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Smart Industry Based Environment Monitoring and Controlling System

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Abstract: **- A smart city enables the effective utilization of resources and better quality of services to the citizens. To provide services such as air quality management, weather monitoring and automation of homes and buildings in a smart city, the basic parameters are temperature, humidity and Co and Light intensity, gas leakage. This project presents a customised design of an environment monitoring system to monitor temperature, humidity and CO and Light intensity, gas leakage. In this project we have used an ARM controller as main controlling unit, a Wi-Fi module to let know the condition of environment of particular area to the authorized user, sensors like gas sensor, temperature and humidity sensors for monitoring environment and light, motor and buzzer as output device who has to work according to the environmental conditions, decision about how the output devices has to work is took by the main controller unit.**

***Index Terms*— Internet of things, smart city, ARM.**

I. INTRODUCTION

The significance of condition checking is existed in numerous perspectives. The conditions are required to be observed to keep up the solid development in crops and to guarantee the protected workplace in enterprises, and so forth. Because of innovative development, the way toward perusing the ecological parameters ended up noticeably less demanding contrasted with the previous days. The sensors are the scaled down electronic gadgets used to quantify the physical and ecological parameters. By utilizing the sensors for checking the climate conditions, the outcomes will be exact and the whole framework will be speedier and less power expending. IoT empowers to be associated with for all intents and purposes boundless gadgets over the web. It in this way has an incredible capability of imparting and connecting with them. Condition observing is one of the real utilization of remote sensor network.WSN comprise of various sensors which are broadly dispersed to screen distinctive condition parameters like temperature, moistness, gasses, weight, wind speed and so on. The utilization of remote encompassing sensors can prompt more vitality productive structures. WSN comprises of sensor hubs which are ease gadgets with restricted power. This framework is utilized to quantify the imperative parameters of condition, for example, temperature, dampness, CO and CO2 utilizing sensors which are reasonable for detecting the natural parameters. The information gathered by condition parameter detecting sensor is transmitted to the cloud utilizing Wi-Fi innovation. The MCP3204 A/D converter is utilized to interface the sensors with ARM7 based LPC2138 microcontroller. In the event that temperature surpass above limit esteem then exhaust fan will automatically on and if gas spillage happens window on consequently, additionally buzzer on.

II. RELATED WORKS

An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels). When the objects like environment equipped with sensor devices, microcontroller and various software applications becomes a self-protecting and self-monitoring environment and it is also called as smart environment. In such environment when some event occurs the alarm or LED alerts automatically. The main aim of this paper is to design and implement an efficient monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the sensors are stored in the cloud and to project the estimated trend on the web browser [1]. Continuous monitoring of any sensitive environment helps to meet security and regulatory compliance needs. Monitoring temperature and/or humidity conditions is an essential ingredient of a wide range of quality assurance applications. Monitoring deterioration would provide an early warning of incipient problems enabling the planning and scheduling of maintenance programs, hence

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minimizing relevant costs. Furthermore, the use of data from monitoring systems together with improved service-life prediction models leads to additional savings in life cycle costs. In this paper digital humidity temperature composite (DHT11) sensor is used to sense the environmental temperature and relative Humidity. Arduino microcontroller is used to make complex computation of the parameters and then to transmit the data wirelessly by using zigbee S2 module to the receiver. At receiver section zigbee S2 module is used to capture the serial data, which is transmitted, by transmitter and using Digit's XCTU software the data is logged onto PC[2]. The agricultural practices such as irrigation, crop rotation, fertilizers, pesticides and animals were developed long ago, but have made great strides in the past century. The concern of better quality agricultural products from the consumers made the farmers adapt to latest agricultural techniques by implementing modern technologies for producing better agricultural products. Among the important things which are taken into consideration by the farmers are the qualities of agricultural land, weather conditions etc. In this paper we have discussed about monitoring of agriculture parameter using soil moisture level sensor, Wireless technology. We update the parameter result from the sensor node data is transferred to the wireless transceiver to another end server PC. From the PC, then after that values are analyzed and some predicate are applied on it. If they give positive response, then there will continuous monitoring but if it shows negative then it will provide total farming solution and cultivation plan. It also sends these all solution to farmers or user via SMS to them in their regional languages [5]. We can design a system to monitor all or any of these parameters as and when required. For monitoring purpose, we need to install some sensors on each node. A node will interact with sensor and will transfer that data to controlling unit. A controller will receive data from each node and can take action depending on programming done. User can use Graphical user Interface (GUI) to manage all activities or to check data at any time. GUI can be designed using python, HTML, CSS or any other language. Depending on sensor types, various monitoring services can be designed. To monitor and control services or action we can use Internet. Data acquired by sensors can be transferred over network by using web server or by using some SMS service. To provide energy, battery cell can be used [6]. Environment monitoring has been deployed for air quality monitoring. The Environment monitoring is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a micro controller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery. The proposed air quality monitoring system is implemented in different phases. The phases are sensors interfacing, Wi-Fi network formation for sensors data transfer to cloud and then user this data easily.

