

CENTRALIZED LPG CYLINDERS THEFT DETECTION SYSTEM WITH SECURITY ALERTS

¹Pruthvi M R, ²Veena M

¹Mtech in Computer Engineering, ²Assistant Professor

^{1,2}Department of Computer Science & Engineering

^{1,2}PES College of Engineering, Mandya Karnataka, India

Abstract: The microcontroller is the heart of this project to which the RFID reader and tags are interfaced which are similar to the Regulator of cylinder. Every cylinder is having unique RFID TAG through which the cylinder can be identified. The RFID reader is connected to microcontroller which in turn is connected to GSM hence whenever a theft occur it will send an alert to user.

Failing of distribution of cylinder to particular customer will automatically send message to server and police that means unauthorized usages / distribution by local distributor men or selling the domestic cylinders to commercial point like hotels etc. Along with this our system is made so intelligent that it can sense GAS leakage and turn of the burner which with help of relay controlled by micro controller & will give buzzer in that case.

Keywords: GPS, GSM, LPC2129, RFID, Gas Sensor

1. INTRODUCTION

.LPG which is otherwise known as Liquefied Petroleum Gas has many industrial as well as domestic uses. It is used in many industries for commercial purpose in order to avoid disaster due to the wrong handling of the lpg cylinder we have to take some proper precaution and safety measure. The important thing is that domestic cylinders should not use for commercial purpose even it will be declared as an illegal activity by the government. Most people ignore this law and hence result in dangerous accidents. In order to avoid this accidents people should be aware of the proper usage of lpg gas cylinder.

Gas leakage and cylinder theft is a major problem faced by the people. For safety purpose we developed a centralized cylinder theft detection system. Whenever a theft occurs it will generate an alert and a message will send to an owner by which the cylinder theft can be prevented manually and automatically we can able to turn off the cylinder by the L293D motor.

2. RELATED WORK

K. Padma Priya [2] this system is mainly proposed for home safety, while activating the alarm. It demonstrated based on the wireless lpg leakage monitoring system. When the gas level reaches below the threshold limit of gas around 2kg so that the user can replace the old cylinder with new in time and automatically books the cylinder using a GSM module .The main purpose of the system is to prevent suffocation and explosion of the gas cylinder due to leakages. The additional advantage of the system is that it continuously monitors the level of the LPG present in the cylinder using load sensor.

DHEMS is defined as domestic energy management system .Qi Liu [3] presented an intelligent platform which integrated with the different components and explains the behavior of the each independent component. It offers different strategies

and persuasive which monitors and effect the positive feedback of DHEMS.It plays an important role in domestic industries as well as energy monitoring system.UDI [4] Innovation Scale domestic energy monitoring system is the basic of different energy monitoring system. Which works as a prototype for DHEMS.Real time application of energy saving system uses the approach of DHEMS system. In this paper a set of networks are being connected to monitor the proper consumption of energy. It can also implement automatically in living environment.

Due to increase in crime everybody wants to take proper measures to prevent intrusion. Home security has been a major issue where Hitendra Rawat, Ashish Kushwah [5] explained an automate home so that user can take advantage of the GSM. Intruders, Gas Leak and Fire are important problems which can be prevented by using this approach. In any of the above cases met while you are out of your home than the device sends SMS to the emergency no provided to it. This works with the microcontroller and AT command.

3. PROPOSED SYSTEM

The block diagram of the hardware implementation of the entire system is as shown in the Figure1.

