MJRET

Open Access

Multidisciplinary Journal of Research in Engineering and Technology

WEB BASED INTELLIGENT IRRIGATION SYSTEM USING WIRELESS SENSOR NETWORK

[1]Shubham Kadam, [1]Namrata Kalyankar ,[1]Unnatee Rao, [2]Prof.Soumitra Das

[1,2]Department of Computer Engineering
[2] Head of Department in Computer Engineering
[1,2]Dr. D. Y. Patil School of Engineering,
Pune, India.

Abstract: *Intelligent irrigation system consist of a wireless sensor network that monitors the weather and soil conditions. Wireless sensor network is used for the monitoring purpose. The monitored data is analyzed using the micro-controller and the controlling action is taken, also the data is provided to the farmers through the Android Application on their mobile. Agriculture sector being the base of Indian financial prudence it should be protected and maintained. Security not only for resources, agricultural products do need security and protection at very initial stage. The binding of conventional approach with modern technologies such as Wireless Sensor Networks results into agricultural modernization. Wireless Sensor Network (WSN) based device which has ability of analyzing the sensed information and then transmitting it to the user. This device can be handled and monitored from distant areas and it can be used in agricultural fields i.e. crop, soil, water level, water pressure, motor related operation purpose. This paper is oriented to accentuate the methods to solve such problems like identification of crop, which is suitable for which soil, level of water in soil, pressure of water, pH of soil. The main aspire of these project is to degrade water consumption & obtain greater yield.*

Keywords*: Soil moisture sensor, pH sensor, Raspberry Pi, ZigBee.*

1. INTRODUCTION

Agriculture playing a major role in monetary development of most nations, agricultural production has been experiencing the continuous improvement of its processes and techniques. Advances in embedded electronics, local wireless connectivity, and efforts in developing communication protocols and hardware for interconnecting networks to IP

M4-3-4-10-2016

(Internet Protocol) based Internet has paved the way for the wide scale distribution of IoT (Internet-of-Things) network. The goal of this project is to enhance products quality, and to maintain a sustainable agriculture, by collecting real-time data from the environment. So, there is the need for optimizing the resources employed in the agricultural processes, mainly in the irrigation system. For every crop the water required is different according their growth. The water provided by pump is not enough for the plants for their healthy growth. So as per the crop requirement it provides the water by monitoring the moisture level of the crop. Currently, agriculture put away about 70% of the fresh water. This percentage can be decreased by performing adequate water management when it comes to irrigation. This project uses the water efficiently, in right proportion and covers the entire field. It brings wide benefits, i.e. water savings, money savings plus the improvement of crop quality. The most important agricultural process, which can be well ordered and adapted to better suit the plants growth, is related to irrigation. Crop selection for the soil is important concept for this we are using pH sensor to determine the pH of soil & according to that we will select the crop which is to be sown. In this project pH sensor is also useful in recognizing the soil quality for crop growth. The users then control the entire agriculture system using Android application.

2. LITERATURE SURVEY

A research by Dr. K.S. Vijula Grace et al has incorporated major WSN based automated agriculture monitoring system. The ZigBee module used has the range of about 150 meters. The readings of temperature and moisture were recorded and timely sent to farmer's mobile enabling him to take the proper action. This paper proposes the architecture of the innovative GSM based remote controlled embedded system for farming. These system is a low-priced system where information is exchange via SMS on GSM network. As we identify the relevant level of water in the farms, it contributes to the quality of grains and highly affects the incidence of pests and diseases on crops [1]

Pravina B.Chikankar et al proposed that WSN is used in monitoring the condition of soil and to control the energy consumption, MAC protocols has a decisive role. It optimizes the expenditure of intensive computation and hardware devices using wireless sensor networks which are small in size and has a precise value Wireless mobile sensor network safeguard the usage of limited battery of sensor to increase the life of network for long and the extravagant sensors can diversify their positions to increase overall network endurance of the WSN. The optimization and modeling of transmission schemes are used to increase the

M4-3-4-10-2016

network lifetime and consumption of energy in the transmitter circuit along with the data transmission. Arduino micro-controller with grove moisture sensor and water flow sensor is used for automatic irrigation system. Moisture contents of soil is sensed by Arduino micro-controller and data is transmitted using ZigBee protocol. When the moisture level reaches the stipulated level, movement of water in the pipe is adjusted accordingly. All the data such as flow, water pressure, moisture content etc. are updated in the database along with time by which one can check the status of moisture level and motor running time on display and also on mobile via GSM [2].

Chetan Dwarkani and R. Priyatharshini et al proposed that system is to barbarize the activities of farming by using the principles of mechanics, communication, and electronics. They accomplish their goal by using mechanical machinery, sensors, and electronic components.
We have used two modules, namely a smart farm sensing system and movable smart Irrigation that moves on mechanical bridge slider arrangement. Both the systems consist of micro-controllers, sensors, and the GSM module to communicate with each other and with the external environment. The smart farm sensing system senses the moisture capacity with the aid of the soil Moisture sensor. Smart sensing system provides precise results and the Smart irrigator system manages to spray the necessary nutrients as per the requirements of the crop [3].

