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SMART KITCHEN USING IOT

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***Abstract*— Now a days, things are changing rapidly in the world. Many machines are developed which made human life easier. Now, peoples are so much busy in their work. People think that there should be a technology that will reduce their work load. Internet of Thing fulfils this requirement of people. People regularly go in kitchen for cooking the food. But it will become a dangerous situation if there is leakage in gas cylinder. Our aim is to reduce the risks in Kitchen using Internet of Things. We proposed the design and construction of an SMS based Gas Leakage Alert System. Gas sensor were used to detect gas leakages in a kitchen; its outputs are then interfaced with an ATmega32 microcontroller programmed in assembly language. The GSM phone is configured to send gas leakage alerts in the form of a short message service (SMS). We can get this and much more safety feature that can be integrated with the automation system includes temperature sensor, weight sensor. Our system provides results in the form of SMS. The system enables monitoring of gas leakages in kitchen and thereby leads to a faster response time in the events of a leakage condition.**

***Index Terms*— Gas leaks, gas sensors, temperature sensors, weight sensors, microcontroller, SMS alert**

INTRODUCTION

IOT has changed the life of human beings. Enormous increase in users of Internet and modifications on the internetworking technologies enable networking of everyday objects [1]. Each things is uniquely identifiable through its embedded computing system within the internet infrastructure [2]. If the settings of the environment can be made to respond to human behaviour automatically, then there are several advantages. Ambient intelligence responds to the behaviour of inhabitants in home and provides them with various facilities [3]. "Internet of Things" is all about physical items talking to each other, machine-to-machine communications and person-to-computer communications will be extended to "things"[4]. The ultimate goal is to create "a better world for human beings", where objects around us know what we like, what we want, and what we need, and hence act accordingly without explicit instructions [5].

Natural gas is an energy source that is commonly used in homes for cooking, and heating. Financial loss as well as human injuries are happened due to accident cause by gas leakage. To detects gas leakage and alerts the subscriber through alerts and status stored in database and display on android device is the work aims of the designing a system [6] .The system is an intelligent system, as it does not create a noise nuisance by continuously sounding alarm but gives the alerts to the users. Explosions due to gas leakages are avoided by this technology and improve safety of life and property while using domestic cooking gas.

We proposed the design and construction of an SMS based Gas Leakage Alert System. Gas sensors were used to detect gas leakages in a kitchen; its outputs are then interfaced with an ATmega32 microcontroller programmed in assembly language. The GSM phone is configured to send gas leakage alerts in the form of a short message service (SMS). We can get this and much more safety feature that can be integrated with the automation system includes temperature sensor, weight sensor. Continues monitoring of gas leakages in kitchen is performed by this system.

IMPLIMENTATION

1. Sensing Unit

We have used 3 sensors in our device. We used gas sensor, weight sensor and temperature sensor. Gas sensor is a high sensitivity Liquefied Petroleum Gas (LPG) sensor which detects the gas leakage. It is a semiconductor type sensor with very low conductivity,

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fast response time and stable long life. However, it is not only has sensitivity to LPG, but also to slightly sensitive to polluted fluid like cigarette smoke and alcohol. Gas cylinder should be placed on weight sensor. Weight sensor can provide weight of gas cylinder. In our system, Temperature sensor is used to measure the temperature in kitchen.

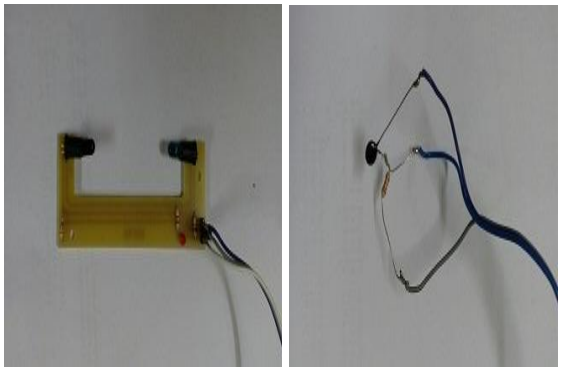

Figure 1.Gas, Temperature, Weight Sensors

2. Power Supply Unit

The power supply unit was designed to supply voltages of 230V. This was achieved by rectification. It is used to power the microcontroller.

