World Journal of Engineering Research and Technology
WJERT
www.wjert.org
SJIF Impact Factor: 5.924

# SMART AGRICULTURE MONITORING SYSTEM USINGIOT

***[1]Dr. Kamalraj R. and [2]Monika G.**

[1]Assistant Professor MCA Department Jain University, Bengaluru, Karnataka, India.

[2]Student MCA Department Jain University, Bengaluru, Karnataka, India.

**Article Received on 10/01/2022** **Article Revised on 30/01/2022** **Article Accepted on 20/02/2022**

***Corresponding Author**
**Dr. Kamalraj R.**
Assistant Professor MCA Department Jain University, Bengaluru, Karnataka, India.

## ABSTRACT

Agriculture is done in every country for ages. Agriculture is the science and art of cultivating plants. Agriculture was the key development in the rise of sedentary human civilization. Agriculture has been done manually for ages. As the world is trending into new technologies and implementations it is a necessary goal totrend up with agriculture also. IoT plays a very important role in smart agriculture. Smart agriculture increases cropyield decreases water wastage, and imbalanced use of fertilizers. The objective of our project is to reduce this manual involvement by the farmer by using an automated irrigation system whose purpose is to enhance water use for crops. The farmers working in the farmlands are only dependent on the rains and bore wells for irrigation of theland. Even if the farmland has a water pump, manual involvement by farmers is required to turn the pump on/off when needed. The project is intended to cultivate an automatic irrigation system that controls the pump motor ON/OFF on sensing the moisture content of the soil and humidity. In the field of agriculture, the use of an appropriate technique of irrigation is essential. The advantage of using this technique is to reduce human intervention and still certify proper irrigation. A software application will be developed by predetermining the threshold values of soil moisture, temperature, and water level that were programmed into an arm controller. This paper presents the controlling and monitoring of the level of water and detecting the soil moisture content.

**KEYWORDS:** Arduino, Humidity and Temperature Sensor,Soil Moisture Sensor, GSM modem.

## INTRODUCTION

Agriculture has been practiced for centuries in every country. Agriculture is the science and skill of growing plants. For centuries, agriculture has been done by hand. Agriculture is an important part of the Indian economy. Agriculture employs nearly 60% of the Indian population and accounts for one-third of the country's revenue. As a result, it is critical to the development of the country.

Modernized agriculture that incorporates modern trends could be one solution to these problems. The project's distinguishing feature is that it assesses the various agricultural factors that influence yield. Second, it uploads all of the data to the cloud, where it can be further investigated. The main goal of project is to use IoT in agriculture to collect data instantly (soil moisture, temperature, etc.), allowing one to monitor some environmental variables remotely and effectively, increasing farmers' production and thus income. Finally, this project includes an Android mobile app that provides the farmer with easy access to information, such as when the soil is dryor moist, allowing the water pump to turn on and off automatically to irrigate the plants' land. A smart irrigation system that optimizes water usage is also included in this project. Embedded systems, big data, and cloud computing are all examples of cutting-edge technologies. Embedded systems, big data, cloud computing, web services, and computer networking and protocols are just a few of the technologies that enable wireless sensor networks in the Internet of Things. The Internet of Things has several advantages in agricultural industries, including the ability to work remotely on a variety of agriculture-related projects thanks to the various sensors designed for this specific field of farming. The various sensors in use make data collection and storage in cloud computing services simple. These real- time data are easily accessible and can be accessed from any smart device. According to experts, farmers can use IoT systems to increase their output as well as the quality of their products. In reality, it boosts profits/incomes while considerably lowering costs. Possessing access

## RELATED WORK

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

IoT-based smart stick that enables live monitoring of the different agricultural parameters. This stick helps farmers 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 analyzed and processed by agricultural experts even in remote areas via cloud computing technologies.

A. Apurva C. Pusatkar, Vijay S. Gulhane, "Implementation of Wireless Sensor Network for Real-Time Monitoring of Agriculture", International Research Journal of Engineering and Technology (IRJET). 05 | May-2016

In this paper, the authors focus on using WSN which is Wireless Sensor Network. The use of WSN helps in real-time monitoring of the agricultural field. The paper stresses the fact that the yield rate in agriculture has become stagnant and hence they have included additional agriculture parameters that have 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 to the use of the wireless network. The writer also proposes an alarm system that sends an alert to the farmer.

