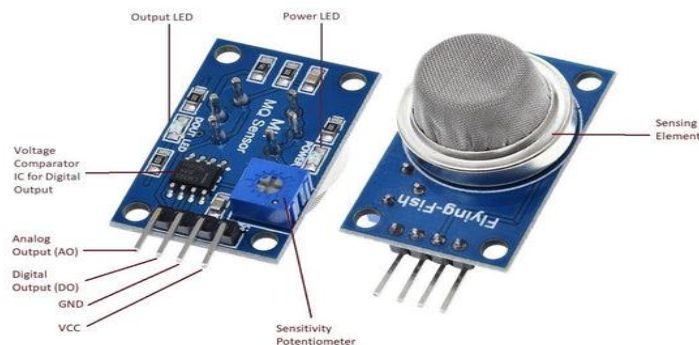
Author	Title	Publication details	Summary
4. Supriya A. Mane Digambar Y. Nadargi Jyoti D. Nadargi Omar M. Aldossary Mohaseen S. Tamboli Vinayak P. Dhulap	Design, development and validation of a portable gas sensor module: A facile approach for monitoring greenhouse gases.	Solution processed coating and characterization for multiple applications. November,2020.	<ul style="list-style-type: none"> •This portable gas sensor module prototype has an original design and is intended for monitoring greenhouse gases. •The Arduino Uno and gas sensors work together to measure the concentration of greenhouse gases, giving poisonous gas alarms the erroneous signal.
5. Ravi Kishore Kodali Tirumala Devi B Sasweth C. Rajanarayanan	IOT based automatic LPG gas booking and leakage detection system.	11 th International conference on advanced computing. December,2019.	<ul style="list-style-type: none"> •Since that this technology may be utilised to complete such jobs, it is not practical for a human to spend time booking manually. •The petrol agency is notified immediately and the new cylinder is reserved when the weight of the cylinder falls below a predetermined limit. •Concentration rises in the presence of LPG gas leakage, and this is shown on ubidots. •An alarm message is provided to the user and the indicator turns red if the concentration rises above 400 ppm.
6. Mohammad Monirujjaman Khan	Sensor-Based Gas Leakage Detector System	7 th International electronics conference on sensors and applications. November,2020	<ul style="list-style-type: none"> •Installing a gas leakage detecting kit in risky locations is one of the preventive measures to stop accidents caused by gas leaks. •A design for a gas leakage detection system that can automatically identify, notify, and manage gas leakage is proposed and discussed. • It provides a system for user alerts as well. The technology is based on a sensor that easily identifies a gas leakage.

METHODOLOGY



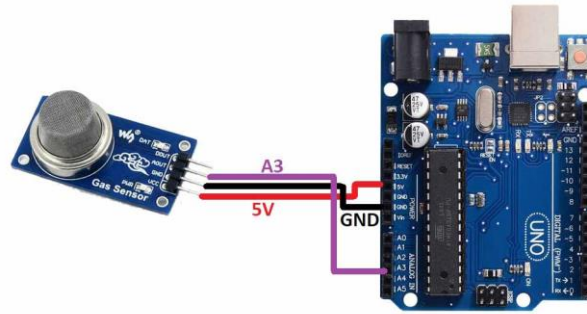
MATERIALS USED IN OUR PROJECT:

1) MQ-2 GAS SENSOR



- Methane, propane, butane, alcohol, smoke, and other combustible gases can all be detected with the MQ2 gas sensor, a common type of semiconductor gas sensor.
- It is frequently utilised in smoke detectors, gas leak detection systems, and other safety applications. The MQ2 gas sensor works on the basis of gas adsorption onto the semiconductor material's surface, which modifies the material's resistance.
- A microcontroller or other electronic device can process an electrical signal created by measuring and converting this resistance change.
- The MQ2 petrol sensor has the benefit of being affordable, making it available to students and hobbyists.
- It is crucial to remember that the sensor could have several drawbacks, including cross-sensitivity to other gases and sensitivity to changes in temperature and humidity.
- The MQ2 gas sensor can be used to detect and monitor gas levels in a variety of applications, but it should be used carefully and calibrated correctly to get reliable results.

2) ARDUINO UNO BOARD



- Due to its low cost, simplicity, and ease of use, the Arduino board, an open-source microcontroller board, is frequently utilised in a variety of electronics projects.
- It may be connected to a variety of sensors, including the MQ2 gas sensor, and can be programmed using the Arduino Integrated Development Environment (IDE).
- An MQ2 gas sensor is typically linked to an Arduino board's analogue input pin, and the board's corresponding pins for power and ground are connected to the sensor's power and ground pins. One of the analogue input pins on the board is connected to the sensor's output pin, which can then be read using a straightforward code in the Arduino IDE.
- A serial monitor or other output device can be used to calibrate and test the sensor after the code has been uploaded to the Arduino board and the sensor has been connected.
- The code is helpful for gas detection and monitoring applications since it can be set to sound an alert or take other action when the gas levels reach a predetermined threshold.
- Overall, the pairing of an Arduino board and a MQ2 gas sensor offers a straightforward and efficient method for gas detection and monitoring. It may be applied in a variety of settings, from industrial gas leak detection to household safety.