Figure 2. Power supply unit

3. Microcontroller Unit

This unit is divided into two parts, hardware part and software part. The hardware is essentially the microcontroller. Microcontroller is a single chip containing a microprocessor, memory (RAM & ROM), input/output ports, timers and serial ports and it is designed for embedded control applications. we know that the main use of microcontroller is the control of a machine or system using a fixed program stored in the ROM and this program does not change over the lifetime of the system[7].

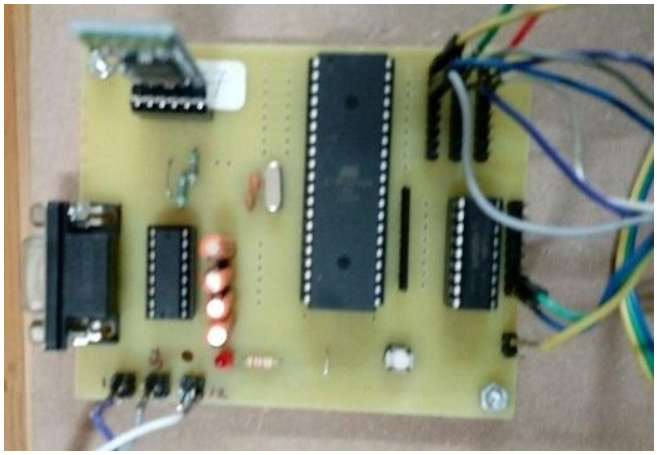

Figure 3. ATmega32 microcontroller

We used ATmega32 microcontroller. ATmega32 is an 8-bit high performance microcontroller of Atmel's Mega AVR family. ATmega32 is based on enhanced RISC architecture with 131 powerful instruction. Most of the instructions execute in one machine cycle. ATmega32 can work on maximum frequency of 16MHZ.It contains 8-channel 10-bit A/D Converter and a JTAG interface for on-chip debugging. The device supports throughput of 16 MIPS at 16 MHz and operates between 4.5-5.5 volts.

4.Alert Unit

The alert unit is the Android phone that sends SMS alerts. We have created an application for alert purpose. We defined certain threshold values. If readings from the sensors goes below the threshold values, then it will send SMS alert to the user. The application receive signals from the microcontroller. The microcontroller sends signals to the application for 50ms and then waits for another 1s before sending another signal. With these signals the application perform the function of controlling the phone to access SMS alerts already stored on the phone and sending it to a specified number on the phone.

5.Software Development

The software needed to run the control process of this system was developed using Assembly language in the microC PRO for AVR. The program code was then written into the chip. NetBeans IDE s used to write code for android application.

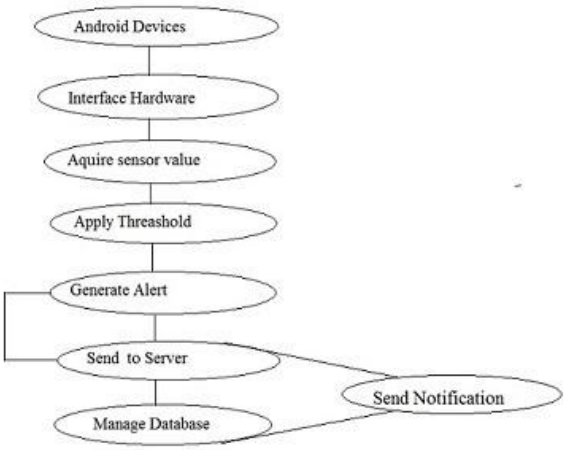

Figure 4. System flowchart

6. Construction

The system was constructed in modules as designed and later put together on completion to simplify construction, testing and maintenance. After verifying that all the components are working as expected, we integrated them into a single system. The entire system circuit as shown in figure 6 was laid out carefully to minimize error and to ease troubleshooting.

