

IOT BASED SMART LPG GAS DETECTOR ROBOT CONTROL BY ANDROID

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Abstract - As we all know, industrial security is a key concern in today's world. The number of accidents is rising every day, and we have seen several examples in our daily lives of accidents caused by flammable gases. We frequently hear about home cylinders exploding, which are used for residential purposes, transportation, and a variety of sectors. Many individuals have been seriously hurt and others have died as a result of explosions in some cases. In addition to being facilitated, the world has become more vulnerable to big blunders and disasters as a result of new breakthroughs and technology. Similarly, Liquefied In most homes, petroleum gas (LPG) is used in the kitchen and for gas geysers or heaters in the winter. Similarly, companies employ it for a variety of reasons, such as furnaces, boiling, and increasing output at a lower cost. The goal of this project is to use GSM connectivity to identify gas leaks in pipelines and monitor them using a mobile app. In the suggested system, the robot moves along the pipe and monitors for gas leaks, sending data to a mobile app via GSM when one is detected.

It works like a robot, moving along with the gas line and detecting gas leaks in real-time. This system, which comes with a large size kit, can be used in industrial applications to detect pipeline leaks. This system comprises an Arduino-based gas detection device and real-time online monitoring through GPS.

Key Words: IOT, GSM, LPG, Arduino, Flammable, Mobile, Robot.

1. INTRODUCTION

With the arrival of the scientific century, the world has seen a plethora of breakthroughs and technical revolutions that have aided humanity. Today, technology is little more than a human extension; it has infiltrated every aspect of life and has become a need. Today's man can't picture his existence without these scientific machines, which makes it even more amazing how humanity in the Stone Age managed to live. However, just as every image has two sides, brilliant and dark, technology brings with it the hazards of misfortunes in addition to these conveniences.

However, new daily research and ideas are developing new technologies to overcome the dangers and dangers of existing ones [2]. This document is specifically aimed at reducing the risk of liquefied petroleum gas (LPG) leaking anywhere in the home, office, industry, or utility line. In addition, the purpose of this paper is to

develop a device that can detect leaks and reduce the risk of leaks without human intervention by warning relevant parties and authorized persons. [3] Therefore, install an Arduino or Raspberry pi to control other assembled circuits or devices that help achieve this goal of reducing gas leak accidents and disseminate information about leaks. The robot consists of an MQ6 sensor that explicitly detects gas leaks in methane (CH₄), propane (C₃H₈) and butane (C₄H₁₂). Robot will be consisting MQ-6 sensor which detects gas leakage explicitly Methane (CH₄), Propane (C₃H₈), Butane (C₄H₁₂).

Moreover, this device will directly be connected with GPS module to locate the location of particular leakage in pipeline hence resulting in alarming all the connected devices for this cause.

1.1 IOT AS A APPLICATION

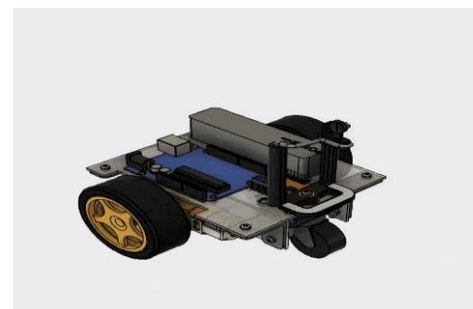


Fig -1: 3D Model of Project

The use of the Internet of Things is worth mentioning and applies to this device as a whole. For example, the Internet of Things (IOT) can be described as connecting everyday objects such as Smartphone's, televisions, sensors, buzzers, emails, sirens, and actuators to the Internet. The Internet allows devices to technically interconnect and enable new forms of communication. Successful development of LPG gas leak detectors will help to detect LPG gas leaks efficiently, avoid the risk of fire and pollution, and save lives and property. Oil and gas industry. Gas leaks are dangerous to personnel and industrial activities. Rapid detection and warning minimize the risk of gas leaks [1].

Wireless technology is used in many areas and in many applications, with several technologies implemented to monitor pipelines. Many systems are used to identify the point at which a leak occurs. Some technologies allow

remote systems to identify leaks and detect the location of leaks and report them to operators. This white paper describes the implementation of a wireless gas leak monitoring system using the Raspberry Pi and monitoring over the Internet via GSM.

