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A REVIEW: - IMPLEMENTATION OF WIRELESS SENSOR NETWORK FOR AUTOMATIC IRRIGATION BY USING GPRS

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ABSTRACT

An automated irrigation system was developed to use of water for agricultural crops. The system has a distributed wireless network of various parameters like soil-moisture, temperature sensors, humidity sensor, light etc. A gateway unit handles sensor information, triggers actuators, and transmits data to a web application. The total system architecture includes a set of sensor nodes, a base station, and an internet data centre. With an ATmegh32 microprocessor and embedded operating system, screen display, system configuration and GPRS based remote data forwarding. Through a Client/Server mode the management software for remote data centre achieves real-time data distribution and time-series analysis. Farmers go through large financial losses because of wrong prediction of weather and incorrect irrigation methods. In this paper, with the evolution of miniaturized sensor devices coupled with wireless technologies, it is possible remotely monitor parameters such as moisture, temperature and humidity.

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

INTRODUCTION

Now a days ,today's world is world of automation and everything is being automated**.** For automation microprocessor and microcontroller based automatic systems are very general due to their accuracy and precision. They are flexible and user friendly due to their programmable nature. Controlling manually is generally not so accurate due to the errors involved. The motivation for this project came from the countries where economy is based on agriculture and the climatic conditions lead to lack of rains & scarcity of water. The farmers working in the farm lands are only dependent on the rains and bore wells for irrigation of the land. Even if the farm land has a water-pump, manual involvement by farmers is required to turn the pump on/off whenever needed. The aim of our project is to minimize this manual involvement by the farmer, which is why we are using a micro-controller (ATMEGA32A.

In an Automated Irrigation System using liquid/moisture sensor (LM), the most significant advantage is that water is supplied only when the moisture in soil goes below a pre-set threshold value. This saves us a lot of water. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump on/off when required. This method sometimes consumes more water and sometimes the water supply to the land is delayed due to which the crops dry out. In addition to this slowed growth rate, lighter weight fruit follows water deficiency. This problem can be completely rectified if we use Automated Irrigation System in which the irrigation will take place only when there will be intense requirement of water, as suggested by the moisture in the soil.

The GPRS Based Irrigation System is a project in which we get continuous up to date status of the operation carried out in field (Farms) by using LCD displays. Actually this project is for our farmers. They work hard and hard not only everyday but also every night in the field. Because in the day they do their field work and in the night our farmers have to irrigate the field land at some intervals.So to wake up in the night from a sleep and then go to field and irrigate the land is to typical for a farmer. There are many drawbacks of this irrigation system that if a farmer started the irrigation system in the night and he forgot to switch off the irrigation system again. In this condition the a lot of water goes to wastage and the crops may get harm or sometimes he forget to

switch on the irrigation system then again the crops get dried due to lack of water. This depends on the type of crops. Lighter weight fruits always follow slight water deficiency. So to resolve this problem I have bring this is electronic project . No hard work need to be done by the farmer.This project works on two mode.This project is developed based on EMBEDDED and GPRS Technology

LITERATURE SURVEY

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

Joaquí Gutiérrez, Juan Francisco Villa-Medina, proposed that an automated irrigation system was developed to optimize water use for agricultural crops. The system has 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. An algorithm was developed with threshold values of temperature and soil moisture that was programmed into a microcontroller-based gateway to control water quantity. 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 [1].

X. Wang, W. Yang, A. Wheaton, N. Cooley, and B. Moran, proposed that there are many systems to achieve water savings in various crops, from basic ones to more technologically advanced ones. For instance, in one system plant water status was monitored and irrigation scheduled based on canopy temperature distribution of the plant, which was acquired with thermal imaging [2].
Kay Smarsly proposed that automatically scheduling irrigation events based on soil moisture measurements has been proven an effective means to reduce freshwater consumption and irrigation costs, while maximizing the crop yield. Focusing on decentralized autonomous soil moisture monitoring, this paper presents the design, the implementation, and the validation of a low-cost remote monitoring system for agricultural ecosystems. The prototype monitoring system consists of a number of intelligent wireless sensor nodes that are distributed in the observed environment. The sensor nodes are connected to an Internet-enabled computer system, which is installed on site for disseminating relevant soil information and providing remote access to the monitoring system. Autonomous software programs, labelled “mobile software agents”, are embedded into the wireless sensor nodes to continuously analyse the soil parameters and to autonomously trigger irrigation events based on the actual soil conditions and on weather data integrated from external sources [3].

