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## A Review: - Survey of Wireless Monitoring and Control System for Temperature, Humidity and Soil Moisture using ZigBee

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**ABSTRACT**—The main purpose of the present paper is to introduce wireless sensor network (WSN) monitoring and control system. For monitoring and control the environmental parameters like temperature, humidity and soil moisture, WSN is more convenient technique nowadays. Traditionally to measure these parameters with manual method which is discontinuous and sometimes incorrect? WSN reduce time and efforts required for monitoring and control environmental parameters. The easy methodology of collecting temperature, humidity and soil moisture data with ZigBee is presented in this paper. ZigBee is typical wireless communication technology. This system can be used in industry, mining sector and such critical areas.

**KEYWORDS**—WSN, Microcontroller, ZigBee, Sensors, Controlling devices, PC

### INTRODUCTION

In recent years wireless sensor network's (WSN) have become popular technique and new implementation in agriculture field has been improved. Traditional method of data collecting is manual which is discontinuous and sometimes incorrect. A manual operation faces some problems or issues for monitoring and control environmental parameters. To overcome these all problems WSN is introduced. WSN reduce time and efforts required for monitoring and control environmental parameters. Wireless sensor networks are fit into critical places where manual operations are not possible. For wireless communication RF module, Bluetooth, GSM networks are used. But they faces some problems like short distance, system complexity, more power consumption. To overcome or reduce these problems ZigBee is used. ZigBee is low rate, low power. This paper deals with the monitoring and control system for temperature, humidity and soil moisture using ZigBee.

Wireless Sensor Network (WSN) :- Wireless Sensor Network can be defined as a self-configuring and infrastructure, less wireless networks to monitor environmental conditions, like temperature, humidity, sound, vibration, pressure, motion or pollutants. A sink or base station acts like an interface between the users and the networks. A wireless sensor networks contains hundreds of thousands of sensor nodes. The sensor nodes can communicates among them using radio signals.

### LITERATURE REVIEW

Jeyashree.K, Chandrabalan.G designed Monitor and Control of Environment for Greenhouse Using Sensor Networks. Almost people live in a world where everything can be controlled and operated automatically, but there are still a few important sectors in our country where automation is not been adopted or not been put to a full-fledged use, because of several reasons one such reason is cost. Agriculture has been one of the primary occupations of human being since early civilizations and even today manual interventions in farming are inevitable. The proposed system is an embedded system which constantly monitors the parameters of the various sensors and compares them with the predefined set values and checks if any corrective action is to be taken by controlling the parameters inside the greenhouse by actuating a cooler, fogger, dripper and light respectively in accordance with the necessary conditions for the plants [1].

Dipti D. Khot and J. S. Await designed the system Implementation of Wireless Monitoring System for Temperature and Humidity Using ZigBee. In this work measuring environmental parameters like temperature

and humidity, WSN is more convenient technique nowadays. Traditional approaches for monitoring the weather parameters are not accurate due to manual system errors. The easy methodology of collecting temperature, humidity data with ZigBee is presented in this paper. ZigBee is a typical wireless communication technology. ZigBee uses low rate, cost effective and low-power digital radios based on an IEEE.802 Standard for personal area networks (PAN). Temperature and humidity values are sensed by temperature node and humidity node respectively within that particular PAN. The sensed data is communicated with master node through microcontroller and data is displayed on PC [2].

Bhushan V. Patil, Punam R. Patil designed ZigBee Technology for remote monitoring of Crop Field in WSN. They use WSN (Wireless Sensor Network) technology for the precise agriculture system from last few years related to agriculture parameters and climate conditions. Also they gave the review on various wireless protocols which are used lastly. The protocols like ZigBee, Bluetooth have limitation of short distance. Hence there is requirement of to develop a system which is more precise than that system i.e. long distance wireless protocol like WiMAX, Wi-Fi. Over years, many more techniques are developed related to agriculture based practices. There is need have to develop a system with a device having flexibility, more power and local intelligences. In India, for agriculture based hand held devices used in various task related to crops [3].

