iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VII **Month of publication:** July 2021

DOI: https://doi.org/10.22214/ijraset.2021.36986

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

A Research on IOT Based Smart Automation Irrigation System

Pooja Jadhav[1], Prof. Vipin Wani[2]
[1, 2]*Dept.Of Computer Science & Engineering, Sandip University, Nashik, India*

Abstract: ***India is an agricultural country. 70% of people do this. The main requirement within the agriculture field is water and manpower. Nowadays the foremost problem lies in agriculture is water scarcity, manpower, funds, etc. To overcome these problems we've to develop an automation irrigation system using IoT. This technology is employed for creating systems automated using sensors like DHT11, Soil Moisture sensor, some hardware parts, and software. The PH sensor is additionally wont to analyze soil nutrient content present within the soil in real-time and therefore the PH sensor is employed to work out the Ph value of the soil. Monitoring of those provides the right fertility to the soil depending upon the soil nutrients. To provide quality crops supported temperature, humidity, soil moisture, and its nutrient level content and Ph. factor, it has also been maintained. The real-time result will be generated. The generated results PDF are going to be sent to the person through email or web SMS. The overall cost required should be low enough in order that every one can afford it.***
Keywords: IoT, DTH11 Sensor, PH Sensor, SMS.

I. INTRODUCTION

In India, the most of the people's main earning source is depends on agriculture. In the Indian farming system, the farmer chooses most of the methods manually such as water dripping, water sprinkling, motor ON/OFF, etc. These all things affect productivity. To improve productivity there is required to change the manual system to automation. The Internet of Things(IoT) will help to convert that the manual system to automation. Also, this is available at a low cost so every person can afford it. This system will help to provide water to crops as per the requirements. Smart Automation Irrigation System used sensors like DHT11, Soil Moisture, and PH sensor to observed the temperature, humidity, and soil moisture around the crop area that gives the precise time to ON/OFF the motor. The system is very useful for farmers so there is a need to protect System from unauthorized users. The data will be stored in the cloud and the graphical representation of data will be displayed on the system or mobile device. If an unauthorized user tries to access that data the message will be sent to the user by SMS. As the data stored on the cloud, we can retrieve the data of the last few months for analysis purposes. According to the analysis result, we can decide, at what temperature and humidity which type of plants will give better productivity. It's very helpful for farmers to improve productivity at minimum cost and no manpower will be required to do this task. The ESP Node MCU will be used as a hardware part and sensors used to observe the temperature, soil moisture, humidity and PH factor also maintained. The sensor's value will be compared with a threshold value and the PH value to calculate, the plants required water or not. If the water is required the SMS will be sent to the person on mobile and the motor gets ON/OFF automatically

II. LITRATURE REVIEW

"A Study on Smart Irrigation Systems for Agriculture Using IoT" . The only recommended solution to this issue is modernizing agriculture using smart technologies. IoT can construct agricultural and farming processes more efficient by tumbling human intervention through automation. In agriculture, irrigation is one of the processes which support crop production by supplying needed water to the soil. The irrigation methods involve a lot of time and effort in farming. A Sensor-based automated irrigation system provides a promising solution to manage agricultural activity. This research article provides a vast study on the irrigation system in smart agriculture. [1].

"IoT Sensors And Applications: A Survey" Sensors helps to monitor our state of health, air quality, home security, and our widely used to monitor production process in industrial internet. For these reasons, knowing how they work and how they can use them to gain information is important. Earlier the Industries and organizations have been using various kinds of sensors but the invention of the Internet of Things has promotes the growth of sensors to a completely different level. For water, transport, garbage, environment, etc., the IoT sensors can be used effectively. This paper presents different types of IoT sensors and its various applications. [2].

"Agriculture Monitoring" IoT sensors are used for providing information about their agriculture fields which made smart agriculture as an emerging concept. The main aim of this paperis to make use of evolving technology i.e. IoT and smart agriculture using Automation. The Major factor is to monitor the Environment and to improve the yield to get efficient crops. The aspect of this paper includes soil moisture, monitoring temperature, and water level in agricultural field through sensors using Arduino UNO. Anipcamera is interfaced with Arduino UNO to capture images. Alert message can be sent to the farmer to inform the status of the agricultural field using GSM module. [3].

