IMPLEMENTATION OF AN AUTOMATIC LPGGAS DETECTION AND ALERT SYSTEM

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ABSTRACT

Gas leakage is a major problem with industrial sector and residential premises. The safety work environment is important for every worker in the industries, hotels, restaurants etc. and important to create a safer workplace. Gas accidents are vital issues for all areas of life where precautions are very important. One of the preventive methods to stop accident associated with the gas leakage is to install gas leakage detection kit at vulnerable places. The aim of this project is to present such a design that can automatically detect, stop and alert gas leakage in vulnerable premises. Therefore an implementation of an automatic LPG gas detection and alert system is proposed in our project. Proposed design can help us to avoid Gasleakage kind of problem in our daily life. The aimof this project is to monitor for liquid petroleum gas (LPG) leakage to avoid fire accidents providing safety feature where security has been an important issue. The system detects the leakageof the LPG using gas sensor and alerts the consumer about the gas leakage by sending SMS.

Keywords : LPG, Arduino Uno, Stepper Motor,Buzzer, GSM Modem

I. INTRODUCTION

LPG is a significant and effective fuel, for the most part utilized as a part of private spots for cooking. LPG for the most part filled in cylinder which is solid and can't be harmed effortlessly. In any case, breaks may happen from gas cylinder, controller and gas pipe tube when these are definitely not in a decent condition and may cause a mishap. Mischances may prompt medical problems like suffocation and potentially cause an impact on the start of any fire or electric supply. One of the important preventive methods to stop mischance related with the gas spillage is to introduce gas leakage detector at vulnerable places. The main focus of this paper isto present

such an outline that can consequently identify and remove gas spillage in defenseless premises.

The gas spill sensor is such a gadget which distinguishes the gas spills at beginning levels and cautions the individuals of the same.

There are generally over 80% LPG customers in the country in which generally 35%of the gas related accidents occur because of gas leakage. So the real concern is spillage of LP. Various guidelines are also executed for the gas spillage identification system. The current model gives analert framework which is basically required to distinguish a Gas leakage in the house and commercial premises. The Gas Leak identifier gadget can discover application at private homes as well as its relevant to inns, eateries and even in business where LPG gas is utilized for a few or alternate purposes.

II LITERATURE SURVEY

A.Mahalingam (2017) : Proposed a gas leak detector that meets the UK occupational and health standards. Gas leakage is a major concernwith residential, commercial premises and gas powered transportation vehicles. One of the preventive measures to avoid the danger associated with gas leakage is to install a gas leakage detector at vulnerable locations. The objective of this work is to present the design of a cost effective automatic alarming system, which can detect liquefied petroleum gas leakage in various premises.

K.Padma Priya(2016) : Proposed an embeddedsystem for Gas Cylinder maintenance, the proposed system consists of three main modulesa GSM and PIC module, leakage detection module and protection circuitry. The detection module detect the gas leakage and sends SMS to the consumer through GSM. The GSM module isused to send short messages about the possibilityof gas leak and as an added feature indicate that it may book a refill cylinder or can program the device to automatically book the cylinder via SMS. The weight of the cylinder is monitored byinterfacing load cell to micro-controller

Sunithaa.J (2015) : Designed a wireless LPG leakage monitoring system for home safety.The proposed system detects the leakage of the LPG and alerts the consumer using GSM about the leakage and it will switch on the exhaust fan. Thissystem also has a feature that the consumption isapproximately indicated in terms of the total weight. Whenever the system detects the increasein the concentration of the LPG leakage it immediately alerts by activating an alarm and simultaneously sending message to the particularmobile phones. The fan is switched on to exhaust gas and an LPG safe valve fitted to the cylinder is closed through signals to avoid further leakage. The device assures safety and prevents explosion.

Jolhe (2013) : Have designed a microcontroller based system where a gas sensor (MQ6) is used in detection of LPG leakage. This unit is also integrated with an alarm unit, to sound an alarm or give a visual indication of the leakage. The sensor has high sensitivity with quick response time at affordable cost. If leakage is detected, message to the particular user or to family member using cellular network called GSM is sent automatically. It also measures the weight of LPG cylinder and displayed in LCD display. A gas quantity of less or equal to10kg,it requests for the new cylinder by automatically sending text message to a distributor. Also when cylinder weighs less than 0.5kg.

