International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

Live and Smart Agriculture

Sidditha.G[1], Rahamed Sabira.M[2], Rothai Chellamani.J[3], Vijayalakshmi.G[4]

[1-3]UG students, Department of ECE, Prince Shri Venkateshwara Padmavathy Engineering College, Chennai
[4]Professor, Department of ECE, Prince Shri Venkateshwara Padmavathy Engineering College, Chennai

---

Abstract - *Agriculture is an integral part of Indian economy. Over 60% of Indian population based upon agriculture and one third of the income of nation arises from agricultural practices. Hence it plays a vital role in the development of the country. Various issues related to farming is continuously hampering the development of the country. Possible solution for these problems is to opt for modernized agriculture that comprises of modern trends. Hence, agriculture can be made smart using IOT and other technologies. Smart agriculture increases crop yield, decreases water wastage and imbalanced use of fertilizers. The highlighting feature of this project is that it measures the different agricultural parameters affecting the yield and it also uses a web page to get the information about the current status of the field. Secondly it sends all the data to the cloud where it can be further analyzed. Thirdly this project also contains an android mobile app providing live streaming to the farmer. Moreover this project presents a smart irrigation system that optimizes water usage.*

Key Words: IOT, Web page, cloud, android app, farming

1. INTRODUCTION

Internet of Things (IOT) is the interconnection or network of physical devices that is interrelated computing devices, digital and mechanical machines, people or animals, objects that can sense, accumulate and transfer data over web without any human involvement. Everything is provided with unique identifier. It is a progressed examination and mechanized frameworks which uses detecting, organizing, enormous information and man-made consciousness innovation to convey total framework for an administration. Basically IOT is about extending the power of internet beyond smart phones and computers.

IOT has changed today's world. Smart cities, smart car, smart homes everything around us can be turned into a smart device with the help of IOT. It also has applications in agriculture, business sectors, healthcare, transport and logistics. Internet of Things has capacity to transform the lives of people in the world in an efficient manner. The ever growing population would touch more than 3 billion in few years. So to feed such an immense population, agriculture industry need to embrace IOT. The demand for more food has to address challenges that include excessive climate conditions, weather change and different environmental affects that results from farming practices.

The paper is organized as follows: Section 2 reviews related works .Smart irrigation system using zigbee are presented in Section 3. Section 4 presents the design of Live and smart agriculture using NodeMCU. Section 5 Discusses the results obtained. Section 6 concludes this paper.

2. RELATED WORKS

Embedded soil analyser with measures the pH value of the soil and based on this value gives measure of various soil nutrients. The system proposed here[1]uses signal conditioning, display, microcontroller unit, sensors, power supply and thermal printer. This model helps in prediction of the soil sequence based on the availability of nutrients. Many techniques monitors various soil parameters and this paper points at soil fertility. The main aim of this model is to replace the conventional method of soil testing by automated soil testing. It automatically measures the major soil nutrients like potassium, phosphorus and nitrogen by calculating the pH value. IOT based smart stick[2] that enables live monitoring of the different agricultural parameters. This stick helps farmer acquire live data of temperature, soil moisture. The agricultural IOT stick gives the idea of plug and measures in which farmers can instantly enact smart monitoring system by positioning the stick in the field and obtaining live data feeds on different smart gadgets like smart tablets, phones etc. and the information which is produced through sensors could be simply analysed and processed by agricultural experts even in remote areas via cloud computing technologies. Use of WSN helps in real time monitoring of the agricultural field. The paper[4] stresses on the fact that the yield rate in agriculture has become stagnant and hence they have included additional agricultural parameters that has to be monitored. In addition to the conventional parameters like humidity, temperature and soil moisture, this paper focuses on water level, flood, wind direction, wind speed, weather etc. Agricultural projects usually use wired communication which has various problems and hence this paper points on the use of wireless network. The writer also proposes an alarm system that sends an alert to the farmer. The proposed model also includes the use of Global system for Mobile(GSM), ZigBee, General Packet Radio service (GPRS), Global Positioning system(GPS) for secure transmission of data. It also suggests the use of automated irrigation system that constitutes of embedded system leading to lesser use of farmer energy and money. This paper also helps in increasing the yield of the farm by optimizing water usage. The proposed irrigation system enhances water management and sustainability.