2. LITERATURE SURVEY

Science is constantly evolving and new research is constantly being conducted to fill the gaps left by each technology. Similarly in 2008 LIU zhenya. WANG Zhendong and CHEN Rong's "Intelligent Private Security Warning and Remote Control Framework Built on Single-Chip Computers" has been released. The main focus of their release was intelligent private intruder alerts, crisis alerts, fire alarms, harmful smoke leak inaccessible sound alarms, and remote control frameworks based on the 89c51 single-chip computer.

Mukesh Mahajanand Vishal Date [2] represents a system that can detect gas leaks and monitor them with IOT. CH Manohar Raju [3] describes robot technology here. Here, the mini robot finds a leak in a dangerous place. Here, the writer has evolved an Android cell app that gets statistics without delay from many robots thru Bluetooth. The downside of this device is that it calls for similarly adjustment and improvement of the find and show of the mini-robotic mirroring past than it may be used within side the sales field.

A Mahalingam [4] introduced the layout and implementation of an economically feasible fuel line leak detection device. This device guarantees non-stop tracking and verification of fuel line ranges and detections. This device can simplest be carried out to the restricted location in which a leak become observed or occurred. Also, this device does now no longer apply. Zhao Yang [5] performed studies on leak detection in fuel line pipeline systems. Get information from pipeline SCADA communication. System 15 utilized in Aashish Srivasthava [6] proposed a fuel line leak detection device in his system.

The downside right here is that the microcontroller used is reminiscence inefficient. Sagar Shinde [7], proposed the device actual time detection of capability hazard location, gather the information of leak coincidence and discover leakage point.

This system is having protection circuitry consist of exhaust fan and LPG safe solenoid valve MQ6 gas sensor. A programmed caution, which can make phone call to the police hotline number directly.

It can also be a voice alert and caution to be appeared on LCD. This safety frame can be used to remotely control electrical control over the telephone [5].

Also in 2008, Chen Peijiang and Jiang Xuehua published a study entitled "Designing and Using an Inaccessible

Observation Framework Based on GSM", which focuses on the remote check framework from a distance. Was emphasized. A monitoring framework for applications based on SMS over GSM.

In addition, much work has been done and many research papers on the robots mentioned above have been produced and published, and in fact, the latest literature on the Internet of Things (IOT) centric MQ6 sensor gas Leak monitoring and warning system of this thing.

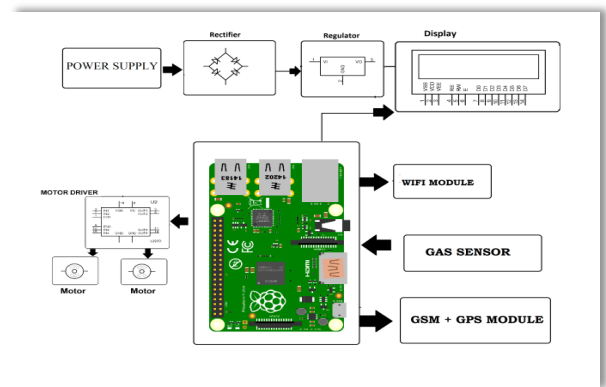


Fig -2: Block Diagram of System

It has been published in 2017, the International Journal of Engineering Development and Research (IJEDR) highlighted concerns about toxic gas leak disasters that could lead to loss of life and property and outlined how to eliminate them, Invention of leak detection robot.

3. METHODOLOGY

The Internet of Things (IOT) is a network of things that physical things can communicate with the help of sensors, Electronics, software and connect. These systems do not require human interaction, and the same applies to IOT-based gas sensing systems, which do not require human attention. IOT and Arduino based LPG leak detection. The System uses an LPG gas sensor to detect LPG gas. An LPG gas sensor interface with Arduino is implemented.

