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WATER SAVING IRRIGATION AND SPONTANEOUS REGULATOR SYSTEM BASED ON IoT

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ABSTRACT

Irrigation place a major role in agriculture now a days. Depends upon the soil moisture value the plants should be irrigated with the help of IOT by using mobile phones can easily monitored and control the irrigation. User use mobile phones can easily soil moisture content of online monitoring and control to realize the irrigation automation. Application results show that system through the embedded control technology complete intelligent irrigation, improve the agricultural irrigation water use efficiency and irrigation system automatization is generally low status, can well realize water saving. To improve irrigation water use efficiency, reduce cost of irrigation water, this paper discussed the design of wireless sensor network and Internet technology of farmland automatic irrigation control method. Emphasis on an analysis of the routing protocol of sensor network nodes to achieve the system hardware and software design, middleware, and applications such as mobile phone, it will constitute a variety of sensors intelligent network, thus enhancing the overall automation system and monitoring levels. The final analysis of the network in the Internet based on the agricultural plants of farmland water-saving irrigation system integrated approach.

INTRODUCTION

Irrigation is the method in which a controlled amount of water is supplied to plants at regular intervals for agriculture. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall. Additionally, irrigation also has a few other uses in crop production, which include protecting plants against frost, suppressing weed growth in grain fields and preventing soil consolidation. In contrast, agriculture that relies only on direct rainfall is referred to as rain fed or dry land farming.

The Internet of Things is a vision of a world in which most objects are connected; transmitting updates about their performance so the people who use them to do things more intelligently. This vision is being built today, with connected devices becoming more and more frequent in our daily lives. The basic concept behind the Internet of Things is that virtually every physical thing in this world can also become a computer that is connected to the Internet.

As the concept of the Internet of Things becomes increasingly prevalent, many systems are being devised to allow all manner of data to be gathered and analyzed, and devices controlled via wireless data networks. We will also focus on the development of urban greenhouse monitoring systems, and present the current and future solutions, concepts and devices that are currently available on the market. Between efforts to eat more food grown locally, a younger generation of farmers and enthusiast has started to become reliant on an infusion of data and technology.

Soil Moisture Sensor: Soil moisture sensors measure the water content in soil. A soil moisture probe is made up of multiple

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soil moisture sensors. One common type of soil moisture sensors in commercial use is a frequency domain sensor such as a capacitance sensor.

Humidity Sensor: A humidity sensor also called a hygrometer, measures and regularly reports the relative humidity in the air. They may be used in homes for people with illnesses affected by humidity; as part of home heating, ventilating, and air conditioning (HVAC) systems; and in humidors or wine cellars. It can also be used in cars, office and industrial HVAC systems, and in meteorology stations to report and predict weather.

LITERATURE SURVEY

It is shown that in the above letter by Catovic and Sahinoglu the Cramer-Rao Bound (CRB) for the time difference of arrival/received signal strength (TDOA/RSS) based location estimation was derived incorrectly. The correct version of the CRB for the TDOA/RSS is provided. measures and regularly reports the relative humidity in the air. They may be used in homes for people with illnesses affected by humidity; as part of home heating, ventilating, and air conditioning (HVAC) systems; and in humidors or wine cellars. It can also be used in cars, office and industrial HVAC systems, and in meteorology stations to report and predict weather [1]. Wireless ad-hoc sensor networks have recently emerged as a premier research topic. They have great long term economic potential, ability to transform our lives, and pose many new system-building challenges. Sensor networks also pose a number of new conceptual and optimization problems. Some, such as location, deployment, and tracking, are fundamental issues, in that many applications rely on them for needed information [2]. Position information of individual nodes is useful in implementing functions such as routing and querying in ad-hoc networks. Deriving position information by using the capability of the nodes to measure time of arrival (TOA), time difference of arrival (TDOA), angle of arrival (AOA) and signal strength have been used to localize nodes relative to a frame of reference. The nodes in an adhoc network can have multiple capabilities and exploiting one or more of the capabilities can improve the quality of positioning [3]. Most sensors are event-driven and wireless sensor networks are mostly used for monitoring purposes in environmental monitoring, structural monitoring, and military battleground and public safety applications. As a result, there is a need to quickly and accurately pin-point a sensor's location when it detects an emergent event. Since sensor networks are severely resource-constrained due to various physical and environmental constraints, including miniature size, limited

battery power, and limited communicational and computational capacity, a low complexity location estimation technique is needed [4].

EXISTING SYSTEM

In this system irrigation automation is based on soil moisture which doesn’t include the different plants moisture level. It doesn’t differentiate the needs of different plants. There is no method in identifying the amount of water supplied. In early days the irrigation system based upon common soil moisture value only, in that process we can’t differentiate the need of different plants.

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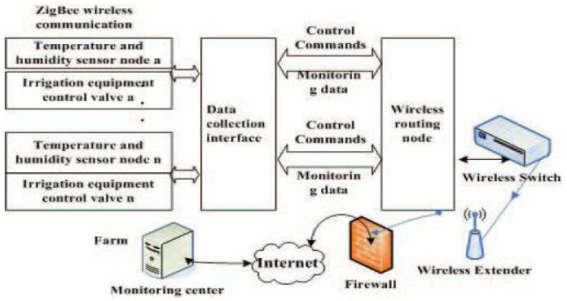

Fig 1: Water saving irrigation system structure

In that irrigation process more water use efficiency, more cost of irrigation water, and human resources will be needed for irrigation, this paper reference some enterprises actual production processes, from abroad to the traceability system related research, through based on internet of things water saving irrigation system scheme.