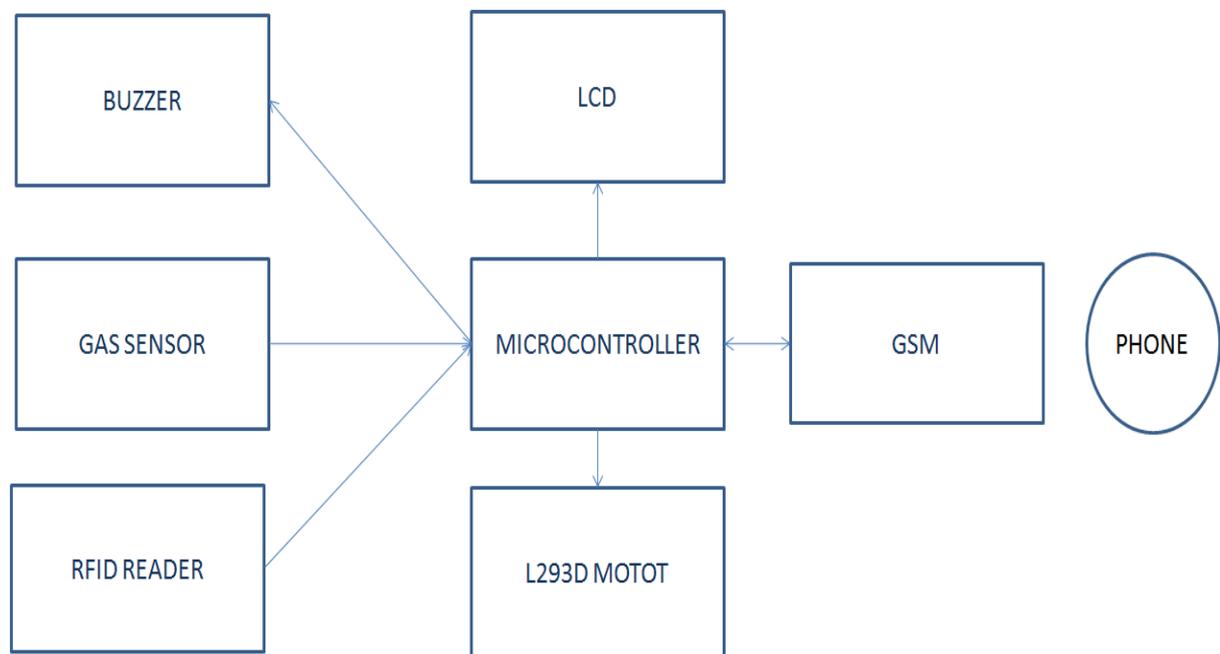


Figure.1: Proposed system.

Microcontroller is a controlling unit on a single integrated circuit containing a processor core, memory and programmable input and output peripherals. It controls the functioning of other components integrated in it. The main components of the system are

1. Microcontroller
2. LCD
3. RFID Reader
4. Gas sensor
5. Motor
6. GSM
7. Android application

3.1 Microcontroller:

Microcontroller is generally called as a core of embedded systems. It is small and low cost computer built for the purpose of dealing with specific task. In our system we are using with LPC2148 microcontroller which belongs to Philips family.

Which has 64 pin IC with 32 general purpose input output pin for port 0 and 16 general purpose input output pin for port 1. It has 256k bytes RAM and 16k bytes of ROM. Figure 2 shows the features of LPC214 IC