B. Chandan Kumar Sahu, Pramitee Behera, "A Low-Cost Smart Irrigation Control System", IEEE sponsored 2nd

**International Conference on Electronics and CommunicationSystem (ICECS2015)**

In this paper, the author proposes a model where the flow and direction of water are supervised and controlled. This is done with the help of DHTT11 and a soil moisture sensor. This method also proposes a way to select the direction of water and this information is also sent to the 9 phones and email accounts of the farmer. This model also enables the farmer to switch on and off the motor with a single click. This paper proposes a prototype where the number of sensors is deployed at different positions in the field. This paper also shows how the proposed model makes the traditional irrigation system more effective and sustainable. This paper also suggests efficient energy and network 15 models. This paper presents a model that is energy-efficient, sustainable, automated, and cost-effective.


C. Li, Li, Hu Xiaoguang, Chen Ke, and He Ketai. "The applications of WiFi-based wireless sensor network in internet of things and smart grid." In Industrial Electronics and Applications ICIEA, 2011 6th IEEE Conference. IEEE,2011.

Internet of Things and Smart Grid Applications of WiFi- based Wireless Sensor Networks. To maximise bandwidth, the authors collaborate on a WiFi-based wireless sensor network in the Internet of Things and smart grid. Higher bandwidth and data rate, non-line-transmission capability, large-scale data collecting, and cost-effectiveness are all advantages of WiFi-based Wireless Sensor Networks(WSNs). In smart power generation, intelligenttransmission, substation, and intelligent power use, the smart grid is critical. Temperature, humidity, wind, air station, rainfall, soil moisture, soil compaction, soil conductivity, pH value, and soil nitrogen are some of the real-time data that the authors hope to collect through sensors and provide ideasto the farmer.

The advantage of the WiFi-based Wireless Sensor Network (WSN) is it can be used in applications which require videomonitoring data.

D. Andri Pranolo, Siti Muslimah Widyastuti and Azhari, ”Expert System Model for Identification Pests and Diseases of Forest Tree Plantations”, Int. J. Advance Soft Compu. Appl, Vol. 9, No. 2, July 2017.

The authors created an expert system for forest management,identification, and recognition. It contains two methods, oneof which is the inference method, as well as numerous alternatives for the certainty and uncertainty methods. There is also the creation of a knowledge base. A graphical user interface (GUI) is a programme that allows users to interact with it. A knowledge base that captures domain-specific knowledge and an inference engine that consists of methods for manipulating the knowledge stored in the knowledge base are two

fundamental components of an expert system. There are also consultation and development aspects to it. The consultation side supplied end-users with a consultation interface to consult with the expert system, inference engine, certainty and uncertainty approach, and interim results. The expert system and a knowledge engineer are the two users who interact with the expert system on the development side.

An expert's knowledge base The system describes a relational database that contains information about trees, symptoms, pests, diseases, management activities, and a set of rules that are used to identify several forest tree plantations. Forward chaining and backward chaining are the two major approaches used by the inference engine. Finally, the system user interface is divided into two sections: consultation and development. The end-user uses the consultation interface to find solutions to problems or answers to inquiries. An expert and knowledge engineer use the development interface to perform tasks such as adding rules, creating a knowledge base, and refining existing information.

This technique has the advantage of detecting pests and diseases that impact crops.

