

## Smart GAS Leak Detection

K. Vijayprabakaran<sup>1</sup>, V. Ajay Teja<sup>2</sup>, S. Ashok Kumar<sup>2</sup>, P. Divya<sup>2</sup>, D. Hima Bindhu<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Computer Science and Engineering, Madanapalle Institute of Technology and Science, Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Madanapalle Institute of Technology and Science, Andhra Pradesh, India

### ABSTRACT

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Use of gases in houses, industries is a common practice, so there is a chance of gas leakage which is a serious problem now-a-days. This problem might be in the tube that is used for connection or not turning off the cylinders when they are not in use. As LPG is highly inflammable, it can cause damage to surroundings even far from the source of leak. This damage includes both material and human loss. Our Project deals with detecting such leakages and preventing accidents. Project is based on IoT (Internet of Things). Using a MQ-6 gas sensor to detect gas leakage to which a microcontroller named Node MCU ESP8266 is connected which process the input from the sensor. When sensor detects gas leakage we are notifying user about the gas leakage using Blynk app and also alert nearby people using buzzer which gives sound and an LED which gives light, so that necessary measures would be taken to avoid accidents and to prevent damage.

Keywords : Internet of Things, MCU, LPG

### I. INTRODUCTION

Gas leakage is a serious problem and nowadays it is observed in many places like residences, industries, and vehicles. It is noticed that due to gas leakage, dangerous accidents occur. The Liquefied petroleum gas (LPG) or propane is a flammable mixture of hydrocarbon gases used as fuel in many applications like homes, hostels, industries, automobiles, and vehicles because of its desirable properties which include high calorific value, less smoke, less soot, and major harm to the environment. Liquid petroleum gas (LPG) is highly inflammable and can burn even at

some distance from the source of leakage. This energy source is primarily composed of propane and butane which are highly flammable chemical compounds. These gases can catch fire easily. In homes LPG is used mainly for cooking purposes. When a leak occurs the leaked gases may lead to an explosion. Gas leakage leads to various accidents resulting in both material loss and human injuries. Home fires have been occurring frequently and the threat to human lives and properties has been growing in recent years. The risks of explosion, fire, suffocation are based on their physical properties such as toxicity, flammability, etc. The number of deaths due to the

explosion of gas cylinders has been increasing in recent years. The Bhopal gas tragedy is an example of accidents due to gas leakage.

IoT stands for Internet of Things which refers to internet connected objects that are able to collect and transfer data from wireless network without human intervention. In simple terms physical devices that need data transfer are connected to each other over internet to do complete their tasks. So using IoT it is easy to accomplish certain tasks. Here also we are using IoT to resolve this problem.

## II. RELATED WORK

There are certain models available in the market for the same problem, every model has its own advantage and disadvantage. Few of them are discussed below.

ARM Processor:

It deals with gas leak detection using arm controller. It also has a system which send notifications to the gas agency when cylinder gets emptied. This detects gas and sends alerts by using buzzer and send messages using GSM Module. GSM module is used to provide the information to the gas agency to book cylinders automatically when the weight of the gas cylinder goes below 2 kg. It has no security for the user. It uses processor instead of Controller.

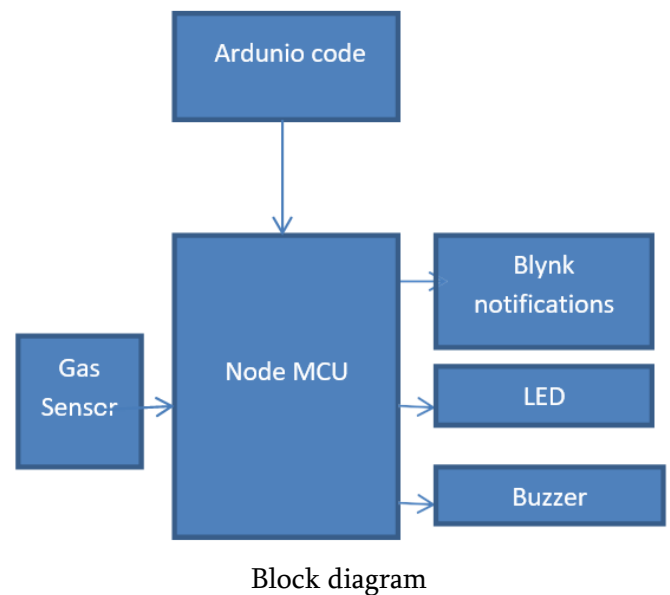
GSM with no secure block:

It uses MQ-6 gas sensor to detect the gas then leakage motor will close the regulator and sends messages to the use about the leakage. The motor that is used can get heated up, which may lead to accident.

## III. PROPOSED SYSTEM

In the proposed system, MQ-6 Gas Sensor which is capable of detecting LPG and Petrol is interfaced with Node MCU ESP8266 Micro controller. When there is a gas leak MQ-6 gas sensor will detect the gas and this input is processes by Node MCU. It will alert the user

by sending notifications through Blynk app. While registering in the Blynk each project has its own authentication key which needs to be used in the code for connecting the entire system to mobile and get notifications over internet. This is done with the help of WIFI module in the Node MCU. In this system we also have fixed a LED which will be switched on indicating a gas leak and also a buzzer which gives buzzing sound to alert nearby people about the leakage. Here gas sensor acts as input device and LED, Buzzer, Blynk notifications acts as output devices through which we can find out gas leakage.



## IV. COMPONENTS DESCRIPTION

### 1. Gas Sensor



MQ-6 gas sensor is capable of detecting LPG and Butane. It's operating voltage is +5v. This sensor can be used as digital or analog sensor. MQ-6 can detect gas concerntration from 200-10000 ppm. It has high sensitivity towards LPG and

Butane, also has low sensitivity towards alcohol and smoke. It has fast response time. (less than 10s) Sensor is 18 mm in diameter, 17 mm high and pins are 6 mm high each.