Nikhil Agrawal et al proposed that paper cites an intelligent drip irrigation system to water plants with the use of devices like raspberry pi, Arduino microcontrollers. ZigBee is used to monopolize the system wirelessly while Python programming language is used for automation purpose. This paper contributes an efficient and relatively low tariff automation irrigation system. System once initiated has no maintenance cost and is effortless to use [4].

A research by Nelson Sales, Orlando Remedios et al data can be occupied to automate the irrigation process in agriculture while shrinking water consumption, resulting in monetary and ecofriendly benefits. The high storage and processing capabilities, the rapid elasticity and pay per-use characteristics makes Cloud Computing an attractive solution to the large amount of data generated by the WSN. Wireless Sensor and Actuator Network (WSAN) communication system is used in these paper which is cloud-based. This solution audits and monitors a group of sensors and actuators, respectively, to access plants water needs. He proposes a cloud-based solution for an intelligent irrigation system organized as a Wireless Sensor and Actuator Network (WSAN). A remote web service is employed to optimize the system with weather knowledge [5].

M4-3-4-10-2016

Pandurang H. Tarange proposed WSN which consists of two nodes, coordinator node and Router/End device node. Each node has its own memory, processor and an RF transceiver. The coordinator node is set up on Raspberry Pi i.e. embedded Linux board and End device is set up on Arduino UNO Atmega328 manifesto. The task of the coordinator node in the system is to take up the communication with distributed End device nodes via the ZigBee wireless communication protocol and continuously collects the soil moisture and temperature data is gathered and stored in the database. The database is created on the raspberry Pi board which is a MySQL database. Hence coordinator node allows data gathering over ZigBee, and data monitoring and system control through web browser remotely [6].

3. GENERAL DISCUSSION AND REVIEW COMMENTS

Sr. No	PAPER NAME	PARAMETERS USED					TECHNOLOGIES				CROP SECURITY
		Soil moisture	Humidity	pH	pressure	Temperature	Zigbee	GSM	Web interface	Cloud computing	
1.	WSN in agriculture.[1]	✓	✓	✗	✗	✓	✓	✓	✗	✗	✗
2.	Automatic irrigation system using Zigbee in WSN.[2]	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗
3.	Monitoring of soil parameters for effective irrigation using (sensor)WSN.[3]	✓	✓	✓	✗	✗	✓	✗	✗	✗	✗
4.	Smart farming system using sensors for agriculture task automation.[4]	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗
5.	Wireless sensor and actuator system for smart irrigation on cloud.[5]	✓	✗	✗	✗	✓	✗	✗	✗	✓	✗
6.	Web based Automatic irrigation system using wireless network.	✓	✗	✗	✗	✓	✗	✗	✓	✗	✗

Fig.1 Taxonomy Chart

4. CONCLUSION & FUTURE SCOPE

In this paper we planned a Wireless Sensor Network system which has many applications in diverse areas. It has been matured for Smart Irrigation System. The study has incorporated

M4-3-4-10-2016

major WSN based automated agriculture monitoring system. This system hand-out the design of intelligent farming using WSN. By using this system, the farmers can get the information of electricity status at farm field, warning message like smoke etc. through various sensors. There are few problems found in WSN and Smart irrigation. New technologies could help to minimize them by achieving the better security & authentication concept along with soil quality and unwanted desolation of water. In future we will work on developing a web based intelligent irrigation system which will overcome the drawback of existing system. We will work on water excavation problems in the field, water consumption problem, determining seeds to be sown according to the soil's pH & watering the plants by determining the soil moisture in the soil. We will also focus on the crop security by using Buzzers.

ACKNOWLEDGEMENT

REFERENCES

[1] Dr.K.S.Vijula Grace,Silja Kharim," wireless sensor based architecture in agriculture field",2015 Global conference on communication technologies.(Gcct 2015)

[2] Pravina B. Chikankar, Soumitra Das," An Automatic Irrigation System using ZigBee in Wireless Sensor Network", 2015 International Conference on Pervasive Computing (ICPC).

[3] Chetan Dwarkani M, Ganesh Ram R," Smart Farming System Using Sensors for Agricultural Task Automation," 2015 IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015)

[4] Nikhil Agrawal, Smita Singhal," Smart Drip Irrigation System using Raspberry pi and Arduino", International Conference on Computing, Communication and Automation (ICCCA2015).

[5] Nelson Sales, Orlando Remedios- "Wireless Sensor and Actuator System for Smart Irrigation on the Cloud"- SenseFinity Lisboa, Portugal. 2015 IEEE.

[6] Pandurang H. Tarange," Web based Automatic Irrigation System using wireless sensor,"2015 international conference on circuit, power and computing technologies.

M4-3-4-10-2016