Automatic Gas Detection System (AGD System)

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ABSTRACT

As we can see from social media and news, there are many accidents happened due to Liquefied Petroleum Gas. There are also too many loses from these accidents in term of damages, injuries, and even death. Thus, a system that prevent these dangerous gases from leaking has been innovated in order to improve the safely of people and environment. This system is called Automatic Gas Detection Equipment System (AGD System) that functions to alert by producing a sound and a red light to warn if there is any leakage of dangerous gases. It also notified the owner through their smartphone by sending a push notification. This system can detect these gases and prevent from any critical accidents from happening. Besides, this system used lowers power and easy to use. The main targets are those people in a residential area, restaurant, laboratory and factory. AGD system should be commercialized because it can bring a lot of benefits in general.

Keywords: gas leakage, AGD system, Liquefied Petroleum Gas

1   INTRODUCTION

Gas is one of the most important things especially in daily works in houses, industries, education and tourism. The common gas that people used is called LPG (Liquefied Petroleum Gas) because it is cheap. However, it can bring negative impact to environment and people's health. It can also lead to extreme damages. This leakage happens due to the fact it is a flammable material if exposed to air and it can increase the thickness from 2% to 10% [1]. The gas that leaking is heavier in term of its thickness and it is harder for it to go through walls of a building [2].Therefore, it is important to prevent it in early stage by using this system [3,4]. This research is to discuss about a system that can detect gas leak which is known as Automatic Gas Detection Equipment System (AGD System). There are many benefits of using this system. For example, it is eco-friendly and suitable to be used in a kitchen, lab, and factory. Lastly, it is simple to use and affordable for consumers.

2   MAIN COMPONENT

Arduino UNO functions as a signal receiver and it sends information to the alarm and LED. Sensor Gas MQ2 is a tool that can detect any gases such as LPG, butane, methane, alcohol and hydrogen. It can alert people if there is a gas leak in a building. The buzzer is a transitional item that makes the warning sound. This system also functions based on the Arduino board. LED will produce a monochromatic light from green which means safe, to red which means unsafe.

