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A Survey Paper on Smart Gas Leakage Detection with Monitoring and Automatic Safety System

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Abstract: Explosion occurred due to gas leaks have become a serious problem in our day to day lives. Home safety has become a huge problem due to increasing gas leak accidents. Many fire truck accidents are caused by poor-quality used rubber-tubes or shutting off the regulators when not in use. That's is why developing a gas leak detection system is very good objective and necessary.The survey states that any gas leak in LPG occurs so care should be taken as to how the gas leak detection system is used in safety systems in various automation and how the necessary safety can be taken to prevent an explosion of LPG.

Keyword: LPG, Wi-Fi Module, Arduino, Buzzer, Microcontroller sensor(Gas, Sound).

I. INTRODUCTION

Gas leakage are a serious problem and are found in many residential, industries and vehicles such as Compressed Natural Gas(CNG). Gas leaks have been reported to cause accidents in many places. Gas leaks due to increasing demand from LPG users are often to improper and untimely action, leading to many dangerous accidents.[3] An effective method by installing a safety system such a situation as well as monitor the level of LPG in the cylinder is required so that users are aware of remaining Gas in cylinder.[4] There have been many accidents due to gas leakage in the last few years. There are some similar examples due to gas leakage. Due to gas leakage, LPG leak at one place in Pune caused loss of 4 people. And another example is, A 45 year old women, two boys and a girl were suffocated to death in a fire at a residence in Shahdara after an LPG cylinder exploded. The house caught fire due to leak in the LPG gas cylinder, resulting in the death of 4 people.

II.LITERATURE SURVEY

- The author has observed gas leakage and LPG levels where gas leakage occurs automatically. The authors suggests that gas leakage is performed by various gas sensors. Whose author has worked on gas leaks and mentions that we can take care if a found using a sensor and gas booking can be done automatically when a small amount of gas is taken closed.[1]
- RFID tag microcontroller, pressure sensors and buzzers are used to monitor gas. Through this paper important parameters are used to find the level of gas in the container. The good purpose of this project is to get notification of gas leak to user when gas leakage is started. Arduino was originally created as a tool for fast sampling and activities for students with no knowledge for electronics. This paper uses a microcontroller, buzzer and a gas sensor to detect gas leakage system. When a gas leak is detected by a gas sensor ,the microcontroller turn on the buzzer in critical condition. The author suggest that this message or instruction may be displayed using an LCD display for LPG monitoring.[2]
- The proposed system detects LPG leaks and alerts customers. The alarm starts when the system notice and increases in LPG leakage concentration by sending an alarm and sending a message to specific mobile phone. The device assures safety and prevents explosions.

A microcontroller based system based on gas sensor(MQ6) has been developed in proposed system to detect LPG leakage . The unit is also integrated with an alarm unit to detect signal a leak.[5]

III.EXISTING LPG LEAKAGE DETECTION AND MONITORING SYSTEM

Sensors, microcontrollers, relays, LCD display and buzzer are the material used for gas leak. It is used to convert power supply system area from alternative current to direct current.

Mq 5 sensor: This sensor is constructed by micro AL203 ceramic pipe and contains SnO2 (Tin Dioxide) layer, capable of measuring electrode and the heater is covered by plastic and stainless steel.

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Arduino: An Arduino is a microcontroller, whose main goal is to make electronic to be as easy as possible. It is provides Integrated Development Environment (IDE). Arduino contains several numbers of parts and integrated interfaces in a particular circuit board.

LCD display: The LCD (liquid crystal display) contains two interfaces on upper and lower side of the module. The 16x2 LCD display has the height and width size of 80.0 x 36.0 mm and containing VA size of 66.0 x 16.0 mm and thickness of LCD 13.2 mm. operating power supply ranges from +5.0 V or +3.0 V.

Load cell: A Load cell is a transducer is used to convert power into electronic output [6]. It is used to detect the weight of the cylinder in this proposed system [12] and is organized Interface with Microcontroller. The weight of the strain gauge load cell dominates the industry. Where it is used precisely in mechanical places expect on certain places laboratories.

Wifi modem: WiFi modem can easily establish a connection through a serving WiFi adapter. It is easily accessible by microcontroller due to its simple connection through UART (Universal Asynchronous Receiver/Transmitter) Interface.

Buzzer: A buzzer is an audio signaling device which is capable of controlling microcontrollers IO via, with the working voltage of 5V.22. If the LPG sensor detects a gas leak at workplace or at home, the sensor will detect the noise and the gas leak will stop.

