

GAS LEAKAGE DETECTION AND PREVENTION KIT PROVISION WITH IoT

SUGITHA S, Assistant Professor, MONIKA A, VIJAYA SRI R, ARCHANA S

ABSTRACT:

Gas leakage and gas detection today can be a big issue in our daily lives. Gas wastage could also be a major issue which needs to be addressed. LPG gas is highly inflammable and can harm both life and property. A large amount of effort has been dedicated to the event of effective techniques for detecting gas leakage to prevent these situations. Since knowing about the existence of a leak is not always enough to initiate a corrective action, a number of techniques for leak detection were designed to allow the chance to locate the leak. The main aim of our project is to decrease risks by using IoT in the Kitchen. The main objective is to propose the design and construction of a Gas Leakage Alert System based on the wi-fi. Gas sensors are used with the help of the ARDUINO UNO (ATmega328P) controller to detect gas leakages in a kitchen. Additionally, the problem of gas wastage is monitored with the help of an infrared sensor. An alarm pops up when the sensor detects no vessel over the burner beyond a certain period of time.

Keywords: LPG gas, IoT, wireless sensors

INTRODUCTION:

The Embedded systems have described the PC system with the precise function in a bigger mechanical, electrical systems and sometimes using the real time constraints to detect the gas leakage mainly within the environment. This gas detection, alert system not only sends the

alert status, but also takes the actions necessary to avoid the accidents due to gas leakage. Our system also informs the user by sending a message to their cell phone. This gives gas setup in any environment a greater safety. In recent days, the people could not give attention, so people may forget to take care of necessary safety measures while cooking. The regulator knob loses which could be harmful, it increases significantly when this carelessness happens in industrial areas with gas plants or engines. If any flammable substance to be present in the area come into contact with the gas that has leaked may cause a blast, loss of assets, loss of life, etc. Industries are the major sectors under continuous danger, as well as places where gas is processed and handled. This system is a compact version for safety facilitation as it includes many mega-significant mini-features and contains a automatic gas detection, power shutdown feature, this feature has great significance of automatic operation in the absence of any human assistance in the area of leakage. Many papers are published on the detection of gas leakage in which gas sensors are used to detect leakage and also provide users with an alert via SMS using GSM. In this article, users are notified using the IoT, a cloud framework, a network of physical devices, cars, home appliances, and other things embedded with electronics and software, sensors, actuators, network connectivity that

enables the objects to communicate and also transfer the given data.

What is meant by IoT?

Now a days, the IoT playing the major role in the human lives. Mainly in the homes, industries to the businesses. It connects everyone by using the wireless sensors

.IoT used to make our earth to be more smarter and better than the past.

II. OVERVIEW OF GAS LEAKAGE:

1. APPLICATION AREAS:

The development of markets and innovations, and thus their economic capacity and impact over successive decades in addressing social developments and challenges, has changed drastically in the last few years.

a) Cities

Smart Parking: Monitoring particular area of the parking spaces.

Structural health: Monitor the condition in historical movements, bridges and buildings.

Smart Lighting: Supervises street lighting sensitive to conditions.

Waste management system: To detect the unwanted levels in the containers by optimizing the waste.

b) The Environment

Detection of Forest fires: To monitor the combustion gas and the fire to specify the particular zones.

c) Air pollution: CO₂ emission control, gas emitted by cars, and harmful gas produced by farm. Security & Emergencies

Perimeter access monitoring: The restricted areas must be accessed and identified by the individuals in unauthorized areas.

Water presence: identification of water to prevent breakdowns in data centers, warehouses and critical building sites. Industrial Control

Indoor Air Quality: Monitoring the toxic gas content and the oxygen in chemical plants to take safety measures for the people.

The Temperature monitoring: Temperature control inside the industrial, medical fridges.

c) Agriculture

Wine Quality Improvement: Track soil humidity in vineyards to control the sugar content of grapes and grapevines.

Green Houses: Climate conditions control to improve the fruit and vegetable quality.

Domestic & Home Automation:

Remote Control Appliances: Switching of the applications on or off automatically to identify the accidents.

Art and Resources Preservation: Tracking conditions in museums and art warehouses.

d) E-Health

Drop Detection: Protection for independently living elderly or disabled individuals.

Medical Fridges: Control the temperature inside freezers which store vaccines, medicines and organic components.

2. SYSTEM ARCHITECTURE OF LPG LEAKAGE

INFRASTRUCTURE:

The IoT is the major part of our lifestyle now a days. It plays the every role in our infrastructure. For example the water, power, telecommunication, television and last of all the www. While the present

Internet typically connects full-scale computers. Things website connects daily objects with robust integration into the world.

a) InfrastructureFunctionality

The infrastructure must find the items required to support applications. An application could run anywhere, even on the products itself. Tracking stuff isn't limited to the setup period for an application. Where specific new items are accessible, items are inaccessible or things change their status, automatic adaptation is required. The infrastructure needs to enable the monitoring of these changes and, as a result of the changes, the adaptation necessary.

b)Physical Location and the Position

In the physical world the IoT is strongly rooted, the notion of physical location and place is essential, particularly for locating things but also for deriving information. Hence, the network will support location-consistent discovering of items (e.g. discovery based on geo-location). Localization technologies, considering accessibility, would play a vital role for the Things network and should be incorporated into the Things web infrastructure.

c) Security andPrivacy

Consequently, an application must provide support for protection and privacy functions including identification, confidentiality, integrity, authentication, and non-repudiation authorization. Here the complexity and hence the need for interoperability between the various ICT systems deployed within the network and hence the resource limitations of IoT devices must be taken into account

AUTOMATIC RESET:

The Arduino board is designed by the software running on a connected device before uploading, rather than having a physical reset button. The reset line is connected to one of the hardware flow control lines via a 100-nanofarad condenser. Once this line is inserted it drops long enough to reset the chip.