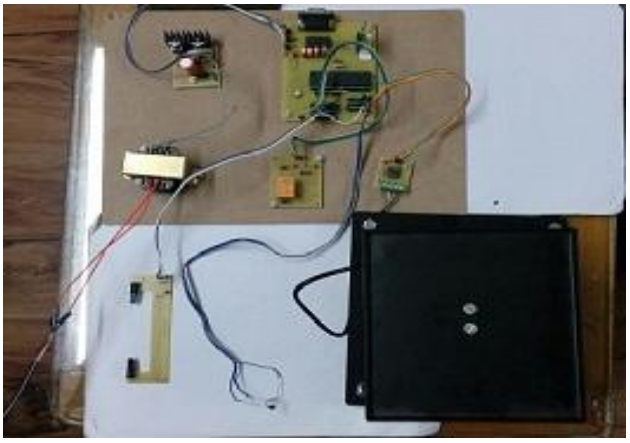

Figure 6. Circuit for gas leakage detection

7. Testing and Results

Hardware and software portions used were separated into units while developing the entire system. Building and testing smaller sections of the system made it more manageable and increased efficiency by decreasing debugging time. The power supply unit in the figure 2 was first tested to ensure it could supply the required power to the circuit. The sensing unit was also tested before interfacing it with the microcontroller and it was