Ms.Ragini D. khadse, Prof. Gauri borkhadedesigned A Review: - Implementation of Wireless Sensor Network for Real Time Monitoring of Agriculture Parameter. A past few years there is rapid growth in technology of monitoring agricultural parameters in order to improve the farm field. Various agricultural parameters like soil moisture, temperature and humidity etc. are monitor and control by monitoring and controlling units. This Paper reviews some of this monitoring system and proposes to add more parameters like wind speed, wind direction, humidity detection and controlling, water level, flood monitoring, soil moisture, soil temperature etc. and use of Tcp/Ip we can get good error recovery, hig her error rate handling, speed and simplicity using microcontroller. This may support the farmer to expand the farm field [4].

Ganiyu R. A, Arulogun O. T, Okediran O. O designed Development of a Wireless Sensor Network for Monitoring Environmental Condition on a Farmland. This paper focuses on the development of a wireless sensor network on agricultural environment to monitor environmental conditions. The developed wireless sensor network is built around sensor nodes and a master microcontroller (PI16F648A) that takes in the data sent from the nodes for upload into a personal computer (PC). Each sensors nodes monitor environmental conditions such as temperature, relative humidity and light intensity which are important environmental factors in an agricultural set-up. The DHT11 sensor is used to sense and provide calibrated digital outputs for the measured temperature and relative humidity while a calibrated light dependent resistor (LDR) is configured to the light intensity sensor unit. The outputs from these sensors are processed by the microcontroller and sent wirelessly, using low-power radio frequency transceivers, to a remote master controller for storage. Thus, the developed wireless sensor network replaces the traditional method of predicting environmental parameters required on a given farmland [5].

Prof. Mrs. S. S. Patil Prof. V. M. Davande Prof. J. J. Mulani designed Smart Wireless Sensor Network for Monitoring an Agricultural Environment. The ability to monitor environmental conditions of fields like temerature, humidity, water level, soil moisture ranging from climate variability to agriculture. Smart weather station consists of microcontroller based measuring units which collects the data of environmental parameters like temperature, humidity, water level and soil moisture. These units send their data wireless to a central station and display them into a database. The facility of adding a few more sensors and a few more stations has been provided [6].

Abdullah Tanveer, Abhishek Choudharyet el designed automated farming using microcontroller and sensors. In that farming can be done using various new technologies to yield higher growth of the crops and their more production. In that farm they checked temperature, light, humidity and soil moisture in farm. In that includes the automated control features with latest electronic technology they are microcontroller and GSM phone line. The project works automatically and hence reduces the man power [7].

Nisha Ashok Somani, Yask Patel designed ZigBee: A Low Power Wireless Technology for Industrial Applications. In that the great potential of WSN is being seen in industrial, consumer and commercial

application. The wireless technology is one of the most prominent areas of research. This mainly focuses on ZigBee technology. ZigBee over IEEE 802.15.4 defines specifications for low data rate WPAN (LR-WPAN) to supports low power monitoring and controlling devices [8].

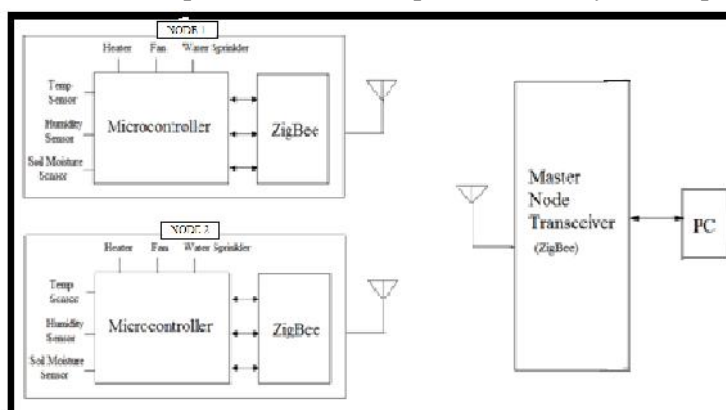
Jian Song designed Greenhouse Monitoring and Control System Based on ZigBee Wireless Sensor Network. Shortcoming of the wired system such as complex wiring and low anti-interference capacity are overcomes by a wireless measurement and control system for greenhouse is developed based on ZigBee, which is composed of upper monitor control PC, wireless gateway CC2430, sensor node CC2430 and sensor module. The star network topology is adopted on the basis of studying the characteristic of the control system for greenhouse. The wireless sensor network with tree topology structure is made up of a center controller and six wireless sensor nodes, and then the node hardware circuit is designed including temperature sensors, humidity sensors and illuminance sensors [9].