"Automatic Irrigation System for Vegetable Crops using Internet of Things" The main problem lies in agriculture is water scarcity, manpower, capital, soil fertility, etc. To overcome these problems, we have developed an automatic irrigation facility. The System minimizes human intervention on fields and provides a limited amount of water to each crop which minimum water scarcity. also, the system detects the pH value of the soil and provides necessary chemical compounds to each plant. It helps the growth of the plant widely. By adopting this methodology the person, who possesses fields in any remote geographic location can also be frequently monitored with the limited cost. Results show a significant improvement in the proposed work[4].

"An Overview of Internet of Things (IoT) and Data Analytics in Agriculture: Benefits and Challenges" This coupled with the diminishing natural resources, limited availability of arable land, increase in unpredictable weather conditions makes food security a major concern for most countries. As a result, the use of internet of things (IoT) and data analytics (DA) are employed to enhance the operational efficiency and productivity in the agriculture sector. There is a paradigm shift from use of wireless sensors network (WSN) as a major driver of smart agriculture to the use of IoT and DA. The IoT integrates several existing technologies such as WSN, radio frequency identification, cloud computing, middleware systems and end-user applications. In this paper, several benefits and challenges of IoT have been identified. We present the IoT ecosystem and how the combination of IoT and DA is enabling smart agriculture. Furthermore, we provide future trends and opportunities which are categorized into technological innovations, application scenarios, business and marketability. [5].

"IoT based Smart Irrigation System" This paper proposes an automated irrigation system that monitors and maintains the desired soil moisture content via automatic watering. Microcontroller ATMEGA328P on the Arduino platform is used to implement the control unit. The setup uses soil moisture sensors which measure the exact moisture level in the soil. This value enables the system to use an appropriate quantity of water which avoids over/under irrigation. The IoT is used to keep the farmers updated about the status of sprinklers. Information from the sensors is regularly updated on a webpage using a GSM-GPRS SIM900A modem through which a farmer can check whether the water sprinklers are ON/OFF at any given time. Also, the sensor readings are transmitted to a Thing speak channel to generate graphs for analysis[6].

"SMART IRRIGATION SYSTEM AND PLANT DISEASE DETECTION" includes1.A module placed in a farm that contains various sensors and devices for data conversion and transfer such that farm details and environmental factors are monitored and controlled correctly 2.Image processing for disease detection of visually seen symptoms of the plant. The proposed system will thus improve productivity and benefit the irrigation sector[7].

"REVIEW PAPER ON IOT BASED TECHNOLOGY" Many industrial IOT applications have been increasingly developed and deployed in recent years. Now-a-days, controlling and monitoring plays a main role in our day to day life. Everything we can monitor and control using advanced technologies. Remote access is a wonderful feature that came because of high speed internet. The main objective of proposed system is to provide a technology oriented and low cost system to make an advanced industry for those who away from their industry and want to control devices. [8]. "IoT based Smart Agriculture" IoT modernization helps in assembly of the information on factors such as climate, dampness, temperature and fruitfulness of the soil, Crop web-based analysis empowers identification of wild plants, water level, bug location, horticulture, etc. [Muthnoori & Munaswamy, 2019]. IoT allows the farmers to remotely access his field and act as per the need of the hour without his actual presence on the field. Reduces human effort, saves time, helps in precise agricultural practices. IoT adaptation can reduce the cost and increase the productivity of the crops. In this context the review study was carried out about the need, utilization, applications, advantages, current and future trends of IoT in agriculture. The study also highlighted the future research and potential development of IoT based agriculture.[9]

"Real-Time Automation and Monitoring System for Modernized Agriculture" The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3. Partial Root Zone Drying Process can be implemented to save water at the maximum extent. Online interaction can be made with the farmers by the consultant to give them the knowledge about this technique and implement it effectively in their farms to extract more yield with advanced technology. Index Terms—Controller Area Network (CAN), greenhouse monitoring, hybrid network, wireless sensor networks (WSNs), ZigBee, Partial Root zone Technique [10].

