A Study on Microcontroller Based Automatic Real Time Water Irrigation Management System

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ABSTRACT

The entire system is controlled using microcontroller which is programmed as giving the signal to the sprinkler or motor. To prevent the water wastage, first we have to estimate the soil parameters like pH, soil moisture and temperature of the soil. Sensors are connected to the internal ports of microcontroller. Whenever there is a change in moisture level of the soil the sensor senses the change and gives the reading to the microcontroller as interrupt. Thus the controller gives the signal to the sprinkler or motor to sprinkle the water.

KEY WORDS: Real time irrigation, Automatic irrigation, Sensor, Microcontroller.

1. INTRODUCTION

In the quick paced world people require everything to be robotized. Our way of life requests everything to be remote controlled (Gayathri & Kavitha, 2015). Aside from couple of things man has made his life computerized. Amid summers, the vast majority are excessively apathetic, making it impossible to water the pruned plants on their housetop cultivates each day. In the realm of propel hardware life of people ought to be more straightforward henceforth to make life less complex and advantageous, so I have made "Programmed Plant Watering Framework". A model of controlling watering offices to help a great many individuals. These mechanized plant watering frameworks have been appeared to utilize 47% more water by and large than sprinkler frameworks that are not robotized (i.e. hose and sprinkler), which can be ascribed to a great extent to the inclination to set water system controllers and not rearrange for shifting climate conditions (Kavitha & Palanisamy, 2013). Water system control innovation that enhances water application proficiency is currently accessible. Specifically, soil dampness sensors can diminish the quantity of pointless water system occasions. This model uses sensor technology with microcontroller to make a keen exchanging gadget (Vivek & Palanivel Rajan, 2016). The model demonstrates the essential exchanging instrument of water engine/pump utilizing sensors from any piece of field by detecting the dampness exhibit in the dirt by soil dampness sensor (Mohanapriya & Vadivel, 2013). At last LCD used to show the dirt dampness level. The goals of the venture are imperative to guarantee the exploration will satisfy the arrangement of the issue look into. Every one of the destinations is demonstrated as follows:

- To outline and build up a programmed plant watering framework controlled by utilizing PIC microcontroller.
- To actualize the programmed watering framework in light of soil dampness sensor and temperature sensor.
- To plan and build up the model of the farming based framework.

Literature Review: In this paper, temperature sensors, soil moisture sensor are placed in the field. An algorithm has been created to scale the critical reading of temperature sensor and soil moisture sensor that should be loaded into a microcontroller (Palanivel Rajan, 2014). And then the system needs to be connected to the remote server through network to maintain the database and for switching the motor.

Here the humidity of the land is supervised using the sensor. It is used to note the moisture content of soil in real time. It works by calculating the speed of the sound and saturation in soil. Based on the kind of soil and moisture level, the speed of sound varies gradually (Palanivel Rajan, 2010).

The system will send the data to the farmer and whenever the farmer needs to turn on the motor he needs to send a message to the system to the device run (Palanivel Rajan, 2012). And the farmer can switch off the device through the message from his mobile. Advanced RISC machine is used and for the communication purpose GSM is used. GSM operates through the short message service and it acts as interconnection between the system and the farmer (Vijayprasath & Palanivel Rajan, 2015). Then the collected raw data are sent to the computer with the help of cellular network (Palanivel Rajan & Dinesh, 2015). There are many AT commands to control the cellular network.

There is also an irrigation technique with the help of WSN nodes. This is used to boost the performance of the system. In this the data collecting elements are placed inside the required area (Palanivel Rajan, 2016). So that it can sense the data at regular interval. This collected information is then shared to the online resources organized by the dealer for further process. Then the particular control signal is generated and given to the WSN nodes for the process of system (Vivek, 2016). Internet is must for this type of irrigation systems.

