

Gas Leakage Monitoring And Alerting System For Industries

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ABSTRACT:

The leakage of any gas has been a problem in recent years, be it in a residential environment, a shop, a cafeteria or a dining room is suggested. This document explains the design of a system that is so intelligent that it intelligently helps to save fuel and avoid accidents. The system must be integrated into the kitchen. The technology includes ultrasonic sensors that determine if the cooker is working whether it is used for cooking or not. When the cooker is determined not to be in use, the system uses an automatic shut-off mechanism to shut off the gas supply. The moment a gas leak is likely to be detected, users will be informed by SMS via GSM so that the user can solve the problem as soon as possible. The system monitors the flame and fire through the flame sensor. When a fire is detected, the buzzer will start to sound. The system also has cloud storage capacity. With the help of this cloud storage solution, daily gas consumption can be tracked for each user. , this procedure will help. Detection of user's natural gas consumption. The system has been tested and is able to monitor gas waste and leaks and send an SMS to the user. The resulting performance demonstrated its effectiveness in saving a significant portion of the Gas wasted at home.

INTRODUCTION:

In recent times, home security detection system plays an important role in people's safety. Since everyone in the household goes to work every day, it is impossible to check the appliances in the household, especially the wiring of the LPG cylinder circuits, etc. In the last three years, the demand for liquefied petroleum gas (LPG) and natural gas has increased enormously. To meet these energy needs, replacing oil or coal due to their environmental disadvantages, LPG and natural gas are preferred. These gases are used on a large scale in industry, heating, household appliances and fuels. To track this escaping gas, the system includes an MQ6 gas sensor. This sensor detects the amount of gas leak in the surrounding atmosphere. By doing so, it could avoid the explosion or be affected by the gas leak.

OBJECTIVE:

The construction of a sensor-based automatic gas leak detector with a warning and control system has been proposed. It is an affordable, less power consuming, lightweight,

portable, safe, easy-to-use, efficient, feature-rich and simple gasoline detection device. Detecting gas leaks will not only be important for us in the health department, but will also lead to increase our economy, because if there is a gas leak, not only will the atmosphere be polluted, but gases will also be wasted and will harm our economy. It is expected to be the main driving force of the market in the coming years.

PROBLEM FORMULATION:

Gas leakage is nothing more than the escape of a gaseous molecule from a furnace, pipe, bottle, etc. This can happen intentionally or even unintentionally. As we are aware that this type of leak is dangerous to health and if it becomes explosive it can pose a great danger to people, homes, workplaces, Industry and environment. Some of the major incidents that have taken place due to gas leaks are the Bhopal disaster and the Vizag gas leak. The Bhopal disaster is considered the worst industrial accident in history. Approximately 45 tons of methyl isocyanate leaked from this insecticide factory. Methyl isocyanate is an organic compound and a chemical that could come from carbonate pesticides. This colourless and toxic pesticide and flammable liquids are something people should stay away from. The Vizag gas leak was the result of a styrene leak that was left unattended for an extended period. This colourless oily liquid can be diffused as a vapor. Be such that it can detect any type of gas, smoke, leaks, fumes, etc. As harmful and dangerous as it may be, the detector could be associated with certain parameters that could help avoid the problem.

LIST OF COMPONENTS:

S.No.	Name of the component	Quantity
1.	Arduino UNO R3	1
2.	Breadboard	1
3.	LED	2
4.	Resistor	5
5.	Piezo	1
6.	Gas sensor	1
7.	LCD 16*2	1

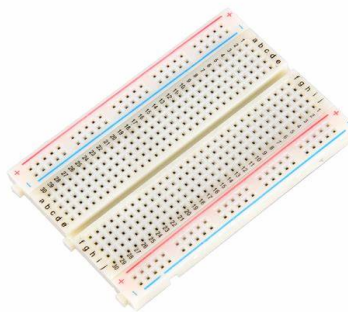
ARDUINO UNO R3:



Arduino Uno R3

Arduino Uno R3 is a kind of micro-controller board based on ATmega328P. Includes everything needed to hold the micro-controller; Just connect it to a PC using a USB cable and power it with an AC-DC adapter or battery to get started. The term Uno means "one" in the "Italian" language and was chosen when the Arduino IDE 1.0 software was released. The Arduino Uno R3 is the third and most recent modification of the Arduino Uno. The Arduino board and IDE software are the reference versions of the Arduino and are being upgraded to newer versions. The Uno board is the leader in a USB Arduino board lineup and the reference model for the Arduino platform.