Kulothungan.S (2019) : The current problem in gas leakage detection systems are not in proper conditions. It doesn't have a prevention system. In Existing, The gas leakage systems used in hospitals at the time of firing it only detects and keeps on alarming to evacuate people form the danger zone, it doesn't close the valve automatically, This can cause fire to be spread in all over the area in a instance of time. To Overcome this, We have designed a robotic drive which is capable of detecting the gas leakages in pipelines and it will detect the leakage and automatically closes the valve by using arduino controller. Since, We are using GSM Module for communication the gas leakage is communicated to the authority via SMS, As soon as the alarm will rang and LED Display shows the leakage point to the control room.

III OBJECTIVES AND RESEARCH METHODOLOGY

In this study it can be described how the tool can work to capture the gas received by the sensor, then the sensor is processed in an Arduino program that can emit sound and send a short message to the registered mobile number. The scheme can be seen in the block diagram shown below

BLOCK DIAGRAM
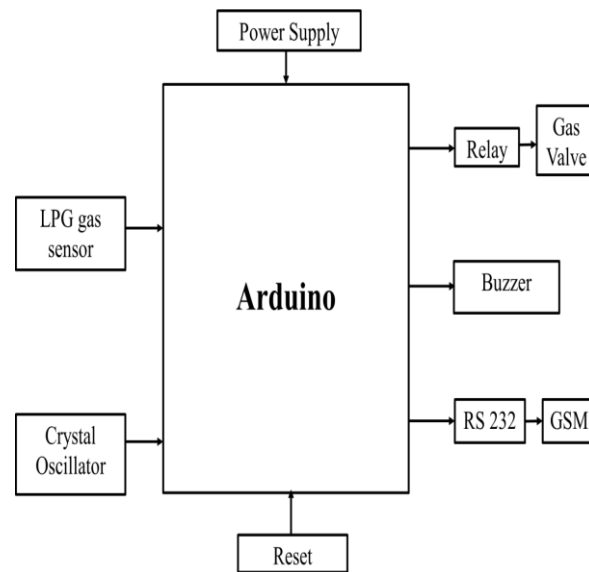
From the picture above it can be seen that this tool has an input device consisting of a gas sensor and an output device which consists of an GSM Module, and buzzer. The way this tool works is when it is turned on, the sensor will work to transfer LPG gas and send data according to the LPG gas level it detects. The higher the LPG gas is detected, the higher the voltage released. When the sensor output is moved, the presence of gas, then Arduino will activate, and activate the buzzer then the GSM SIM800L module will send a notification message to the handphone number specified in the program.

When the program is run the system will immediately detect LPG gas detected by the sensor. Then the Arduino microcontroller will read LPG gas through an LPG gas sensor. If it detects a gas leak, the red LED will light up, the buzzer will activate, then the system will send a notification message stating that there has been an LPG gas leak.