2.1 Proposed Architecture

In this project we design the system which is helpful for monitoring environment parameter. The temperature sensor, Co sensor, humidity sensor and Co2 should be used to detect environmental parameters. Each sensor is separately connected to the MCP3204 (ADC) transmit the information on about the environmental parameters to the Wi-Fi Module. This Wi-Fi Module sends the information to the thingspeak cloud then the user can see the environment parameter information on the mobile phone as well as laptop using web browser in the form of graph. Buzzer is connected to ARM7 based LPC2138 microcontroller. Buzzer will is on when gas leakage occurs as well as when temperature goes above threshold value; it will alert the surrounding people using its volume. When gas leakage occurs the automatically window will open for releasing gas outside. When temperature exhausts threshold value then exhaust fan will on. Using this system industry as well as home, office environment monitoring made easy.

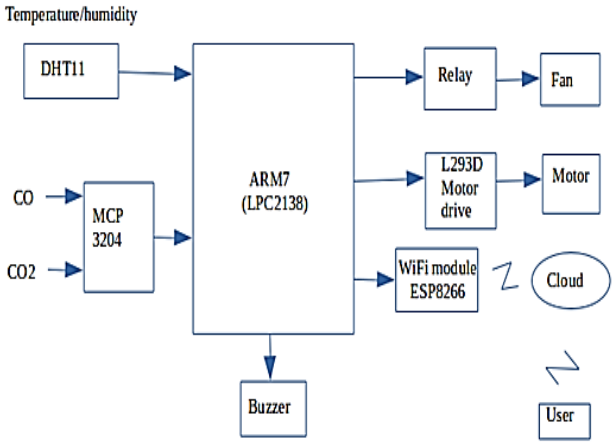

Fig.1. Block Diagram of proposed system

2.2 System Algorithm

We propose an algorithm to describe the operation of the system.

Step 1 Below is the algorithm of the proposed system

Step 2 Initialize the system.

Step 3 ARM7 gets the environment parameter by using different sensors such as temperature /humidity sensor i.e. DHT11, Co sensor i.e. MQ7.

Step 4 ARM7 controls the light, exhaust fan based on

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monitored environment parameter.
Step 5 Send information about changing values of sensor to thingspeak server using ESP8266.
Step 6 Access data of sensors and monitor output devices using thingspeak server.
Step 7 Stop.