BREADBOARD:



A breadboard is a widely used tool for designing and testing circuits. You do not have to solder wires and components to make a circuit while using a breadboard. It is easier to assemble and reuse components. Since the components are not soldered, you can easily change your circuit design at any time. It consists of a series of conductive metal clips encased in a white ABS plastic box, with each clip insulated from another clip. There are a series of holes in the plastic box that are arranged in a specific way. A typical breadboard layout consists of two types of areas, also called strips:- Busbars and connector strips. Bus strips are typically used to provide power to the circuit. It consists of two columns, one for supply voltage and one for ground.

Power strips are used to hold most components in a circuit. It generally consists of two sections, each with five rows and 64 columns. Each column is connected from the inside.

LED:



LED (Light Emitting Diode) is an optoelectronic component that works on the principle of electro-luminescence. Electro-luminescence is the material's ability to convert electrical energy into light energy and then emit that light energy. In the same way, this is how the semiconductor in LED emits light under the influence of the electric field. The LED symbol is formed by merging the P-N junction diode symbol and the outward pointing arrows. These outward-pointing arrows symbolize the light emitted by the light emitting diode.

RESISTOR:



A two-terminal passive electrical device used to limit or regulate the flow of current in electrical circuits.

PIEZO:



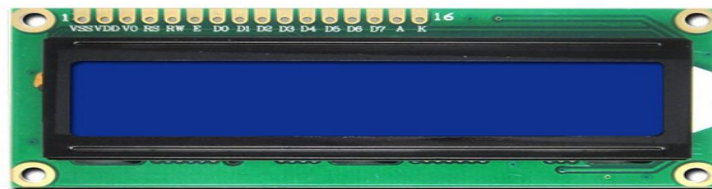
A piezoelectric is a device that generates a voltage when a force is applied or deforms when a voltage is applied.

GAS SENSOR:



A gas sensor is a device that detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas, the sensor creates a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured using this voltage value as the output voltage type and concentration of the gas can be estimated.

LCD 16*2:

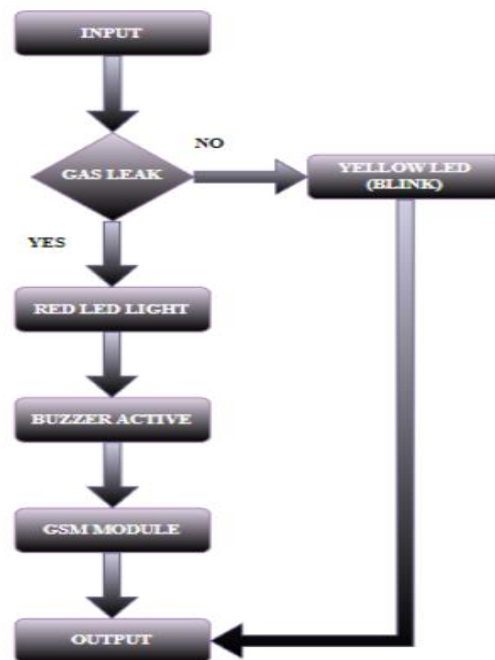


16×2 LCD is a kind of electronic device for displaying news and data. The full term LCD is liquid crystal display. The screen is called 16×2 LCD because it has 16 columns and 2 rows ($16 \times 2 = 32$) 32 characters are displayed in total and each character consists of 5×8 pixel dots. These displays are based on multi-segment light emitting diodes. There are many screen combinations available on the market, e.g. 8×1, 8×2, 10×2, 16×1, etc., but 16×2 LCD is widely used. Inexpensive and easy to program, these LCD modules are used in various DIY circuits, devices and integrated projects.

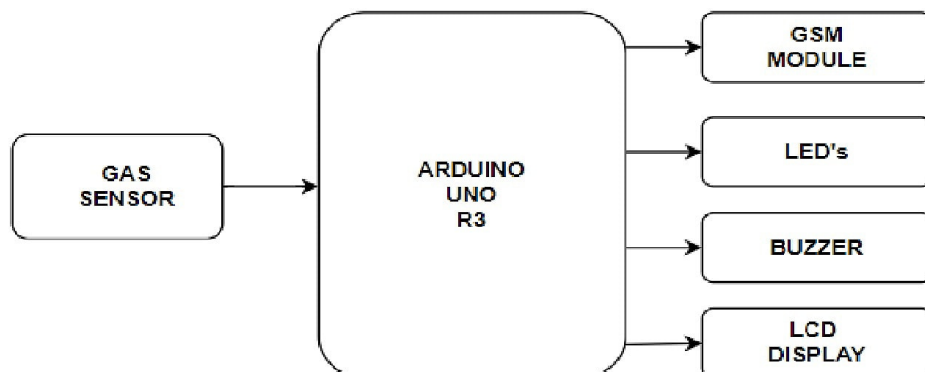
PROPOSED METHOD:

