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Safety Monitoring System for Gas Leakage Detection using IOT

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Abstract : An end to end wireless sensor network is integrated for gas leakage detection and monitoring applications. It fully utilizes IOT (Internet of Things) functionalities and capabilities. The project involves both hardware and software unit. The wireless sensor nodes are pre deployed for LPG gas leakage in residential areas, hotels, industries, factories and etc. It is responsible of collecting, analyzing and forwarding the data to the monitoring centre through the wireless medium called IOT controller. In case of gas leakage, an appropriate action will be taken immediately in order to avoid danger.

KEYWORDS: Gas Leakage Detection, Internet of Things, Wireless Sensor Networks, Clustering

I. INTRODUCTION

Nowadays, most couples leave for work early in the morning and get back only in the evening. Most people also have to travel to other cities for their work. When they are away, their house is empty. Therefore case like leakage of LPG and short circuitry Leakage or else is easy to occur because the home owners are not in the house. Our Country India has many such cases and still going ascending day by day. The based solution is to develop home security system using a wireless to keeps your house safe from such accidents and enables you to work in peace.

Based on the events above, the project can be developing to make our home secure and safe. We never anxious and worried anymore even we leave the house. So this project is to design and develop a home security system that can provide security against Gas leak, Leakage and other emergency situation by alarm via calling to the home owner as there is something suspicious at home. Today there are a many wireless home security alarm system available in the market. Some are designed for very high security level protection and some are basic type. Most of the alarm systems are very expensive and therefore not affordable by poor or middle class families. Some systems which cheaper in cost do not provide reliable features like status checking. To provide the public with a cost effective wireless security system, it is important to design a low cost system with advanced features which ease the residents' life and benefits the public and also will decrease the accident rate of India. Besides that, to develop the system that can monitor Gas leakage and Leakage detector including control appliances in our home is a good matter. It is important because the system can be help people through the realization of fully automated home protections. So this project wills develops and design the home security system that can control the lamp in the house. Not only in home, this project will helps to maintain a gas leakage in hotels, factories, educational institutions, industries and still more.

Paper is organized as follows. Section II descres the IOT based intelligent gas leakage detection system using arduino. In Section III cluster based approach is used to detect gas and to intimate the network coordinator, then it will be transferred to the particular person via IOT controller. Section IV shows the experimental results and Section V presents Conclusion.

II. RELATED WORK

The concept of Internet of Things was first developed SomayyaMadakam, R. Ramasway, SiddharthTripathi [1]. In this the general concept of IOT is explained. Internet of Things (IOT) started changing in earnest the way we live, work and play. Many applicationslike factory digitalization, safety and security, quality control, product flow monitoring,



packaging optimization and etc., has been described by VandhanaSharma and Ravi Tiwari [2]. Then the microcontroller based gas leakage detection system was developed at low cost for residential applications by the author [3]. In [4], the author used the concept of sensor based gas leakage detection system, in which only detection can be done but not the monitoring system. Later on, in [5], the author uses IOT based intelligent gas leakage detection system based on arduino.

III. METHODOLOGY

In this, cluster based approach is used in which the various sensor nodes are pre deployed. The sensor used here are oxygen sensor, temperature sensor, accelerometer sensor, gas sensor. The sensor nodes deployed are responsible of collecting and analyzing the data. One node will be acting as cluster head node (CH node). If the gas exceeds the predetermined value, that is indicated as leakage. In case of any leakage, the sensed data will be transferred to the cluster head node, which in turn passes the information to the network coordinator. From the network coordinator, the data packets will be moved to the task manager via the wireless medium called IOT controller. An alarm beeps and sms will be sent to the particular person whose number is registered.

