REVIEW PAPER BASED ON AUTOMATIC IRRIGATION SYSTEM BASED ON RF MODULE

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Abstract— In India, agriculture plays an important role for development in food production. In our country, agriculture are depends on the monsoons which is not sufficient source of water. So the irrigation is used in agriculture field. In Irrigation system, depending upon the soil type, water is provided to plant. In this paper, automatic irrigation system based on ARMs and RF module. All the system will be setup using ARM and RF module. The most important factor of this system is RF module which is used to send and receiving the message to the controller. This system used three nodes which communicate each other and irrigate paddy field automatically. The aim of our project is to modernizing agriculture technology by programming components and built the necessary component for the system. The system is real time based and extracts the exact condition of paddy field. There is one central node used which to control other node. The main function of RF module is to pass the message to the node and operate the system.

Keywords— Irrigation System, Soil Moisture Sensor, Temperature Sensor, RF Module

I. INTRODUCTION

For continuously increasing demand of food necessities, it's important to rapid improvement in production of food technology. Agriculture in only the source to provide this. This is the important factor in human societies to growing and dynamic demand in food production. Agriculture plays an important role in economy and development. Agriculture plays the important role in the economy and development, like India. Due to lack of water and scarcity of land water result the decreasing volume of water on earth, the Farmer use irrigation. Irrigation may be defined as the science of artificial application of water to the land or soil that means depending on the soil type, plant are to be provided with water. In agriculture, there is two things is very important, first to get information of about fertility of soil and second is to measure moisture content in soil. Nowadays for irrigation different Techniques are available which is used to reduce the dependency of rain. And mostly this technique is driven by electrical power and on/off scheduling controlled. There is also more technique available which is based on climate data which is irrigated with smart controller and using microclimate data to schedule irrigation water also irrigation is real time application. These technique, irrigate using following technique.

- Internet based Monitoring using Servers, GPRS modems, etc. with different approaches.

- GSM-SMS protocols using GSM module individually or in combination with Internet Technologies.

- Monitoring using Wireless Sensor Networks.

- Wireless Monitoring using Bluetooth, Wi-Fi, Zigbee and RF.

- Applications have varied widely like Home Automation, Security Systems, Bio-medical applications, Agriculture, Environment, Reservoir, Bridge health monitoring, etc.

II. LITERATURE REVIEW

In this paper, soil moisture sensor, temperature sensors placed in root zone of plant and gateway unit handles the sensor information and transmit data to a web application. One algorithm was developed for measure threshold values of temperature sensor and soil moisture sensor that was programmed into a microcontroller to control water quantity. For power photovoltaic panel was used. Another facto like cellular-Internet interface used that allowed for data inspection and irrigation scheduling to be programmed through a web page.

The automatic system was tested for 136 days and save 90% compared with traditional irrigation system. 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 area [1].

In this paper, soil moisture content has been detected using acoustic based technique was developed. The main propose of this technique is development for measure soil moisture in real time method. The technique based on relationship between two quantities i.e. speed of sound and the degree of saturation with water in soils. This experiment found that the speed of sound decreases with the moisture content following, depending on the kind of soil. [2]

This paper design a model of automatic irrigation system which is based on microcontroller and solar power was used only for source of power supply. Various sensor are placed in paddy field. Sensors sense water level continuously and give the information to farmer through cellular phone. Farmer controls the motor using cellular phone without going in paddy field. If the water level reaches at danger level, automatically motor will be off without conformation of farmer. [4]

The automatic system based on ARM and for communication GSM technology was used. Irrigation system provides foe adequate irrigation in particular area which is real time. Soil moisture sensor placed in root zone in paddy field and sense water level. The system was set up using ARM7TDMI core and GSM. GSM is an important part of these this system. System communicates using GSM. GSM operate through SMS and is a link between ARM processor and centralized unit. This system detects climate condition and field condition in real time. This information send to user in the form of SMS and GSM modem is controlled with the help of standard set of AT (Attention) commands. These commands are used to control majority of the functions of GSM model. [5]

In the paper, automatic irrigation technique irrigated using wireless sensor network i.e. Zig-bee and internet technology. The idea was developed for improve irrigation system and reduced cost of irrigation water. Sensors are placed in farm and sense continuously and collect he information. This information stored at center monitor and also passes to data collection interface and then transmits to the wireless sensor node. Using this information system was control automatically using internet. [6]

III. OVERALL ANALYSIS

An automatic irrigation system used for irrigate sage crop field for 136 days and save 90% water as compare to traditional irrigation system using wireless network and GPRS system(1) . The Brutsaert's model used for measure the moisture of agricultural soils by an accurate, on site, real-time method and also derived the speed-moisture curves, the conditions for the actual validity of the curves, and the suitable sound frequency for performing the measurement, for a wide range of agricultural soils in different physical conditions[3].

