

# Smart Safety System at Railway Station

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## ABSTRACT

Liquefied Petroleum Gas (LPG) is a main source of fuel, especially in urban areas because it is clean compared to firewood and charcoal. Gas leakage is a major problem in the industrial sector, residential premises, etc. Nowadays, home security has become a major issue because of increasing gas leakage. Gas leakage is a source of great anxiety with ateliers, residential areas, and vehicles like Compressed Natural Gas (CNG), buses, and cars which are run on gas power. One of the preventive methods to stop accidents associated with the gas leakage is too small a gas leakage detection kit at vulnerable places. The purpose and discuss a design of a gas leakage detection system that can automatically detect, alert and control gas leakage. This proposed system also includes an alerting system for users. The system is based on a sensor that easily detects a gas leakage.

**Keywords:** Arduino, LM35, MQ2, IR Sensor, Relay. Buzzer, LCD Display, Bulb, Divider.

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## I. INTRODUCTION

Now a days most of the people facing problem of electricity shorting. As the power is limited it is our soul responsibility to save it. But in moll are always ON irrespective of costumer. It leads to the loss of Energy. This project is for that reason only. We are developing the system where in lamp will get ON if and only if person is present. person can be detected by using obstacle sensor (IR Sensor). Heart of the system will be Microcontroller of ARDUINO family. Bulb can be interface by using relay. Also we added TEMP sensor for detecting the temperature and

control by using fan, also we added smoke sensor for fire safety. at from January to June last 2017, the BFP has recorded a total of 2,522 fire incidents. It was traced that LPG is one of the major causes of fire during that year where half of the total which is 1,253 beside from the electrical causes. More than the lifetime Arduino has been a reason that thousands of projects from everyday bodies to complicated scientific mechanism. Worldwide societies of scholars, performers, programmers, and specialists have assembled around this opensource program. Their knowledge about the said matter contributions a lot to help the society in this subject area. The project

entitled “LPG Leakage Detector using Arduino with SMS Alert and Sound Alarm, will be a great help in terms of preventing any danger caused by gas leakage. The purpose of this project is to detect the presence of LPG leakage as a part of a safety system. Apart from sound alarm, an SMS alert will inform the authorized person and the solenoid valve will be triggered to shut down the gas supply to prevent any harmful effects due to gas leakage. Descriptively, we use a gas sensor to monitor the LPG if the gas leak reaches beyond the normal level. This proposed project will trigger the sound alarm. In addition, the authorized person will be informed about the leakage via SMS alert and the gas supply will be automatically shut down. The people can be saved from a potential explosion caused by gas leakage. Liquefied Petroleum Gas commonly known as LPG consists of a mixture of Commercial Propane and Commercial Butane having saturated as well as unsaturated hydrocarbons. It is an odourless gas due to which Ethyl Mercaptan is added as powerful odorant so that leakage can easily be detected. LPG is commonly used in homes for heating and cooking. This energy source is primarily composed of propane and butane which are highly flammable chemical compounds. LPG was first produced in 1910 by Walter Snelling (Didpaye1, 2015) and is classified as a hazardous material because of its 2 flammable properties and explosive potential when stored under pressure. Before the development of electronic household gas detectors in the 1980s and 90s, gas presence was detected with a chemically infused paper that changed its colour when exposed to the gas (Didpaye1, 2015). Since then, many technologies and devices have been developed to detect, monitor, and alert the leakage of a wide array of gases. Hence the requirement of an efficient system to detect leakage of LPG is inevitable, which may be used for domestic and commercial purposes. The Microcontroller that is utilized for the project is Arduino Uno R3. R3 is the 3rd and latest revision of Arduino Uno. The Arduino Uno is a microcontroller board that is based on ATmega328. The ATmega328 is

a single microchip controller that has 32 Kbytes (with 0.5 Kbyte which is occupied through the boot loader). Moreover, it comprises of SRAM and EEPROM that can be written and read with the EEPROM library, I/O pins, AVR microcontroller chip, a power jack, a USB connection, ICSP (InCircuit System Programming header), and the reset button. Simply, it is connected to a computer via USB cable. The Clock speed of the Arduino is 16 MHz; thus, it performs a specific task quicker than other processors or controllers. AVR chip is continuously clocking on 16 MHz regardless to what a code is performing, it never halts; thus, its current’s consumption is essentially independent from the code that is executed.

## II. OBJECTIVES

- To design an automation system which saving a electricity.
- Design an automation system with maintain the temperature.
- Design a fire detection system for reducing the major accident due to late action taken by fire brigade.

## III. LITERATURE SURVEY

Humphry Davy (of England) in 1815 proposed a system to detect the presence of methane gas in the underground coal mines. The first gas detector in industrial age was the safety lamp or day lamp was invented by Humphry Davy. The flame safety lamp consisted of an oil flame adjusted to specific height in the fresh air. The glass sleeve contained a flame with a mesh flame arrester to prevent ignition with the lamps. Flame heights vary depending on the presence of methane or lack of oxygen [1]. Early detection methods relied on less precise detectors. Though the 19 and 20th centuries coal miners would bring canaries down to the tunnels with them as an early detection system against life-threatening gases such as carbon dioxide, carbon monoxide and methane.