Kshitij Shinghal, Arti Noor, Neelam Srivastava, Raghuvir Singh designed Wireless Sensor Networks in Agriculture: For Potato Farming. The newly introduced wireless sensor network (WSN) technology has spread rapidly into various fields. Agriculture is one of the industries which have recently diverted their attention to WSN, seeking this cost effective technology to improve its production and enhance agriculture yield standard. This paper presents the application of WSN technology to improve potato crop production. By monitoring individual crop and its requirements, farmers can potentially identify the various like fertilizers, irrigation and other requirements. The sensor nodes which is small size and low power consumption. In this paper an irrigation management model is given to estimate agricultural parameters. Using WSN agricultural parameters like that depth of water, soil water tension and system capacity are estimated for irrigation management system to maintain optimum SWT for better crop yield and increase the application efficiency of irrigation system by 10% [10].

Zhou Yiming, Yang Xianglong et al designed A Design of Greenhouse Monitoring & Control System Based on ZigBee Wireless Sensor Network. The WSN is one of the most significant technologies in the 21st century. The open and global standard for WSN, ZigBee shows advantages on low-cost, low power consumption and self-forming. ZigBee wireless sensor network on industrial automation, electronic products and medical care were presented in that. The application of ZigBee wireless sensor network in protected agriculture overcoming the limits of wire connection [11].

## SYSTEM DESCRIPTION

In manual operation system, there are various human errors. So the skilled persons are required for operations. Hence it is highly recommended to implement and develop WSN based system to provide better quality.



**Figure1. Proposed System Architecture**

System consists of two nodes, one master node transceiver and personal computer. Each node consist of sensors, microcontroller, ZigBee, controlling devices. System architecture is shown in Fig1.

Here temperature, humidity and soil moisture parameters will be measured and controlled using controlling devices such as heater, fan and water sprinkler. First it is decide the threshold value which has to protect the crops. In that system sensor sense the change value then microcontroller reads that data. Then data given to the master node transceiver through ZigBee. This receives data display on PC. In this way monitoring process is done.

For the control process that monitor data is given to master node transceiver. Master node transceiver reads that value and compare with threshold value. After the comparisons decide which controlling device is ON/OFF. Through ZigBee, microcontroller controls the parameter using the controlling device. In that way control process is done.

**Sensors:-**The system consists of various sensors, namely temperature, humidity and soil moisture. These sensors sense parameters- temperature, humidity and soil moisture and are then sent to the microcontroller.

- ) Temperature Sensor: - Temperature sensor can be used to measure temperature with an electrical output.
- ) Humidity Sensor: - Humidity sensor measures the amount of water dissolve in the air.
- ) Soil Moisture Sensor: - Soil moisture sensor check conductivity of the soil.

### CONCLUSION

Temperature, humidity and soil moisture parameters measurement system is implemented easily. The use of ZigBee makes measuring system more reliable, accurate and cost effective than the traditional methods which are used. The proposed system with ZigBee technology in agriculture system provides advantages over traditional methods are low power consumption, low rate, provides reliable, open and global standard and simple network configuration. In future there is requirement to develop a system which is more precise than previous system i.e. to used long range wireless protocol like WiMAX, Wi-Fi and GSM protocols and also reduce short distance problems.

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