When an Uno is connected to a computer running on Linux, software gets reset every time a connection is made to it. In the next half-second, the boot loader runs on the Uno. While it is used to ignore malfunctioned data, after a link is made, the first few bytes of data is then sent to the board will be intercepted.

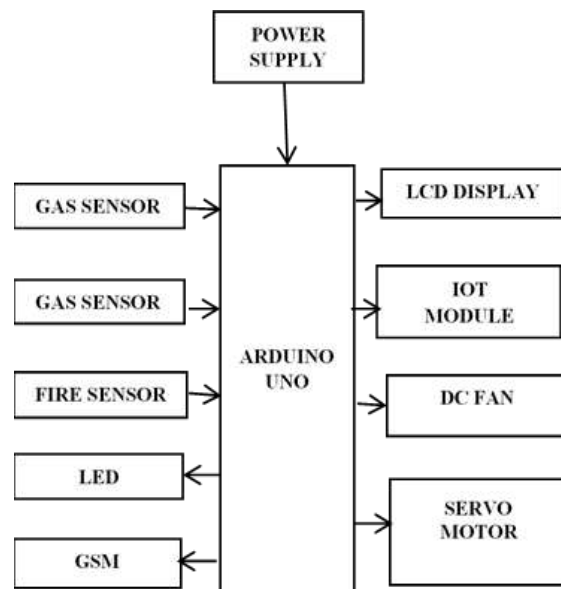


Figure 1:ARCHITECTURE DIAGRAM

If it is running on the board, it receives one-time configuration, when it starts it must be made sure that the software communicates while it waits for a second after the connection is opened and before sending that data.

III. METHODS AND MATERIALS:

ARDUINO:

Arduino is an open source electronics platform that supports the usage of software and hardware. Arduino boards are used to read inputs to glow light on a sensor and switch it to an output to activate a motor, kept on an LED.

1)Arduino UNO: it's micro controller supported AT Mega 328. Simulation is completed on Arduino IDE software.



The AT mega 16U2 provides serial data to the foremost processor and features a built-in USB peripheral. Arduino Uno line Standard A-B USB cable. it's 14 digital I/O pins.

Gas sensor (MQ 2)

The sensitive material has lower conductivity in clean air for the MQ-2 gas sensor. If the target combustible gas occurs then the sensor's conductivity increases the gas concentration. The conductivity shift that leads to the gas concentration output, instead using simple electrical circuit.



Highly sensitive to LPG, propane and hydrogen, methane and other fuel vapor, the MQ-2 gas sensor is low-cost and suitable for different applications.

MQ-2- GAS SENSOR FOR AIR QUALITY



You can use either the digital button or the analog knob to try and do so. Simply power the 5V module and note that the LED will glow on the module, and the output LED will remain turned off when no gas is detected ensuring that the digital output pin is 0V. Note these sensors need to be kept on for preheating time before you actually work with them. Now add the sensor to the gas you want to detect and you will need to see the output LED moving high along the side of the optical pin, if not using the potentiometer until high output. Now, if the sensor is applied to the present gas at that specific concentration.

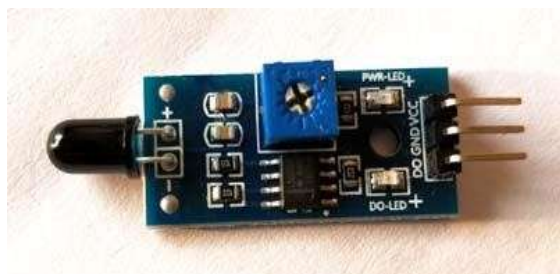
GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

The GSM will now be a standard recognized worldwide for wireless cellular communication. GSM is the name of a common organization set up in 1982 which establishes a standard European mobile telecommunications network capable of formulating standards for a pan European mobile cellular radio system operating at 900 MHz, it is expected that several countries outside Europe will join the GSM alliance.



FIRE SENSOR:

The GSM is now to become a worldwide accepted standard for wireless cellular communication. GSM is the name of a national association founded in 1982 that creates a standard European mobile telephone network capable of formulating specifications for a pan European mobile cellular radio system operating at 900 MHz and is intended to join the GSM partnership in many countries outside Europe. Some of them are: Ultraviolet detector, near IR array detector, IR detector, thermal infrared cameras, UV detector, etc. This light will be received on the sensor module by the Photodiode as fire burns it emitted a tiny low amount of Infra-redlight.



V.CONCLUSION:

Gas leakage leads to serious incidents leading to loss of products and human injury. Gas leakage happens primarily because of inadequate equipment maintenance and people's lack of understanding. Therefore identification of LPG leakage is important for preventing accidents and saving human lives.

From the reference to the above literature survey, we infer that our project focuses primarily on how to resolve the various health, leakage, and high-performance factors. In this paper the MQ2 sensor senses LPG gas leakage. As soon as it detects more of the edge value of LPG content in air, LED light glows and sound is produced. A SMS is often sent to the user's cell phone and thus notifies the user of the accident if the user is out of the sound range. The device can be used to avoid fire incidents, and to provide protection for the house.

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