Household Multi - Hazard Alert System

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Abstract — **In our daily lives, fuels, gasses, etc. are used in a variety of settings, including homes, workplaces, and industries. But if not used properly, it can have serious consequences. Many accidents in the past had it as their sole reason. There are many applications for fuels, gasses, etc. in daily life, including those in homes, businesses, and other settings. But it might produce serious problems if not used properly. Many accidents in the past had it as their sole reason. This project's goals are to find gas leaks, stop them from happening, and plug them in sensitive places. to avoid accidents, and stop the obstruction of susceptible locations with gas leaks. Included in this is the MQ6 gas sensor, which may also be used to detect other gasses such as LPG, i-butane, hydrogen, methane, smoke, and alcohol. It is used to detect gas leaks in homes and businesses. Only the trend of gas concentration within a reasonable error range is shown. This gadget automatically takes safety measures. Include the GSM module as well so that it may send the owner an alert SMS and take the necessary action right away.**

Keywords —*Arduino UNO, MQ6 gas sensor and 800L GSM Module*

I. INTRODUCTION

There are numerous tools available to prevent gas leaking mishaps. such as fire extinguishers and smoke alarms. Only fire exposure can be prevented by these gadgets; injury protection is not possible. When LPG gas poured out in events like the Visakhapatnam gas tragedy in May 2020, several people died. Nine persons, including four children, perished in a fire that was started by an LPG cylinder leak in a room in Venkatapuram, Visakhapatnam, Andhra Pradesh, on July 20, 2021.

Therefore, it is necessary to enhance the technologies to protect people from this dangerous tragedy. If gas escape is not promptly identified, significant damage may result. By cutting off the main supply, the MQ6 sensor is a device that not only detects but also prevents accidents. It responds quickly and with high sensitivity. A sensitive SnO2 filament is present in this detector. In the presence of clean air, this filament prevents electrical conductivity from rising. When a combustible gas, such as LPG, is ignited, the filament's conductivity rises. With Arduino, this sensor may be easily interfaced. The maximum and

minimum variables will be set accordingly in this Arduino-based gas leak detection system, which may link to an 800L GSM module. The owner will receive an alert SMS after detection**.**

II. LITERATURE REVIEW

[1] Arpitha .T1 , Divya Kiran, V. S.N. Sitaram Gupta and Punithavathi Duraiswamy, In this paper, they proposed a leakage detection method in which the leakage information is also sent to the first response team through wireless media. This ensures preventive actions immediately even in the absence of people onsite. The detection system uses FPGA to detect the leakage and automatically initiate a warning call through a GSM. Leakage and automatically initiate a warning call through a GSM. A prototype of the gas leakage detection system has been developed and tested with LPG (Liquefied Petroleum Gas). The experimental results show that the system is able to detect the leakage in less than a minute.

[2] Aakash Parashar,Chanchal Rai,Sagar Pokhariyal The purpose of this project is to detect a gas leak and prevent the accident and blocking of gas leaks in vulnerable areas. This includes the MQ6 gas sensor which is used to detect gas leakage in home and industry and is also very much suitable for detecting LPG, i-butane, Hydrogen, Methane, Smoke and Alcohol, etc. But it does not indicate the exact gas concentration. It only illustrates the trend of gas concentration in a suitable error range

[3] Ana M. C. Ilie, Carmela Vaccaro, This paper focuses on the development of a new device suitable to detect and measure methane gas in areas of natural gas storage sites. This device, the Smart Gas Detection system, can measure the air and water quality, including all the parameters that can have outliers by an eventual gas leak in the aquifer or atmosphere. The air quality parameters measured by low cost sensors, include CH_4 and CO_2 gas, while for water quality parameters measured include temperature, pH and electrical conductivity

[4] Ms Fariha Aiman , Mr .Vedananda,This paper is on survey for various technologies used for detection of gas leakage. This paper also has the advantages and disadvantages related to the existing

technologies. High voltage electrical equipment use SF6 gas as an insulation medium. Detection of Sf6 gas can be performed by various technologies such as infrared image processing technique, wireless sensor networks, and also by using infrared cameras.

