./



Version Number:

Team Members :

Team No:

Module: Model Based System Engineering

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ver.Rel. No.** | **Release Date** | **Prepared. By** | **Reviewed By** | **Approved By** | **Remarks/Revision Details** |
|  | 20/2/22 | KIRUBAKARAN K(99007633) |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Document History**

**SIMPLE EMBEDDED SYSTEM**

LPG GAS LEAKAGE DETECTION

OBJECTIVE:

* Detect Gas Leakage (like LPG leak, Butane leak, Methane leak) or any such petroleum based gaseous substance that can be detected using MQ5 Sensor.
* Produce a sound alarm upon gas leak and stop the alarm once gas leak is under control (gas presence in atmosphere is under normal range)
* Display status in an LCD using a 16×2 LCD module.

REQUIREMENTS:

HIGHLEVEL REQUIREMENT

1.Arduino should able to detect the LPG leakage whenever the gas gets leaked.

2.Arduino should able to alert the user when the gas gats leaked.

3.Arduino should able to show the alert message.

LOWLEVEL REQUIREMENT

1.Ardunio should able to detect the LPG leakage detection using MQ2 sensor.

2.Arduino should able to alert the user with Buzzer and LED.

3.Arduino should able to show alert message using LCD display.

BLOCK DIAGRAM:

16\*2 LCD DISPLAY

ARDUINO

BUZZER

LED

**COMPONENT USED:**

* Arduino Uno
* MQ-2 sensor
* Buzzer
* 16x2 LCD
* 1K resistor
* Bread board
* 9 volt battery
* Connecting wires

**Arduino uno:**

**Arduino Uno** is a microcontroller board based on the ATmega328P . It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator , a USB connection, a power jack, an ICSP header and a reset button.

|  |  |
| --- | --- |
| Microcontroller | ATmega328P |
| Operating Voltage | 5V |
| Input Voltage (recommended) | 7-12V |
| Input Voltage (limit) | 6-20V |
| Digital I/O Pins | 14 (of which 6 provide PWM output) |
| **MQ-2 Gas sensor:** |  |
|  |  |
| MQ2 is one of the commonly used gas sensors in MQ sensor series. It is a Metal Oxide Semiconductor (MOS) type Gas Sensor also known as **Chemiresistors** as the detection is based upon change of resistance of the sensing material when the Gas comes in contact with the material. Using a simple voltage divider network, concentrations of gas can be detected.MQ2 Gas sensor works on 5V DC and draws around 800mW. It can detect **LPG**, **Smoke**, **Alcohol**, **Propane**, **Hydrogen**, **Methane** and **Carbon Monoxide** concentrations anywhere from 200 to 10000ppm.  **Buzzer:**  A buzzer or beeper is **an audio signalling device**, which may be mechanical, electromechanical, or piezoelectric (piezo for short). ... Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.  **LCD Display:**  A liquid-crystal display (LCD) is a **flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers**. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.  **Bread Board:**  A breadboard is used to make up **temporary circuits** for testing or to try out an idea. No soldering is required so it is easy to change connections and replace components. Parts are not damaged and can be re-used afterwards.  **WORKING:**  The functioning of the circuit is very simple. Once the device is powered ON, the Arduino initializes the LCD display and start reading the analog voltage from the MQ-2 sensor. The analog voltage from the sensor is digitized using the in-built ADC channel and stored in a variable as a 10-bit value. The sensor value is compared with a calibrated threshold and if the sensor value exceeds that value, the buzzer is activated and a RED light LED will ON . If the sensor value remains within limits, a message showing “No Danger” keeps on displaying on the LCD screen and the GREEN light LED will ON. The buzzer is kept OFF for the condition.  **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. 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. |  |

**COMPLEX EMBEDDED SYSTEM**

**BIOMETRIC ATTENDANCE SYSTEM**

**INTRODUCTION:**

In this project, we are going to design a Fingerprint Sensor Based Biometric Attendance System using Micro controller. Simply we will be **interfacing fingerprint sensor with Arduino**, **LCD Display** & **RTC Module** to design the desired project. In this project, we used the fingerprint Module and Arduino to take and keep attendance data and records.

**REQUIREMENTS:**

**HIGHLEVEL REQUIREMENTS**

1.The system should able to recognize the finger print of the user

2.The system should verify the data of the user and save them.

3.The system should able to navigate between different function provided in the system.

**LOWLEVEL REQUIREMENTS**

1.The finger print of the user is scanned by the system using RC305 Finger print sensor module.

2.The data of the user can be stored in the flash memory of the embedded system.

3.Navigation function can be enabled using the bush button.

**BLOCK DIAGRAM:**

**BUSH BUTTONS**

**1.Register/Back 2.Delete/OK**

**3.Forward 4.Reverse**

**FINGER PRINT SENSOR**

LED Indication

RTC Module

**LCD Display**

**Buzzer**

**Computer Interference**

**MICRO**

**CONTROLLER**

**COMPENENT USED:**

1.Micro controller

2.Finger Print Sensor

3.RTC Module

4.LCD Display

5.Potentiometer

6.Bush button

**WORKING:**

In this Fingerprint Sensor Based Biometric Attendance System using Arduino, we used a Fingerprint Sensor module to authenticate a true person or employee by taking their finger input in the system. Here we are using 4 push buttons to register new fingerprint or delete stored fingerprint or match stored fingerprint. The 4 push buttons are used as an input unit for these tasks. Similarly, RTC Module DS3231 is used for registering scanning/entering/existing time of the user.

The LCD displays the time record and every function happening via push button. Buzzer indicates different functions and happening whenever an interrupt is detected. The LED is used for power indication.

**APPLICATION:**

1. This can be used in educational institutions.
2. Biometric attendance system can be used in industries.
3. Biometrics can be used in ATM for authentication.
4. Finger print authentication can be used in access control.

**LIMITATION:**

* There is a chance of misusing the technology by placing a fake finger print.
* Modules are sensitive and they need to be handled carefully.

**CONCLUSION:**

This project mainly comprised of development of attendance management system and fingerprint identification system. Attendance management is very helpful in saving valuable time of students and teachers, paper and generating report at required time.

# 