ISSN 2278-3091
Volume 8, No.1.3, 2019
International Journal of Advanced Trends in Computer Science and Engineering
Available Online at http://www.warse.org/IJATCSE/static/pdf/file/ijatcse0981.32019.pdf
https://doi.org/10.30534/ijatcse/2019/0981.32019

Crop Selection in Agriculture Lands using Internet of things with ARM

V Mahesh Reddy[1], I Adum Babu[2]
[1]PG Student, Dept. of ECE, Marri Laxman Reddy Institute of Technology and Management, Dundigal, Hyderabad, India
[2]Dept. of ECE, Marri Laxman Reddy Institute of Technology and Management, Dundigal, Hyderabad, India

ABSTRACT

Agriculture is the primary occupation in our country for ages. In India about 70% of population depends upon farming and one third of the nation's capital comes from farming. But now due to migration of people from rural to urban there is hindrance in agriculture. To overcome this problem we go for smart agriculture techniques using Internet Of Things (IOT). The IOT is remodelling the agriculture enabling the farmers with the wide range of techniques such as precision and sustainable agriculture to face challenges in the field. IOT interconnects human to thing, thing to thing and human to human. IOT enables the objects to be sensed and controlled remotely across existing network model. In this project it comprises of sensors that sense the field parameters such as temperature, humidity, moisture and fertility in the farm. The sensed values are validated and later sent to the WI-FI module and from WI-FI module the validated data are sent to the farmer's mobile or laptop using cloud. The farmers are also notified by SMS if the field needs a care. An algorithm is developed with threshold values of temperature, humidity, moisture and fertility that are programmed into a node Micro Controller Unit (MCU)to control water quantity. Farmer can automate the motor from anywhere in the world.

Key words: IoT, Arduino, Raspberry pi, W-Fi Module, Sensors

1. INTRODUCTION

Agriculture plays vital role in the development of agricultural country like India. It continues to be the stay of life for the majority of the Indian populations. Issues concerning agriculture have been always hindering the development of the country [1]. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. Hence the proposed method aims at making agriculture smart using automation and IoT technologies [8]. Internet of Things (IoT) enables various applications crop growth monitoring and selection, irrigation decision support, etc. A Raspberry Pi based automatic irrigation IOT system is proposed to modernization and improves productivity of the crop .

In today's world the Internet plays a vital role in all domains. In the agricultural domains [2], the proposed method is used to monitor the agriculture fields with the help of IoT. Sensors are used for analysing the various parameters in agricultural domain based on the wireless sensor network technology. In that, the proposed system is used to collect the soil properties and then it will be stored in the cloud database.

2. EXITING METHOD

In the existing system the soil can be tested just to check out the fertility and the moisture level. It has to be given to the lab for testing the soil [3-4]. Farmers are suffering much to get the farm lands survey reports quickly.

3. PROPOSED SYSTEM

As shown the below figure 1, to provide the soil testing services at the farmers' doorstep by determining all the soil parameters such as pH, moisture, temperature, humidity contents for the soil. Live updating in a website helps the farmers to get to know the current status of soil .We are suggesting the crops to the farmers based on the soil fertility and climatic conditions.

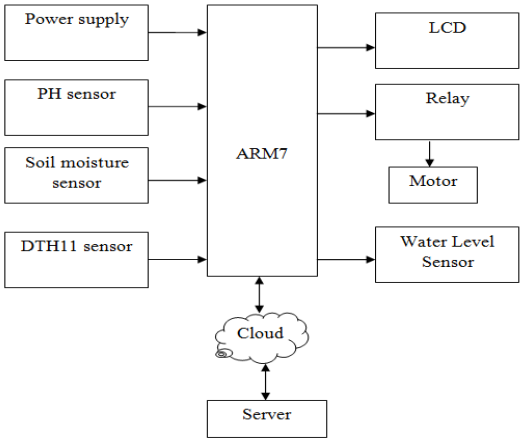

Figure 1: System Block Diagram

Smart agriculture also known as precision agriculture allows farmers to maximize yields using minimal resources such as water, fertilizer and seeds. By deploying sensors and mapping fields farmers can begin to understand their crops at a micro scale, conserver sources and reduce impact in the environment. Advances in sensor technology have also proven beneficial to the agricultural industry through its application for infield soil analysis.