For automatic irrigation systems irrigate using cellular phone and for power source used solar power [7]. Arm also used for monitoring the irrigation system in real time based and for irrigation system, system irrigates using GPRS system [8].

Automatic irrigation system control using Zigbee and internet thing[9]. GPRS technique has some disadvantage viz speed, distance factor, reliability, so GPRS is not used in our project. Zigbee also have disadvantage i.e. low transmission rate. It is only use for smaller distance. Maximum papers have problem in networking and also some security issues [10].

IV. PROPOSED WORK

All above techniques have some problem like security issues, low transmission rate, etc. For overcome this problem, this system is used. In this model, Automatic Irrigation System based on RF module. RF module is used only for passing the signal. All nodes is connected will be centralize node and this node is used ARM. And remaining two nodes is used microcontroller which is low power device. One more thing will be added i.e. node to node communication for better results and more area will be cover. The system has a distributed wireless network of soil-moisture and temperature sensors placed in the root zone of the plants and sense he condition and transfer the information to centralize node and other nodes. When nodes are receiving the information then system will be start automatically.

V. SYSTEM DESCRIPTION

Measuring soil moisture is very important in agriculture to help farmer for managing the irrigation system. Soil moisture sensor is one who solves this. This sensor measures the content of water. Soil moisture sensor uses the capacitance to measure the water content of soil. It is easy to use this sensor. Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent.

Fig 1 : Soil Moisture Sensor

ARM-LPC2148 is used widely IC from ARM-7 family and this microcontroller socket is used with LPV2148 pro Development Board. It is standalone board. It is manufactured by Phillips and is preloaded with many inbuilt peripheral making it more efficient reliable option for the beginner as well as high end application developer. It has 12MHz crystal for clock system and 32 KHz crystal for RTC. it has power on reset circuit with MCP130T brownout monitoring chip and power decoupling capacitor. This board used for LPC2148 based generic development.

Fig 2 : ARM-LPC2148

VI.   CONCLUSION

The proposed model using ARM-LPC2148 which is fully based on RF Module. This project developed agriculture field and increase the growth of food production. This can also useful for increasing the economy and demand of food necessity.

Reference

[1]   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 2013

[2]   Samy Sadeky, Ayoub Al-Hamadiy, Bernd Michaelisy, Usama Sayedz," An Acoustic Method for Soil Moisture Measurement ", IEEE 2004

[3]   Thomas J. Jackson, *Fellow, IEEE*, Michael H. Cosh, Rajat Bindlish, *Senior Member, IEEE*, Patric J. Starks, David D. Bosch, Mark Seyfried, David C. Goodrich, Mary Susan Moran, *Senior Member, IEEE*, and Jinyang Du ,"Validation of Advanced Microwave Scanning Radiometer Soil Moisture Products", IEEE 2010

[4]   Jia Uddin, S.M. Taslim Reza, Qader Newaz, Jamal Uddin, Touhidul Islam, and Jong-Myon Kim,"Automated Irrigation System Using Solar Power" ©2012 IEEE

[5]   Ms. Sweta S. Patil, Prof. Mrs. A.V. Malvijay, "Review for ARM based agriculture field monitoring system",International Journal of Scientific and Research Publications, Volume 4, Issue 2, February 2014.

[6]   Zhang Feng Yulin University Yulin University tfnew21@sina.com, " Research on water-saving irrigation automatic control system based on Internet of things Institute of Information Technology", 2011 IEEE

[7]   Awati J.S., Patil V.S., "Automatic Irrigation Control by using wireless sensor networks", Journal of Exclusive Management Science - June 2012-Vol 1 Issue 6.

[8]   Rashid Hussain, JL Sahgal, Anshulgangwar, Md.Riyaj , "Control of Irrigation Automatically By Using Wireless Sensor Network", International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-1, March 2013.

[9]   Shaohua Wan, "Research on the Model for Crop Water Requirements in Wireless Sensor Networks", 2012 International Conference on Management of e-Commerce and e-Government.

[10] Ejiofor Virginia Ebere (PhD)1, Oladipo Onaolapo Francisca (PhD)2, "Microcontroller based Automatic Water level Control System", International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 6, August 2013