There are many systems for automatic irrigation. Among that irrigation using rain gun is one. This plan is used when there are enormous amount of water is used. So, this saves a large quantity of water (Palanivel Rajan, 2012). They are controlled by software developed in android stack. This can be controlled by an external application with the help of mobile. The android application can be developed using the android SDK application using the Java programming language (Renuka & Kavitha, 2013). In these mobile phones plays a important role. This application

uses the GPRS features of mobile phone. This system covers low range of irrigation. But it is not economically affordable (Palanivel Rajan, 2015). In field irrigation using global system monitoring, we can perform efficiently. With these we can power on and off efficiently. These valves are controlled using microcontroller (Palanivel Rajan & Vivek, 2016). If the plants gets water at regular interval, the yield will the plants gets increased by 20 to 30 percentages.

Agriculture irrigation control with the help of remote system and WSN nodes. In this windows application is used to control the system. But using WSN is less effective because of its low power storage (Palanivel Rajan & Sheik Davood, 2015). But the other devices connected to it use more power. So the WSN becomes reduced.

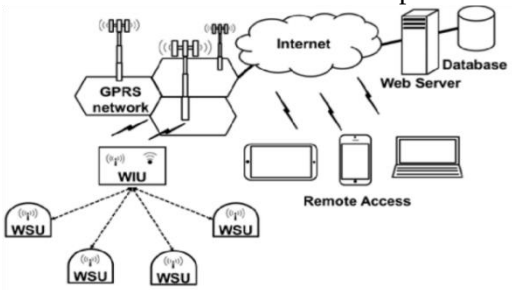

Figure.1. WSN Controlled Irrigation System

But using these WSN will affect the performance of the system. WSN have only low amount of power and are very small (Palanivel Rajan & Sukanesh, 2013). So if we connect additional devices to the WSN, then the power discharge will be quicker and we want to charge it every time frequently (Palanivel Rajan & Sukanesh, 2012).

Figure.2. Some of the areas in which automated irrigation practiced

At the same time all the farmers would not have the knowledge to use android developed applications. They feel it harder to use (Sundaravadivu and Bharathi, 2013). And connecting to the internet may lead to the theft of data. So the privacy is also important to be maintained.

2. CONCLUSION

Nowadays farmers are facing a major problem due to the shortage of irrigation water. And there is no rain so we want to use the ground water efficiently (Sridevi & Prasannavenkatesan, 2016). By using this method we can preserve the water and at the same time we can increase the yield and growth of the plants.

REFERENCES

Gayathri C, Kavitha V, Mitigation of Colluding Selective Forwarding Attack in WMN's using FADE, International Journal for Trendsin Engineering and Technology, 3 (1), 2015.

Kavitha V, Gayathri C, A Survey on Detection Methods for Network Layer Attacks in WMN's, International Journal of Applied Engineering Research, 10 (1), 2015, 744-748.

Kavitha V, Palanisamy V, A Performance Analysis of Load Balanced Deflection Routing with Priority Scheduling in OBS Networks, International Journal of Engineering Science and Technology, 5 (4S), 2013, 1-8.

Mohanapriya S, Vadivel M, Automatic retrieval of MRI brain image using multiqueries system, International Conference on Information Communication and Embedded Systems (ICICES), 2013, 1099-1103.

Palanivel Rajan S, A Significant and Vital Glance on Stress and Fitness Monitoring Embedded on a Modern Telematics Platform, Telemedicine and e-Health Journal, 20 (8),2014,757-758.

Palanivel Rajan S, Cellular Phone based Biomedical System for Health Care, IEEE Digital Library Xplore, 2010, 550-553.

Palanivel Rajan S, Dinesh T, Analysis of Human Brain Disorders for Effectual Hippocampus Surveillance, International Journal of Modern Sciences and Engineering Technology, 2 (2), 2015, 38-45.

Palanivel Rajan S, Dinesh T, Systematic Review on Wearable Driver Vigilance System with Future Research Directions, International Journal of Applied Engineering Research, 10 (1), 2015, 627- 632.

Palanivel Rajan S, Intelligent Wireless Mobile Patient Monitoring System, IEEE Digital Library Xplore**,** 2010, 540-543.