III. METHODOLOGY

Methodology of the project is completely based on the group working ethic including the coordination and active participation of all group members. It involves the input from all the group members which when processed in a perfect guidance and thus leading to the best possible outcome. It then includes the study of available domains and finalization of project topic relating it with study of various factors such as socials, capability of the group, knowledge about the project domain and application and importantly the scope of achieving the desired work and product. The guidance of the project guide was taken at this stage. Then it came to the study of literature and reviews of such projects that have been accomplished before. This was all included in the pre-development stage of the methodology.

The development stage includes the acquiring of project implementation knowledge along with being familiar with the tools, equipment and interface to be used in completion of the project. The development stage went through firstly the formation of the skeleton that is the flowchart of the entire project then distribution of work among the members. Then the work of all the members was combined in orderto achieve the best possible outcome.

The project programming part was completed in Arduino IDE and the hardware assembly was done .At last a test run was called on to ensure the functioning of the system and to check the desired availability of functions and properties.

So Hardware parts used are-

For this project we have used different types of components including Primary and main component i.e Breadboard, MQ 6 gas sensor, Arduino Uno,LM35, Temperature sensor, KP 303450 Li-IOn battery 3.7 V 1000Mah, 4.7k , 1k ohm resistors, Sim800L GSM module, jumper wires.

MQ6 GAS SENSOR :

Fig1. MQ-6 Gas sensor

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.
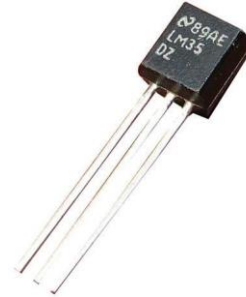
Sim 800L

Fig 2.Sim800L

SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls.

LM35 Temperature Sensor

Fig3. LM35 Temperature sensor

LM35 is a temperature measuring device having an analog output voltage proportional to the temperature.
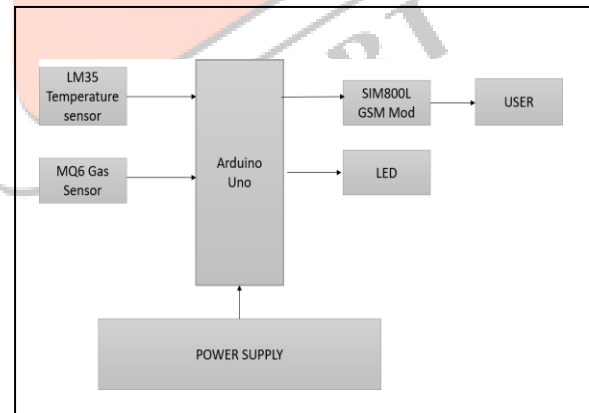
IV.   FLOWCHART

Fig 4. Flowchart

This is our basic flowchart of the Project that we are implementing. From LM35 it is sensing the temperature, From MQ6 gas sensor how it isdetecting the temperature.
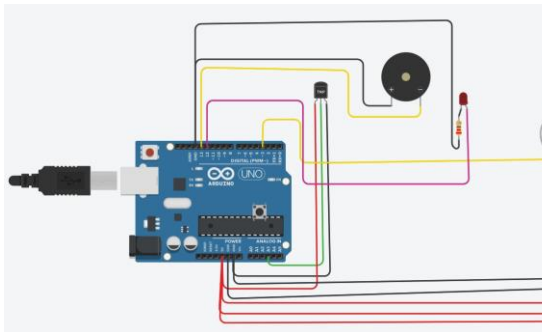
I.   SCHEMATIC DIAGRAM

