IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 5, May 2016

Observation and Control of Crops over Internet

Nitish Bharti[1], Shalabh Bade[2], Vipul Badge[3], Mr. Manish Narkhede[4]

UG Scholar, Department of E&TC Engineering, Pimpri Chinchwad College of Engineering, Pune University, India[1,2,3]

Assistant Professor, Department of E&TC Engineering, Pimpri Chinchwad College of Engineering,

Pune University, India[4]

Abstract: India is known as the agricultural country as the main occupation in India is Farming. India is also known for the export of the spices, jute, raw wool and tea. India nearly produces half of the tea combining the whole world's production.The main and important thing which causes this massive production is the Land quality and features of Indian soil. To maintain this overwhelming production rate the qualities of soil must be preserved at a functional level. The factors that needed to be controlled are listed below and with the help of sensors we are able to measure the different parameters related to soil. Factors affecting productivity of soil are Moisture, Humidity, Temperature and salinity of the soil. By measuring the parameters we can control them to a set point value by limiting the excess and increasing the lacking parameters. The control will be entirely over the internet. The user will be able to decide the appropriate action to be taken and can take decision by controlling the system via the internet.

Keywords: Temperature Sensor, Moisture Sensor, Humidity Sensor, LPC2138, Internet of Things.

I. INTRODUCTION

Recent trend develops a need of smart farming for proper and fruitful yield from the fields. Due to advent of internet and wireless technology, farms can be easily monitored and controlled. In this project we emphasize on the idea of Observation and Control of Crop over the Internet, where using the web one can monitor and exercise control on his farm from anywhere and at anytime. The soil conditions will be continuously monitored via sensors.

The basic soil parameters moisture, temperature and humidity will be observed using respective sensors. The measured readings will be sent over to the web application from where the user can access and monitor the conditions of his field. As per measurements if the user feels a need of control action, using the control button he can initiate the control action.

The system at field will read the control command and then will initiate the appropriate control action by actuating or turning ON/OFF water pumps installed on the field. Once the control action is done the parameters are then again simply monitored. The use of internet makes this system more accessible and vivid in terms of usability and understanding to any layman. The control actions with feedback also put user's action on the top priority making the system user friendly and not just an automated control system.

II. BLOCK DIAGRAM

In sensor unit the sensors having input requirement of 3V-5V will take the input from the field for moisture humidity and temperature content for the field. Motor requires 6V supply for the complete function. On the other hand Micro-controller requires 3.5V supply. ARM7 family's LPC2138 Micro-controller is used to obtain the sensors reading, process it and control the fieldparameters by following the command given by the user via webpage.

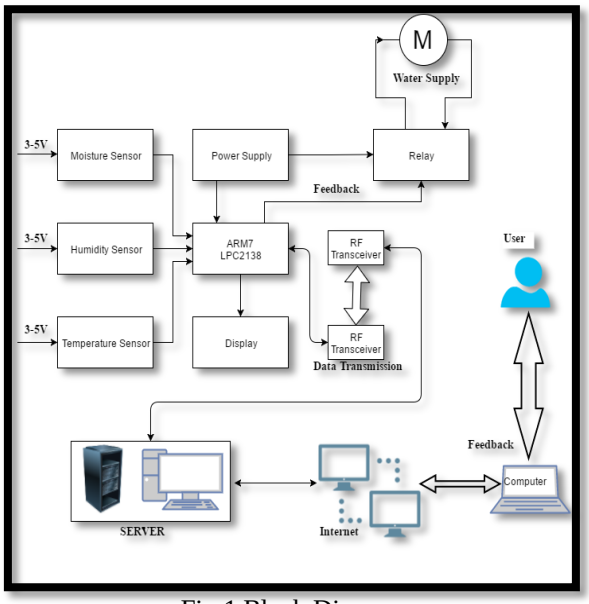

Fig.1 Block Diagram

DC water pump is used for water supply facility which is control by relay interfaced with the on-field microcontroller.

The collected on-field data is continuously shared between on-field controller and the server computer via RF transceiver link installed at both ends.The Server computer continuously keeps on receiving the data from ARM 7 via RF transceiver and uploading it on the internet.