E. Kaura, Ramanjeet, Salam Dina, and P. P. S. Pannub. "Expert System to Detect and Diagnose the Leaf Diseases of Cereals." International Journal of Current Engineering and Technology, 2013

The author’s layout and professional gadget that is an intelligent pc packages that gives answers associated with specific troubles in a given area. Expert gadget reduces the statistics that the customers want to process, reduce employees prices and boom output. A technique is designed wherein abnormalities are routinely identified, which reduces the threat of human error. This will be achieved via an picture processing thing with a diagnostic hassle solver. Image processing is a effective device that accepts photographs as an enter and it produces the output. Automatic know-how acquisition gadget of Pulse Expert gives user-pleasant interface to the area professionals for entering, storing and structuring the area specific know-how. Identification of plant sicknesses is the venture that is dealt with through plant pathologists. The farmers are not capable to perceive the leaf sicknesses of the cereals. They can apprehend the common disorder symptoms. This professional gadget is a database, which shops all of the statistics of the leaf sicknesses of rice. This software program gives the centers to perceive the disorder and to indicate the remedy conveniently. Edge detection is a essential device in picture processing, device imaginative and prescient and pc imaginative

and prescient.

The essential cause of detecting sharp modifications in photo brightness is to seize critical events. In the proposed professional gadget, pixel through pixel contrast set of rules has been implied to evaluate pics of the leaf disorder of a cereal. The photo of the inflamed cereal plant is in comparison with the pics saved withinside the database. Nonexperts locate it tough to perceive the signs and symptoms of the illnesses. The non- specialists are constantly based on specialists for the proper facts concerning the leaf illnesses of cereals. The downside is a few illnesses have similar signs and symptoms making it tough for the non- specialists as nicely as specialists to perceive the disorder effectively and to specify the proper remedy. This will substantially lessen the losses happened to the crop as they get the specified facts on time. The benefit is internet primarily based totally professional gadget may be accessed from any internet-enable pc at any time.

## CONCLUSION

The project provided an opportunity to evaluate existing systems, along with their benefits and shortcomings, by designing a system to monitor moisture levels in the soil. The proposed system can be used to automate the process of irrigation, which is one of the most time-consuming processes in farming, by turning on and off the water sprinkler based on soil moisture levels. Horticulture is one of the water-intensive industries. The system irrigates the soil using data from soil moisture sensors, which helps to minimize over-or under-watering of the soil and thereby crop damage. A website allows the farm owner to keep track of the process. This study may argue that using technology in agriculture can lead to significant growth. As a result, the technology could be a potential solution to the challenges as associated with the current manual and inefficient irrigation method by allowing for more efficient use of water resources.

## REFERENCE

1. Anand Nayyar, Er. Vikram Puri, “IoT Based Smart Sensors Agriculture Stick for Live Temperature and Moisture Monitoring using Arduino, Cloud Computing & Solar Technology”, May 2015.
2. Chandan Kumar Sahu, Pramitee Behera, "A Low-Cost Smart Irrigation Control System", IEEE sponsored 2nd International conference on electronics and communication system (ICECS), 2015.
3. Dr. Narayan G. Hegde, “Water Scarcity and Security in India”, BAIF Development

ReseachFoundation, Pune.

4. Karan Kansara, Vishal Zaveri, Shreyans Shah, Sandip Delwadkar, and Kaushal Jani "Sensor-based Automated Irrigation System with IOT: A Technical Review",(IJCSIT) International Journal of Computer Science and Information Technologies, 2015; 6(6): 5331-5333.
5. Sumeet. S. Bedekar, Monoj. A. Mechkul, and Sonali. R. Deshpande "IoT based Automated Irrigation System", IJSRD - International Journal for Scientific Research& Development, 2015; 3(04).
6. Remote Sensing and Control of an Irrigation System Usinga Distributed Wireless Sensor Network by Yunseop (James) Kim, Member, IEEE, Robert G. Evans, and William M. Iversen, IEEE Transaction on Instrumentation andMeasurement, 57.
7. Laxmi C. Gavade, A.D Bhoi, "N, P, K Detection andControl for Agriculture Applications using PIC Controller", International Research Journal of Engineering and Technology (IRJET), 2017; 6(4).
8. Mrs.T.Vineela, J. NagaHarini, Ch. Kiranma, G.Harshitha, B.AdiLaksh, "IoT Based Agriculture Monitoring and Smart Irrigation System Using Raspberry Pi", International ResearchJournal of Engineering and Technology (IRJET), 2018; 5(1).
9. Meola, A. (Jan 24, 2020). Smart Farming in: How IoTsensors are creating a more efficient precision agriculture industry, 2020.