ARDUINO CODE

#code started

#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);  
  
    }  
  
}
```

3) RELAY MODULE



- A relay module is an electronic device that allows low voltage signals from a microcontroller, such as an Arduino board, to control high voltage circuits, such as a motor or an exhaust fan. The relay module consists of a small control circuit that switches a larger circuit on or off.
- To connect a relay module to an Arduino board and an MQ2 gas sensor to control an exhaust fan, the following steps can be taken:
 - a) Connect the power supply and ground of the relay module to the corresponding pins on the Arduino board.



- b) Connect one of the output pins of the MQ2 gas sensor to one of the analog input pins on the Arduino board.
 - c) Connect the input pin of the relay module to one of the digital output pins on the Arduino board.
 - d) Connect the exhaust fan to the output terminals of the relay module.
- Once the hardware connections are made, the code can be uploaded to the Arduino board. The code should include a section that reads the analog input from the MQ2 gas sensor, and if the gas level exceeds a certain threshold, it should activate the relay module, which in turn will switch on the exhaust fan to remove the gas.

4) LED

- It is used as lights of house which will get automatically off when a LPG leakage occurs.

5) DC MOTOR

- It is used as fans of house which will get automatically off when a LPG leakage occurs.

6) BUZZER

- It is used as alarm which makes a beep sound when a LPG leakage is detected.

7) EXHAUST FAN

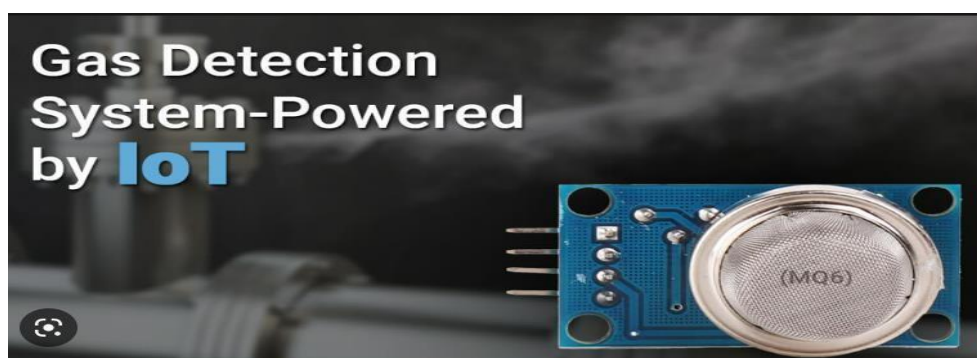
- It is used to remove the leaked gas out of the house or kitchen.

RESULTS

The results that we obtained are as follows:

- **Early detection of gas leaks:** LPG gas detectors can quickly detect the presence of propane or butane gas in the air, even at low concentrations, and alert occupants of a potential gas leak before it becomes a serious safety hazard.
- **Improved safety:** LPG gas detectors can prevent gas-related accidents by triggering an alarm that prompts people to evacuate the area, shut off the gas supply, or take other necessary safety measures.
- **Compliance with regulations:** LPG gas detectors are often required by local regulations or building codes to ensure the safety of occupants in homes, commercial buildings, and industrial facilities.
- **Cost-effective:** LPG gas detectors are relatively inexpensive compared to the potential costs associated with gas leaks, such as property damage, personal injury, or loss of life.
- **Peace of mind:** Knowing that there is a reliable gas detector installed in your home or workplace can provide peace of mind and help you sleep soundly at night, knowing that you and your loved ones are protected from potential gas leaks.
- **Easy to install:** LPG detectors are easy to install and can be placed in various locations, including near gas appliances or in areas where gas is stored. They can be battery-operated or wired to the electrical system.
- **Continuous monitoring:** LPG detectors offer continuous monitoring, meaning they can detect gas leaks even when people are not present. This provides additional safety and peace of mind for homeowners and businesses

In summary, using an LPG gas detector can help improve safety, comply with regulations, save money, and provide peace of mind.





CONCLUSION

The LPG gas detector project is a critical safety measure for homes that use LPG as a fuel source. The device is designed to detect gas leaks and automatically shut off all home appliances to prevent potential hazards such as fires, explosions, and other gas-related accidents.

One of the primary benefits of the LPG gas detector is that it provides an early warning system. Gas leaks can go unnoticed, especially if they occur in areas that are not frequently visited, such as basements or attics. The LPG gas detector can detect even small gas leaks and alert homeowners to take action before the situation worsens.

Another significant advantage of the LPG gas detector is that it automatically shuts off all home appliances. This feature is crucial in preventing potential hazards such as fires and explosions. Gas leaks can lead to the buildup of gas in confined spaces, creating a volatile environment that can ignite with a spark from a home appliance. The LPG gas detector's ability to switch off all home appliances prevents this scenario from occurring, reducing the risk of fire and explosion.

To ensure the successful implementation of the LPG gas detector project, several factors must be considered. Proper installation of the device is crucial to its effectiveness. The LPG gas detector must be placed in a location where it can detect gas leaks accurately. Additionally, the device must be installed away from air vents, windows, or drafts that may affect its performance. Calibration is another important factor in the LPG gas detector's effectiveness. Calibration ensures that the device can detect gas leaks accurately, preventing false alarms and missed detections. Regular maintenance is also necessary to ensure that the device is functioning at optimal levels. This includes cleaning the device, checking for damage, and replacing worn-out components.

In addition to the technical aspects of the LPG gas detector project, education and training are crucial. Household members must be educated on the importance of the LPG gas detector and the safety measures to take in the event of a gas leak. Proper training will reduce the risk of false alarms, ensure a prompt response in emergencies, and save lives.



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The LPG gas detector project is an ongoing process. Regular assessments of the device's performance and maintenance procedures must be conducted to ensure continued safety. Additionally, advancements in technology should be monitored to identify opportunities to enhance the device's performance and functionality.

Overall, the LPG gas detector project is a valuable safety investment that provides peace of mind to homeowners who use LPG. It is a reliable solution that can help prevent gas-related accidents and ensure the safety of homes and families. The project's success depends on proper installation, calibration, and regular maintenance of the device, coupled with effective education and training programs for household members.

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