# A LITERATURE SURVEY ON IOT ENABLED SMART FARMING APPLICATION


## ABSTRACT:

Internet of Things (IoT) is present and future of every field impacting everyone's life by making everything intelligent. It is a network of different devices which make a self-configuring network. The new developments of Smart Farming with use of IoT, by day turning the face of conventional agriculture methods by not only making it optimal but also making it cost efficient for farmers and reducing crop wastage. The aim is to propose a technology which can generate messages on different platforms to notify farmers. The product will assist farmers by getting live data (Temperature, humidity, soil moisture, UV index, IR) from the farmland to take necessary steps to enable them to do smart farming by also increasing their crop yields and saving resources (water, fertilizers). The product proposed in this paper uses ESP32s Node MCU, breadboard, DHT11 Temperature and Humidity Sensor, Soil Moisture Sensor, SI1145 Digital UV Index / IR / Visible Light Sensor, Jumper wires, LEDs and live data feed can be monitored on serial monitor and Blynk mobile. This will allow farmer to manage their crop with new age in farming.


## INTRODUCTION

The India is an agricultural country. Nowadays, at regular intervals the lands are manually irrigated by the farmers. There is a chance that the water consumption will be higher or that the time it takes for the water to reach the destination will be longer, resulting in crop dryness. Real-time temperature and humidity monitoring is crucial in many agricultural disciplines. However, the old method of wired detection control is inflexible, resulting in several application limitations. This project achieves irrigation automation as a crucial answer to this problem. This is accomplished with the aid of a Raspberry Pi, which controls the moisture and temperature sensors based on the input provided. Moisture sensors are used in the construction of an automated plant watering system for this purpose. The main aim of our project is to reduce the complexity of supervision and to avoid the continuous monitoring. We can accomplish smart agriculture using our system. This system includes IoT-based agricultural monitoring. The Internet of Things (IOT) is transforming the agriculture business and addressing the enormous difficulties and huge obstacles that farmers confront today in the field. The soil moisture sensor is

put into the soil to determine whether the soil is wet or dry, and If the moisture level in the soil is low, the relay unit attached to the motor switch must be monitored on a regular basis. When the soil is dry, it will turn on the motor, and when the soil is moist, it will turn off the engine.

## LITERATURE REVIEW

[1] Aishwarya Kagalkar (2017) , has proposed a paper titled “Smart Irrigation System “; The proposed Irrigation System in this paper aims at fulfilling water requirements of the crops, by monitoring the soil moisture and other environmental parameters. The system, which is based on the Internet of Things, logs the sensor data to the cloud and the farmer can monitor and control all the water pumps remotely over the internet using an Android application. It consists of a wireless sensor node with Arduino publishing sensor data to the cloud using Wi-Fi module and controlling the pump using relay. The paper presents an automated irrigation system providing precision agriculture and thus preventing water wastage.

Advantage : Farmers can control all water pumps remotely over the internet.

All the datas is stored in the cloud.

Disadvantage : The mobile app doesn't display the weather conditions in the field.Hardware Details : Arduino , Relay ,Wifi module
Software Details : Android Application

[2] **Divya J., Divya M.,Janani V.** Agriculture is essential to India's economy and people's survival. The purpose of this project is to create an embedded-based soil monitoring and irrigation system that will reduce manual field monitoring and provide information via a mobile app. The method is intended to help farmers increase their agricultural output. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used to examine the soil. Based on the findings, farmers may plant the best crop for the land. The sensor data is sent to the field manager through Wi-Fi, and the crop advice is created with the help of the mobile app. When the soil

temperature is high, an automatic watering system is used. The crop image is gathered and forwarded to the field manager for pesticide advice.

[3] Dr. Madhu Kumari and Anant Kumar Sah (2021) have proposed a paper titled "IoT Enabled Smart Irrigation System, Monitoring and Water Harvesting in Different Soils" ; In this paper, we are able to realize the cost effective and reliable device whose aim is to irrigate fields only when there is a need of water and to provide information. The farmers can monitor their farm's field simply by just browsing the channel link of thing speak. The information is sent to the farmers by using a cloud website called thing speak. All the data is uploaded by the Wi-Fi module inbuilt in MICROCONTROLLER, to thing speak cloud database.

Advantage : The farmers can monitor their farm's field using simply by justbrowsing the channel link of thing speak.

Disadvantage : This device cant check the Environmental weather conditions.

Hardware Details : NodeMICROCONTROLLER-8266, soil moisture sensor, DHT11sensor, Relay, Arduino Uno.

Software Details : Thinkspeak

[4] **H.G.C.R. Laksiri, H.A.C. Dharmagunawardhana, J.V. Wijayakulasooriya [3]** Development of an effective loT-based smart irrigation system is also a crucial demand for farmers in the field of agriculture. This research develops a low-cost, weather-based smart watering system. To begin, an effective drip irrigation system must be devised that can automatically regulate water flow to plants based on soil moisture levels. Then, to make this water-saving irrigation system even more efficient, an IoT-based communication feature is added, allowing a remote user to monitor soil moisture conditions and adjust water flow. The system also includes temperature, humidity, and rain drop sensors, which have been updated to allow remote monitoring of these parameters through the internet. In real time, these field weather variables are stored in a remote database. Finally, based on the present weather conditions, a weather prediction algorithm is employed to manage water distribution. Farmers would be able to irrigate their crops more efficiently with the proposed smart irrigation system.

[5] CH Nishanthi,et.al(2021) have proposed a paper titled " Smart Farming Using IOT". In this project, we are able to realize with a compilation of data from sensors and modern electronic gadgets, the farmer can monitor agricultural fields. Smart Agriculture can forecast weather data, switching ON the pump motor and switching ON the bulb for artificial light due to less light intensity, for farms acknowledging the dampness of soil or moisture levels . It also focuses on detecting the pest and humans by their temperature using IR sensors and the sensors are interfaced to process module Arduino-UNO.