Fig. 1 Arduino UNO	Fig. 2.Alarm	Fig.. 3 LED light	Fig.. 4 Sensor Gas MQ2

3   HOW IT WORKS

Based on the chart below, AGD System functions when the sensor gas MQ2 detects any gases in a building. Then, it will send a signal to the Arduino board. A red light and an alert that sounds like a moving fan will indicate that there is a gas leak. All these processes happen automatically from the output program from the Arduino system. If the detected level of gas is low, the alarm will not go off. It is also can communicate wirelessly through phone. In case of there is no one around, it can send a push notification through phone.
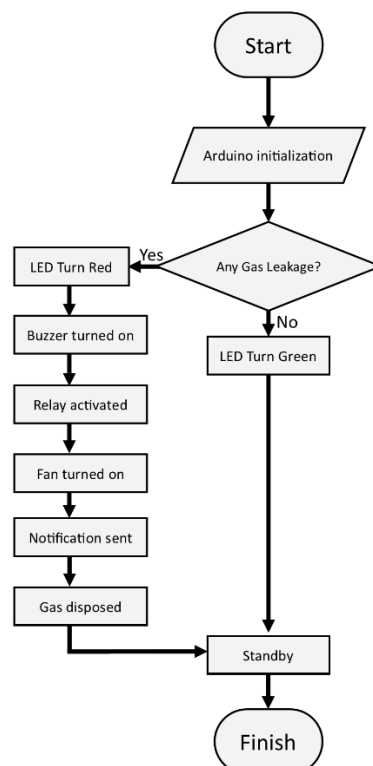
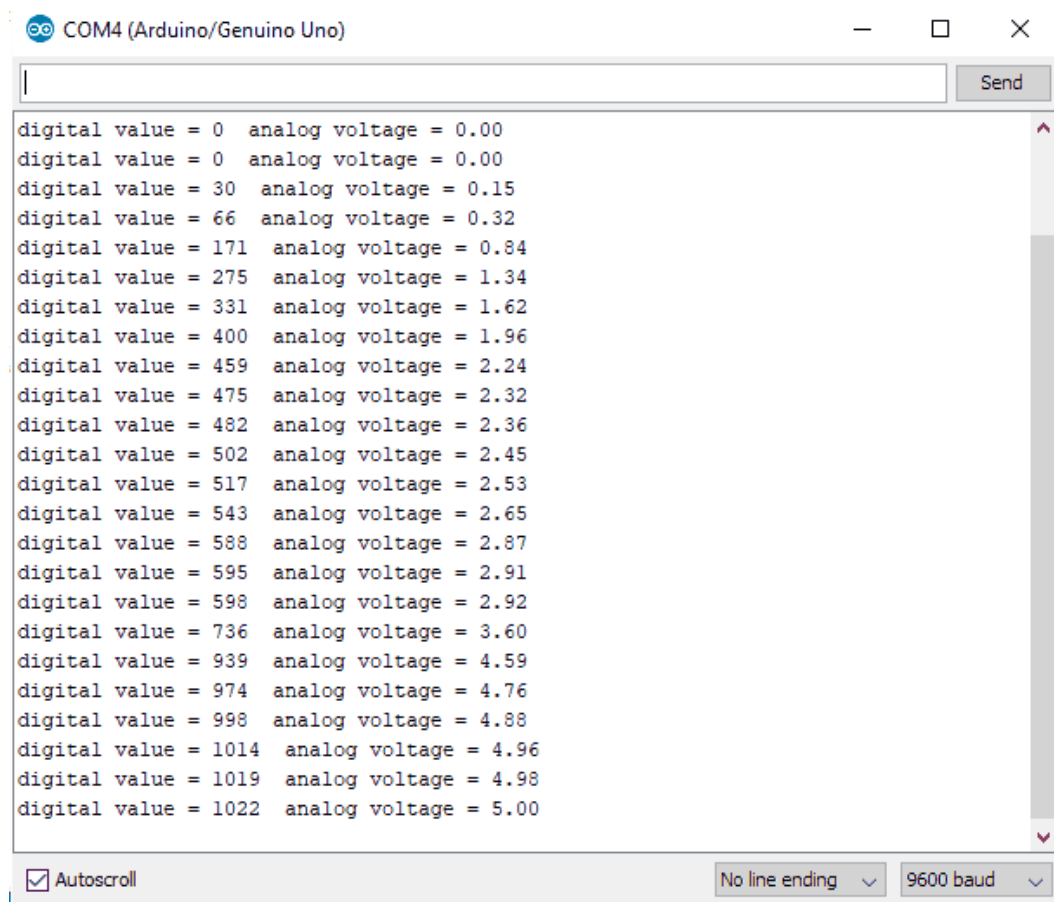Fig. 5 Flowchart to detect the presence of gas

4   RESULTS

After testing using sensor gas MQ2 in a gas leaking environment, the measurement results are obtained as shown in Table 1.

Table 1: Results for sensor gas MQ2

No.	Condition	Data
1.	No gas exists	0
2.	Gas exists	30-1022

From Table 1 it shows the data reading gap between the presence of gas released through the Arduino board. Zero-value data readings indicate that there was no gas present in the area while readings obtained in gaps 30-1022 indicate that gas was present in the area.

When the components are connected and sensor gas MQ2 is being activated, the computer will display the output program from Arduino IDE application to monitor the gas leakage situation and it is shown in Fig. 6.

Fig. 6 Programming results from the Arduino IDE application

Digital value as shown in Fig. 6 above shows the concentration of gas when it is detected by the sensor gas MQ2. When the Digital Value get bigger it shows the gas concentration is higher. Digital reading value in the ranges from zero to 400 is considered within the normal level due to the situation in the surrounding air where it has a gas but in a small quantity, while the number of value 400 up to 1022 indicate the gas concentration is at dangerous level.

5   DISCUSSION AND CONCLUSION

In general, this AGD system can detect a gas leak efficiently. It also gives a lot of benefits and positive impacts to consumers because it can be used to detect any leaking of dangerous gases [5].

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