The final analysis of the network in the internet based on the agricultural plants of the farmland water saving irrigation system integrated approach. User use mobile phones or wireless PDA can easily moisture content of online monitoring and control to realize the irrigation automation.

PROPOSED SYSTEM

In this proposed system the soil moisture sensor sensing the moisture level of the soil, humidity sensor sensing the heat level of the particular plants then amplifying and the values are sending through the PIC microcontroller. The PIC microcontroller analyzing the value then passed through the driver circuit, and the driver circuit is connected to the relay, when the relay is one the motor will be ON condition, and then relay is zero the motor is in OFF condition. and all the values are transmitted to ZigBee.

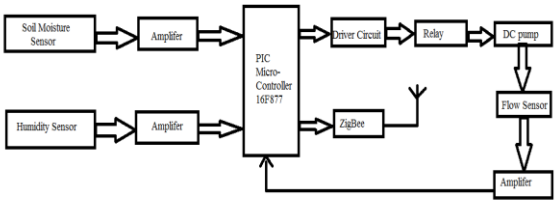

Fig 2: Transmitter side of irrigation system

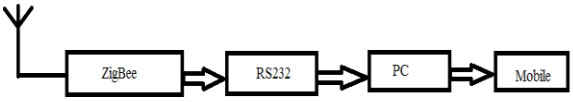

Fig 3: Receiver side of irrigation system

ZigBee - typical traffic types addressed:

1 Periodic data
2 Application defined rate (e.g., sensors)
3 Intermittent data
4 Application/external stimulus defined rate (e.g., light switch)

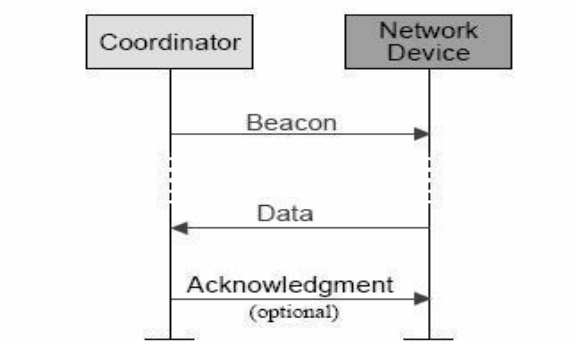

Fig 4: Beacon Network Communication

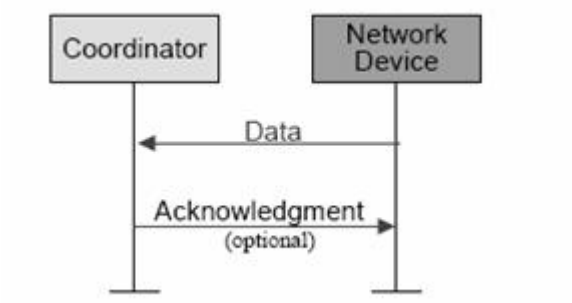

Fig 5: Non-Beacon Network Communication

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RESULTS AND DISCUSSION

The application of agriculture networking technology is need of the modern agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware and analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production. With more advancement in the field of IoT expected in the coming years, these systems can be more efficient, much faster and less costlier. In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IoMT can be implemented so that agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

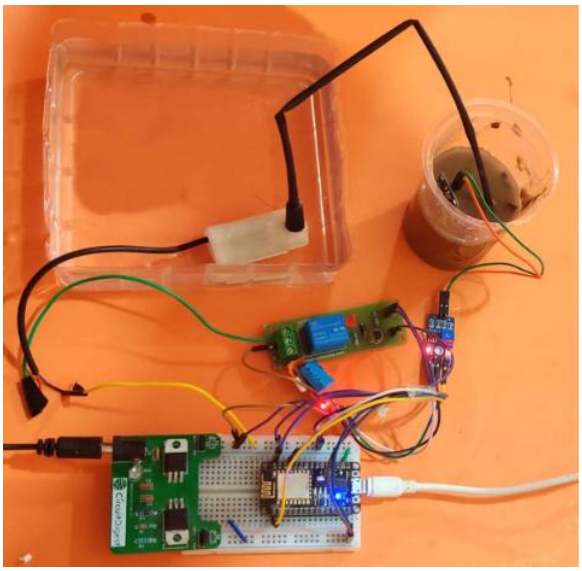

Fig 6: Prototype of Irrigation System

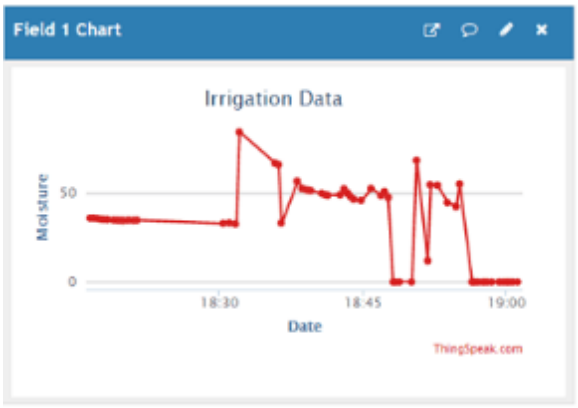

Fig 7: Simulation Result of Irrigation system

CONCLUSION AND FUTURE WORK

A novel technique for controlled water flow for irrigation purpose is suggested for multiple numbers of crops systems. The water flow is maintained in a measured manner for each and every system based upon the various factors such as humidity and soil moisture. The basic advantage of this system is controlled of water with help of IOT system. This technique as prove to be a more advantage system than the current existing one.

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