3. EXISTING METHODOLOGY

Soil moisture plays a key role in partitioning water and energy fluxes, in providing moisture to the atmosphere for precipitation, and controlling the pattern of groundwater recharge. Large scale soil moisture variability is driven by variation of precipitation and radiation in space and time. At local scales, land cover, soil conditions, and topography act to redistribute soil moisture. Despite the importance of soil moisture, it is not yet measured in an operational way, e.g. for a better prediction of hydrological and surface energy fluxes (e.g. runoff, latent heat) at larger scales and in the framework of the development of early warning systems (e.g. flood forecasting) and the management of irrigation systems. The SoilNet project aims to develop a sensor network for the near real-time monitoring of soil moisture changes at high spatial and temporal resolution on the basis of the new low-cost ZigBee radio network that operates on top of the IEEE 802.15.4 standard. The sensor network consists of soil moisture sensors attached to end devices by cables, router devices and a coordinator device. The end devices are buried in the soil and linked wirelessly with nearby aboveground router devices. The ZigBee wireless sensor network design considers channel errors, delays, packet losses, and power and topology constraints. In order to conserve battery power, a reactive routing protocol is used that determines a new route only when it is required. The sensor network is also able to react to external influences, e.g. such as rainfall occurrences.

4. LIVE AND SMART AGRICULTURE USING NODEMCU

In proposed system, the smart and live irrigation system is done in four steps. NodeMCU is used in the proposed system as it has inbuilt wi-fi module. The four steps carried out in proposed system data acquisition, wireless data transmission, data processing and decision making, automatic irrigation system

Data acquisition is the process of sampling signals that measure real world physical conditions and converting the resulting samples into digital numeric values that can be manipulated by a computer. Data acquisition systems, abbreviated by the acronyms *DAS* or *DAQ*, typically convert analog waveforms into digital values for processing. The components of data acquisition systems include: Sensors, to convert physical parameters to electrical signals. Signal conditioning circuitry, to convert sensor signals into a form that can be converted to digital values. Analog-to-digital converters are used to convert conditioned sensor signals to digital values. Wireless communication known as "over the air" is the transfer of information or power between two or more points that are not connected by an electrical conductor. The most common wireless technologies use radio waves. With radio waves, intended distances can be short, such as a few meters for Bluetooth or as far as millions of kilometer for deep-space radio communications. It encompasses various types of fixed, mobile, and portable applications, including two-way radios, cellular telephones, personal digital assistants (PDAs), and wireless networking.

ThingSpeak is an Open-Source IOT application and API to store and retrieve data from Hardware devices and Sensors. It uses HTTP Protocol over the Internet or LAN for its communication. The MATLAB analytics is included to analyze and visualize the data received from your Hardware or Sensor Devices. We can create channels for each and every sensor data. These channels can be set as private channels or you can share the data publically through Public channels. The commercial features include additional features. Data processing is defined as "the collection and manipulation of items of data to produce meaningful information." In other words, the purpose of data processing is to convert raw data to something useful. Something the end user can react to. We should also take notice of the difference between data and information. Data refers to raw, unorganized facts, and it usually is fairly useless until it is processed. Once the data is processed, it is called information. Data is the input, or raw material, of data processing. The output of data processing is information. The output can be presented in different forms, such as plain text files, charts, spreadsheets, or images. The decision making is carried out from the data that is obtained from the sensors. In the proposed system the decision making is carried out based on the measure of water level and soil moisture content to turn on and off the motor.