User's input via web end is considered as a feedback command for the system and has the highest priority.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 5, May 2016

III. WORKING OF SYSTEM

Phase I: Acquisition of the measured parameters is included in this phase. The sensors that are moisture sensor, temperature and humidity sensor take in the continuous readings at the field. These readings are then conveyed to the main controller that is ARM7 LPC2138. The controller processes the reading and sends it to the server computer via wireless RF link which is connected to the internet.This is a continuous and real time process that enables the user to monitor and gain control over the field anytime and every time.

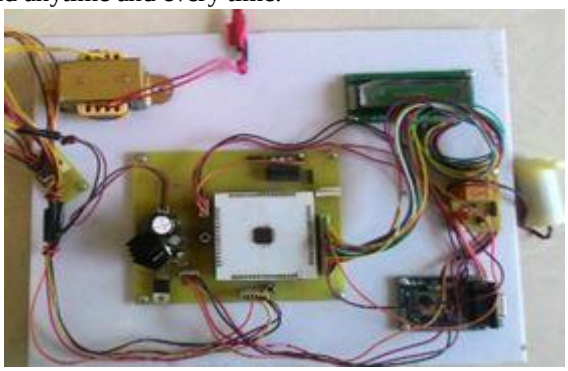

Fig. 2 On-field Hardware

Phase II: The data on the server is updated continuously after an interval of few seconds. The user can access the web application developed using PHP and Python to monitor the readings from the field. Also the user is provided with the control buttons on the web page that helps the user to control the field condition as and when required. Clicking on the control buttons, the user initiates the control commands towards the field.

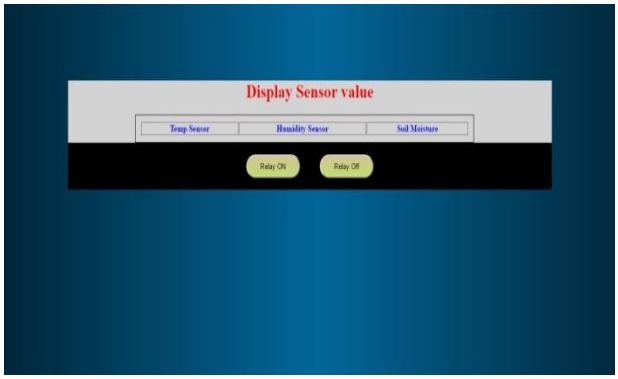

Fig. 3Web Application

Phase III: After receiving the control commands, the same are processed by the server PC and forwarded to the field controller that is ARM7 LPC2138 by the base MCU. The program in the main controller analyses the parametric values and conditions.

As per the difference between measured value and ideal/ required value it turns ON the control motor pumps, which then supplies water to the field. Thus the control action taken and changes are continuously compared to equate the field conditions to required value. After attaining the required value to control actions stops and the field is then simply monitored.

IV. FLOWCHART

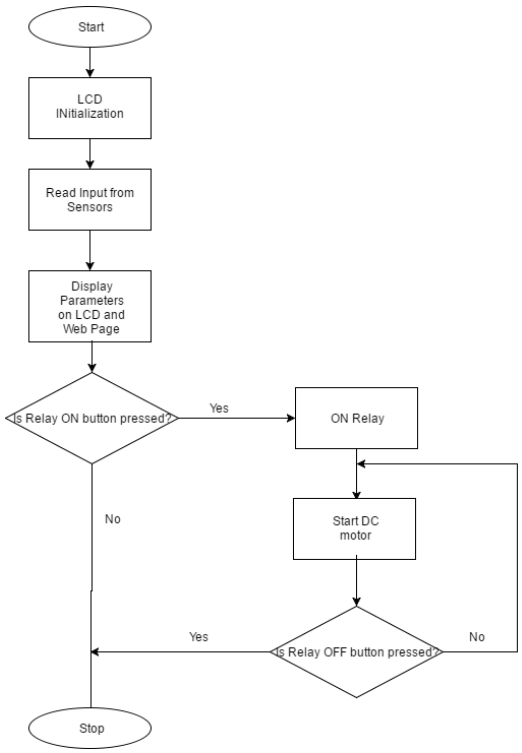

Fig. 4 Flowchart of proposed system

V. ALGORITHM

Step1: Take the inputs from sensors.
Step2: Send sensor values to the on-field controller LPC2138.
Step3: Display the values on the on-filed LCD device.
Step4: Continuously transmit the sensors value via RF transceiver to the server.
Step5: Continuously upload the data on the database and display the field parameters on the web page.
Step6: Check if 'Relay On' button is pressed.
Step7: If pressed, turn on the relay which turns on the pump.
Step8: Keep the relay ON till 'Relay Off' button is pressed.
Step9: If the 'Relay Off' button is pressed, turn off the relay and display new values.
Step10: Go to step 1.

