NANDHA ENGINEERING COLLEGE

ERODE–638052 (Autonomous)

(Affiliated to Anna University, Chennai)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

22AIC14 – INTERNET OF THINGS AND ITS APPLICATIONS

MINI PROJECT REPORT ON

TOPIC – EARLY DETECTION OF FOOT ULCER

Submitted by

REGISTER NUMBER	NAME
22AI024	KODISMITH R
22AI028	NARESH S
22AI030	NAVEEN PRASATH A

NANDHA ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

This is to certify that the project work entitled **" GAS LEAKAGE DETECTION SYSTEM WITH AUTO OFF REGULATOR USING ARDUINO "** is the Bonafide work of KodiSmith R (22AI024) , Naresh S(22AI028) , Naveen prasath A (22AI030) who carried out work under my supervision.

Signature of the Supervisor

Dr. K. Lalitha,

Assistant Professor,

Department of AI & DS,

Nandha Engineering College,

Erode – 638052.

Signature of the HOD

Dr. P. Karunakaran,

Head of the Department,

Department of AI & DS,

Nandha Engineering College,

Erode – 638052.

Submitted for End semester PBL review held on _____

GAS LEAKAGE DETECTION SYSTEM WITH AUTO OFF REGULATOR USING ARDUINO

AIM:

The aim of this project is to design and develop a gas leakage detection system with an auto-off regulator using Arduino. The system should be able to detect gas leaks and automatically shut off the gas supply to prevent accidents.

SCOPE:

- Designing and developing a gas leakage detection system using Arduino

- Integrating a gas sensor to detect gas leaks

- Implementing an auto-off regulator to shut off the gas supply in case of a gas leak

- Testing and validating the system

BRIEF HISTORY:

Gas leakage detection systems have been in use for several decades. However, most of these systems are manual and require human intervention to detect and respond to gas leaks. With the advent of IoT and automation technologies, it is now possible to design and develop automated gas leakage detection systems that can detect gas leaks and respond quickly to prevent accidents.

PROPOSED METHODOLOGY:

1. Literature review: Conduct a thorough review of existing gas leakage detection systems and their limitations.

2. System design: Design a gas leakage detection system using Arduino and a gas sensor.

3. System development: Develop the system and integrate the gas sensor and auto-off regulator.

4. Testing and validation: Test and validate the system to ensure its accuracy and reliability.

COMPONENTS REQUIRED:

S.NO	COMPONENTS	NO'S
1	Arduino uno	1
2	Gas sensor (MQ2)	1
3	Servo motor	1
4	Piezo buzzer	1
5	Jumper wires	As required
6	Gas regulator	1
7	Bread board	1
8	Mosfet540N-60v 30A	1
9	1k Ohm Resistor	1
10	12v PC Fan	1
11	USB Cable AtoB	1
12	Power supply (power bank)	1

DESCRIPTION:

The gas leakage detection system with auto-off regulator using Arduino is designed to detect gas leaks and automatically shut off the gas supply to prevent accidents. The system uses an Arduino board, a gas sensor, and a relay module to detect gas leaks and shut off the gas regulator.

Here's how the system works:

1. The gas sensor detects gas leaks and sends a signal to the Arduino board.

2. The Arduino board processes the signal and triggers the relay module to shut off the gas regulator.

3. The gas regulator shuts off the gas supply, preventing accidents.

CODING:

```
#include <Servo.h>  // Include the Servo library


// Pin Definitions

int gasSensorPin = A0; // LPG Gas sensor connected to A0

int buzzerPin = 8;     // Buzzer connected to digital pin 8

int fanPin = 9;        // CPU cooling fan connected to digital pin 9 (through MOSFET)

int servoPin = 10;     // Servo motor connected to digital pin 10


// Threshold value for gas sensor

int threshold = 400;   // Adjust this based on your sensor calibration


// Create a Servo object
Servo myServo;

void setup() {
  // Initialize the serial monitor for debugging
  Serial.begin(9600);


  // Set pins for buzzer, fan, and servo as OUTPUT
  pinMode(buzzerPin, OUTPUT);
  pinMode(fanPin, OUTPUT);
```

```arduino
  // Attach the servo to the specified pin (pin 10)
  myServo.attach(servoPin);

  // Initialize servo position to 0 degrees (servo is off)
  myServo.write(0);  // Servo motor will be in its initial position (0 degrees)
}

void loop() {
  // Read the analog value from the gas sensor
  int gasValue = analogRead(gasSensorPin);

  // Display the gas value on serial monitor for debugging
  Serial.print("Gas Sensor Value: ");
  Serial.println(gasValue);

  // If the gas concentration exceeds the threshold, trigger buzzer, fan, and servo
  if (gasValue > threshold) {
    // Trigger the buzzer
    digitalWrite(buzzerPin, HIGH);

    // Turn on the fan
    digitalWrite(fanPin, HIGH);

    // Move the servo to a specific position (e.g., 90 degrees)
    myServo.write(90);  // This rotates the servo to 90 degrees
```

```arduino
    Serial.println("LPG Detected! Buzzer, Fan, and Servo ON.");
  }
  else {
    // Turn off the buzzer and fan when no gas is detected
    digitalWrite(buzzerPin, LOW);
    digitalWrite(fanPin, LOW);

    // Reset the servo to its initial position (e.g., 0 degrees)
    myServo.write(0);  // This moves the servo back to 0 degrees

    Serial.println("No LPG detected. Buzzer, Fan, and Servo OFF.");
  }

  // Small delay to avoid overwhelming the serial monitor
  delay(500);
}
```

SCREENSHOTS:
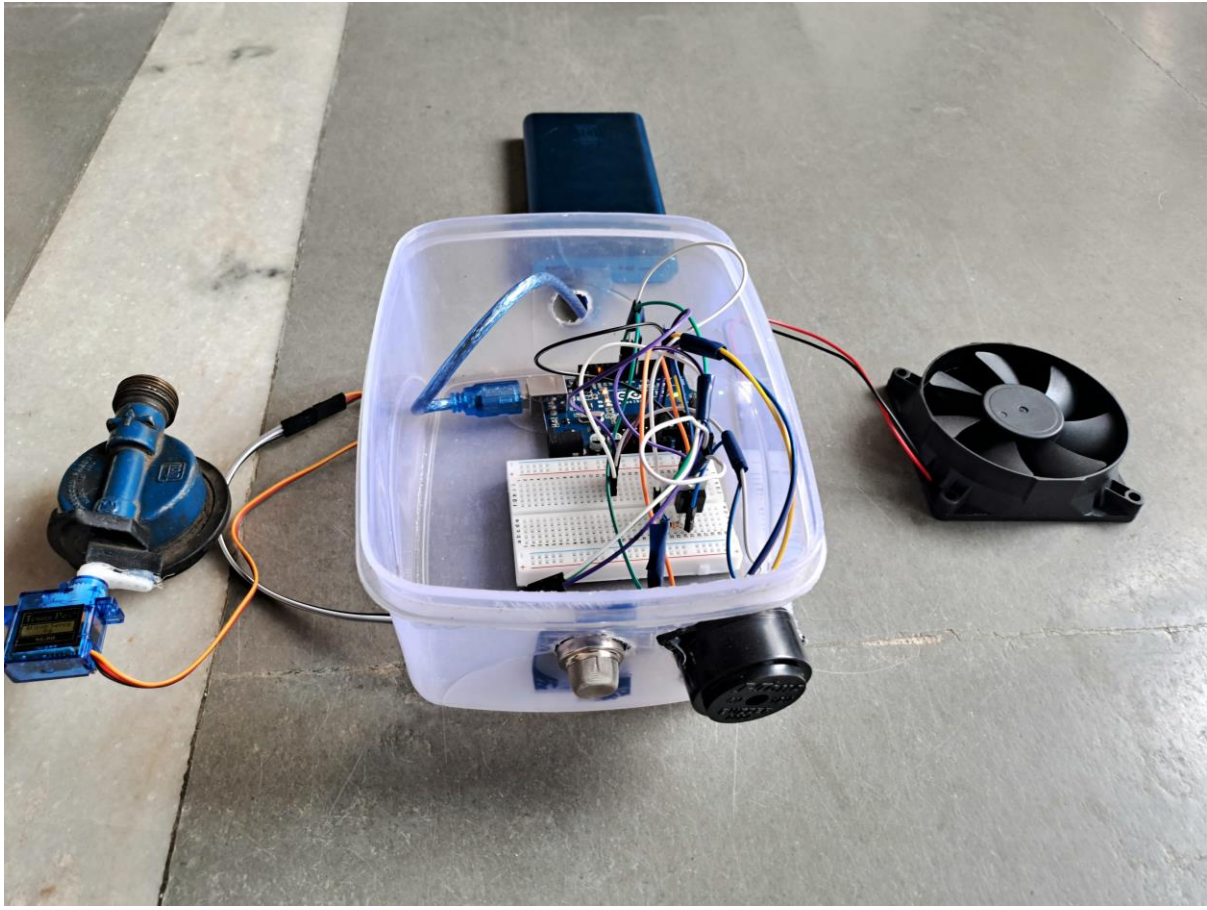
LIMITATIONS:

- Improving the accuracy and sensitivity of the gas sensor

- Integrating the system with other safety devices, such as fire alarms and sprinkler systems

- Developing a user-friendly interface for monitoring and controlling the system

FUTURE ENHANCEMENTS:

- The system requires a power supply to operate

- The system may not detect gas leaks in areas with poor ventilation

- The system may require periodic maintenance and calibration to ensure its accuracy and reliability

CONCLUSION:

In conclusion, the gas leakage detection system with auto-off regulator using Arduino is a reliable and efficient solution for detecting gas leaks and preventing accidents. The system is easy to install and maintain, and can be integrated with other safety devices to provide a comprehensive safety solution.