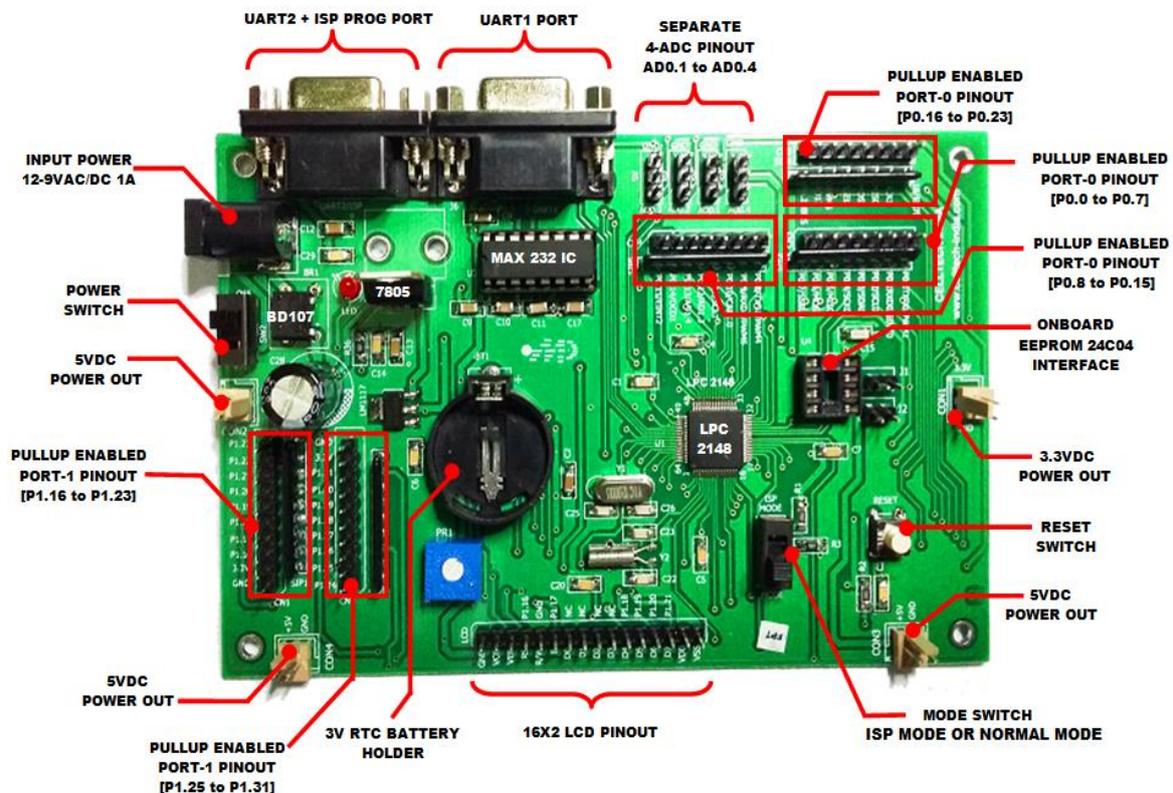


Fig.2(a): LPC214 IC.

In our system LPC2148 uses 40 KB of on-chip static RAM and 32 to 512 KB of on-chip flash program memory. It uses a 128-bit wide interface/accelerator. LPC2148 enables high-speed 60 MHz operation. In-System/In-Application Programming is via on-chip boot-loader software. It has single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.

A. Features of LPC2148 IC

- It offers real-time debugging and on-chip Real Monitor software with the high-speed tracing of instruction execution.
- It uses 2KB of endpoint RAM and 8 KB of on-chip RAM.
- 10-bit A/D converters with a total of 6/14 analog inputs.
- 32-bit timers/external event counters, PWM unit (six outputs) and watchdog.
- LPC2148 uses a low-power real-time clock dedicated 32 kHz clock input.
- Multiple serial interfaces including two UARTs (16C550).
- It has two Fast I²C-buses with 400 Kbit/s.
- SPI and SSP with buffering mechanism and variable data length.
- Vectored interrupt controller.
- 45 of 5 V tolerant fast general purpose I/O pins.
- 9 edge or level sensitive external interrupt pins available.
- On-chip integrated oscillator operates with an external 1 MHz.

3.2 LCD:

The proposed system uses a 16x2 ALCD for displaying messages on the board, displaying only 16 characters in a single line. The following figure 2 shows the pin-out diagram of the LCD.



Fig.2(b): Alphanumeric LCD

3.3 RFID Reader:

Generally RFID is defined as Radio Frequency Identification. Here RFID is provided with the tag. Each tag consists of a unique ID. RFID tags are used for security purposes. In our proposed system, tags are defined with an eight-digit ID which is used as matched or unmatched. If the tag is successfully read by the RFID reader, then there will be no theft. Each time the user has to use his unique tag to use his cylinder in order to prevent accidents. There are different RFID tags available in the market: hang tags, labels, security tags, etc. It consists of a tiny IC chip which is connected to an antenna. The information of the system can be tracked by the RFID.

3.4 Gas Sensor:

A gas sensor is an important device which detects the leakage of gas in an environment. It has a high advantage in order to prevent many disasters such as gas explosion. Monitoring gas leakage is important in household applications as well as for commercial applications. Gas sensors are often used for safety purposes. In our system, the working of a gas sensor is very simple; a threshold value is set in order to maintain proper sensing. A different factor has to be taken into account while choosing a gas sensor, such as sensitivity level, physical dimensions, sensing elements, absorption potential, etc.

