

## IMPLEMENTATION OF LPG TRANSPORTATION SYSTEM USING GSM AND RFID

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### ABSTRACT

*Liquefied Petroleum Gas (LPG) is utilized as a part of numerous businesses for business reason keeping in mind the end goal to evade calamity because of the wrong treatment of the LPG cylinder we need to play it safe and security measure. The critical thing is that residential cylinders ought not be utilized for business reason since it is announced as an illicit movement by the legislature. A great many people overlook this law and consequently bringing about hazardous mishaps. Keeping in mind the end goal to maintain a strategic distance from this mischances individuals ought to know about the best possible use of LPG gas cylinder. Gas spillage is a noteworthy issue looked by the general population. For security reason in this paper we proposed an incorporated cylinder spillage identification framework. By utilizing Arduino nano LM328 and Microcontroller at whatever point a spillage happens it produces an alarm message and a similar will be sent to separate conveyance individual by utilizing GSM and the cylinder spillage can be anticipated physically. With the assistance of Radio Frequency Identification (RFID) we can convey the cylinder to the correct individual.*

**Keywords:** GSM, RFID, LPG, Relay, TDMA.

### 1. INTRODUCTION

LPG which is also called Liquefied Petroleum Gas has numerous modern and in addition household employments. In India the supply of LPG through pipelines isn't conceivable because of lack of LPG production[1]. As innovation being enhanced numerous gas organizations or wholesalers have executed IVRS nowadays albeit because of every day occupied calendars, customer's finds extremely hard to book new cylinder, and furthermore it is exceptionally hazardous when a LPG gas spillage happens in any household utilization, compound industry or in other applications[2]. IVRS framework was borne from general protestations of shoppers that landline telephones of their wholesalers were either occupied or nobody addressed the call expeditiously. With this framework, a buyer can approach the gas office by dialing a sans toll number and later should take after the intuitive directions[3]-[8]. At long last, the framework will declare the customer number and affirms the customer's number and furthermore affirms the refill of cylinder by squeezing one. The booked cylinder will be conveyed to another client by the wholesaler wrongfully. This will be avoided by utilizing RFID technique[9].

Radio recurrence recognizable proof (RFID) is a framework that encourages the following of articles, essentially for stock following, by means of a three section innovation included a peruser, a handset with decoder and a transponder (RF tag)[10]-[12]. RFID is a remote framework that works in conjunction with an association's data innovation foundation to enhance business procedures, for example, stock administration and effectiveness in inventory network management[13].

The GSM framework was planned as a moment age (2G) wireless innovation. One of the essential points was to give a framework that would empower more prominent ability to be accomplished than the past original simple frameworks. GSM accomplished this by utilizing an advanced TDMA (time division different access approach)[14]. By embracing this system more clients could be suited inside the accessible transfer speed. What's more, figuring of the carefully encoded discourse was received to hold protection. Utilizing the prior simple cell advancements it was feasible for anybody with a scanner collector to tune in to calls and various well known identities had been "listened in" with humiliating consequences[15].

## **II. PHYSICAL CHARACTERISTICS OF RFID TAGS**

Since RFID labels should physically append information to things of various shapes and sizes in various situations, they arrive in a wide combination of shapes and sizes. Moreover, they might be housed in a wide range of sorts of materials. A portion of the physical attributes of different labels include:

- PVC or plastic catches and circles, more often than excluding a focal opening for latches. These labels are tough and reusable.
- RFID labels molded like charge cards, which are called "contactless savvy cards".
- Labels made into the layers of paper in a mark, called "shrewd names". These might be connected with computerized tools like those utilized for standardized identification marks.
- Little labels installed in like manner protests, for example, attire, watches, and wrist trinkets. These little labels may likewise come as keys and keychains.
- Labels in glass containers, which can survive even in destructive conditions or in fluids.

## **III. MATERIALS AND METHODOLOGY**

The microcontroller is the core of this undertaking to which RFID peruser is interfaced which goes about as the Regulator of cylinder. Each cylinder is having extraordinary RFID TAG through which the cylinder can be recognized. From the Fig.1 the RFID peruser (controller) is associated with microcontroller which thusly is associated with GSM. At the point when customer ask for new cylinder, a one of a kind TAG number is produced by specialist co-op and the same is sent by means of SMS to the RFID module associated at the place of the individual buyer. Each time a purchaser ask for new number, another one of a kind TAG number is produced. The Fig.2 demonstrates finish continuous setup of the gear.

At the point when an agent of specialist organization tries to convey the cylinder at home, he/she initially distinguish the realness of the purchaser by examining the unique mark of the individual. On the off chance that the unique finger impression is coordinated, that implies the client is a legitimate client and thus conveys the

cylinder. On the off chance that, none of the relative is available at home, at that point he/she can convey the cylinder to neighbor on ask for premise. The legitimacy of neighbor must be distinguished if the neighbor gives an extraordinary 4 digit PIN apportioned to the purchaser at the season of taking new association. The agent of specialist co-op, at that point enter 4 digit codes to the module to distinguish, if the 4 digit code has a place with a similar client.