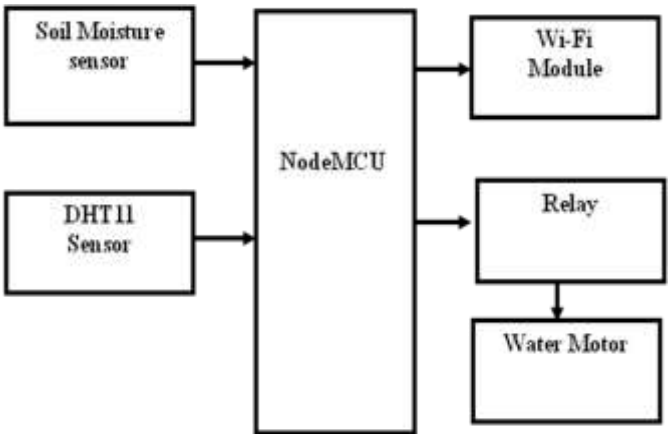

Figure1. Block diagram

5. Results and discussion

We have measured the moisture of soil at different times of the day and figures below show the results of all the sensor readings at different platforms.

1) At the time of day

The figures shown below depict the sensor readings of temperature, humidity and soil moisture on the web page.

Figure 2 Soil moisture graph

Figure 3 Humidity graph

Figure 4.Temperature graph

Figure 2, Figure 3 and Figure 4 shows the variation of soil moisture, humidity and temperature respectively with time. These graphs depict the real time data acquired on thingspeak.

2) At Night

b) The figures shown below depict the sensor readings of temperature, humidity and soil moisture when the soil is wet.

Figure 5 soil moisture graph

Figure 6 Humidity sensor

Figure 7 Temperature Sensor

Figure 5, Figure 6 and Figure 7 shows the variation of soil moisture, humidity and temperature respectively with time. The graphs depicts the real time data acquired on thingspeak. From our above observations we can say that at the time of day the moisture in the soil is low as the temperature is high and at night moisture of the soil is high as the temperature reduces.

6. CONCLUSION

The proposed model explores the use of IoT (Internet of things) in the agriculture sector. This model aims at increasing the crop yield by helping in predicting better crop sequence for a particular soil. Thingspeak helps in real time sampling of the soil and hence the data acquired can be further used for analysing the crop. We have also taken many readings of the soil moisture, temperature and humidity of the environment for various days at different times of the day. Data on the cloud also helps the agriculturists in improving the yield, evaluating the manures, illness in the fields. This system is cost effective and feasible. It also focuses on optimizing the use of water resources which combats issues like water scarcity and ensures sustainability. This model focuses on the utilization of IoT in agriculture and the solutions proposed in this paper will improve farming methods, increase productivity and lead to effective use of limited resources. This system also gives an option for live streaming of the farm

REFERENCES

1 Anand Nayyar, Er. Vikram Puri (2015), "IoT Based Smart Sensors Agriculture Stick for Live Temperature and Moisture Monitoring using Arduino, Cloud Computing & Solar Technology"

2 Apurva C. Pusatkar, Vijay S. Gulhane(2016), "Implementation of Wireless Sensor Network for Real Time Monitoring of Agriculture", International research journal of engineering and technology (IRJET). Volume: 03 issue: 05

3 Chandan kumar sahu, Pramitee Behera (2015), "A Low Cost Smart Irrigation Control System", IEEE sponsored 2nd International conference on electronics and communication system

4 Laxmi C. Gavade, A.D Bhoi (2017), "N, P, K Detection and Control for Agriculture Applications using PIC Controller", International Research Journal of Engineering and Technology (IRJET).

5 S.Sivachandran, K.Balakrishnan, K .Navin (2014), "Real Time Embedded Based Soil Analyser", International Research Journal of Engineering and Technology (IRJET). Volume: 3 Issue3

6 Mrs.T.Vineela, J. NagaHarini, Ch.Kiranma, G.Harshitha, B.AdiLaksh (2018), "IoT Based Agriculture Monitoring and Smart Irrigation System Using Raspberry Pi", International Research Journal of Engineering and Technology (IRJET). Volume: 5 Issue: 1

7 https://www.iotforall.com/iot-applications-in-agriculture/

8 https://community.blynk.cc/t/temp-monitor-with-sms-alarm/3064

9 http://osoyoo.com/2017/08/arduino-lesson-1-channel-relay-module