Fig5.Schematic diagram

II.   PROPOSED SYSTEM

So final system consists of
1. Arduino Uno As a microcontroller
2. Two Sensors LM35 Temp sensor , MQ6 gassensor
3. LED for on site indication that it will blinkwhen gas is detected
4. SIM800L for sending Alert to user via GSM
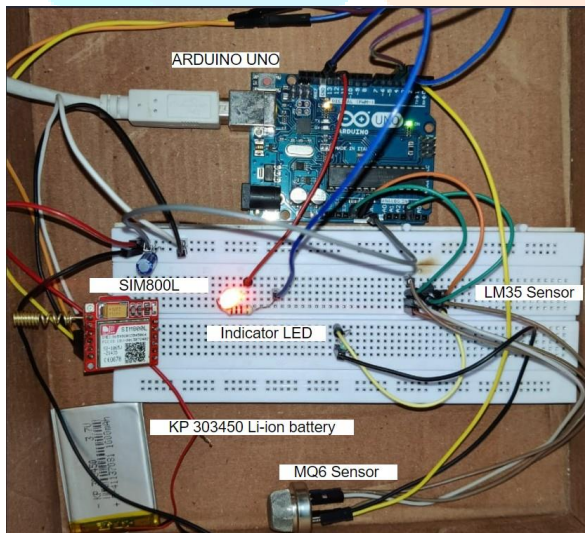5. Used KP 303450 3.7 V 1000mAh Li-IOnbattery for power supply to GSM

Fig6. Proposed System

III.   EXPERIMENTAL SETUP AND MEASUREMENTS

A.   Threshold adjustment-

Fig. 6 depicts a prototype of the designed gas leakage system.
There must be a threshold for the leakage detecting system.
voltage in order to find the leak. The noise voltage without gas is measured, and the threshold voltage is fixed for FPGA comparison. Without gas, a noise voltage of 0.02 V was measured.
The threshold is typically set to be higher than the noise voltage.
However, MQ-6 can only detect concentrations down to 200 ppm, which translates to 0.61 V of voltage. By monitoring the gas concentrations, this is confirmed. Fig7 displays the measurements of the gas concentrations. Here, a threshold of 0.7 V is used for testing purposes. For this, more than 800 ppm of LPG must be injected into the gas chamber.

B. Using LPG for tasting-

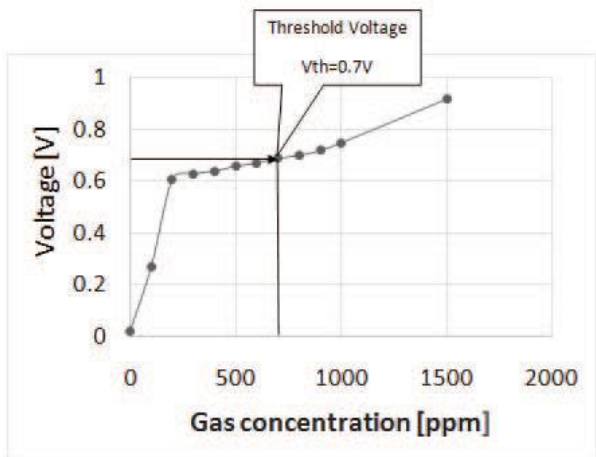Fig7. Proposed System

Fig7.
Output

After execution of code we are getting the results on Mobile Phone for alerting the user from various hazards.

Fig8. Serial Monitor
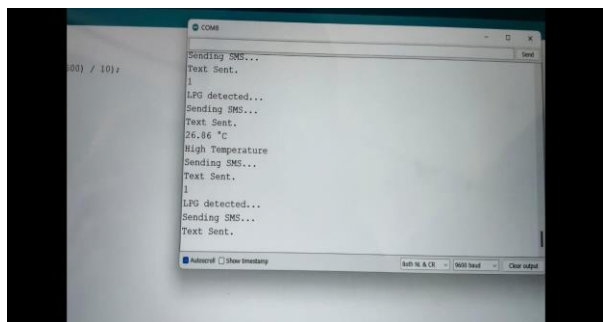
In the serial Monitor we are able to see the "LPG Detected, Message sent".

IV. CONCLUSION

This is an arduino based system designed and implemented to detect the gas leakage in homes, hotels, and in industrial applications. By using sim 800l we are sending messages to the user to avoid further hazards.It is a very serious issue by warning users to take appropriate action.

I. FUTURE SCOPE

Gas detectors measure and indicate the concentration of certain gasses in the air via different technologies. Typically employed to prevent toxic exposure and fire, gas detectors are often battery operated devices used for safety purposes.Catalytic sensors represent a large number of gas detector devices that are manufactured today. This technology is used to detectcombustible gasses such as hydrocarbons, and works via catalytic oxidation.

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