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LPG Leakage Detection in Kitchen Using IOT

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Abstract*— Liquefied Petroleum Gas (LPG) is one of the most used fuels in both domestic and commercial kitchens. Basically, LPG is a combination or mixture of propane and butane which is a highly flammable, colorless chemical and also odorless so an odorant has been added to it to help in detecting the leakage. Gas leakages causes a threat in our households and the surroundings. In recent days, kitchen-based accidents have been increased in both domestic and commercial premises. The main reason for these accidents is gas leakage as it enhances the risk of explosions. To dodge this problem, there is a requirement for an automatic gas leakage detection system to distinguish the spillage of LPG and give alerts. In the present day, IOT (Internet of Things) is extensively used to automate the household appliances. In this paper we are discussing about an Internet of Things (IOT) based system which enables the initial detection of gas leaks which can prevent house fires in a kitchen by measuring the temperature and humidity using sensors. So, if we can detect these gas leakages onset, we can avert a serious explosion and protect lives.

***Index Terms*— MQ2 gas sensor, smoke sensor, IOT, LM35 temperature sensor, Arduino UNO, Buzzer sensor.**

I. INTRODUCTION

LPG (Liquefied Petroleum Gases) is the widely used cooking gas in India . have suggested the system for detecting gas spillage that is based on IOT in this paper. The Internet of Things (IoT) has altered people's lives. The massive rise in the internet users and advancements in internet working technology have enabled the networking of common devices. Through its embedded computing system within the internet backbone, each thing is uniquely recognizable. The internet of things is all about physical objects communicating with one other via machine-to- machine communication. Things will be able to communicate with each other and with computers. We used this technique for detecting gas leaks so that action can be taken before they become dangerous. A MQ2 gas sensors is used in the system to detect the presence of gas. Using a NODE MCU microcontroller written with lua programming language. We demonstrate the structure and implementation of an IoT-based LPG leakage detection system.

Gas is a popular energy source for heating and cooking in our houses for many reasons. As a result, we create and implement a system that guards against occurring of such incidents. GSM is used for communication.

II. PROBLEM STATEMENT

Gas leakages lead to various hazards which result in both property loss and personal injury. The death toll from gas cylinder explosions has been on the rise in recent years, which is mainly because of low-quality cylinders, damaged valves and controls, and many other factors. LPG is a flammable mixture or combination of hydrocarbon gases used as fuel in many systems such as homes, hostels, restaurants because of its desirable areas of inclusion like high calorie content, less smoke and minor damage caused to the environment. This paper mainly aims at

1. Detecting leakage of LPG systems in domestic and commercial environments.
2. Sending alert messages via SMS, buzzer to alert owners about gas leakage with the help of IOT system which is projected for home safety.

III. LITERATURE SURVEY

We have made our literature survey from the websites like google scholar and publishers like IEEE, ECCE, IJSRSET, IJITEE, IJCST. Yashaswini C et al. published IoT BASED SMART KITCHEN for IEEE in which they discussed smart container for gas leakage, smoke detection in 2019. In 2021, Shubham More et al. published a paper with the title IoT Based Smart Kitchen System, which included the modules related to the gas leakage detection using MQ2 gas sensor.[1]

Apart from these research papers, other systems which are intended about gas spillage detection contain some extra features like alarm (alert) in case of fire, gas and humidity monitoring etc. These papers mainly focus on the safety of individuals and the surroundings. The proposed systems mainly use IOT and WSN to identify gas spillage.

IV. REQUIREMENTS

Following the re-enactment of the framework, we

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purchased all of the components needed for our project, including an Arduino UNO, GSM GPRS SIM800C module, Hub MCU ESP 8266, Mq2 gas sensor, an LM 35 temperature sensor, Debilitate fan, 1-channel 5v relay module, LC show, piezoelectric buzzer, jumper wires, and control supply cables.

V. DESIGN

Kitchen temperature changes and customer warnings IOT for continuous checking of LPG and temperature values. These libraries are not included with proteus. Arduino UNO programming with the help of quotes from Arduino UNO simulation format program.[2] we ran the association according to the project at Proteus Gas leak and gas leak condition.

A.HARDWARE IMPLEMENTATION

According to proposed framework, gas spillage is detected by MQ 5 sensor with Arduino software, the engine wakes up and turn off the light with buzzer alert sound and a caution message on the LCD, and the client receives the notice via a portable device connected through Wi-Fi.[3]

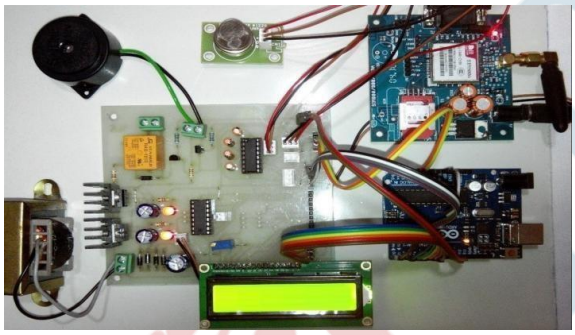

Fig.1 Hardware Implementation.