IV.PARADIGM OF SYSTEM

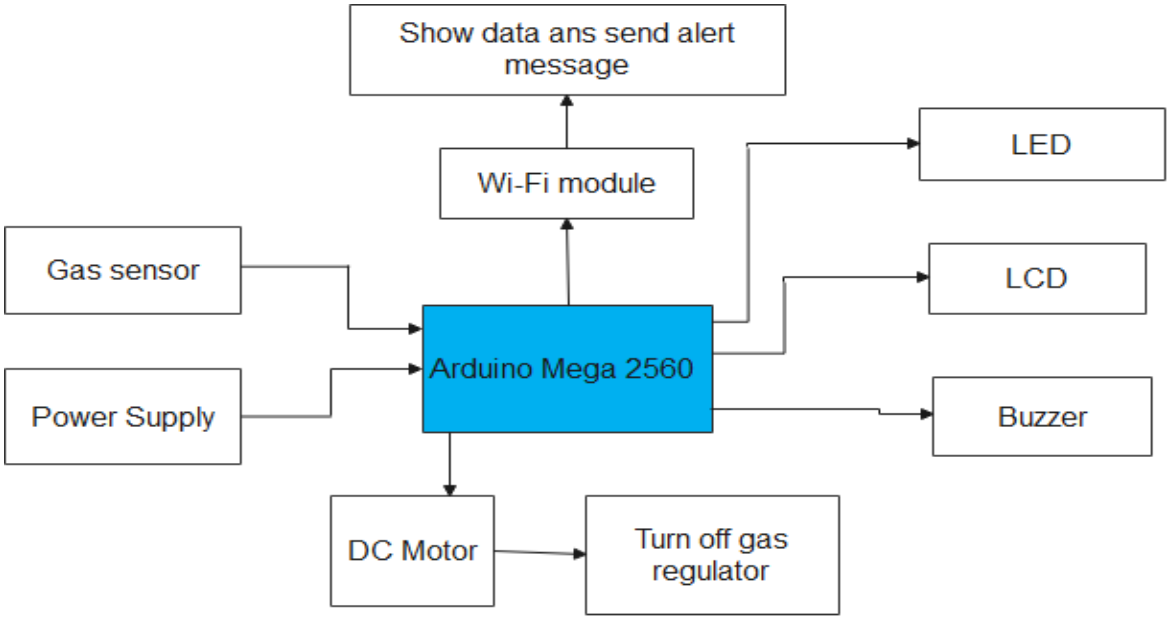

Figure1: LPG Gas Leakage Detector System.

PROPOSED SYSTEM:

Proposed work suggests that to ensure LPG leakage detection. our project has four modules which are LPG leakage detection, Gas flow control, on off the gas using android app, and weight monitoring.

[1]. First module checks the gas leakage and sends the notification to user.

[2]. Second module is flow control of LPG gas to maintain flame of gas constant.

[3]. Third module is to ON /OFF the gas. This module automatically on/Off the gas whenever user wants to on or off the gas.

[4]. Fourth module is weight monitoring which check the amount of remaining gas in the cylinder and sends the notification to the user.

SYSTEM REQUIREMENTS:

The system we want to make uses MQ2560 sensor, GSM/ Wi-Fi module, Buzzer, LCD with Arduino Mega. The Wi-Fi module sends SMS to the mobile number,in case of gas leakage and control Arduino signal as well as process the information received from Wi-Fi.

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FLOWCHART:

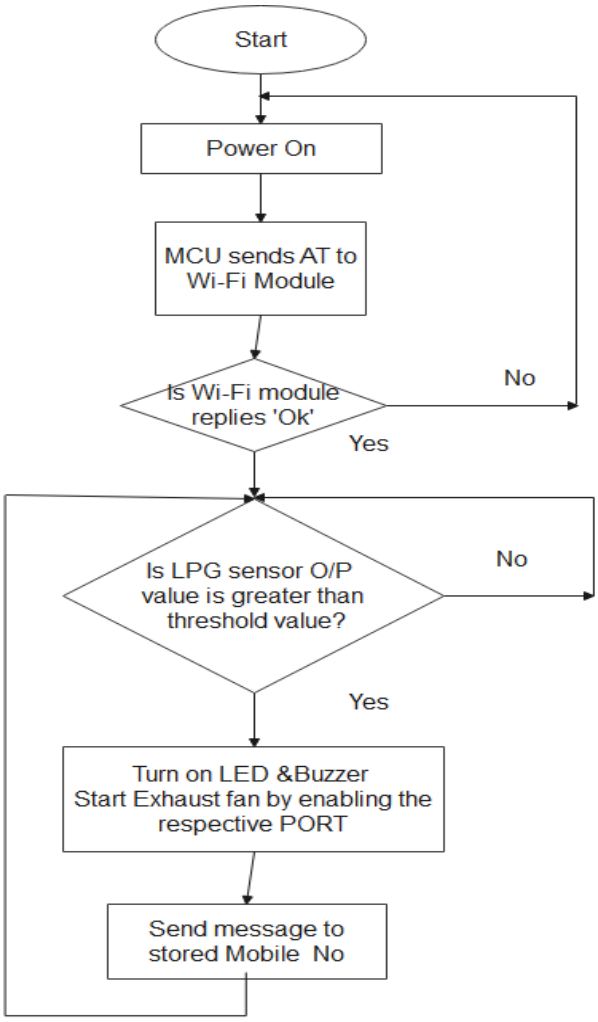

Fig 2. Flowchart of LPG leakage detection

A flowchart is a type of figure that represents a workflow or process. A flowchart is defined as a solution to a task, by converting the algorithm into a diagram. The flowchart shows the order of different types of boxes by connecting the boxes with steps and arrows and also shows its usage.

OVERVIEW:

In this survey paper, We discussed the different methods used for identifying the leakages and drawbacks of the proposed system that provide precautions in the form of alert Signals or indications whenever there is leakage. Also, we have proposed a method that can automatically close the valve of the gas regulator using steeper motor and update sensor date in Android application using Wi-Fi module.

V.CONCLUSION

1]. The proposed system monitors and develops LPG gas leaks that detect air leaks and if it exceeds the safety level, it buzzer and sends notifications using mobile. This user is alerted to the dangers and unusual situations to perform the required activity.
2]. Gas leaks not only pollute the environment but also dissipate gases, damaging our economy. This system will help if such a situation arises.
3]. This proposed system can be used in case of leakage of LPG gas in commercial areas like hospitals, shops and hotels.
4]. We can avoid dangerous accidents caused by gas leakage with the help of gas leak detection system.

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