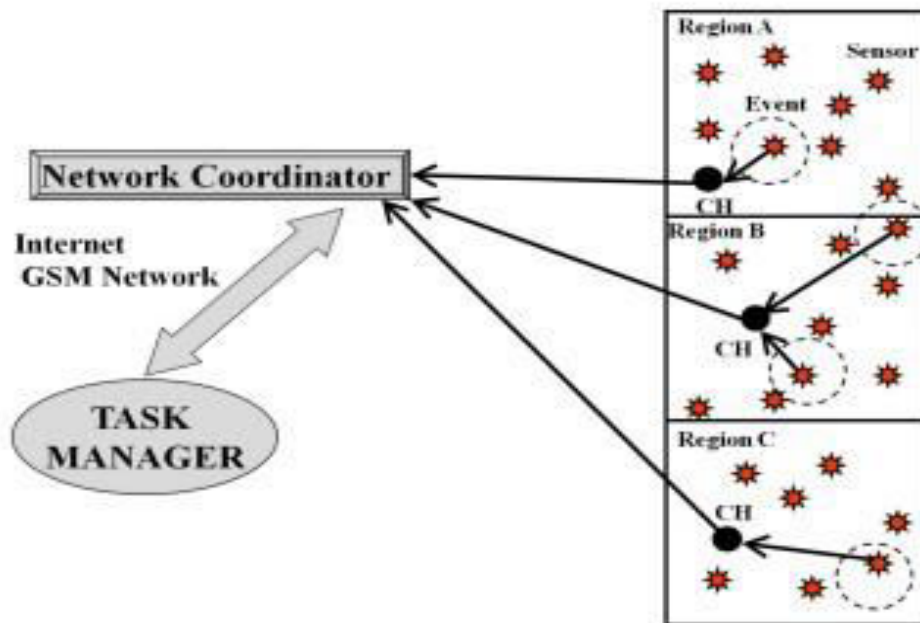


Fig1. Cluster based Approach

IV. EXPERIMENTAL RESULTS

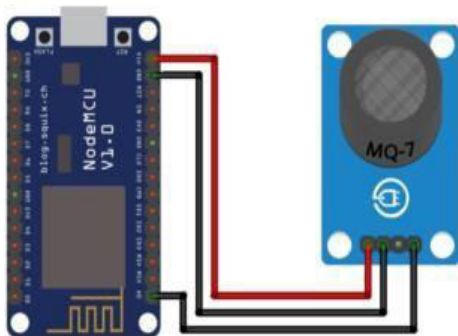


Fig 2 Node MCU with MQ7

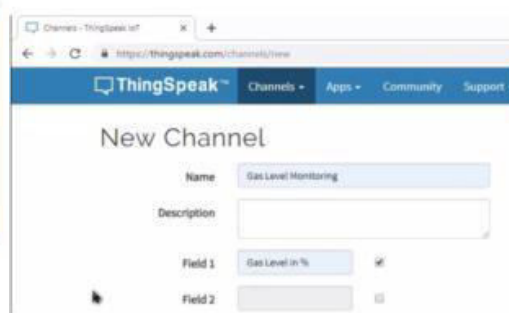


Fig 3 ThingSpeak dashboard



Fig 2 shows the node MCU(ESP8266) connection with MQ7(Gas and Smoke sensor) and Fig 3 shows the dashboard of ThingSpeak through Wi-Fi.