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

III.PRAPOSED SYSTEM

In the Proposed system latest IoT technology is employed , which helps in collecting information about soil moisture, temperature, humidity, pH nutrients value, of the sector . Sensors like DHT11, soil moisture, pH nutrients are used for the detection of the plant conditions and Raspberry pi is used to manage and automate the farm process. It generates real-time results. GSM Module is employed for sending and receiving the updated message through an internet portal to the farmers with the continued conditions of the agricultural land using IoT at any time.

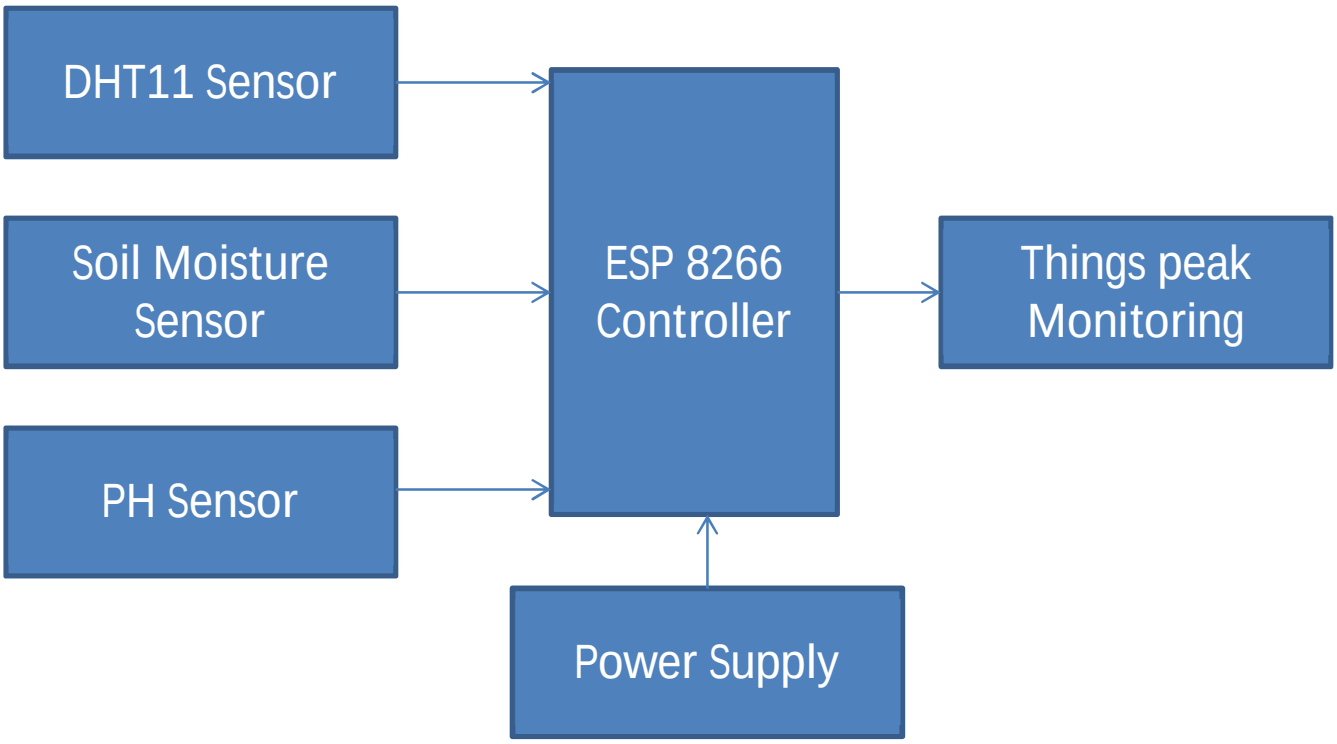


Fig. 1 Block Diagram of Proposed System

DTH11 Sensor: This sensor is employed to spot the Temperature and Humidity of the soil. It helps farmers to reply quickly consistent with the soil conditions. It consists of 3 pins. One of them is an output pin and two pins are wont to discover the analog readings of Temperature and Humidity.

Soil Moisture Sensor: This sensor is employed to detect the moisture content within the soil for the higher yielding of crops. If the soil has less water content then it automatically indicates that there's less water contamination. It has four pins. one of them may be a n analog pin (A0) and therefore the second is a Digital pin (D0)[3].