## 2. Node MCU ESP8266:



Node MCU stands for Node MicroController Unit. It is an open source firmware and development kit which helps to build IoT based products. It also has a wifi module which is used to connect over internet. Node MCU has 128kb RAM and

4 MB flash memory to store data and programs. Node MCU can be powered using micro USB jack. Its high processing power with in-built wifi makes it ideal for IoT projects. It takes input from input devices like sensor and process it and will give output through output devices like LCD, LED, buzzers etc.

## 5 Breadboard



It is a construction base for prototyping of electronics. Most of the breadboard we use today are made of white plastic and it is pluggable. It was designed by Ronald J. Portugal in 1971.

## 6 Jump wires



They are also called as Jumper wires. They are electrical wires with a connector or a pin at each end which are normally used to interconnect the components in a breadboard. Each Jump wire's end connectors are connected to the slots provided in the breadboard and header connectors are connected to components.

## 7. LED



LED stands for Light Emitting Diode. It is a semiconductor device that emits infrared or visible light, when charged with an electric current. It acts as output device. LED has an anode(+) and cathode(-) to connect it to the power supply. Anode is usually the longer pin and cathode is the shorter one.

## 8. Buzzer



Buzzer is an audio signalling device which makes buzzing sound. It can be used as alerting device when there is some destruction happening. It act as a output device.

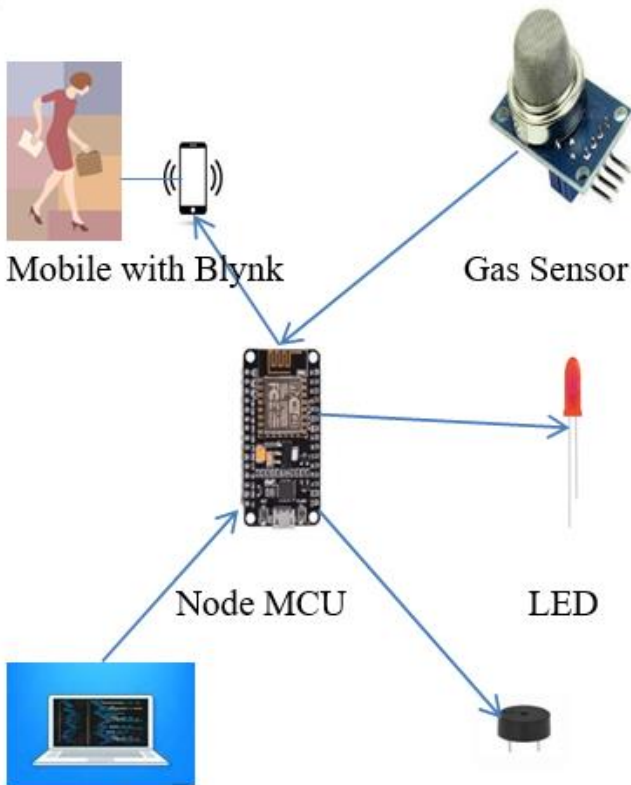
## 9. Battery



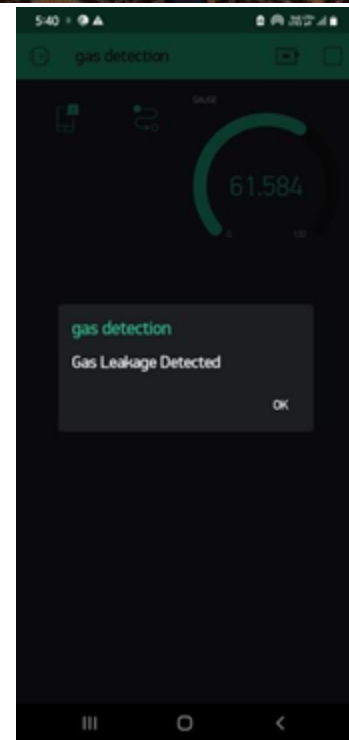
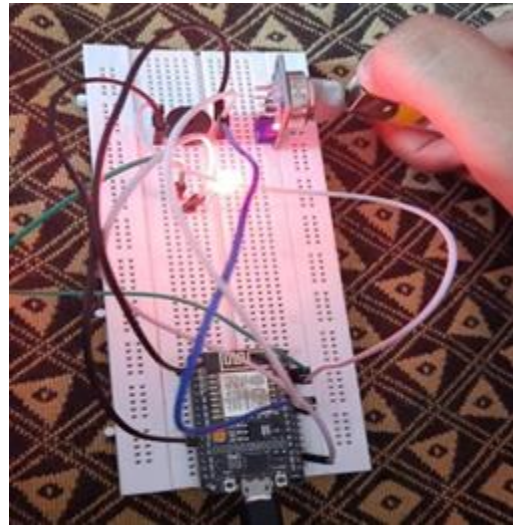
It is a power source which has electro- chemical cells with external connections for powering electrical

devices like lights, electrical cars, mobile phones etc. It has anode and a cathode to which an electrical device is connected and taken power supply.

Architecture diagram



MCU and alert near by people using an LED and Buzzer.



## V. RESULT ANALYSIS

The proposed system is able to detect gas leakage and send notifications through mobile and also alert near by people by switching on LED and making buzzer sound.

## VI. CONCLUSION

This system is mainly proposed to detect gas leakage and to prevent accidents that occur during gas leakage. This also helps to save environment from pollution. It also avoids damage that occur to both human and material loss. This is done by providing a sensor at gas storage space and connecting it to a Node MCU which can process and send leakage status to mobile through Blynk app using wifi module embedded on Node

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