3.1 Soil Moisture Sensor:

The Soil moisture sensor can be used to test the moisture of soil, when the soil is having water shortage the module output is at high level and else the output is at low level. As in figure 2, by using the sensor one can automatically water the flower plant, or any other plants requiring automatic watering technique. The sensor has both the analog and the digital output. The digital output is fixed and the analog output threshold can be varied. It works on the principle of open and short circuit. The output is high or low indicated by the LED. When the soil is dry, the current will not pass through it and so it will act as open circuit [6]. Hence the output is said to be maximum. When the soil is wet, the current will pass from one terminal to the other and the circuit is said to be short and the output will be zero. The sensor is platinum coated to make the efficiency high. The range of sensing is also high. It is anti-rust and so the sensor has long life which will afford the farmer at a minimum cost.

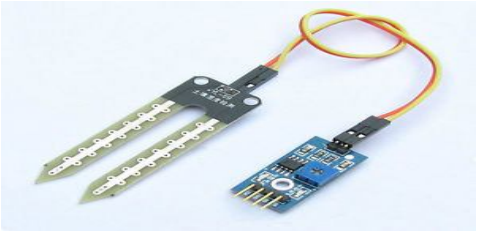

Figure 2: Soil moisture sensor

3.2 PH Sensor

As in figure 3, the PH sensor module consist of pH sensor called as pH probe and a signal conditioning board which gives an output which is proportional to the pH value and can be interfaced directly to any microcontroller. The pH sensor components are usually combined into one device called combination pH electrode. The measuring electrode is usually glass and quite fragile. Recent developments have replaced the glass with more durable solid-state sensors. The preamplifier is a signal conditioning device [7]. It takes the high impedance pH electrode signal and changes it into a low impedance signal which the analyzer or transmitter can accept. The preamplifier also strengthens and stabilizes the signal, making it less susceptible to electrical noise. The pH and ORP probes are both used for measuring the acidic intensity of liquid solutions.

Figure 3: PH sensor

3.3 DTH 11 Sensor

The DTH 11 is a temperature and humidity sensor. DTH 11 can be interface with any microcontroller like Arduino, Raspberry Pi, NodeMCU, etc. DTH11 is a low cost humidity & temperature sensor which provides high reliability and long term stability. DTH11 sensor can measure a humidity value in the range of 20-90% of relative humidity (RH) and Temperature in the range of 0-500 c. It gives out digital value and hence there is no need to use conversion algorithm at ADC of the microcontroller and hence we can give its output directly to data pin instead of ADC. It has a capacitive sensor for measuring humidity. The only real shortcoming of this sensor is that one can only get new data from it only after every 2 seconds as shown the figure 4.

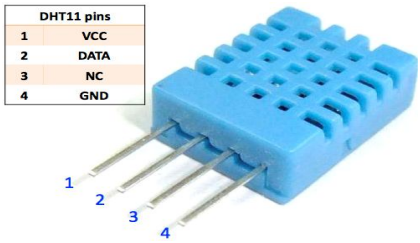

Figure 4: 4 DTH 11 Sensor

3.4 LCD Display

Figure 5: 16*2 LCD Display

As in figure 5, LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable

video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

4. RESULTS & DISCUSSIONS

The below figure 6, depicts the output of the moisture sensor when there is moisture in the soil/field and Temperature, Humidity, pH values. It shows the water level in the crop and suggest the crop prediction.

