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AUTOMATIC GAS DETECTING AND VALVE CONTROLLING SYSTEM

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Abstract

Now a Day's every system is automated in order to face new challenges. In present day, Automated systems have less manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronics automated systems are giving good performance. The project aims in designing a home system which is capable of detecting the LPG gas leakage and automatically controls the GAS regulator and gives the alerts through Buzzer and also switches on the exhaust fan automatically. In this project gas sensor is interfaced to the microcontroller. Gas sensor constantly measures the LPG gas. When the Gas sensor detects the gas are converted to digital using ADC and fed to the microcontroller. Then the microcontroller switch off the regulator valve through servomotor and active the buzzer and also switch on the exhaust fan. By this way we can take the prevention steps before occurrence of the major fire accidents and we can avoid the human losses and financial losses.

1. INTRODUCTION

Gas is a leading source of energy used for heating and cooking purposes in our homes. The two major types of gas which serves these purposes are liquefied petroleum gas (LPG) and natural gas. These two gases are hydrocarbon gases. Natural gas is basically methane gas while LPG gas is a blend of butane and propane gas or purely butane or propane gas. Gas leakage detection is a method of identifying dangerous gases in the surrounding environment by the use of sensors, thereby leading to prevent further consequence. LPG is the most commonly used gas that serves the purpose of cooking. LPG is a highly flammable gas and if leaked it can lead to major destruction to life and property. The major characteristic of LPG is that the gas being heavier than air, it does not easily disperse and when inhaled it leads to suffocation. The ignition of these leaked gases may lead to explosion. The number of death reports caused by gas leakage explosions has been enlarged in recent years. The

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reason behind such explosions is mainly due to the old cylinder valves, drained out regulators, shortage of substandard cylinders, and lack of knowledge of using gas cylinders add to the danger.

2. RELATED WORK

Abishek et.al [1] developed a system for detection of gas leakage incorporate with the tripping mechanism of main power supply which is to avoid any explosion due to it. The system was implemented and tested to conclude that the working of the system based on the concentration of gas present in the system. As the concentration level of the gas reaches to the threshold, the main power line gets shut-off and the alarm sounds loudly. S. P. S. Selvapriya C et.al [2] a microcontroller based model for detecting the gas leakage in a closed environment using sensors was developed. The test result produces the audio and visual alarm to alert the human and also sends a short message service (SMS) to the user.An Arduino based automatic gas detection and value controlling device has a wide range of applications to improve home security. The problem posed thus is used to implement a system that is capable of improving regulator functionality by detecting gas. A microcontroller is used to implement the control circuit which in turn positions a servo motor used to turn off the value of regulator optimally.

3. IMPLEMENTATION

The project seeks to follow the following steps:

➢ To design a system to automatic gas detection and valve controlling system.

➢ To provide a home security by controlling gas regulator.

➢ Automatic air purifying using exhaust fans and audible alert using buzzer.

Gas leakage detection is the process of identifying potentially hazardous gas leaks by sensors, additionally a visual identification can be done using a thermal camera These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. Exposure to toxic gases can also occur in operations such as painting, fumigation, fuel filling, construction, excavation of contaminated soils, landfill operations, entering confined spaces, etc. Common sensors include combustible gas sensors, photoionization detectors, Infrared point sensor,Ultrasonic sensors, Electrochemical Gas sensors, and Metal-oxide-semiconductor sensors (MOS sensors). More recently, infrared imaging sensors have come into use. All of these sensors are used for a wide range of applications and can be found in industrial plants, refineries, pharmaceutical manufacturing, fumigation facilities, paper pulp mills, aircraft and shipbuilding