PH Sensor: This sensor is employed to live the ph value and nutrients of the soil. The PH value between 0 to7 is acidic solutions with an outsized combination of hydrogen ions whereas solutions having pH values between 8 to14 have basic solutions with small hydrogen concentrations. The pH value of seven is neutral solutions. Based on the values of PH, its plant's growth will depend.

Raspberry Pi3: The Raspberry pi is used to receive the sensors data and generate the real-time result and send an instantaneous email or SMS of the obtain data to the user.

IV. RESULT

The Result briefly described in Table 1. That automated working of pump and data updating and retrieving operations in cloud server has been done by the proposed system. Program run on ESP8266 board fetches the info from the sensor and check the sensor data is bigger than or but the given threshold value the pump will automatically start and stop automatically if the sensor data is found above the threadhold value. Threshold value is given according to the whether condition and soil moisture content of a particular area where the system is implemented. The analyzed data is stored in SQL database provided by the ThingSpeak IoT platform using URL command line tool.

Sr. No.	EXPERIMENT DONE	RESULT
1	Check the Sensor by connecting with Arduino Board	Sensor data showed in the serial monitor
2	Connect the ESP8266 WIFI module with the existing Wi-Fi network	Serial Monitor of Arduino IDE showed user id and password of the connected of WI-FI network
3	Check the Status of the pump when sensor data is less than threshold value	Water pump activated automatically when sensor returned numeric data less than threshold value
4	Check the status of the sensor when sensor data is shown that there is enough water in the soil	Water pump deactivated automatically when sensor returned numeric data greater than threshold value
5	Check if the numeric data of the sensor and Boolean data from the pump are uploading in the intended cloud server provided by ThingSpeak IoT platform	After Logging in into the ThingSpeak website, we can view the real time data of the sensor and the pump which is the graphically represented.