VI. ADVANTAGES

- Precise monitoring and control.
- Improves quality and quantity of crops produced.
- Improves time utilization.
- Safety of crops is ensured.
- Increases quantity per time ratio.

VII. APPLICATIONS

- Greenhouse, Nursery, Horticulture, etc.
- Monitoring hazardous region.
- Automated surveillance control system.

DOI 10.17148/IJARCCE.2016.5523

VIII. CONCLUSION

Observation and Control of Crops over the Internet is a technology of new age. It covers monitoring and control of the field located remotely, over the internet. The required levels of moisture are set and controlled with continuous monitoring via high speed ARM7 family processor. The control actions with feedback also put user's action on the top priority making the system user friendly and not just an automated control system.

This prototype can be updated with more number of sensors and other control elements can be added as per the required application.

Currently we have used web application for interaction of user with the field processor, respective mobile applications can develop to make the project more convenient for the users.

ACKNOWLEDGMENT

We express our great pleasure in submitting this project entitled "**Observation and control of Crops Over the Internet**" to "Pimpri Chinchwad College of Engineering ,Pune.". We express our deep sense of gratitude towards our project guide **Mr. M. M. Narkhade** for his constant encouragement and valuable guidance to work on this project and to make it success. We are also thankful to **Dr.N.B.Chopade** (Head of the E&TC department) for his involvement and his interest in the project. We indebted to our honorary Principal of our institute **Dr.A.M.Fulambarkar** who has been a source of motivation and co-operation to complete this project. Lastly we are thankful to all other staffmembers of E&TC department of Pimpri Chinchwad College of Engineering, Pune and our colleagues who have directly or indirectly helped us while completing this report.

REFERENCES

[1] Internet of Things Technology applied in the field of information monitoring. By- Kencai Source: Advances in Science and information Sciences, July 2012- Vol.4
[2] "IoT" A vision architectural element and future direction. By- JayvardhanaGubbi Source: Future Generation computer system. Vol.29
[3] Research on water saving irrigation control system based in IoT. By- Zhang Fang Source:ICEICE 2011
[4] YogeshR.,Sameer Khandekar, Bipin Mishra, K.K. Saundra "Environment Monitoring and control of a Polyhouse Farm through Internet"
[5] Prof. S. G. Galande, Prof. G. H. Agrawal, Mrs.LondheShalakaRohan, "Internet of Things Implementation for Wireless Monitoring of Agricultural Parameters", International Journal of Advanced Research in Electronics and Communication Engineering,2122
[6] MayurRandhir and R. R. Karhe ,"Monitoring Of Environmental Parameters by Using Cloud Computing", International Journal of Computer Science Trends and Technology (IJCST),152,153.
[7] D.D.Chaudhary ,S.P.Nayse , L.M.Waghmare ,"APPLICATION OF WIRELESS SENSOR NETWORKS FOR GREENHOUSE PARAMETER CONTROL IN PRECISION AGRICULTURE", International Journal of Wireless & Mobile Networks (IJWMN),146,147.
[8] Keerthi.v and Dr.G.N.Kodandaramaiah, "Cloud IoT Based Greenhouse Monitoring System", Int. Journal of Engineering Research and Applications, 36.

LINKS

[1] http://web.b.ebscohost.com
[2] http://ieeexplore.ieee.org
[3] http://www.sciencedirect.com
[4] http://www.sugarcanecrops.com

BIOGRAPHIES

NitishBharti, B.E. in Electronics and Telecommunication Engineering. Interested in Embedded & Automation, Green Energy, Web Design,Automotive Engineering.

Vipul Badge, B.E. in Electronics and Telecommunication Engineering. Interested in Industrial automation, Manufacturing, Embedded Systems, Robotics.

Shalabh Bade, B.E. in Electronics and Telecommunication Engineering. Interested in PLC and Automation, Audio Video Engineering, Embedded Systems.

Mr. Manish Narkhede, Assistant professor. Specialization: Embedded system design, Matlab, Artificial Intelligence, Automotive Engineering, Web Development.

DOI 10.17148/IJARCCE.2016.5523