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A Review: - Implementation of Wireless Sensor Network for Real Time Monitoring of Agriculture Parameter

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Abstract:*In A Past Few Decades 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, higher error rate handling, speed and simplicity using microcontroller.This may support the farmer to expand the farm field.*

Keywords: *Base station, embedded operating system, GPRS/ GSMN Modem,TCP/IP Protocol, Wireless sensor network.*

I. INTRODUCTION

In the field of agriculture,real time monitoring of the temperature and humidity of soil and other factor such as monitoring of conditions like weather, wind direction, wind speed, water level, flood monitoring, automated irrigation facility and providing alarming system that is warning alarm to farmer's phone when certain condition occurs based on Wireless Farming System can correctly guide agricultural production and improve crop income. It also provide scientific basis for high-precision monitoring and calculating for farmland drought and flood area. Against the background of global informatization and digitization, traditional agriculture is gradually turning into digital agriculture.

Traditional wired communications exist many problems it has broad application prospects in real time environmental monitoring field. The age of the Internet of things comes; wireless sensor networks become the core of networking. In order to achieve greater things on the technical requirements of the Internet of things, we adopt the technology of wireless sensor network based on Transmission control protocol/internet protocol (TCP/IP), GPRS and Web Services technology designing a set of low cost, low power.

The system will consists of wireless sensor network nodes and network management platform. The automatic networking realizes through the many jump routing consumption, flexible automatic networking temperature humidity monitoring system of soil. And the system is a complete set of wireless sensor network induction, acquisition, storage, application, reporting, solution, and has a good man computer exchange interface. Users will need not to go into farmland, in a corner anywhere in the world, could early understand the changing condition of farmland soil temperature, humidity and other factors, and scientifically guide agricultural production.

II. LITERATURE SURVEY

It has been assumed that yield rate in an agricultural is not improving. So many researches developed different aspects and came up with various monitoring system which could help the farmer yield. Some of this are summarized follows.

In this paper the advanced development in wireless sensor networks was used in monitoring various parameters in agriculture. In this context, with the evolution of miniaturized sensor devices coupled with wireless technologies, it was possible remotely monitor parameters such as moisture, temperature and humidity. In this paper it was proposed to design, develop and implement a wireless sensor network connected to a central node using Zigbee, which in turn was connected to a Central Monitoring Station (CMS) through General Packet Radio Service (GPRS) or Global System for Mobile (GSM) technologies. The system also obtained Global Positioning System (GPS) parameters related to the field and sent them to a central monitoring station. This system was expected to help farmers in evaluating soil conditions and act accordingly [1].

To monitor high tech poly house wireless sensor developed with AVR ATmega8L microcontroller and RF Zigbee module for secure data transmission. Use of smart sensor module caused to enhance the accuracy and reliability. Humidity is continuously monitored on base station [2]. This system established monitoring various factors such as humidity, soil moisture and provided remote monitoring using zigbee which sent data wirelessly to a central server which collect data, store it and allow it to be displayed as needed and also be sent to the client mobile [3].

This paper waspresented for the automatic irrigation by remotely which was based on embedded system to accumulate farmers energy, time and money and take placed only when there will be requirement of water.In this

approach, the soil test for chemical constituents, water content, and salinity and fertilizer requirement of data, collected by wireless and processed for better drip irrigation plan. This was review different monitoring systems and proposed an automatic monitoring system model using Wireless Sensor Network (WSN) which helped the farmer to improve the yield [4].

The system developed by Aji Hanggoro and Rizki Reynaldo based on Greenhouse monitoring and controlling using Android mobile application was designed to monitor and control the humidity inside a green house. Here software was used as an android mobile phone and used Wi-Fi connection via serial communication to a microcontroller and to a humidity sensor [5].

Smart sensor based monitoring system monitored various agricultural parameter remotely and proposed inductor model for monitoring with wireless protocol implemented using field programmable gate array (FPGA) which was used for the analysis and monitoring of data , a display element and a relay as a control unit[6]

This review aimed to provide monitoring of marine environment and provided advantage of easy deployment, in real time monitoring. System had provide architecture of WSN-based oceanographic monitoring systems with a general architecture of an oceanographic sensor node ,sensing parameters and sensors, wireless communication technologies, deployment of wireless sensor networks for marine environment monitoring [7].