Palanivel Rajan S, Paranthaman M, Vivek C, Design and Enhancement of Wideband Reconfigurability using Two E-Shaped Patch Antenna, Asian Journal of Research in Social Sciences and Humanities, 6 (9), 2016, 317-327.

Palanivel Rajan S, Performance Evaluation of Mobile Phone Radiation Minimization through Characteristic Impedance Measurement for Health-Care Applications, IEEE Digital Library Xplore, 2012.

Palanivel Rajan S, Review and Investigations on Future Research Directions of Mobile Based Telecare System for Cardiac Surveillance, Journal of Applied Research and Technology, 13 (4), 2015, 454- 460.

Palanivel Rajan S, Sheik Davood K, Performance Evaluation on Automatic Follicles Detection in the Ovary, International Journal of Applied Engineering Research, 10 (55), 2015, 1-5.

Palanivel Rajan S, Sukanesh R, Experimental Studies on Intelligent, Wearable and Automated Wireless Mobile Tele-Alert System for Continuous Cardiac Surveillance, Journal of Applied Research and Technology, 11 (1), 2013, 133-143.

Palanivel Rajan S, Sukanesh R, Performance Analysis Of Mobile Phone Radiation Minimization Through Characteristic Impedance Measurement, International Journal of Computer Science Issues, 9 (2), 2012, 540.

Palanivel Rajan S, Sukanesh R, Viable Investigations and Real Time Recitation of Enhanced ECG Based Cardiac Tele-Monitoring System for Home-Care Applications: A Systematic Evaluation, Telemedicine and e-Health Journal, 19 (4), 2013, 278-286.

Palanivel Rajan S, Sukanesh R, Vijayprasath S, Analysis and Effective Implementation of Mobile Based Tele-Alert System for Enhancing Remote Health-Care Scenario, HealthMED Journal, 6 (7), 2012, 2370–2377.

Palanivel Rajan S, Sukanesh R, Vijayprasath S, Design and Development of Mobile Based Smart Tele-Health Care System for Remote Patients, European Journal of Scientific Research, 70 (1), 2012,148-158.

Palanivel Rajan S, Vivek C, Blending Augmented Reality and Cloud - Need of the hour and an innovative approach, Journal of Chemical and Pharmaceutical Sciences, 8, 2016, 23-27.

Renuka R, Kavitha V, An Energy Model for achieving High Performance Burst Transmission in OBCS Networks, International Journal of Engineering Science and Technology, 5 (4S), 2013, 7-13.

Renuka R, Kavitha V, OBCS, High performance burst transmission for achieving energy consumption, International Conference on Emerging Trends in Computing, Communication and Nanotechnology, IEEE, 2013, 410-414.

Sridevi A, Prasannavenkatesan G.K.D, A Survey of PAPR Reduction in OFDM Signals, Journal of Advances in Chemistry, 12 (23), 2016, 5478-5483.

Sundaravadivu K and Bharathi S, STBC codes for generalized spatial modulation in MIMO systems, IEEE International Conference ON Emerging Trends in Computing, Communication and Nanotechnology (ICECCN), Tirunelveli, 2013, 486-490.

Vijayprasath S, Palanivel Rajan S, Performance Investigation of an Implicit Instrumentation Tool for Deadened Patients Using Common Eye Developments as a Paradigm, International Journal of Applied Engineering Research, 1, 2015, 925-929.

Vivek C, Palanivel Rajan S, Kavitha V, Implementation of High Speed Area Efficient Variable Latency Adder, Asian Journal of Research in Social Sciences and Humanities, 6 (9), 2016, 306-316.

Vivek C, Palanivel Rajan S, Review of Low Power and High Speed Implementation of 3-bit Flash Analog to Digital Converter, Journal of Chemical and Pharmaceutical Sciences, 8, 2016, 74-78.

Vivek C, Palanivel Rajan S, Z-TCAM: An Efficient Memory Architecture Based TCAM, Asian Journal of Information Technology, 15 (3), 2016, 448-454.