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A GAS LEAKAGE DETECTOR USING IOT

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Abstract: Combustible gas detection and measurement has become essential in many fields. Combustible gas leakages are capable of reaching large areas, affecting entire neighborhoods or even cities, causing devastating environmental impacts. This documentation presents an industrial monitoring system design using Internet of Things (IOT). This gas sensor which has captured information about combustible gas leakage will be posted into a data cloud. The gas sensor is capable of detecting the leakage of combustible gas under most of the atmospheric conditions. All the components are controlled by an Arduino that acts as a central processor unit in the setup. As soon as a combustible gas leakage was detected by the sensor, the alarm will be raised in the form of a buzzer. This alarm supports a small LCD to show the leakage location, to alert the respected person to turn on the exhaust fans or stop incoming gas in the particular section to extract the gas leakage. The capabilities of this gas detection system are not only to monitor continuously the surroundings but are also to help to prevent the gas leakage and hence minimizing the chances of fire and damage.

Keywords: IOT Gas leakage detector

I. INTRODUCTION

Safety at Industrial places like CNG and LPG should be always a priority. As we all know that Gas leakage always been a major problem with industrial sector, residential areas and gas driven vehicles such as CNG (Compressed Natural Gas) buses, cars etc. Security is the level of protection against dangers and losses. The help of this technology is needed to provide an early warning alert in order to ensure that enough time is available to prevent many potential dangers. There is always a risk of leakage whenever and wherever combustible gas is used, threatening human lives and properties. Therefore, designing a low-cost gas leakage detector helps in minimizing this risk over a span of few years. There have been several accidents caused by combustible gases (LPG or methane) leakages in homes and industries (mainly oil and gas).

Fig 1: LPG Leakage

These leakages had led to the loss of several lives and properties through fire outbreaks and explosions. One such prevention methods to stop these kind of accidents related with the gas leakage is to install a gas leakage detecting device at permeable places. The ultimate goal of this project is to design and develop such kind of a device which is capable to automatically detect and simultaneously stops the gas leakage in those permeable areas. The combustible gases can be detected by this system which has a gas sensor and it uses GSM to give the alarm to the person about the leakage of gas through a message or a call. When the combustible gas level exceeds the gas concentrations more than permissible levels, the device and sensor senses the leakage and the sensors output goes low. This is detected by the microcontroller and the LEDs and buzzers are turned on simultaneously.

II. EXISTING SYSTEM

There are numerous reviews regarding the topic of combustible gas leakage detection techniques were wiped out the past either as a part of research papers/technical reports on a particular leak detection method and other gas related subjects. Ch. Manohar and N. Sushma in 2008; they had introduced an automatic gas leakage detector and an indicating robot based on Android. They have proposed that this prototype model has a small mobile or a device which is capable of detecting the gas leakage at the hazardous and permeable places. Whenever there's an event of gas leakage during a particular allocated place the robot will immediately read and sends the info to android mobile connected to the robot through the means of wireless communications like Bluetooth. The aim is to

develop an android application for android based smart phones which is capable to receive data from robot directly through Bluetooth. This application warns the person with an indication whenever there is an occurrence of gas leakage at that particular hazardous place.

III. DESIGN AND DEVELOPMENT

Most combustible gases are basically a mixture of propane and butane which are highly inflammable chemicals. It's odorless gas in its wild to which Ethyl Mercaptan is added as powerful smelling agent, so as that leakage are often easily detected. We'll detect the LPG leakage within the cars, industrial sectors and residential areas employing an ideal gas Sensor. We'll easily implement the LPG gas leakage detector unit into a unit which can sound an alarm or provides a visible suggestion of the LPG concentration during a 16×2 LCD display. The sensor utilized during this project has both admirable sensitivity and rapid response time. This sensor also can be wont to sense other gases like isobutene, propane, LNG and even cigarette smoke. The output of the sensor goes low as soon because the LPG sensor senses any gas leakage. this is often detected by the microcontroller and thus the LED & buzzer are turned on. After a delay of few milliseconds, the fan is additionally turned on for throwing the gas out. There are varieties of hardware and software components needed to form this gas leakage detector as follows

IV.HARDWARE AND SOFTWARE SPECIFICATIONS

Hardware Specifications:

- Transformer (203-12 V Ac)
- Voltage Regulator (LM 7805)
- GSM Modem
- GPS Module
- Buzzer
- DC Motor
- Crystal Oscillator
- Microcontroller (At mega 328)
- In4007 &Led
- Resistors and Capacitors
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Push Buttons and LCD
- Switch
- IC
- IC Sockets

Software Specifications:

- Raspberry pi 3
- Programming Language: Python
- Python compiler

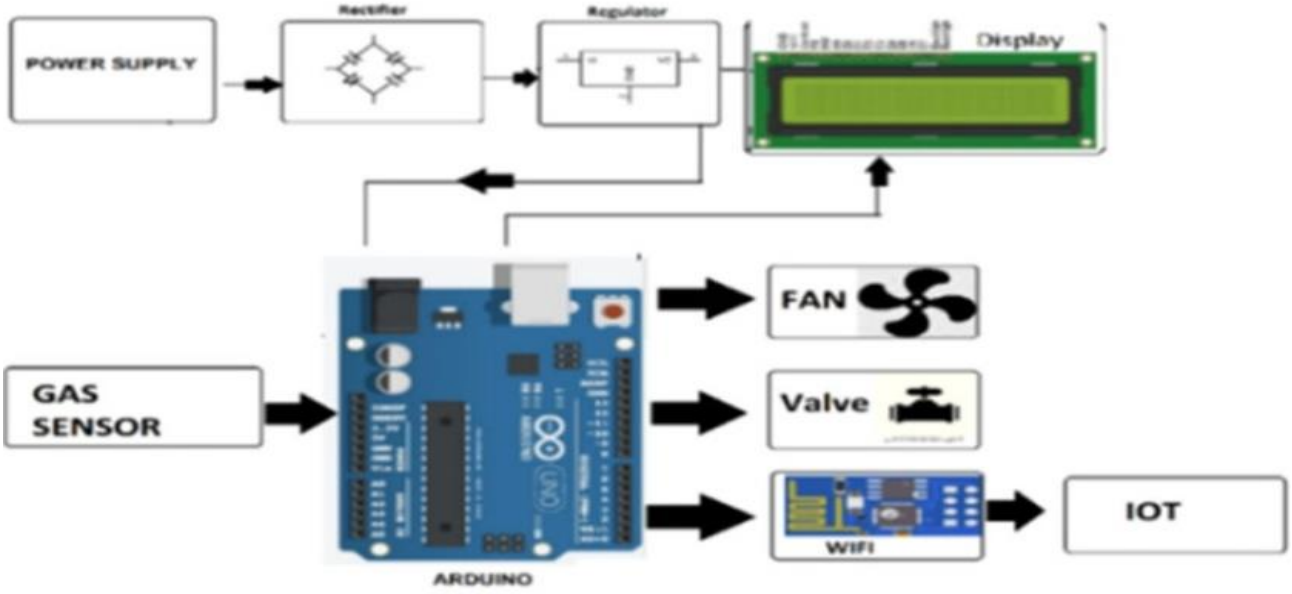

Fig 2: Gas Sensor Device

V. WORKING TECHNIQUES AND RESULTS

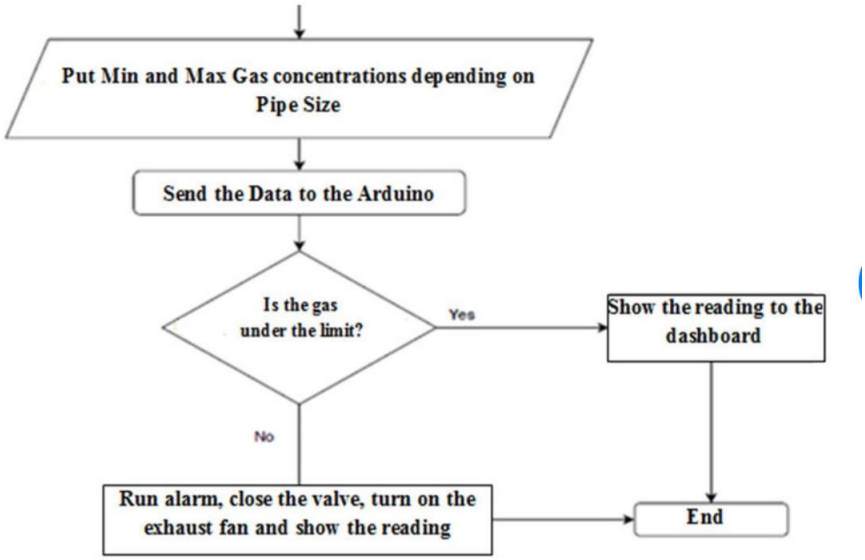

Fig 3: Working Flow LPG Gas Detector

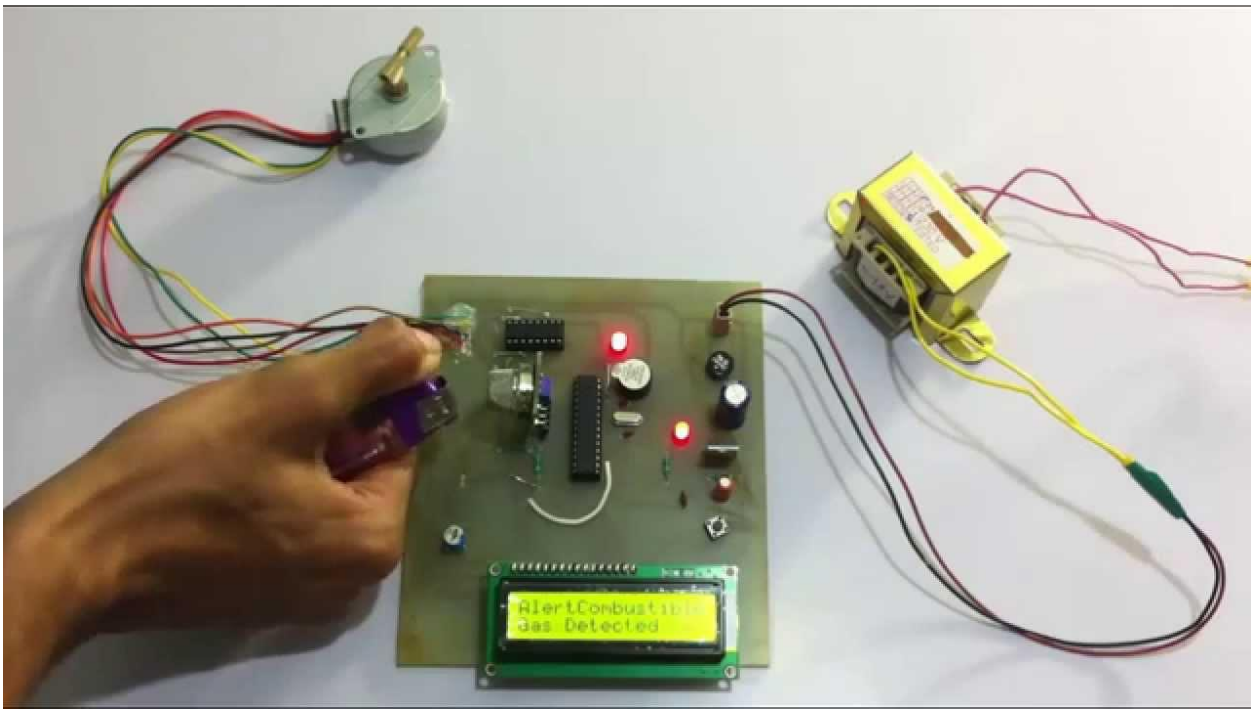

Fig 4: Gas Leakage Detector Using IOT

After the planning implementation, the device accurately detected the simulated gas leakages and a message was generated through the Wi-Fi network. The message was transmitted to the server to arm the buzzer for the aim of user alert. On an equivalent time the exhaust fans were automatically activated to suck out the leaked gas from the cavity , to stop potential ignition and fire hazards. This smart device gives many safety beneficial

signs which are vital for early gas leakage detection, and response towards preventing LPG leakage. With small modifications the system also can be used for household purposes to stop house gas leakages.

VI. CONCLUSIONS

Finally, we can conclude that in recent households, the use of LPG is taking a big toll. From the use of cylinder to the use of petroleum pipelines. The biggest problem for using this technology is security. And this project will prove to be a boom for the households and industries.

There are a good sorts of leak detecting techniques are available for gas pipelines. Some techniques are improved since their first proposal and a few new ones were designed as a result of advances in sensor manufacturing and computing power. However, each detection method comes with its ups and downs. Leak detection techniques in each category share some ups and downs.

This project is very cost efficient and provides a very high security on gas leakage hence can be used in various fields and industries.

VII. REFERENCES

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