When we lit the liter close to MQ2 gas sensor the LCD displays “Gas is leaking” message, the piezo electric buzzer starts ringing. With that we stimulate sudden change of temperature using liter with the LM 35 sensor.[1] Now the LCD display “temperature rising above danger level” also the exhaust fan helps to throw the fire out of the room.

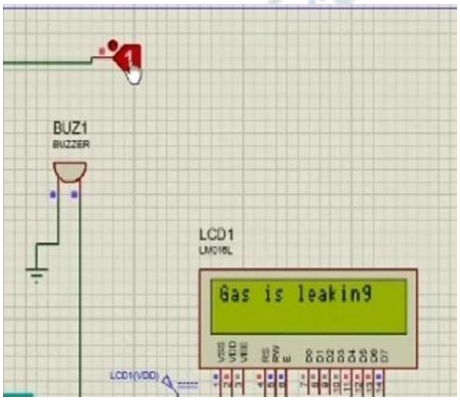

Fig.2 Proteus LCD warning

B.PROTEUS SKETCH

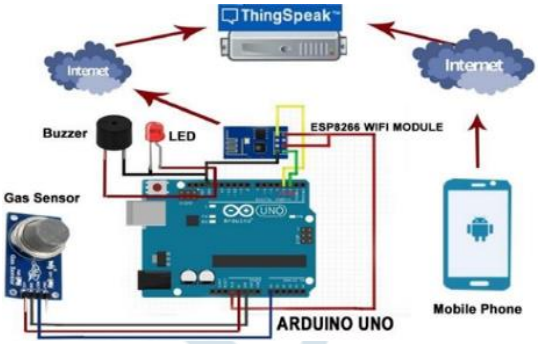

Fig.3 Proteus sketch.

We use proteus with Arduino UNO, GSM module, LCD, MQ2 gas sensor, Buzzers, LM 35, engines. It uses hypothesis for explaining the situation. Whenever accost becomes 0 it shows there is no gas spillage, if its one there is gas spillage. Here proteus make use of a virtual terminal to view the message.LC shows “Gas Status is ok” , the flip hail becomes 0 and 1 gives “gas is leaking”.

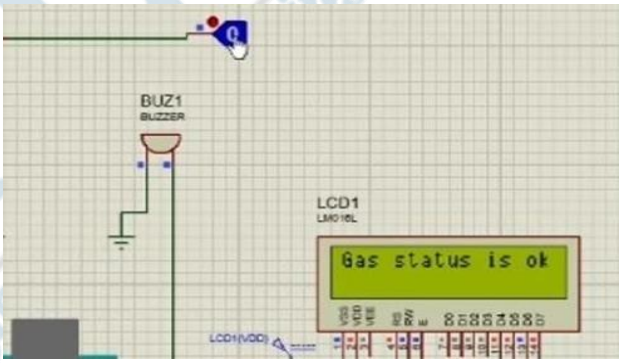

Fig.4 Proteus LCD status

Ordinarily reproduced by implies of virtual terminal.[4] As well, we can observe this temperature by utilizing LM 35 by transferring temperature readings to the LCD as appeared in fig, as some time recently long as temperature outflanks the edge respect the caution SMS is delivered to the LCD as well as versatile with offer help of GSM module. Fig.4 Proteus virtual terminal

VI. RESULT

We utilize Mq2 gas sensor and LM 35 temperature sensor as input gadgets and LCD, GSM module, and debilitate fan as output gadgets in this project it utilizes IOT to keep a constant eye on gas level and temperature test cases.[6]

- If no gas spillage LCD will display“gas status is ok”.

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Fig.5 LCD Status.

- The piezoelectric buzzer will start sounding as soon as a gas spill is detected. The gas leakage warning message will be displayed on the LCD.

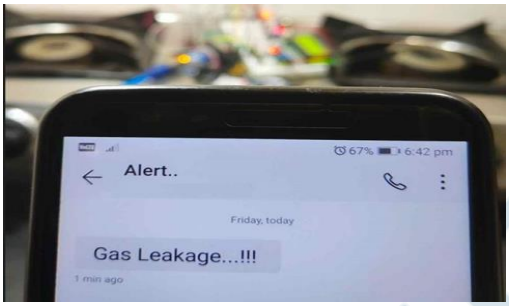

Fig.6 LCD Warning message.

It will continuously monitor the weight of the gas. It will also measure the temperature and humidity around the gas cylinder.

VII. CONCLUSION

Gas leakage occurs as a result of poor equipment maintenance and a lack of public knowledge and it leads to severe accidents causing human injuries and material losses. This detection system is mainly proposed to prevent the fire accidents caused due to leakage and to save the human lives. Gas leak detection for both household and business reasons is one of these applications. Despite the fact that various approaches exist, gas leakage detection remains a serious concern and a task. As a result, this study proposes new system.

For added convenience, this gadget can be simply connected into alarm system or visual indicates the LPG awareness.[5] If there is any gas leakage, this system will send a SMS to the owner and it will turn off the power and activate an alarm. It will also measure the temperature and humidity around the gas cylinder.

VIII. ACKNOWLEDGEMENT

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