2.3 Flow Chart

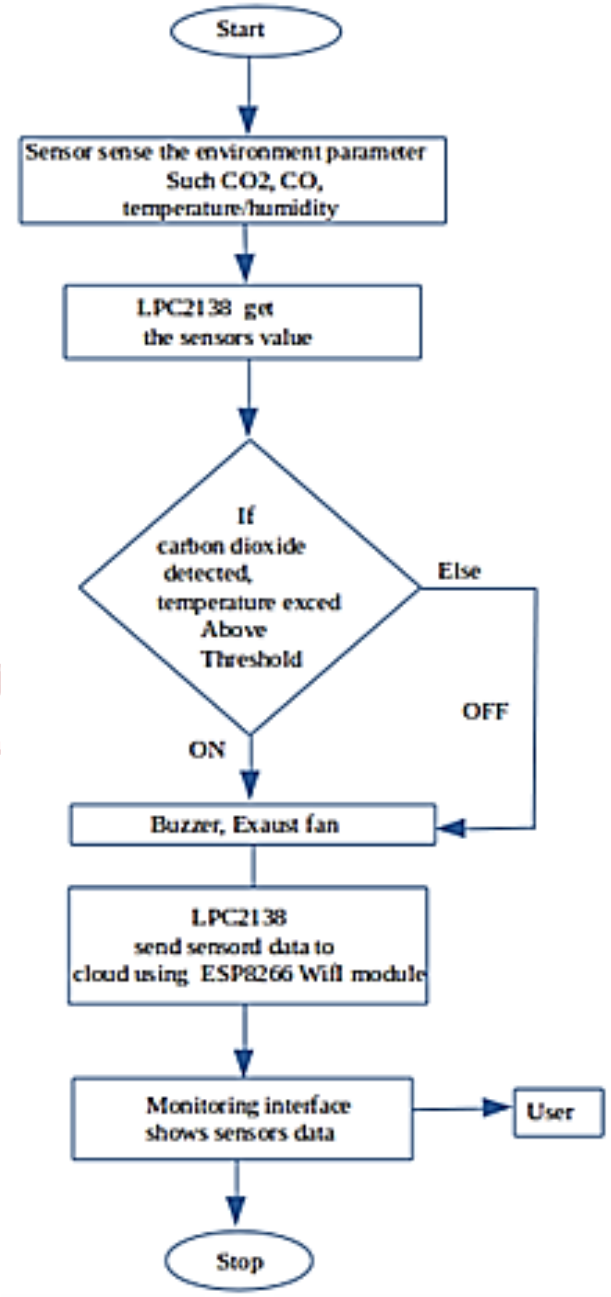

Fig 2 Flow of system operation

III. RESULT AND ANALYSIS

Thingspeak page
Fig 4shows the login page of the IoT based environment monitoring system.

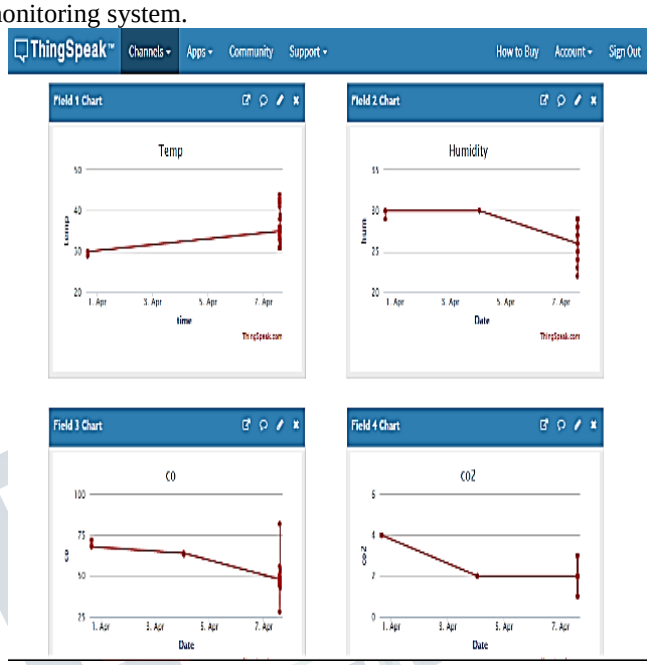

Fig 3: thinkspeak page.

IV. FUTURE SCOPE

In future, it is possible to add number of sensor for measuring different environmental parameter. Current system uses only one node (controller) for environment monitoring. In future it is possible to monitor different locations environment parameters using no of nodes at different location.

V. CONCLUSION

By keeping the embedded devices in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment, we can bring the environment into real life i.e. it can interact with other objects through the network. The results obtained from the measurement have shown that the system performance is quite reliable and accurate. The important parameters of the environment such as temperature, humidity, CO and CO2 are checked by the respective sensors. The measured parameters are transmitted to the thingspeak cloud through the ESP8266 Wi-Fi Module.

Finally we can see the graph of environment parameter on mobile phone as well as laptop through browser.

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