Fig 4 Varying gas levels in percentage

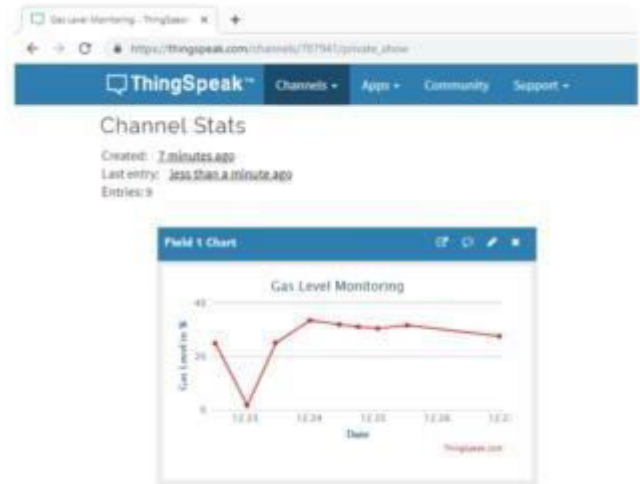


Fig 5 Gas level monitoring graph indication

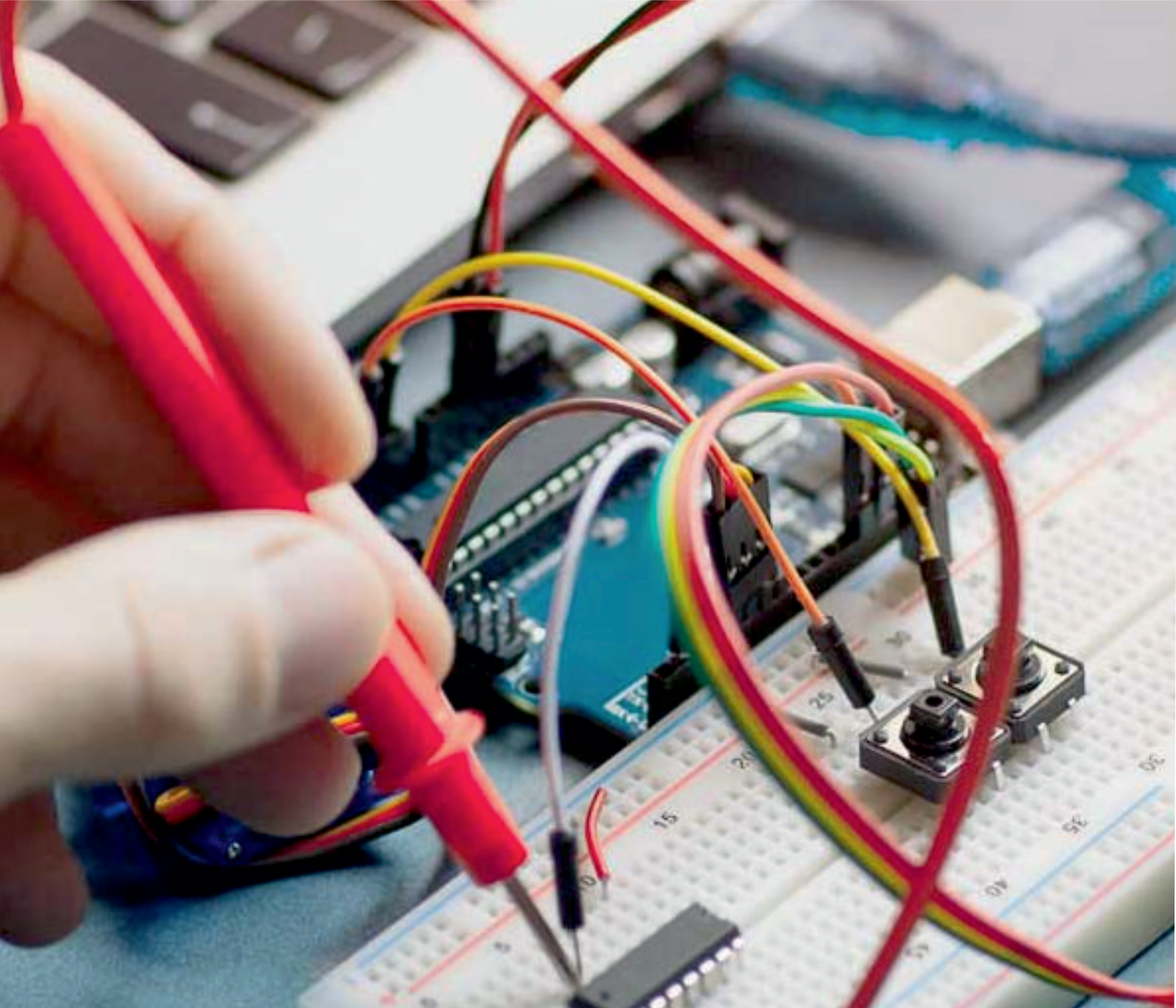
Fig 4 shows the varying gas levels in percentage and Fig 5 shows the gas level monitoring graph for every 15 minutes.

V. CONCLUSION

Using cluster based approach, an end to end wireless sensor node network for gas leakage detection and monitoring is integrated by fully utilizing IOT. With the help of ThingSpeak dashboard, we can monitor the gas levels and immediate action will be taken in case of leakage. Safety is assured by doing this which is one of the major role.

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