Multi parameter monitoring system by using wireless sensor network was designed based on low-power Zigbee wireless communication technology for system automation and monitoring. Real time data was collected by wireless sensor nodes and transmitted to the base station using zigbee. Data was received, saved and displayed at base station to achieve soil temperature, soil moisture and humidity monitoring. The data was continuously monitored at base station and if it exceeds the desired limit, a message was sent to farmer mobile through GSM network for controlling actions. Advantage of flexible networking for monitoring equipment, convenient installation and removing of equipment, low cost and reliable nodes and high capacity [8]

Monitoring greenhouse environment parameter and controlling was takes placed efficiently by both automatic and manual manner. Manually controlled zigbee network sent status of agricultural environment parameter to the control room from which itcontrolled the activities and sent to the controller back. These microcontroller based circuits was used to monitor values of parameter, continuously modified and controlled in order to optimize them to achieve maximum plant growth and yield controller communicates with the a variety of sensor modules in order to Control the light, drainage process efficiently inside a greenhouse by actuating a cooler, fogger, dripper and lights respectively according to the necessary condition of the crops. [9]. an automated multisensor greenhouse monitoring system controlled and monitored various parameters inside and outside greenhouse using microcontroller [10].

This paper was based on modernizing the irrigation technology in agriculture and also provided for adequate irrigation by using ARM7TDM1 core and GSM. Which was serves as an important part and responsible for controlling the irrigation on field and sent to receiver through receiver signals. This project was used to detect the exact field condition as well as weather condition in real time. The information was given on user request in the form of SMS. GSM modem was controlled with the help of standard set of AT (Attention) commands. These commands were used to control majority of the functions of GSM modem [11].

To increase the productivity of the farms one has to use optimum water for irrigation system that was used.to improve water management and for the controlling the parameter of farm. Wireless sensor network was described for which it store and utilized rainwater to increase the crop productivity, to reduce the cost for cultivation and make use of real time values. [12]

Precision farming by using wireless sensor network monitoring agricultural parameter promise higher yields and lower input costs by real-time and automatic monitoring of site specific environmental and soil conditions using different sensors and thereby improved crop management reduced waste and labour costs. This paper was presented a test bed implementation of a wireless sensor network for automatic and real-time monitoring of soil and environmental parameters influencing crop yield. The paper presented practical issues and technical challenges including the integration of sensors, placement of sensors in outdoor environment, energy management scheme and actual power consumption rates [13].

These system monitored multi parameter of agricultural using low power zigbee wireless communication technology for system automation and monitoring. Real time data was collected by wireless sensor nodes and transmitted to base station using Zigbee. Data was received, saved and displayed at base station to achieve soil temperature, soil moisture and humidity monitoring. The data was continuously monitored at base station and if it exceeds the desired limit, a message was sent to farmer mobile through GSM network for controlling actions [14].

In This review paper various agricultural parameters was monitored and controlled by using peripheral devices like valve, watering pump etc. where monitoring was done automatically by using microcontroller to improve the farmer yield [15]

Paper was presented for the Monitoring System for Vegetable Greenhouses based on a Wireless Sensor Network designed for monitoring the life conditions of greenhouse vegetables. The complete system architecture included a group of sensor nodes, a base station, and an internet data centre. For the design of wireless sensor node, the JN5139 micro-processor was adopted as the core component and the Zigbee protocol was used for wireless communication between nodes. With an ARM7 microprocessor and embedded ZKOS operating system, a proprietary

gateway node was developed to achieve data influx; screen display, system configuration and GPRS based remote data forwarding. Through a Client/Server mode the management software for remote data centre was achieved real-time data distribution and time-series analysis. Besides, a GSM-short-message-based interface was developed for sending real-time environmental measurements, and for alarming when a measurement is beyond some pre-defined threshold. The whole system had been tested for over one year and satisfactory results have been observed, which indicate that this system was very useful for greenhouse environment monitoring [16].

Paper proposed by Liu Yumei, Zang Changli developed monitoring system of soil based on wireless sensor networks used a wireless sensor network as information acquisition and processing platform. The coverage was big, effectively resolves the disadvantages of wired communications. Adopting the technology based on Zigbee, GPRS and Web Services technology, it designed a set of low cost, low power consumption, flexible automatic networking temperature humidity monitoring system of soil. And the system was a complete set of wireless sensor network induction, acquisition, storage, application, reporting, solution, has a good man-computer exchange interface [17].