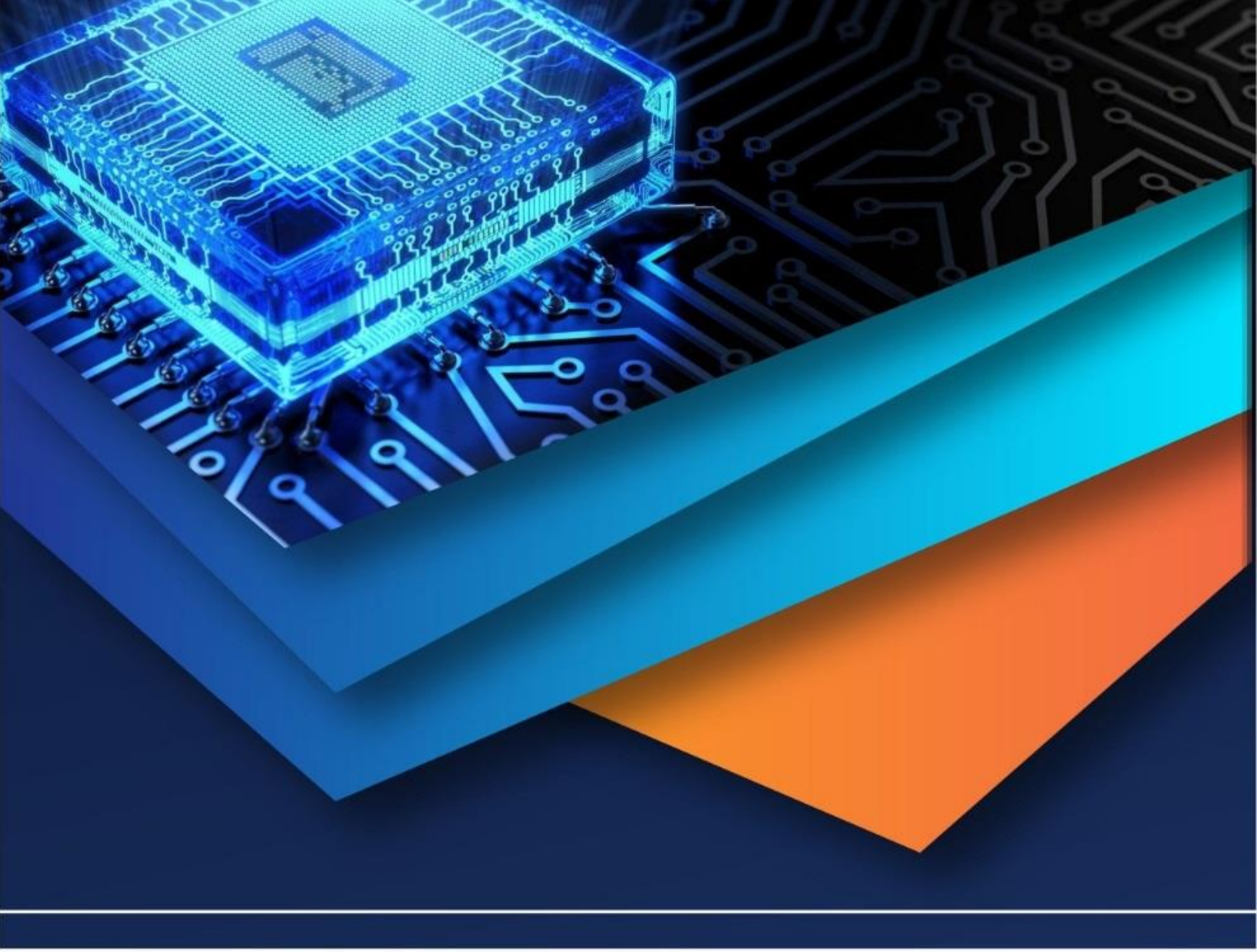
Table 1: result of proposed system

V. CONCLUSION

IoT-based smart automation irrigation system using a web portal is very useful in the agriculture field. It required low cost so every person can afford it. Using this system the productivity in the agriculture field get increased. Also, it doesn't require manpower. Using sensors the temperature, soil moisture, and soil nutrients will observe and according to that water will be provided to plants. Data security is also provided so unauthorized users can't access the data. This system is very useful to improve productivity in the agriculture sector.

REFERENCES

[1] Dr. J. Jegathesh Amalraj, S. Banumathi, J. Jereena John, "A Study On Smart Irrigation Systems For Agriculture Using Iot",2019
[2] Dr. J. Jegathesh Amalraj, S. Banumathi, J. Jereena John," IOT Sensors And Applications: A Survey", ISSN 2277-8616 INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 8, ISSUE 08, AUGUST 2019
[3] Ajay .T.R1, Vijaykumar .R2, Prabha .M3 "Agriculture Monitoring", International Journal of Engineering Trends and Technology (IJETT) - Volume 67 Issue 3- March 2019
[4] M. Marimuthu , M. Ajitha and R. Priya Nandhini3," Automatic Irrigation System for Vegetable Crops using Internet of Things", ISSN 2581-3560 Research Journal of Science and Engineering Systems Vol.3, 2018
[5] Olakunle Elijah," An Overview of Internet of Things (IoT) and Data Analytics in Agriculture: Benefits and Challenges", IEEE INTERNET OF THINGS JOURNAL, VOL. 5, NO. 5, OCTOBER 2018
[6] Srishti Rawal," IOT based Smart Irrigation System", International Journal of Computer Applications (0975 – 8887) Volume 159 – No 8, February 2017
[7] Lav Gupta, Krunal Intwala and Karishma Khetwani, ―Smart irrigation system and plant disease detection‖, International Research Journal of Engineering and Technology, Volume 4, Issue 3, Pages: 80-83, 2017
[8] Mr.P.B.Ghewari, A.Hukeri and Ms. Pradnya, ―Review Paper on Iot Based Technology‖, International Research Journal of Engineering and Technology, Vol. 4, Issue 1, January 2017
[9] Nikesh Gondchawar , Prof. Dr. R. S. Kawitkar, "IoT based Smart Agriculture",International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 6, June 2016
[10] Dr. V. Vidya Devi, G and Meena Kumari, ―Real- Time Automation and Monitoring System for Modernized Agriculture‖, International Journal of Review and Research in Applied Sciences and Engineering (IJRRASE) Volume 3, Issue 1, Pages: 7-12, 2013.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY