Gas Leakage Detection And Controlling System Using IoT

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Abstract- *Safety plays a major role in today's world and it is necessary that good safety system be implemented in the home. One of the most serious problems that one could have with the kitchen is a gas leak. To overcome this problem we introduced Gas leakage detection and control system using IOT. A new method of designing and development of a microcontroller based toxic gas detection system is proposed. If the toxic gas leakage is detected, the microcontroller automatically alerts by sending SMS to the mobile number from the cloud, through Wi-Fi and also gives Buzzer Alert. The gas leakage is controlled by an Exhaust fan, which is automated by the microcontroller. The advantage of this automated detection/alert system is that, it offers faster response time and accurate detection of an emergency in turn leading to faster diffusion of the situation, compared to manual methods.*

I. INTRODUCTION

The Internet of Things is an emerging topic of technical, social, and economic signiftcance. Consumer products, durable goods, cars and trucks, industrial and utility com- ponents, sensors, and other everyday objects are being combined with Internet connectivity and powerful data analytic capabilities that promise to transform the way we work, live, and play. Projections for the impact of IoT on the Internet and economy are impressive, with some anticipating as many as 100 billion connected IoT devices and a global economic impact of more than 11 trillion by 2025. The Internet of Things (IoT) is an important topic in technology industry, policy, and engineering cir- cles. This technology is embodied in a wide spectrum of networked products, systems, and sensors, which take ad- vantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities. The large-scale implementation of IoT devices promises to transform many aspects of the way we live. For consumers, new IoT products like Internet- enabled appliances, home automation components, and energy management devices are moving us toward a vision of the "smart home", offering more security and energy efftciency. IoT systems like networked vehicles, intelligent trafftc systems, and sensors embedded in roads and bridges move us closer to the idea of "smart cities", which help minimize congestion and energy consumption. IoT technology offers the possibility to transform agricul- ture, industry, and energy production and distribution by increasing the availability of information along the value chain of production using networked sensors.

II. LITERATURE REVIEW

In the year of 2008, LIU zhen-ya, WANG Zhen-dong and CHEN Rong, "Intelligent Residential Security Alarm and Remote Control System Based On Single Chip Computer", the paper focuses on, Intelligent residential bur- glar alarm, emergency alarm, ftre alarm, toxic gas leakage remote automatic sound alarm and remote control system, which is based on 89c51 single chip computer. The system can perform an automatic alarm, which calls the police hotline number automatically. It can also be a voice alarm and shows alarm occurred address. This intelligent security system can be used control the electrical power remotely through telephone. In the year of 2008, Chen Peijiang and Jiang Xuehhua, "Design and implementation of Remote Monitoring System Based on GSM", this paper focuses on the wireless monitoring system, because the wireless remote monitoring system has more applica- tions a remote monitoring system based on SMS through GSM In the year of 2002, K. Galatsis, W. Wlodarsla

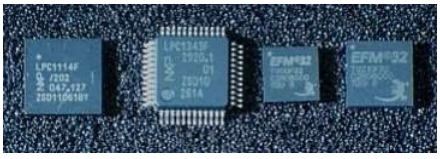

Figure 1. ARM Cortex-M0 and Cortex-M3 IC

sors for vehicle cabin air quality monitoring", this paper focuses on, car cabin air quality monitoring can be effectively analyzed using metal oxide semiconducting (MOS) gas sensors. In this paper, commercially available gas sensors are compared with fabricated Moo3 based sensors possessed comparable gas sensing properties. The sensor has response 74tested.

III. MATERIAL PROPERTIES AND DESIGN SPECIFICATION

ARM CORTEX M4

The ARM Cortex-M is a group of 32-bit RISC ARM proces- sor cores licensedby ARM Holdings for microcontroller use. The cores consist of the Cortex-M0, Cortex-M0+, Cortex- M1, Cortex-M3, Cortex-M4(F), Cortex-M7(F), Cortex-M23, CortexM33(F). The ARM Cortex-M family are ARM mi- croprocessor cores which are designed for use in micro- controllers, ASICs, ASSPs, and SoC. Cortex-M cores are commonly used as dedicated chips, but also are "hidden" inside SoC chips as power management controllers, I/O controllers, system controllers, touch screen controllers, smart battery controllers, and sensors controllers. Cortex- M4 Conceptually the Cortex-M4 is a Cortex-M3 plus DSP Instructions, and optional floating-point unit (FPU). If a core contains an FPU, it is known as a Cortex-M4F, other- wise it is a Cortex-M4.

GAS SENSORS

The Figure below of the MQ-2 gas sensor unit may com- monly illustrate us more LPG sensor It is an ideal sensor to detect the presence of a dangerous LPG leak in our home or in a service station, storage tank environment and even in vehicle which uses LPG gas as its fuel. This unit can be easily incorporated into an alarm circuit/unit, to sound an alarm or provide a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time. When the target combustible gas exist, the sensor's conductivity is higher along with the gas concentration rising. LPG gas sensors change of conductivity to its corresponding output signal

MODEL NO	MQ-2
SENSOR TYPE	SEMICONDUCTOR
STANDARD	BAKELITE
DETECTION GAS	LPG,PROPANE HYDROGEN
CONCENTRATION	300-1000 PPM

of gas concentration. MQ-2 gas sensor shown in ftgure is used to sense the poisonous gas and has high sensitivity to LPG, and also response to Natural gas. It is a portable gas detector which has long life with low cost.. Model No. MQ-2 Sensor Type Semiconductor Standard Bakelite (Black Bakelite) Detection Gas PROPANE, HY- DROGEN,LPG Concentration 300-1000ppm (Hydrogen, Propane, LPG). When the target combustible gases exist, the sensor's conductivity is higher along the gas concen- tration increasing.. Raspberry pi 3 has been used as a single-board computer with wireless LAN and Bluetooth

.It is a powerfull processor which can run full range of ARM GNU/Linux distributions as well as windows 10 IOT edition. The raspberry pi 3 is installed in our project model which supports linux operating system and python language coding commands which helps us to control and monitor the detected gas level through a sensor and it is interfaced with a free web page is linked via cloud inter- face raspberry pi 3 model which in turn is runned with set of python coding commands which detects and tells us about the real time value of gas level in the plant via MQ-2 sensor units.

IV. CONCLUSION

An overall conclusion IOT based toxic gas detector, or IOT technology has come a long way since it was conceptualized two decades ago. It has become more efftcient, more applicable to today's applications and smarter. The work presented in this project was directed towards pushing IOT technology to the next level. The work has presented solutions to several problems and issues that have not been addressed in previous work. The principle of opera- tion of Operation of IOT based gas leakage and monitoring system was shown by operating the Raspberry pi 3 model attached with embedded system with required input and output gas level with the help of gas sensors. This results in a more efftcient in operation because it is connected to a common web page specially built to notify or email the responsible authority automatically so reduces the stress of constant monitoring. The choice of using a real time gas leakage monitoring and sensing the output

levels of gas has been clearly observed by the help of this system.

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