Advantage : A compilation of data from sensors and modern electronic gadgets,the farmers can monitor agricultural fields.

Disadvantage : This device can't detect if the water is in the well or not.

Hardware Details : Humidity sensor,Temperature sensor, Arduino UNO microcontroller,IR sensor, ESP8266 Wi-Fi Module.

Software Details : Arduino IDE,Web Application.

[6] **Anushree Math, Layak Ali, Pruthviraj U[4]** India is a country where agriculture plays a vital role. As a result, it's critical to water the plants wisely in order to maximise yield per unit space and so achieve good output. Irrigation is the process of providing a certain amount of water to plants at a specific time. The purpose of this project is to water the plants on the National Institute of Technology Karnataka campus with a smart drip irrigation system. To do this, the open source platform is used as the system's fundamental controller. Various sensors have been employed to supply the current parameters of components that impact plant healthiness on a continual basis. By controlling a solenoid valve, water is provided to the plants at regular intervals depending on the information acquired from the RTC module. The webpage may be used to monitor and manage the complete irrigation system. This website contains a function that allows you to manually or automatically control plant watering. The health of the plants is monitored using a Raspberry Pi camera that gives live streaming to the webpage. The controller receives water flow data from the water flow sensor through a wireless network. The controller analyses this data to see if there are any leaks in the pipe. Forecasting the weather is also done to restrict the quantity of water given, making it more predictable and efficient.

[7] **R. Nageswara Rao, B.Sridhar [6]** Agrarian countries like India rely heavily on

agriculture for their development. Agriculture has always been a roadblock to the country's development. Smart agriculture, which comprises modernising present agricultural systems, is the only answer to this challenge. As a result, the suggested strategy attempts to use automation and Internet of Things technologies to make agriculture smarter. Crop growth monitoring and selection, irrigation decision assistance, and other uses are possible thanks to the Internet of Things (IoT). To modernise and boost crop yield, a Raspberry Pi-based autonomous irrigation IOT system has been proposed. This project's main purpose is to produce crops using the least amount of water possible. Most farmers waste a lot of time in the fields in order to focus on water available to plants at the appropriate time. Water management should be improved, and the system circuit's complexity should be minimised. Based on the data collected from the sensors, the suggested system determines the amount of water required. Two sensors detect the humidity and temperature of the soil, as well as the humidity, temperature, and length of sunshine each day, and send the data to the base station. Based on these characteristics, the recommended systems must calculate the irrigation water quantity. The key benefit of the system is the integration of Precision Agriculture (PA) and cloud computing, which will reduce water fertiliser consumption while increasing crop yields and assisting in the evaluation of field weather conditions.

[8] **Shweta B. Saraf, Dhanashri H. Gawali [7]** The Internet of Things (IoT) is the internet-based connectivity of a huge number of devices (IoT). A unique identity links each item, allowing data to be sent without human involvement It makes it possible to develop strategies for improved natural resource management. Smart gadgets with sensors, according to the IoT concept, enable interaction with the physical and logical worlds. The proposed system in this study is built on the Internet of Things and uses real-time input data. Over a wireless sensor network, a smart farm irrigation system uses an Android phone to remotely monitor and regulate drips. Between sensor nodes and base stations, Zigbee is utilised to communicate. A web-based java graphical user interface is used to process and present the server's real-time observed data. Field irrigation system wireless monitoring eliminates human interaction and enables for remote monitoring and control using an Android phone.

Cloud computing is a potential choice due to the large volume of data created by the wireless sensor network. This research presents and examines a cloud-based wireless communication system for monitoring and controlling a collection of sensors and actuators in order to determine the water needs of plants.

[9] **G. Sushanth, and S. Sujatha [9]** Smart agriculture is a novel concept since IoT sensors can offer information about agricultural regions and then act on it based on user input. The purpose of this study is to develop a smart agricultural system that utilises cutting-edge technologies such as Arduino, Internet of Things, and wireless sensor networks. Through automation, the research tries to take use of emerging technologies such as the Internet of Things (IoT) and smart agriculture. The capacity to monitor environmental factors is a critical component in increasing crop efficiency. The purpose of this study is to develop a system that can monitor temperature, humidity, wetness, and even the movement of animals that might damage crops in agricultural areas using sensors, and then send an SMS notification as well as a notification on the app developed for the same to the farmer's smartphone via Wi-Fi/3G/4G if there is a discrepancy. The system uses a duplex communication link based on a cellular Internet interface, which allows data inspection and irrigation schedule to be changed using an android app. Because of its energy independence and inexpensive cost, the gadget has the potential to be useful in water-scarce, geographically isolated areas.

**Summary of Literature Review:**

The above literatures used hardwares like Humidity sensor, Temperature sensor, Moisturesensor, Raspberry pi, Arduino UNO, Zigbee module and some other microcontrollers. Softwaresused are Arduino IDE, Cloud, Think speak, Web Application and Android Application. Some of the projects they have used are Machine learning and Deep Learning Methods. In the majority ofthe papers they have taken sensor data and sent it to the cloud or any other platform and the farmers can control the motor pump from their Mobile App.

**Proposed Work:**

- IoT-based agriculture system helps the farmer in monitoring different parameters of hisfield like soil moisture, temperature, and humidity using some sensors.

- Farmers can monitor all the sensor parameters by using a web or mobile application evenif the farmer is not near his field. Watering the crop is one of the important tasks for the farmers.

- They can make the decision whether to water the crop or postpone it by monitoring thesensor parameters and controlling the motor pumps from the mobile application itself

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