Once conveyed, additionally control of controller/valve of is just conceivable by the assistance of RFID TAG. On the off chance that an unapproved TAG tries to get to the cylinder, the framework will send SMS to specific client and to a server and police that implies unapproved uses/circulation by nearby merchant men or pitching the household cylinders to business point like inns and so forth. Alongside this our framework is made so astute that it can detect GAS spillage and kill the burner which with help of hand-off controlled by microcontroller and will give alert as well.

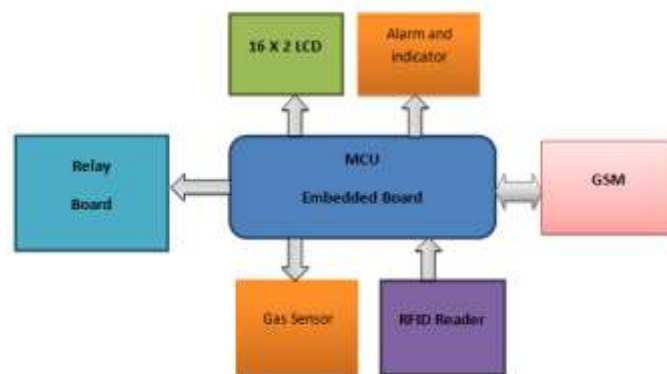


Fig.1: Block diagram of microcontroller interfacing

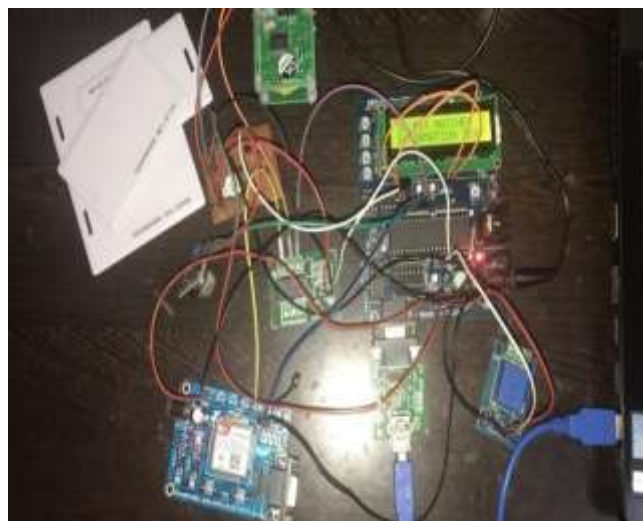


Fig.2: The Complete System Setup

#### IV .RESULTS AND DISCUSSIONS

Step 1: Customer books for a new cylinder system.

Step 2: Message will be send to the gas agency through GSM module.

Step 3: RFID number will be generated and it is sent to the customer by encrypting the number.

Step 4: The number will be stored in the regulator.

Step 5: If RFID tag doesn't matches with RFID reader then the cylinder will not be delivered to the person.

Step 6: If the gas is leaking from the container (Cylinder truck) then automatic message will be sent to the Delivery Person/Truck Driver.

The following figures represent the Gas Agency's response with RFID and Message Delivered to the Delivery Person in Fig.3 and Fig.4 respectively.