Aji Hanggoro, Rizki Reynaldo proposed that the existing system has the ability to yet lack the ability to control indoor humidity. Green House Monitoring and Controlling is a complete system designed to monitor and control the humidity inside a green house. This software uses an Android mobile phone, connected using Wi-Fi to a central server which connects via serial communication to a microcontroller and humidity sensor. The result shows that the condition specified in sensor’s datasheet and system in reality is appropriate [4].

LIU Yumei, ZHANG Changli, ZHU Ping proposed that the big coverage is, effectively resolves the disadvantages of wired communications. Adopting the technology of wireless sensor network based on Zigbee, GPRS and Web Services technology .They design a set of low cost, low power 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, has a good man-computer exchange interface. Through commissioning in the demonstration base of soybean in Northeast Agricultural University, it shows that the system can meet the requirements of the temperature and humidity of soil environmental monitoring and unified management [5]

G. V. Satyanarayana , SD.Mazaruddin proposed that the advanced development in wireless sensor networks can be used in monitoring various parameters in agriculture. Due to uneven natural distribution of rain water it is very difficult for farmers to monitor and control the distribution of water to agriculture field in the whole farm or as per the requirement of the crop. There is no ideal irrigation method for all weather conditions, soil structure and variety of crops cultures. Farmers suffer large financial losses because of wrong prediction of weather and incorrect irrigation methods. In this context, with the evolution of miniaturized sensor devices

coupled with wireless technologies, it is possible remotely monitor parameters such as moisture, temperature and humidity. In this paper it is proposed to design, develop and implement a wireless sensor network connected to a central node using Zig Bee, which in turn is connected to a Central Monitoring Station (CMS) through General Packet Radio Service (GPRS) or Global System for Mobile (GSM) technologies [6].

Xiu-hong Li 1,2,*, Xiao Cheng 1,2,*, Ke Yan 2 and Peng Gong 2 proposed that a wireless sensor network-based automatic monitoring system is designed for monitoring the life conditions of greenhouse vegetables. The complete system architecture includes a group of sensor nodes, a base station, and an internet data centre. For the design of wireless sensor node, the JN5139 micro-processor is adopted as the core component and the Zig bee protocol is used for wireless communication between nodes. With an ARM7 microprocessor and embedded ZKOS operating system, a proprietary gateway node is 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 achieves real-time data distribution and time-series analysis. Besides, a GSM-short-message-based interface is developed for sending real-time environmental measurements, and for alarming when a measurement is beyond some pre-defined threshold [7].

PROPOSED SYSTEM DESCRIPTION

In agricultural field there are various agricultural parameters that affects the farm, 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.

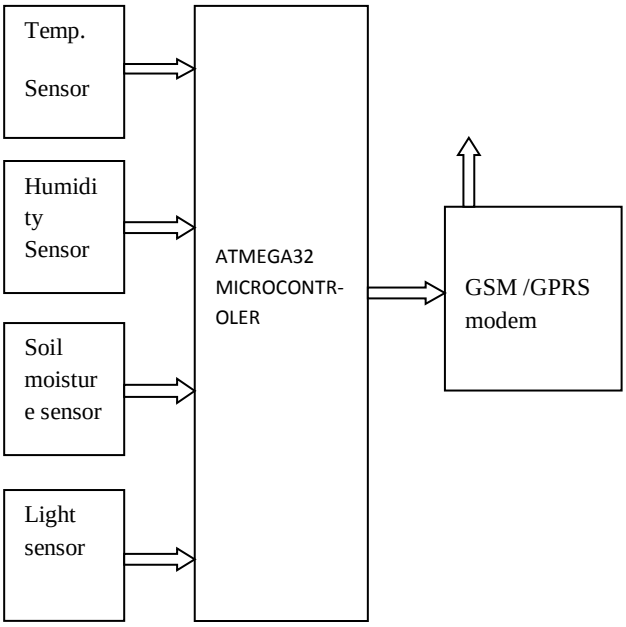

Fig. 1 Basic block diagram of proposed system

The sensors sense the change and note weather's different parameters. The readings will then give to the microcontroller which has in built 10 bits A/ D convertor. The microcontroller reads this from the data at its input ports after being converted to a digital form by the ADC. This convertor converts all analog data to equivalent digital form, and then sends to GSM modem. At GSM, various AT commands SMS can be sent to the user pc. At the same time, we can visualize the data on TCP/IP protocol suit.

CONCLUSION

Implementation of Wireless Sensor Network For Automatic irrigation by using GPRS used to increase the yield of plants by monitoring and controlling environmental conditions (parameter) and thus providing necessary information.

The wireless sensors sense the various agricultural 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 obtain the information from the Agricultural area to the client PC.

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