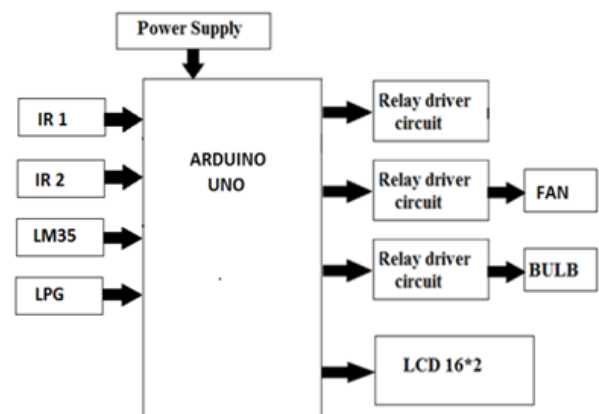
The first gas detector in industrial age was the safety lamp or day lamp was invented by Humphry Davy (of England) in 1815 to detect the presence of methane gas in the underground coal mines. [1] Dr. Oliver Johnson in 1926-1927 proposed a system to detect combustible mixtures in air to help prevent explosions in fuel storage tanks. The era of gas exploration was 1926-1927. It began with the development of the Catalyst Combustion (LEL) sensor by Oliver Johnson. Johnson was an employee of Standard Oil Company in California (now Chevron), the first practical electric steam indicator: production of the meter began in 1927 with the release of the Model B. The world's first gas exploration company, Johnson-Williams Instruments, was formed. Performed by Oliver Johnson, Phil Williams in Pilot, CA in 1928. J-Instrument was named the first electrical company in Silicon Valley. The first in the modern age of gas exploration, including the development of equipment to make it a smaller and more portable oxygen detector, as well as the first compounding device to detect flammable gases as well as oxygen [2]. Ch. Manohar Raju and Sushma Rani in 2008 proposed a prototype depicts a mini mobile robot which is capable to detect gas leakage in hazardous places A few reviews about gas leakage detection techniques were done in the past either as part of research papers/technical reports on a certain leak detection method and other gas related subjects. Ch. Manohar Raju and Sushma Rani, 2008; they introduce an android based automatic gas detection and indication robot. They proposed prototype depicts a mini mobile robot which is capable to detect gas leakage in hazardous places. Whenever there is an occurrence of gas leakage in a particular place the robot immediately read and sends the data to android mobile through wireless communication like Bluetooth. We develop an android application for android based smart phones which can receive data from robot directly through Bluetooth. The application warns with an indication whenever there is an occurrence of gas leakage and we can also

control the robot movements via Bluetooth by using text commands as well as voice commands. The previous mobile robots are based on heterogeneous technologies like GSM, GPS, 4 internets based etc., but the main disadvantage of those prototypes was the absence of communication in particular areas. So, with the rapid developments and tremendous changes in technology we have lots of techniques to eradicate previous problems. Wireless communication protocols play a vital role in present trends. Bluetooth, Wi-Fi, Zigbee etc., we use one of the best features of smart phone i.e., the Bluetooth technology to control and monitor parameters driven by a robot [3].

#### IV. PROBLEM STATEMENT

Currently there is no automation system for fire detection with controlling hence our proposed system is detect a fire and immediately start a water sprinkler to control a major accident using LPG detect sensor and temperature detector sensor.

#### V. BLOCK DIAGRAM



- Block diagram consist of Arduino Uno which is major role in our system to control the all-automation system.
- we use a IR sensor for detecting the presence of people when the person is detected the light will automatically turn on.

- Also, we design a fire detection system using mq6 sensor when the fire is detected the relay driver circuit automatically on.
- Also, we added lm35 sensor for monitoring the temperature according to the temperature the fan will be automatically on and off.
- We use 16\*2 lcd display for display the sensor data.

## VI. HARDWARE REQUIREMENTS

### 1. ARDUINO

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write, and upload computer code to the physical board.

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

### 2. IR SENSOR MODULE

This is a multipurpose infrared sensor which can be used for obstacle sensing, color detection (between basic contrasting colors), fire detection, line sensing, etc. and as an encoder sensor. The sensor provides a digital and an analog output. The sensor outputs a logic one (+5V) at the digital output when an object is placed in front of the sensor and a logic zero (0V), when there is no object in front of the sensor. An onboard LED is used to indicate the presence of an object.

### 3. LM35 SENSOR MODULE

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in °Kelvin.

### 4. (MQ6) SENSOR MODULE

The [MQ6 \(LPG Gas Sensor\)](#) is a simple-to-use liquefied petroleum gas (LPG) sensor. It can be used in gas leakage detecting equipment in consumer and industry applications, this sensor is suitable for detecting LPG, iso-butane, propane, LNG. Avoid the noise of alcohol, cooking fumes and cigarette smoke. The sensitivity can be adjusted by the potentiometer. Using a MQ sensor it detects a gas is very easy.

### 5. RELAY

A Relay is a large mechanical switch, which is toggled on or off by energizing a coil. This relay has 5 pins. 2 for the coil. Middle one is COM (common) and the rest of the two are called NO (Normally Open) and NC (Normally Close). When current flows through the coil of the relay, a magnetic field is created that causes a ferrous armature to move, either making or breaking an electrical connection. When the electromagnet is energized the NO is the one which is on and NC is the one which is off. When the coil is de-energized the electromagnetic force disappears and the armature moves back to the original position turning on the NC contact. The closing and releasing of the contacts result in powering on and off the circuits.

## VII. CONCLUSION

After all the data had been gathered, analysed, and processed, the proponents arrived at the succeeding conclusion. Therefore, Here We conclude that the “LPG Leakage Detector Using Arduino temperature sensor” will help a lot in terms of preventing any danger caused by gas leakage and useful as part of

safety to avoid the gas leak that can cause harmful result. It will also improve the safety of all users of Liquefied Petroleum Gas. We successfully build complete safety system by using multiple sensors by using Arduino uno microcontroller.

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