Arduino UNO (Atmega-328) is the main unit of the system that performs the following tasks. The signal conditioning of the Arduino UNO is done by the output signal of the sensor, which is provided as an input to the Arduino. The recognition results will be displayed on the LCD screen. Indicates vulnerable people in the workplace, factory or home. Buzzer activity is

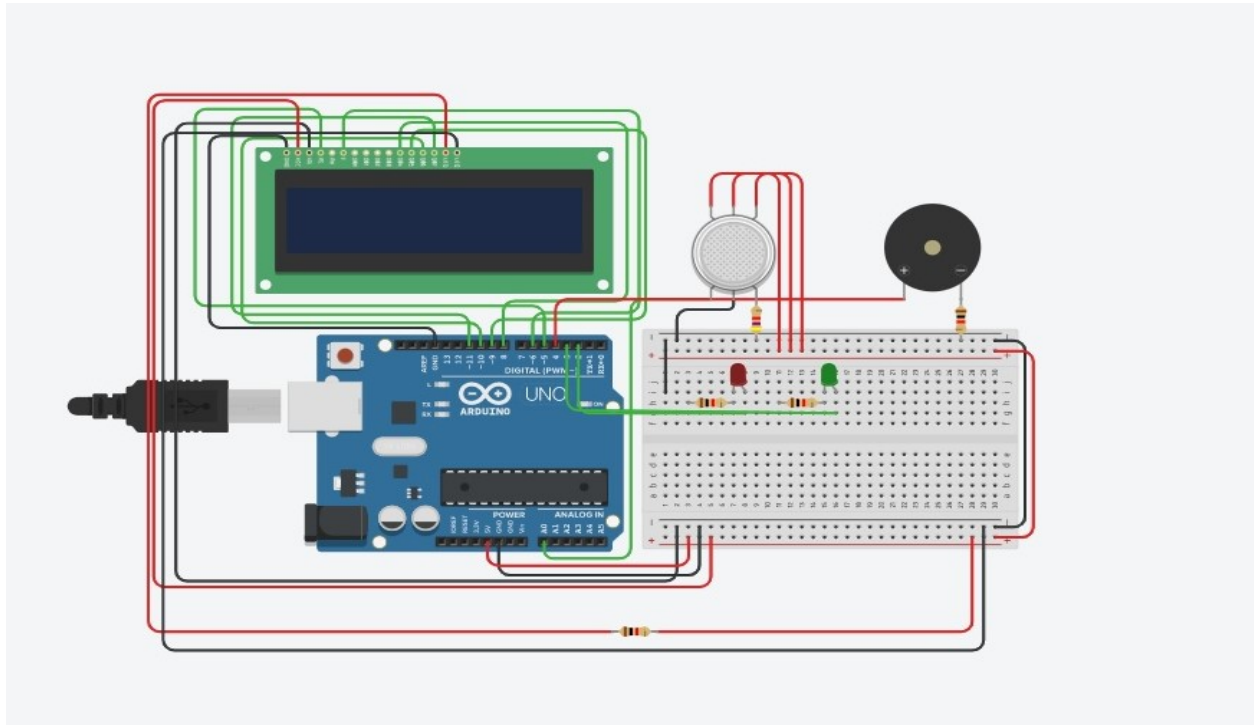
activated with a beep (siren). It also sends an alarm SMS to the operations manager whose number is stored on the SIM card via a GSM modem. The received SMS depends on the gas leak in the detection area of the sensor.



FLOWCHART: GAS LEAKAGE MONITORING AND ALERTING SYSTEM



CIRCUIT DIAGRAM:



SOLUTION STATEMENT:

The system can be seen as a small attempt to connect existing primary gas detection methods with a mobile platform integrated with IoT platforms. Gases are detected within 1m of the rover and sensor output data is continuously transmitted to the local servers. The accuracy of the sensors is not up to date, so dispersed gases are also detected, leading to many errors in the sensor results, especially for methane. In addition, the availability and storage of toxic gases such as hydrogen sulphide also creates problems in testing the assembled hardware. Because the system operates outside the pipeline, the complexity of system maintenance and selection of system materials in the event of corrosive gases is reduced. Therefore, at this stage the system can only be used as a primary indicator of leaks within a facility.

CONCLUSION:

After completing this project, can conclude that the gas leak detection in the project system is amazing. Usefully applicable in industry and household. In dangerous situations we can save lives with this system. The GSM module displays an alert. A sensor node detects gases such as CO₂, oxygen, propane. Estimated transmission distance and power consumption are obtained. The sensor is built using simple techniques and the area of the Arduino UNO microcontroller.

