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A Wireless Remote Monitoring Of Agriculture Using Zigbee

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Abstract*— The main objective of the present paper is to develop a smart wireless sensor network (WSN) for an agricultural environment. Monitoring agricultural environment for various factors such as temperature and humidity along with other factors can be of significance. A traditional approach to measure these factors in an agricultural environment meant individuals manually taking measurements and checking them at various times. This paper investigates a remote monitoring system using Zigbee. These nodes send data wirelessly to a central server, which collects the data, stores it and will allow it to be analyzed then displayed as needed and can also be sent to the client mobile.

***Index Terms*—Wireless Sensor Network, Temperature, Humidity.**

I. INTRODUCTION

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 history of agriculture has played a major role in human history, as agricultural progress has been a crucial factor in worldwide socio-economic change. 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. Traditional farming involves a human labour. With proper data the farmer will be able to deliver the quality product to the consumer. In this paper we have discussed about online monitoring of agriculture parameter using multiple sensors are like temperature, humidity and water level sensor, Zigbee wireless technology. We update the parameter result from the sensor node data is transferred to the Zigbee to another end server PC. From the PC, the sensor values are transferred to the client so the farmer may know the status of their agricultural field. **T**he ability to monitor environmental conditions is crucial to research in fields ranging from climate variability to agriculture and zoology. Being able to document baseline and changing environmental parameters over time is increasingly essential important and researchers are relying more and more on unattended weather stations for this propose. The author Haefke. M [2] designed and developed A Zigbee Based Smart Sensing Platform for Monitoring Environmental Parameters. Zigbee wireless sensor network usually works in a complex environment, and the energy of sensor node is very limited, so energy consumption is a big problem in Zigbee wireless sensor network especially in the multi-sensor system. Plant eco-physiological monitoring system is a typical multi-sensor system. The authors Wang Cheng et.al [6] presented power reduction in plant eco-physiological monitoring system, and low power strategy on both the hardware designing and software controlling. **S**ensors are used in everyday objects such as touch-sensitive elevator buttons and lamps which dim or brighten by touching the base. There are also innumerable applications for sensors of which most people are never aware. Applications include cars, machines, aerospace, medicine, manufacturing and robotics. The authors [3] proposed a system to locate workers by using fixed sensor nodes in green houses or outdoors, and to determine yield by exploiting information sensed from weight sensors on harvest carts of workers. It could plan efficient arrangement of workers by using sensed information to collect production and environmental information for each area, and could utilize as a reference for making optimum growth conditions of crops in green houses in the future by storing conditions in green houses and environmental information of high-yield regions through real-time monitoring into a database. The authors Jeong-hwan Hwang and Hyun Yoe [4] proposed the 'Paprika greenhouse management system' based on wireless sensor network technology, which will establish the ubiquitous agricultural environment and improve the productivity of farmers. The proposed 'Paprika greenhouse management system' has WSN environmental sensors and CCTVs at inside/outside of paprika greenhouse. These devices collect the growth-environment related information of paprika. The system collects and monitors the environmental information and video information of paprika greenhouse. The authors [1],[5] uses Zigbee to monitor agriculture environment Zhuanwei Wang et.al[7] designed a low-cost real-time remote environmental monitoring system based on GSM short message was designed. It is made up of wireless environment monitoring equipment. Based on these literatures it is found that there are many architectural models for measuring agriculture parameters .However, the integration of advanced Web technology and remote monitoring with existing architectural models for agriculture application becomes a practical problem. It was felt that there is a need for research enhancement and development of effective remote monitoring of agriculture environment.The objectives of this paper are:

- ✓ Agriculture environmental parameters measurement
- ✓ The Data are received by the central monitoring server.
- ✓ The server transfers the result.

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II. IMPLEMENTATION

The system which is implemented is divided into three parts. They are field side, server side and client side. The architecture diagram in figure 1 shows the implementation.