IV. MODULE DESCRIPTION

1. ARDUINO UNO:

Arduino Uno is an open source microcontroller card dependent on the Microchip ATmega328P microcontroller created by the organization. The card is outfitted with advanced and simple info/yield (I/O) pin gatherings, which can be associated with different development cards (safeguard) and different circuits. It has 14 advanced I/O pins (six with PWM yield work), 6 simple I/O sticks, and can be modified with Arduino IDE (Integrated Development Environment) through USB Type B cable. It can be powered by a USB link or an outside 9-volt battery, despite the fact that it can acknowledge voltages somewhere in the range of 7 and 20 volts. It is like Arduino Nano and Leonardo. The equipment reference configuration has been authorized similarly as Creative Commons Attribution 2.5 permit. It very well may be found on the Arduino site. Plan and assembling documents are additionally accessible for some equipment adaptations.
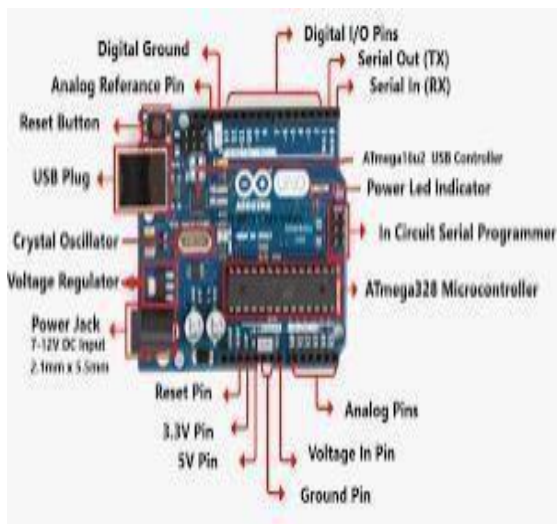

Fig 1: Hardware component Arduino uno

2. GSM MODULE

A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMS to identify their device to the network.

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Fig 2 : GSM module

3. GAS SENSOR :

Gas sensors are devices that help us understand the amount of gas in the environment and the natural state of its movement. Gas sensors reveal the amount of gas in the environment and the nature of the gas composition with electrical signals and can provide its change.

The parameters that should be considered when creating gas sensors are as follows: the type of gas that needs to be detected, its concentration, and the environment in which the gas is located. MWCNT gas adsorption occurs in the outer region where the gas molecule is connected to the sensor together with the van der Waals force. The electrical charge flow in the gas sensor differs from the binding of the molecule. With this differentiation, gas sensor resistance is determined to differ.

Fig 3 : Gas Sensor

V.RESULTS :

Below figure shows the result of proposed system of our project. This technique has been tested by leak of gas almost about sensors, MQ2 gas sensor sends the signal to the Arduino UNO after detecting the gas leakage. Arduino to other externally connected device such as buzzer and GSM send vigorous signals. SMS is sent by GSM module to the provided mobile number as a result. In practice, results for are noticed by the people surrounding by the area, buzzer sound indicate the danger to the people by making beep sound.
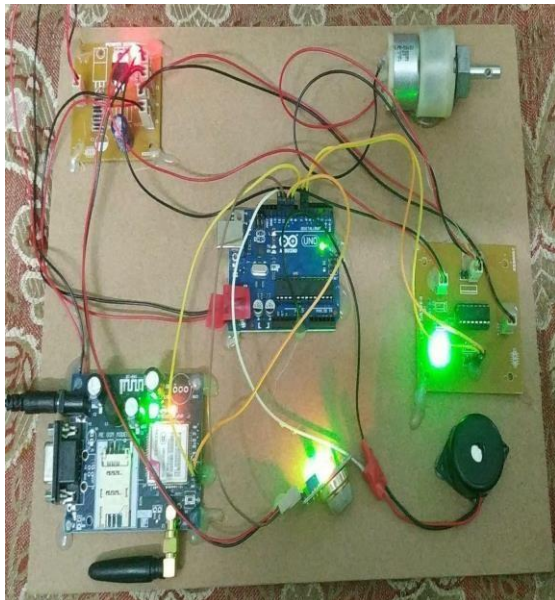

Fig 4 : Hardware Implementation

VI. CONCLUSION AND FURTHER RESEARCH

Gas accidents are vital issues for all areas of life where precautions are very important. Thus aim of our project is to design and development of automation based gas, temperature and fire detection system. This is an Internet of Things (IoT) based system implemented to ensure the safety of lives with detection of gas, temperature and fire accidents then control them with respective operations.

Future work of this research will include data analytics that will apply to the cloud side to improve the system's services and accuracy.

Also, use multiple gases and fire sensor for detectinggas and fire leakage in industries and prepare a database for gathering sensors output. Besides, somebody will develop it for calling or messaging multiple users by creating a database in the future. GSM data will be stored in the database and transmit to multiple users. Furthermore, a gasand fire sensing robot can be constructed to sense gas leakage through pipelines.

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