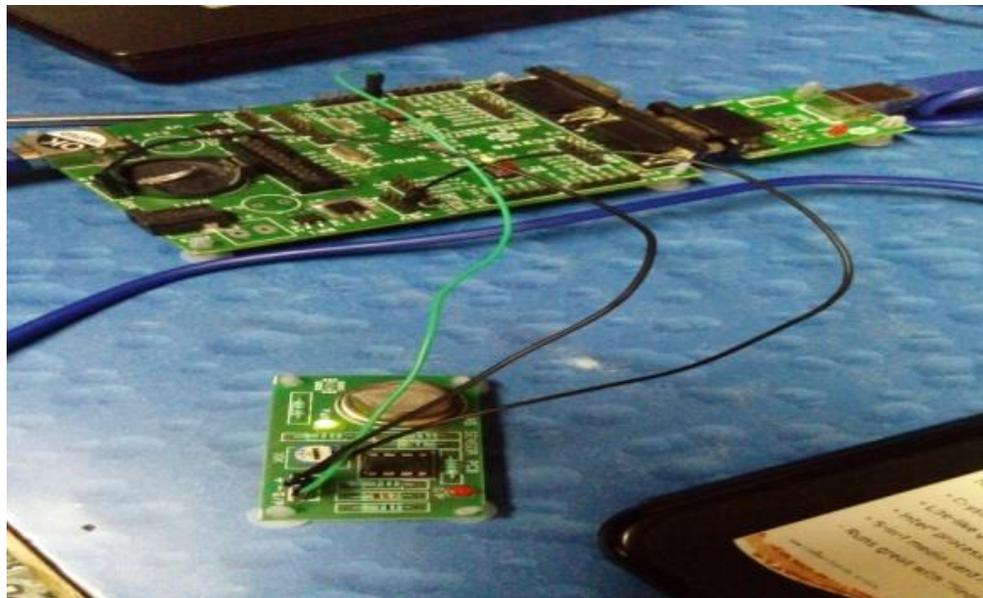


Fig.3: Gas sensor connected to LPC214 microcontroller.

3.5 L293D DC motor:

L293D is a motor driver IC which allows a motor to drive in both directions. It typically consists of 16 pins which simultaneously control the motor in any direction. It works on the concept of an H-bridge, which allows the voltage to flow in both directions. The pin-out diagram of the L293D DC motor is shown in Fig. 5. There are 4 input pins for the L293D, pins 2, 7 on the left and pins 15, 10 on the right as shown on the pin diagram. Left input pins will regulate the rotation of the motor connected across the left side, and right input pins for the motor on the right-hand side. Motors are rotated on the basis of the input provided across the input pins as LOGIC 0 or LOGIC 1.

In our proposed system L293D is used as a gate, which automatically turns off the cylinder whenever an unauthorized user tries to use the cylinder. Each user consists of an unique RFID tag which has to be read by RFID while using this proposed system. If the tag is matched with the user defined id then the motor will turn on and send notification to GSM.

3.6 GSM module:

GSM stands for global system for mobile communication. It is an open and digital cellular technology developed mainly for wireless communication. Here we use GSM as an modem device which can be used to send the alerts to an user.

A. Service provided by GSM

GSM is used with the simple Subscriber Identity Module generally we call it as SIM.

A GSM modem is a wireless modem that works with the GSM wireless network. The working principle of GSM is very simple as it support a common set of AT commands. In our proposed system SIM 300 wireless communication is used. As shown in the fig1. Whenever an unauthorized user tries to use the clinder a notification will be generated by the system and the alert will be send using GSM modem to the user hence he will able to off the connection manually by the developed application or by automatically through the l293d motor.

B. GSM feature

- It provides short message service.
- It has duplex technique.
- It can use up to 8 users per channel.
- Modulation is up to 0.3 Gauss_Ian Filter.

3.7 Android Application:

Now day’s android phones are customizable due to its ease of use. Here in the user end we will use with the android application in order to turn off the cylinder manually. When a user is at out of his place if there is any clinder theft occur it can be handled by our system by the developed android application. GSM receive an alert from the microcontroller and it will send the notification to the owner hence he can off the relay through his mobile phone. Developed application has to be installed in the user’s mobile phone to control the system. Sample android application window is shown in figure 5.