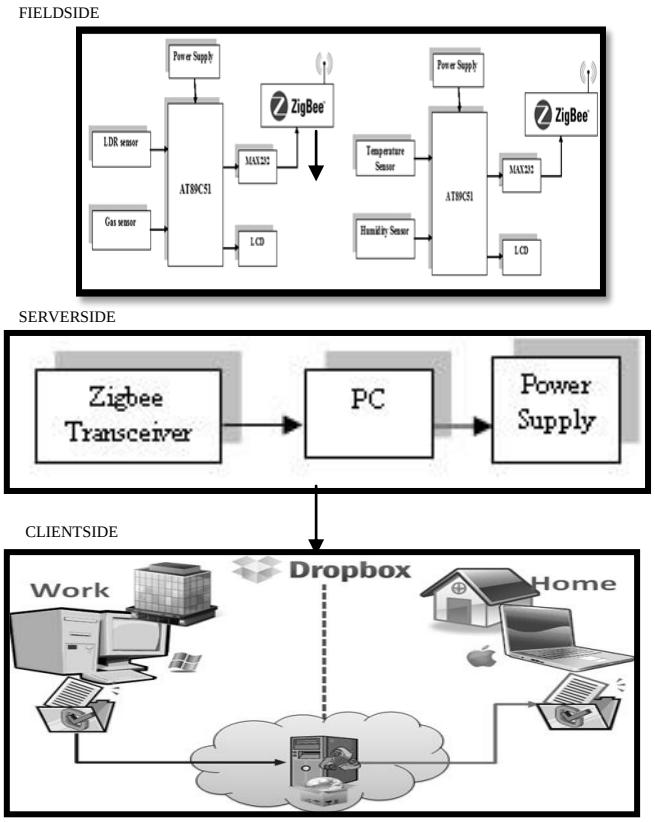

Fig1. Architectural Diagram

The hardware circuit in the field side measure the soil parameters using the sensors such as Humidity sensor, Gas sensor, and Light sensor and Temperature sensor. This information is collected by the hardware controller and transmitted using Zigbee transceiver. On the other side all this information are received by the Zigbee transceiver which is stored in the server computer .Then the information which is collected is send to the mobile of the user using the drop box technology.

A. Field Side

Two prototype hardware controller circuits have been developed and shown below:

Fig 2. Prototype Hardware Boards 1 and 2

A prototype hardware board has been implemented .In this prototype the hardware gets the Humidity and temperature from corresponding sensor in hardware circuit 1 and light and gas form corresponding sensor in hardware circuit 2 then it send all the information to the server using the Zigbee transceivers .

B. SERVER SIDE

In the server prototype the gathered values from the Zigbee transceivers are saved in the form of Microsoft Excel format and then it is transferred to user as mobile data using Drop Box technique so that it can be retrieved immediately and also for future references. The connection between Zigbee and server side computer is shown in figure1 and screenshot of server side is shown in figure3.

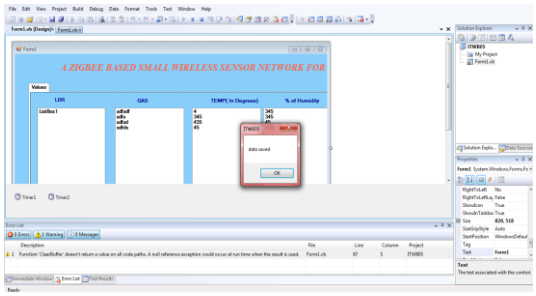

Fig 3 Screenshot in Saving Data Records

C. Client Side

The received data is stored in the server pc for later reference and also the stored real time information is securely send to user or client by using drop box synchronizing technique between mobile and server. So that user can able to get real-time information about the land at anywhere at any time. The received data in mobile is shown in the Figure4.

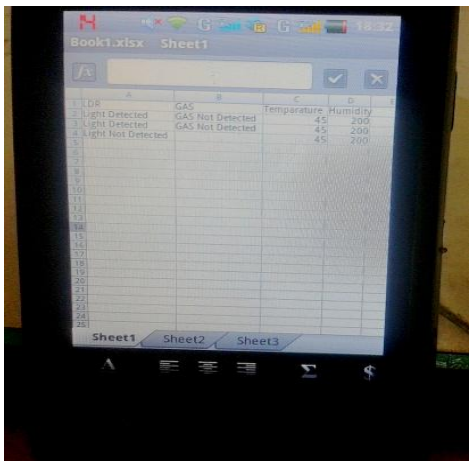

Fig 4 Screenshot in Sync Using Drop Box

III. CONCLUSION

Zigbee-based agriculture monitoring system serves as a reliable and efficient system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. It is much

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cheaper in cost, consumes less power and can control 254 devices, which in turn leads to the development of lots of new technologies like Home Automation, Health Care Automation etc.

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