The 11th TSAE International Conference

26-27 April 2018

Available online at www.tsae.asia

Monitoring Wireless Agricultural Sensors with Smart Phones

Waris Rattananimit[1]*

[1]Siam Technology College, 46 Chalarnsanitwong Watthapra Bangkokyai, Bangkok, Thailand
*Corresponding author: Tel: +66-8-31324777, Fax: +66-28-785-033, E-mail: warisr@saimtechno.ac.th

Abstract

Nowadays the Internet Technology going to increase even the agriculture system in order to add product value in quality.wireless sensors in agriculture is an application of advanced technology in agriculture which solves a series of information technology for wide area. This research aim to propose a model for wireless sensors based approach for agricultural monitoring .The varieties sensors are successfully interfaced with NodeMCU and wireless communication is achieved between various Nodes. There is gateway for receive many data from sensors and send data with WiFi to Blynk Server for generate graph.User can view with Mobile Device .

Keywords: Smart Agriculture, Monitoring, Internet of Things

1 Introduction

Nowadays the IoT Technology going to increase a role an agriculture system in order to add product value in quality, Smart Agriculture is an application of advanced technology in agriculture which solves a series of technical hurdles in information technology for wide area.We have used various sensors to create a well established agricultural monitoring system like Temperature and Humidity sensor, Soil Moisture sensor is used to measure data from sensor is used to keep the track of field activities, thereby sending the data to the user. The remote monitoring solution that we offer can be monitored in real time through any remote devices including mobiles or tablets. This provides the flexible for the data visualization, data understanding, and the predictive analysis also given the scope for the farmers to prepare for the advanced data which might appear in the future.

2 Literature Review

Saraswathi Sivamani, Namjin Bae, and Yongyun Cho (2013) study A Smart Service Model Based on Ubiquitous Sensor Networks Using Vertical Farm Ontology we propose a vertical farm ontology (VFO), an OWL based ontology model which helps in more understanding of the relationship between the domain factors. With the proposed model, the information from the Internet of things is recomposed as context information and made understandable for the other systems. For the sake of agriculture and Nikesh Gondchawar, Prof. Dr. R. S. Kawitkar (2016) study IoT based Smart AgricultureAgriculture plays vital role in the development of agricultural country. In India about 70% of population depends upon farming and one third of the nation's capital comes from farming The highlighting features of this project includes smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly it includes smart irrigation with smart control and intelligent decision making based on accurate real time field data smart warehouse management which includes temperature maintenance, humidity maintenance and theft detection in the warehouse. Controlling of all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors, Wi-Fi or ZigBee modules, camera and actuators with micro-controller and raspberry pi. Dharti Vyas, Amol Borole, Shikha Singh (2014) study smart Agriculture Monitoring and Data Acqusition System we discuss about field signal monitoring system with wireless sensor network (WSN) which integrates different platform with different communication technology monitoring agriculture field we have to use different sensors with raspberry pi and Arduino or LPC 2148 or AVR based microcontroller. implementation using comparison of real time and historical data. and Vaibhavraj S. Roham (2015) study Smart Farm using Wireless Sensor Network Wireless Sensor Networks due to their vast area of application being used in current research areas Wireless Sensor Networks (WSN) does this job to automate and analyze the corresponding parameters. they are going to develop the Web Application, Smartphone Application and Sensor Networkusing Zigbee Devices, BeagleBone Controller and various Sensors

3 Method

The essential marvel behind the working of smart dryer is the constrained convection instrument. Notwithstanding this drying will be done in a temperature which empowers the Humidity [13]

Figure 1 wiring sensor

NodeMCU is an open source IoT platform.It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

The soil moisture sensor used is capacitive type. The sensor gives analog output of zero volt when there is 100% moisture and 5V for 0% moisture .the moisture sensor is a resistive sensor. It determines the change in resistance of the soil between two probes which depends upon water content in it. Since water is a good conductor of electricity in the presence of ions

Photoresistor is a component that has a variable resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.Variation in resistance with changing light intensity.The most common type of Photoresistor has a resistance that falls with an increase in the light intensity falling upon the device .The resistance of an Photoresistor may typically have the following resistances:

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet.

It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets.

It's really simple to set everything up and you'll start tinkering in less than 5 mins. Whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the Internet Of Things. [13]

The system architecture is composed of sensors (temperature, moisture and the light), which are installed in the agriculture field. These sensors will be collecting the environmental parameters. The sensed data is mitigated into the cloud through an IoT gateway gives a real time data visualization

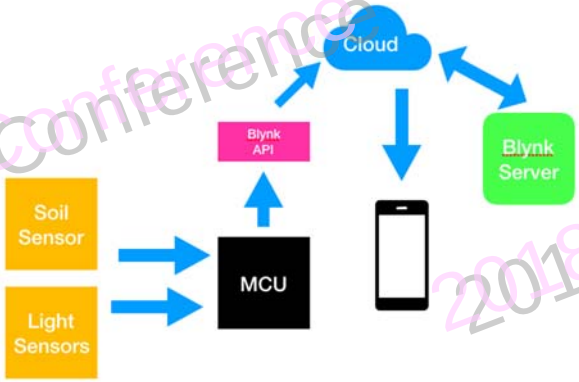

Figure 2 The system architectures

User can analyze the output in the Blynk Application. which will give the graphical notations of all the values. Blynk is an internet of things application and is an open source. Blynk can also acts as an application programming interface in order to store and retrieve the data using the protocol over the internet or via a Local area. We can see the graphs of temperature value, light value, and soil moisture value.

A real time data visualization can be analyzed in the Blynk, which is an IOT hub. The following figure shows the real time data visualization

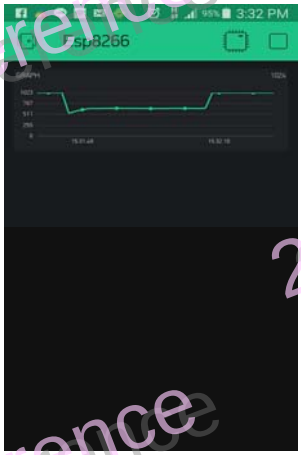

Figure 3 Graph of collect data

The graph in the above figure suggests that the temperature value is analyzed in the Blynk Application hub. The graph is plotted with Soil Moisture value v/s date.

Figure 4 Soil Moisture change when dry and wet And label change High and Low

4 Conclusions

The sensors and microcontrollers are successfully interfaced with NodeMCU and ESP8266 wireless communication is achieved between various Nodes. The Application also offers real time realization and analysis of data which can be used across the globe in conjunction with the parameter been monitored through to understand the abnormal behavior of the similar kind of the crop. The system can further been improved by incorporating new self learning techniques which could deployed in the cloud to understand the behavior of the sensing data and Alert on Mobile with Instant Message Application. User can take autonomous decisions.

5 Acknowledgements

This research was financially supported by Siam Technology College.

6 References

Shruti A Jaishetty, Rekha Patil (2016) ,IOT SENSOR NETWORK BASED APPROACH FOR AGRICULTURAL FIELD MONITORING AND CONTROL ,IJRET: International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308 ,Jun-2016

Saraswathi Sivamani, Namjin Bae, and Yongyun Cho (2013),A Smart Service Model Based on Ubiquitous Sensor Networks Using Vertical Farm Ontology,Hindawi Publishing Corporation International Journal of Distributed Sensor Networks ,2013

Nikesh Gondchawar, Prof. Dr. R. S. Kawitkar(2016) IoT based Smart Agriculture ,International Journal of Advanced Research in Computer and Communication Engineering ,Vol. 5, Issue 6, June 2016

Prof C. H. Chavan, Mr.P. V.Karande (2014),Wireless Monitoring of Soil Moisture, Temperature & Humidity Using Zigbee in Agriculture ,International Journal of Engineering Trends and Technology (IJETT) – Volume 11 Number 10 – May 2014

Tejas Bangera, Akshar Chauhan, HarshDedhia, Ritesh Godambe, Manoj Mishra (2016),IOT Based Smart Village ,International Journal of Engineering Trends and Technology (IJETT) – Volume 32 Number 6- February 2016

Dharti Vyas, Amol Borole, Shikha Singh(2016) ,Smart Agriculture Monitoring and Data Acqusition System ,International Research Journal of Engineering and Technology (IRJET) ,Volume: 03 Issue: 03 | Mar-2016

Waris Rattananimit,Komsan pittayapron (2015) , Small Weather Station via Internet of things,Techcon 2015 ,Bangkok,1223- 1227,2015.

Vaibhavraj S. Roham, Smart Farm using Wireless Sensor Network(2015) ,International Journal of Computer Applications ,2015

Drishti Kanjilal, Divyata Singh, Rakhi Reddy(2014), Prof Jimmy Mathew ,Smart Farm: Extending Automation To The Farm ,INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 3, ISSUE 7, JULY 2014

Damini H Patel , Monali Dave ,(2017) IOT Compatible Wireless Smart Portable Mini Weather Analyzer ,International Research Journal of Engineering and Technology (IRJET) ,Volume: 04 Issue: 05 | May -2017

http://www.blynk.cc,The most popular mobile app for the IOT Pasha Baiborodin ,2017

Komsan Pitayaporn1 , Ongarj Wisesook2 , Waris Rattananimit3 (2018) Controlled Temperature of Smart Solar Dryer by Smart Phone ,International Congress on Technology Engineering and Science,01-02 February 2018.