Automated Irrigation System Using a Wireless Sensor Network and GPRS Module Developed algorithm with threshold values of temperature and soil moisture that was programmed into a microcontroller based gateway to control water quantity. This system is used for optimizing water resources for agriculture production, the places with water scarcity. The system had a distributed wireless network of soil-moisture and temperature sensors placed in the root zone of the plants. In addition, a gateway unit handles sensor information, triggers actuators, and transmits data to a web application. The system was powered by photovoltaic panels and had a duplex communication link based on a cellular-Internet interface that allowed for data inspection and irrigation scheduling to be programmed through a web page. The automated system was tested in a sage crop field for 136 days and water savings of up to 90% compared with traditional irrigation practices of the agricultural zone were achieved. Three replicas of the automated system have been used successfully in other places for 18 months. Because of its energy autonomy and low cost, the system has the potential to be useful in water limited geographically isolated areas [18].

System used three commercial sensors which was capable to measure four climate variables. Collected data was used to evaluate the network reliability and its ability to detect the microclimate layers, which typically existed in the greenhouse between lower and upper flora. It was also able to show that the network could detect the local differences in the greenhouse climate caused by various disturbances, as direct sunshine near the greenhouse walls. This was first step in the area of greenhouse monitoring and control, and it is all about the developed sensor network feasibility and reliability [19].

This system presented effective method for crop monitoring in which the sensor motes had several external sensors namely leaf wetness, soil moisture, soil pH, atmospheric pressure sensors attached to it. Based on the value of soil moisture sensor, the mote triggers the water sprinkler during the period of water scarcity. Once the field was sprinkled with adequate water, the water sprinkler was switched off. Hereby water could be conserved. Also the value of soil pH sensor was sent to the base station and in turn base station hints the farmer about the soil pH via SMS using GSM modem. Obtaining the soil pH value in his mobile the farmer selects the necessary fertilizer and crop for his next season. Hereby the amount of fertilizer could be reduced. In order to overcome the lack of information and technical support and to increase the rice production, a development of rice cropping monitoring using WSN was proposed to provide a helping hand to farmers in real-time monitoring, achieving precision agriculture and thus increasing the rice production. Thus automated control of water sprinkling and ultimate supply of information to farmers was done as a result of this project using wireless sensor network [20].

III. PROPOSED SYSTEM DESCRIPTION

Agricultural depends on various agricultural parameter disturbances, this parameter changes the condition of farm and eventually causes problem in growth of plant result in lesser yield. Fig. 1 consists of different types of sensing unit.

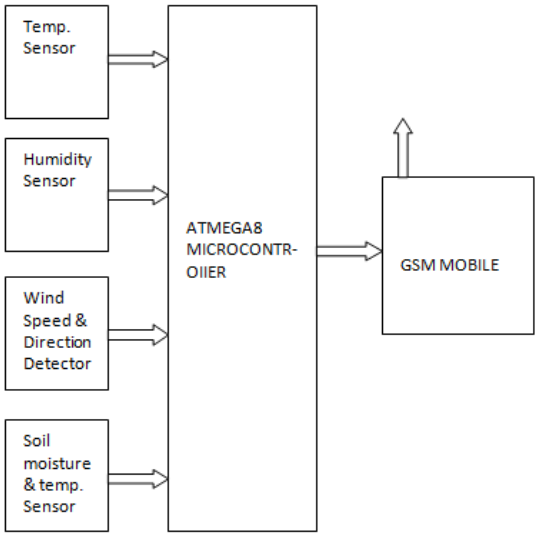

Fig. 1 basic block diagram of proposed system

Sensors note weather's various parameters. The readings will then provide to the microcontroller which has in built 10 bits A/ D convertor. This convertor converts all analog data to equivalent digital form, and then sends to GSM mobile. At GSM, by using mobile, various AT commands SMS can be sent to the user mobiles. At the same time, we can visualize the data on TCP/IP protocol suit.

IV. CONCLUSION

Implementation of Wireless Sensor Network For Real Time Monitoring of Agriculture Parameter used to increase the yield of plants by monitoring and controlling environmental conditions (parameter) and thus providing necessary information to the farmers. The use wireless sensor network enables sensation of parameter by using microcontroller which accepts data from sensor and transmitted to the farmer through the TCP/IP Protocol which provide direct access to the internet and get the information from the Agricultural area to the client PC.