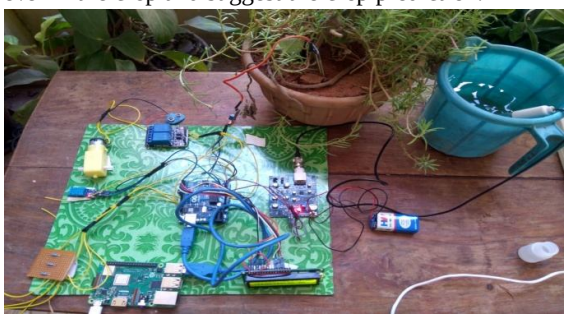

Figure 6: Hardware Results

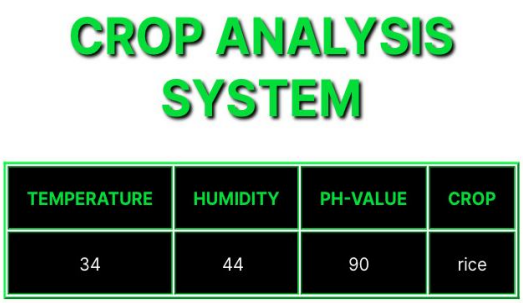

Figure 7:. Crop analysis

The above figure 7 is to providing analysis of various sensors information in crop

5. CONCLUSION

Agriculture are gradually being replaced and enhanced by more sophisticated and accurate digital and electronic device. A high percentage of agriculture revenue is lost to power loss, incorrect methods of practicing. This is reduced by the use of smart sensors. The proposal is to perform the agriculture in smart and more efficient way. In addition, this method advocates for the use of the Internet of Things. Internet of Things has enabled the agriculture crop monitoring easy and efficient to enhance the productivity of the crop and hence profits for the farmer. Sensors of different types are used to collect the information of crop conditions and environmental changes and this information is transmitted through network to the farmer/devices that initiates corrective actions. Farmers are connected and aware of the conditions of the agricultural field at anytime and anywhere in the world.

REFERENCES

1. Anjum Awasthi & S.R.N Reddy, "Monitoring for Precision Agriculture using Wireless Sensor Network-A Review", Global Journal of Computer Science and Technology Network, Web & Security,ISSN: 0975-4350.Year 2013
2. Aruna G,G .Ganga Lawanya,V.Anbu Nivetha, "Internet Of Things Based Innovative Agriculture Automation Using AGRIBOT" International Journal of Electronics and Communication Engineering, ISSN : 2348 –8549,March 2017
3. Barshe P.S.B and P.D.K. Chitre, "Agriculture System based on Ontology Agro Search",(IJETAE) International Journal of Emerging Technology and Advanced Engineering, vol. 2, no. 8, 2012.
4. Braun, R. Wichert, A. Kuijper, and D. W. Fellner, "A benchmarking model for sensors in smart environments," in Ambient Intelligence: European Conference, (AmI '14), Eindhoven, The Netherlands, November 2014. Revised Selected Papers, E. Aarts, B. de Ruyter, P. Markopoulos et al., Eds., pp. 242–257, 2014
5. Farooq M.U, "A Review on Internet of Things (IoT)", Muhammad Waseem, Sadia Mazhar, International Journal of Computer Applications Volume 113 -No. 1, March 2015. https://doi.org/10.5120/19787-1571
6. Papa Rao Nalajala, Rotala Umarani, Naroju Mounika, "Design Of Intelligent Road Traffic Control System For Ambulance Using RF And GSM Technology ", International Journal of Advanced Trends in Computer Science and Engineering, Vol. 5, No. 1, 2016.
7. InfantialRubala. J, D. Anitha, "Agriculture Field Monitoring using Wireless Sensor Networks to Improving Crop Production" International Journal of Engineering Science and Computing , March 2017.
8. Paparao Nalajala; Bhavana Godavarthi," An intelligent system to connect or disconnect home appliances and monitoring energy levels using IoT", International Journal of Technology Intelligence and Planning, Vol.12 No.3, 2019 https://doi.org/10.1504/IJTIP.2019.099203
9. Jianfa Xia, Zhengzhou Tang, Xiaoqiu Shi, Lei Fan, Huaizhong Li ,"An environment monitoring for precise agriculture, based on wireless sensors Network", IEEE, 2011