4. FLOW CHART OF THE PROPOSED SYSTEM

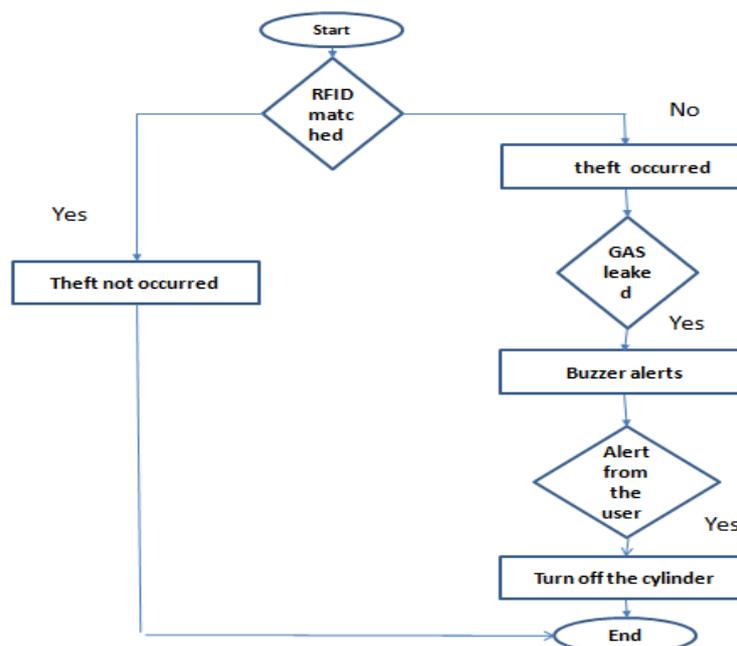


Fig.4: Flow chart of the proposed system

4.1 APPLICATIONS:

- Overcome come cylinder theft.
- Record maintenance.
- Security issues.
- Future scope billing can also be implemented.

4.2 ADVANTAGES:

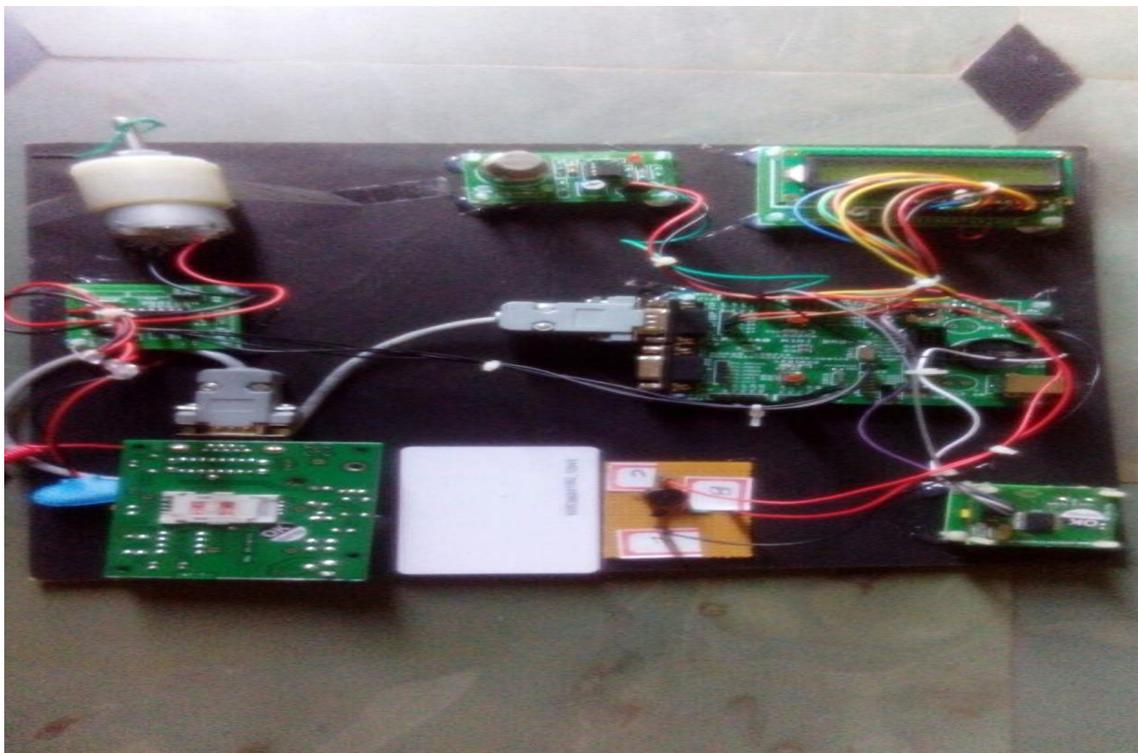
- Able to locate the user of the cylinder.
- Authorized access to cylinders can be increased.
- Security of cylinder distribution can be implemented.
- Server helps to maintain the data base.

5. CONCLUSION

LPG cylinder theft detection can be successfully done automatically and manually by developing an android application. The biggest advantage of an system is that it provides an unique RFID for each user hence whenever a theft occur it will alert user by generating notification and it will send to owner .Some times the cylinders are received by neighbour or friends may miss lead the data base records in order to over come from this issue a proper system has to be set in future work.

5.1 MODULAR DESIGN PICTURE:

The following figure shows the actual Design of the Module



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