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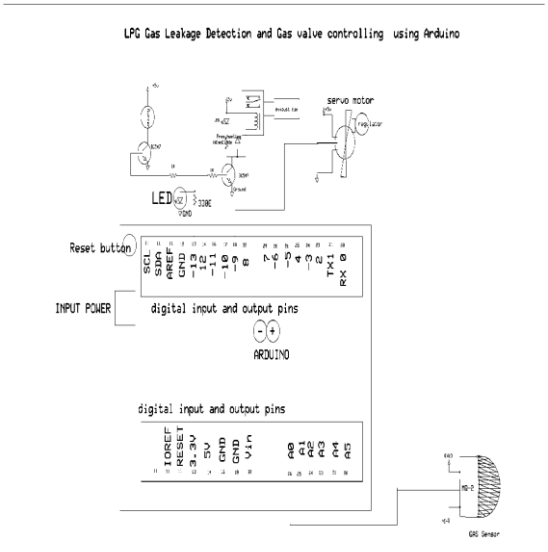
facilities, hazmat operations, waste-water treatment facilities, vehicles, indoor air quality testing and homes.The proposed system comprises of a gas sensor that detects the gas leakage and is interfaced with Arduino microcontroller. If the gas leakage was detected, Arduino informs the motor driver unit and immediately rotates the dc motor to close the gas cylinder regulator. The system uses a load sensor that continuously monitors the LPG ***Automatic gas detecting and valve controlling system*** level present in the gas cylinder. If the gas level reaches below the threshold limit, the user is alerted by an indication, thus the user can replace the old cylinder with new in time. An additional feature of the system is that if the users accidently leaves the gas stove burner on, the system will automatically turn it off. The system has included a timer controlles knob, which is used for setting the duration of cooking. When the timer count is completed, the controller automatically turns off the burner.If the system detects the level of gas in the air that exceeds the safety level it will activate the alarm which includes the buzzer to alert the users at home of the abnormal condition and to take any necessary action. The most tell-tale sign of a leak is the smell of gas in the home. However, in the case of a carbon monoxide leak, there are also particular physical symptoms you may suffer from if there is a leak. The output result of this paper is that the leakage will be detected and stopped within 2 s after the leakage starts. This system can even detect the level of gas leakage. This is an efficient method for automatically detecting and controlling the gas leakage. Moreover, the fire accidents are also prevented by switching off the power supply. The idea for gas detection and control can be implemented at a large scale for various industries. This system can be installed in a kitchen, at a hostel cafeteria, and any other areas. This can be helpful in reducing accidents caused by gas leakage Eng. Proc. 2020, 2, 28 5 of 6 in household as well as in any similar commercial set up. In our country there are 180 million people, and due to its low cost this product is affordable and will prevent many accidents and save many properties and human lives.



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4. EXPERIMENTAL RESULTS

The audrino based gas leakage detection and valve controlling system works with the power input of 5v given through the socket .the regulator is fixedly attached to the gas regulator ,initially when we switch on the device the valve is in open condition .whenever the gas is detected by the mq2 combustable gas sensor the audrino uno will take the decision to rotate the servo motor which is attached to the regulator valve to the off condition. Also at the same time the buzzer will be given the indication sound, also the exhaust fan will automatically turn on so that it will exhaust the gas which was somewhat leaked previously we are using relay board to control the speed of the exhaustable fans The power to the realy board ,buzzer board and servo motor through the breadboard which takes input power from the connecting wires .

5. CONCLUSION

The project “LPG Gas Leakage Detection and Gas valve controlling using Arduino UNO” was designed a home system which is capable of detecting the LPG gas leakage and automatically controls the GAS regulator and gives the alerts through Buzzer and also switches on the exhaust fan automatically. For the conclusion, the product name as automatic smoke absorber machine. The main focus to build up this machine is to create something new that very useful to most of the people around the world that very loved to breathe in the good air. It is a multifunction machine. This machine will pull up the smoke that comes from burning process and absorbed the smoke with the neutralization process using water mist/ water sprays. This machine is a environmental concept. Main focus to I build this machine to save our environment that worst day by day. As a lover to healthy environment, I wish to build up this machine for my final year projects. I hope I can fulfil my wish as I planned. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC’s with the help of growing technology, the project has been

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successfully implemented. Thus the project has been successfully designed and tests.

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