In this project, the signal from this sensor will be sent to the Arduino microcontroller. The microcontroller is connected to the LCD, buzzer, and IOT module (ESP8266). The IOT LPG leak detector project is implemented using the ESP8266 chip. This is a Wi-Fi module used to connect a microcontroller to a Wi-Fi network, establish a TCP / IP connection and send data. The data collected by these sensors is sent to the IOT. The IOT module then sends the data to the website. As soon as a gas leak is detected, the buzzer sounds and the LCD display the message "Leak detected". A prerequisite for this LPG gas leak detection and smart alert project is that the Wi-Fi module is connected to a Wi-Fi zone or hotspot. In this project, the signal from this sensor will be sent to the Arduino microcontroller. I used the GSM module instead of the IOT module, trigger SMS.

3.1 WHAT IS ARDUINO

The Internet of Things (IOT) is networks of things that physical things can communicate with the help of sensors, electronics, and software and connect these systems do not require human interaction, and the same applies to IOT-based gas sensing systems, which do not require human attention. IOT and Arduino based LPG leak detection. The system also able to detect a LPG gas. An LPG gas sensor interface with Arduino is implemented.

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This project is also done without IOT module. I used the GSM module instead of the IOT module, trigger SMS.

3.2 ESP 8266 WI-FI MODULE

The ESP8266 Wi-Fi module is a stand-alone SOC with an integrated TCP / IP protocol stack that can provide access to your Wi-Fi network to any microcontroller. The ESP8266 can host applications or offload all Wi-Fi network functions to another application processor. This module comes with AT command firmware that allows you to take advantage of features such as the Arduino Wi-Fi Shield. However, you can load various firmwares' to create your own application in the module's memory and processor. This is a very budget mod and received a lot of support from the community.

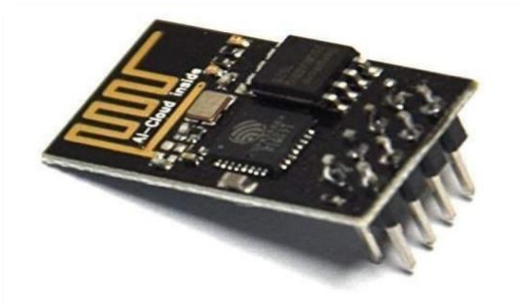


Fig -3: ESP 8266 WI-FI Module

This module has a built-in 80MHz low power 32-bit processor that can be used for custom firmware. It also means you can host small websites without any external controller. For more details see NODEMCU. ESP8266 supports APSD for VoIP applications and Bluetooth coexistence interfaces; it contains a self-calibrating RF that allows it to operate under all operating conditions and requires no external RF components. The ESP8266 transforms the world with its low cost and high functionality, making it an ideal module for the Internet of Things (IOT).

4. RESULT AND CONCLUSION

The internet of things is the new revolution of the Internet, and it is important for researchers in computer science & information technology for different scopes and different combinations of different communications and built-in technologies this is a research topic. In our modern scenario, LPG usage increases. As a result, damage due to gas leakage increases every day. In order to solve these problems, we will introduce a sophisticated system known as the Internet (IOT) of things. Today's society is used in a wide range of applications and introduces a wide range of ranges.

The proposed system is a more effective and environmentally friendly system for detecting gas leaks and controlling gas valves. Therefore, it is designed primarily for the safety of people and property. IOT also allows you to book gas with a gas agent if the weight of the gas cylinder falls below the threshold. Therefore, people can use their time easily and effectively. It is also used to warn consumers about waste of gas while removing cookware from the burner using an object detection sensor.

5. FUTURE SCOPE

The proposed approach can be implemented in the IOT database and stored in thinkspeaks.com. The graphical representation provides a field chart of gas leaks and monitoring levels. We can monitor sensors anywhere and anytime using cloud framework. Table represents gas sensor levels to identify gas leaks. Think Speak is a Cloud in that it can receive data from sensors through Wi-Fi module and it can represent data as field graph in different parameters. The implemented project is an IOT Based Gas Leakage Detector system with SMS Service and Sound Alarm which is very cost effective and it can be built easily.

- 1) LPG leakage detector is helpful to prevent explosions and to save human lives. Property and material loss.
- 2) For the further improvements in future we can add a capture a images LPG gas leakage pipes and upload to server.

- 3) Another very interesting improvement would be use of DC motor to automatically turn off the Nob of cylinder. The system is cost effective and handy.
- 4) A Mobile Application can be created for this system which can give information about the concentration of gas present in the area, setting reminders to check gas level, also to predict the gas leak by giving values.

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