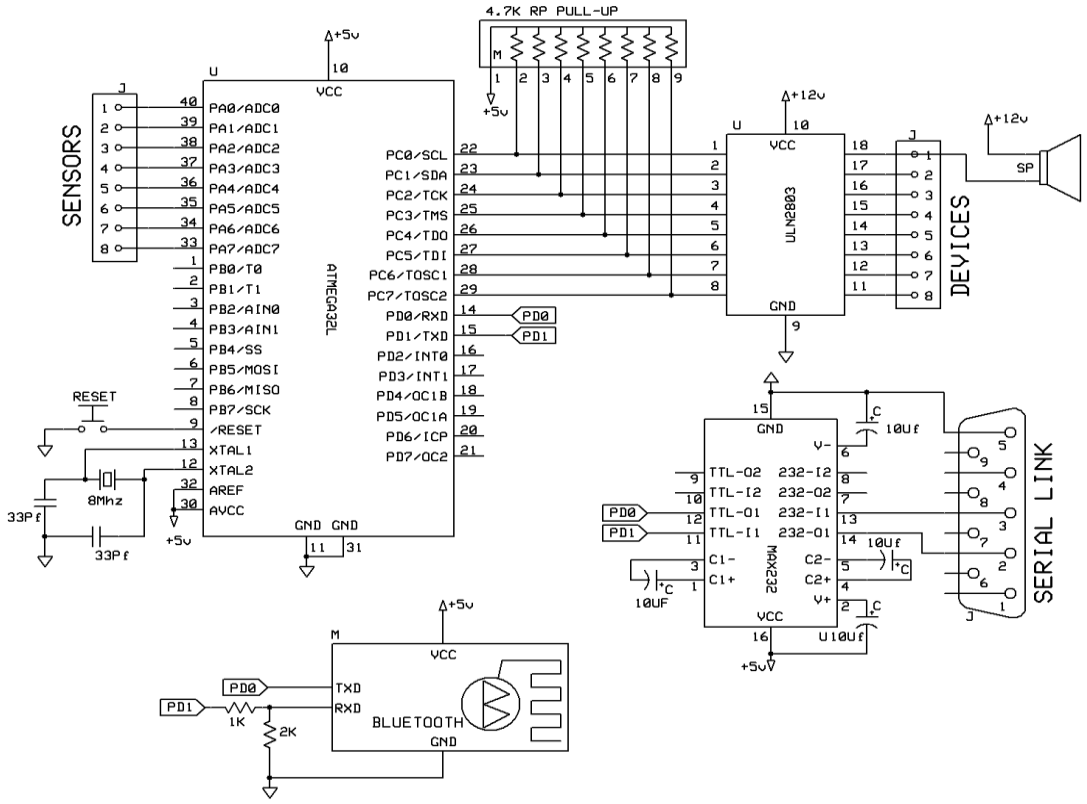

Figure 5.Circuit Diagram

found that it was capable of delivering an output signal wherever there was a gas concentration at its input. The gas sensors was tested with the help of the gas from a simple disposable lighter. The weight sensor was tested with small bucket of grains, As we add or removed grains from bucket reading of sensor changed. The temperature

sensor is tested in room. After it was confirmed that the sensing unit delivers output in response to gas at the input, the outputs at both the sensors were conditioned and fed to the microcontroller. The microcontroller monitors the sensors and on receiving signal it sends another signal to the application. after that application send message After the whole system unit had been coupled, the gas leak alert system was tested as a functional unit and was
found to be working.

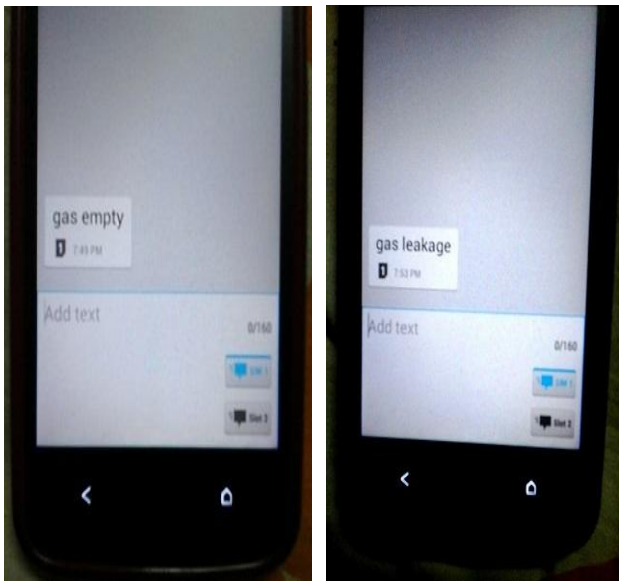

Figure 7. Message sent to end user

CONCLUSION

Our Smart Kitchen using IOT system with multiregional sensors has been designed, constructed and tested. The result obtained from the tests carried out shows that the system is capable of sending SMS alerts whenever there is gas concentration at the inputs of the gas sensors. Hence this system can be used in homes and public buildings such as hotels and restaurants. Smart kitchen provides you all the automation features that includes safety features over gas leakage detection system. For this we are using a gas sensors, temperature sensors, weight sensors. Gas sensors are used to detect the leakage of a gas in the system, weight sensors are used to detect the weight of the gas cylinder. Temperature sensors are used to detect the current room temperature. Server stores information and related data are stored in it, it also stores the information about the hardware, sensors, and also maintain the logs and status of system, also stores the room temperature and information about the users. Threshold values are set into the room, when it crosses that values it will send a notification to the user, about the leakage of a gas cylinder and leakage of a gas. Server can communicate with the user through android device. Through email and SMS server can sends a notification to the user which will display on the android devices. It can prevent the accident and hazards. The only way to access the information is if the user is far from the home. It is a cost effective and time consuming solution. We can use this in various applications like home automation, Hospital management, Military management, industrial applications.

FUTURE WORK

One of the modifications is to provide the system with a dual power supply i.e. include a battery power supply source in addition to the utility power supply**.** Design the sensors that can be used for more kitchen parameters. Apply various techniques to make the system more secure.

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