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REFERENCES

[1] G. V. Satyanarayanads, S.D. Mazaruddin, "Wireless Sensor Based Remote Monitoring System For Agriculture Using Zigbee and Gps", Conference On Advances In Communication and Control Systems 2013 (Cac2s 2013).
[2] B. P. Ladgaonkar and A. M. Pawar, "Design and Implementation of Sensor Node for Wireless Sensors Network to Monitor Humidity of High-Tech Polyhouse Environment", IJAET July 2011 ISSN: 2231-1963 1 Vol. 1, Issue 3.
[3] Prof C. H. Chavan, Mr. V.Karande , "Wireless Monitoring Of Soil Moisture, Temperature & Humidity Using Zigbee In Agriculture" ,(IJETT) – Volume 11 Number 10 - May 2014 ISSN: 2231-5381.
[4] Aniket H. Hade, Dr. M.K. Sengupta, "Automatic Control Of Drip Irrigation System &Monitoring Of Soil By Wireless", (IOSR-JAVS) E-ISSN: 2319-2380, P-ISSN: 2319-2372. Volume 7, Issue 4 Ver. Iii,pp. 57-61 (Apr. 2014).
[5] Aji Hanggoro, Rizki Reynaldo, "Greenhouse monitoring and controlling using Android mobile application".
[6] Swarup S. Mathurkar, D. S. Chaudhari, "A Review on Smart Sensors Based Monitoring System for Agriculture", (IJITEE) ISSN: 2278-3075, Volume-2, Issue-4, March, 2013.
[7] Guobao Xu, Weiming Shen, and Xianbin Wang, "Applications of Wireless Sensor Networks in Marine Environment Monitoring: A Survey", Sensors 2014.
[8] Anjum Awasthi & S.R.N Reddy, "Monitoring For Precision Agriculture Using Wireless Sensor Network-A Review", Global Journal of Computer Science and Technology Network, Web & Security Volume 13 Issue 7 Versions 1.0 Year 2013.

[9] S.Thenmozhi, M.M.Dhivya, R.Sudharsan, K.Nirmalakumari, "Greenhouse Management Using Embedded System and Zigbee Technology", IJAREEIE Vol. 3, Issue 2, February 2014.
[10] Purna Prakash Dondapati, K. Govinda Rajulu, "An Automated Multi Sensored Green House Management", (IJTEL) Volume 1 Issue 1 (August 2012).
[11] Ms. Shweta S. Patil, Prof. Mrs. A. V. Malviya ,"Review For arm Based Agricultural Field Monitoring System" ,International Journal Of Scientific And Research Publications, Volume 4, Issue 2, February 2014.
[12] Manish Giri, Pranoti Kulkarni, Anuja Doshi, Kanchan Yendhe, Sushma Raskar, "Agricultural Environmental Sensing Application Using Wireless Sensor Network" (IJARCET) Volume 3 Issue 3, March 2014.
[13] Siuli Roy, Somprakash Bandyopadhyay, "A Test-Bed on Real-Time Monitoring Of "Agricultural Parameters Using Wireless Sensor Networks For Precision Agriculture".
[14] Dr. R. K. Prasad , Mr. S. R. Madkar, "Design & Implementation Of Wireless Transceiver For Data Acquisition In Wireless Sensor Network" ,Volume 3, Issue 7, July 2013 International Journal Of Advanced Research In Computer Science And Software Engineering Research Paper
[15] N.R.Patel, S.S.Thakare, D.S.Chaudhari, "A Review of Different Parameter Monitoring Systems for Increasing Agricultural Yield", (IJITEE) ISSN: 2278-3075, Volume-2, Issue-4, March 2013.
[16] Xiu-Hong Li, Xiao Cheng, Ke Yan and Peng Gong, "A Monitoring System for Vegetable Greenhouses Based on A wireless Sensor Network", ISSN 1424-8220 Sensors 2010.
[17] LIU Yumei, ZHANG Changli, and ZHU Ping, "The temperature humidity monitoring system of soil based on wireless sensor networks".
[18] Joaquín Gutiérrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel Ángel Porta-Gándara, "Automated Irrigation System Using a Wireless Sensor Network and GPRS Module", IEEE transactions on instrumentation and measurement .[19] Teemu Ahonen, Reino Virrankoski and Mohammed Elmusrati, "Greenhouse Monitoring with Wireless Sensor Network".
[20] N. Sakthipriya, "An Effective Method for Crop Monitoring Using Wireless Sensor Network", Middle-East Journal of Scientific Research ISSN 1990-9233 IDOSI Publications, 2014

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