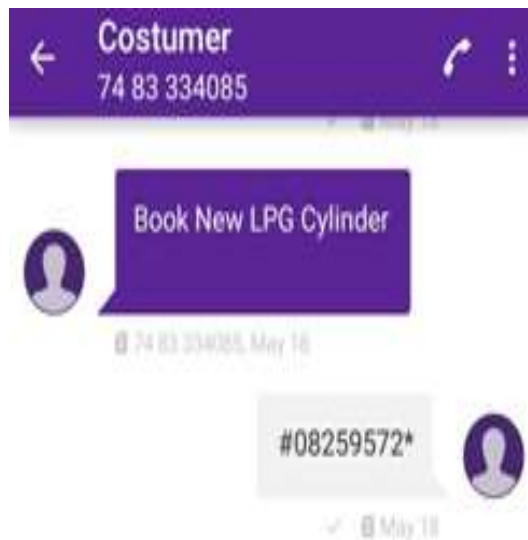


Fig.3 : Gas Agency's response with RFID

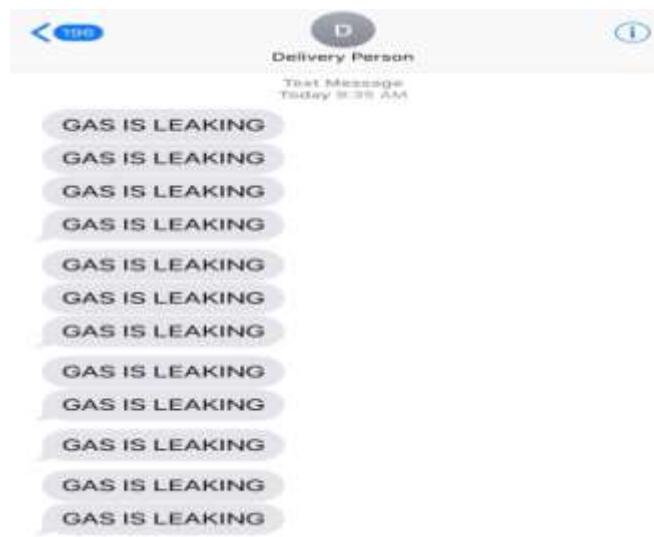


Fig.4 : Message Delivered to the Delivery Person

## **V. ADVANTAGES & APPLICATIONS**

### *Advantage:*

- Accurate delivery
- Safety from gas leakage
- User friendly
- Easy to use

### *Applications:*

- Domestic purpose
- Industries
- Hotels and restaurants

## **VI. CONCLUSION**

The Proposed design "Implementation of LPG transportation system using GSM and RFID" is a model to portray secured transport framework (Leakage location) in view of RFID and GSM innovation. For wellbeing reason we built up a brought together cylinder Leakage discovery framework by utilizing GSM innovation and gas sensor. RFID number will be created for the costumer for specific request and number will be sent back to client. RFID tag in cylinder will be detected on the off chance that it doesn't coordinate then the framework will produce an alarm and a message will send to a proprietor, merchant and to conveyance individual by which the cylinder can be followed and conveyed to the right individual.

## **REFERENCES**

- [1] C. V. Raiyani et al., "Characterization and problems of indoor pollution due to cooking stove smoke," Atmos. Environ. A, General Topics, vol. 27, pp. 1643–1655, Aug. 1993.
- [2] L. F. Dong, Z. L. Cui, and Z. K. Zhang, "Gas sensing properties of nano-ZnO prepared by arc plasma method," Nanostruct. Mater., vol. 8, no. 7, pp. 815–823, 1997.
- [3] X. Liu, Z. Xu, Y. Liu, and Y. Shen, "A novel high performance ethanol gas sensor based on CdO–Fe<sub>2</sub>O<sub>3</sub> semiconducting materials," Sens. Actuators B, Chem., vol. 52, pp. 270–273, 1998.
- [4] N. Barsan, M. Schweizer-Berberich, and W. Göpel, "Fundamental and practical aspects in the design of nanoscaled SnO<sub>2</sub> gas sensors: A status report," Fresenius' J. Anal. Chem., vol. 365, no. 4, pp. 287–304, 1999.
- [5] E. R. Leite, I. T. Weber, E. Longo, and J. A. Varela, "A new method to control particle size and particle size distribution of SnO<sub>2</sub> nanoparticles for gas sensor applications," Adv. Mater., vol. 12, no. 13, pp. 965–968, 2000.
- [6] R. E. Melchers and W. R. Feutrill, "Risk assessment of LPG automotive refuelling facilities," Rel. Eng. Syst. Safety, vol. 74, no. 3, pp. 283–290, 2001.

- [7] J. Stawczyk, "Experimental evaluation of LPG tank explosion hazards," *J. Hazardous Mater.*, vol. 96, pp. 189–200, Jan. 2003.
- [8] A. Kolmakov, D. O. Klenov, Y. Lilach, S. Stemmer, and M. Moskovits, "Enhanced gas sensing by individual SnO<sub>2</sub> nanowires and nanobelts functionalized with Pd catalyst particles," *Nano Lett.*, vol. 5, no. 4, pp. 667–673, 2005.
- [9] H.-C. Chiu and C.-S. Yeh, "Hydrothermal synthesis of SnO<sub>2</sub> nanoparticles and their gas-sensing of alcohol," *J. Phys. Chem. C*, vol. 111, no. 20, pp. 7256–7259, 2007.
- [10] A. B. Bodade, A. M. Bende, and G. N. Chaudhari, "Synthesis and characterization of CdO-doped nanocrystalline ZnO:TiO<sub>2</sub>-based H<sub>2</sub>S gas sensor," *Vacuum*, vol. 82, no. 6, pp. 588–593, 2008.
- [11] T. Chen, Q. J. Liu, Z. L. Zhou, and Y. D. Wang, "A high sensitivity gas sensor for formaldehyde based on CdO and In<sub>2</sub>O<sub>3</sub> doped nanocrystalline SnO<sub>2</sub>," *Nanotechnology*, vol. 19, no. 9, p. 095506, 2008.
- [12] T. Chen, Z. Zhou, and Y. Wang, "Effects of calcining temperature on the phase structure and the formaldehyde gas sensing properties of CdO-mixed In<sub>2</sub>O<sub>3</sub>," *Sens. Actuators B, Chem.*, vol. 135, no. 1, pp. 219–223, 2008.
- [13] C.-H. Lai, C.-C. Chang, C.-H. Wang, M. Shao, Y. Zhang, and J.-L. Wang, "Emissions of liquefied petroleum gas (LPG) from motor vehicles," *Atmos. Environ.*, vol. 43, no. 7, pp. 1456–1463, 2009.
- [14] A. I. Zia et al., "Development of electrochemical impedance spectroscopy based sensing system for DEHP detection," in *Proc. 5th Int. Conf. Sens. Technol. (ICST)*, Nov./Dec. 2011, pp. 666–674.
- [15] A. I. Zia et al., "Sensor and instrumentation for progesterone detection," in *Proc. IEEE Int. Instrum. Meas. Technol. Conf. (I2MTC)*, May 2012, pp. 1220–1225.