A Review on Iot Based Smart Crop Monitoring InFarm Land

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***Abstract*— There is a pressing need for agricultural improvement in the current world, since new technology have been introduced and used in the modern world. A variety of studies have been conducted in an effort to enhance agricultural farming, and the results of these studies have been extensively used. To maximize agricultural yields, it is essential to keep an eye on environmental conditions in and around the field. Soil quality, weather conditions, moisture, temperature, and other variables may be monitored in real time utilizing a variety of Internet of Things (IOT) apps. When IoT is used in conjunction with sensor networks in agriculture, the old methods of farming may be completely reimagined. Using IOT to monitor crops online allows farmers to be connected to their fields at all times, regardless of where they are. To keep tabs on the state of the field, sensors of all kinds are used. The farm's status is sent to the farmer's smart phone through IOT technology in a unified manner.**

***"Keywords*— Node MCU, Cloud Server, IOT, Humidity sensor, Pressure sensor, Temperature Sensor, soil moisture sensor.**

I. INTRODUCTION

Agriculture, our primary food supply, is critical to our existence as a species. Agriculture is a complex system. Sadly, the majority of farmers in our nation still employ the old-fashioned method of farming, which requires a lot of time and effort to manually analyze data about soil and crops. Modern agricultural techniques may help alleviate this problem. A nation's economic development depends heavily on its agricultural sector, hence automation in agriculture is vital to increase crop yields and aid in the expansion of the country. Without human interaction, automated crop monitoring is possible with the use of agricultural automation. Things integrated with sensors, software, and electrical components, such as microcontrollers, are part of the Internet of Things. A well-functioning irrigation system is critical to a crop's ability to grow. A sensor is placed in the field to monitor the soil's water needs, and irrigation is automatically initiated based on this information. Internet of Things (IoT) protocols will allow a farmer to monitor his field's progress.

II. IOT CROP MONITORING SYSTEM

Basic working diagram of this project is shown in the figure. It consists of Node MCU Board, Humidity Sensor, Pressure sensor, Temperature sensor, soil moisture sensor, LCD Display, WIFI module, DC power supply and Smart phone. Agriculture field's Sensor parameters are given to Node MCU board where data are collected and calculated the values of each sensor and update sensor parameters on LCD display.

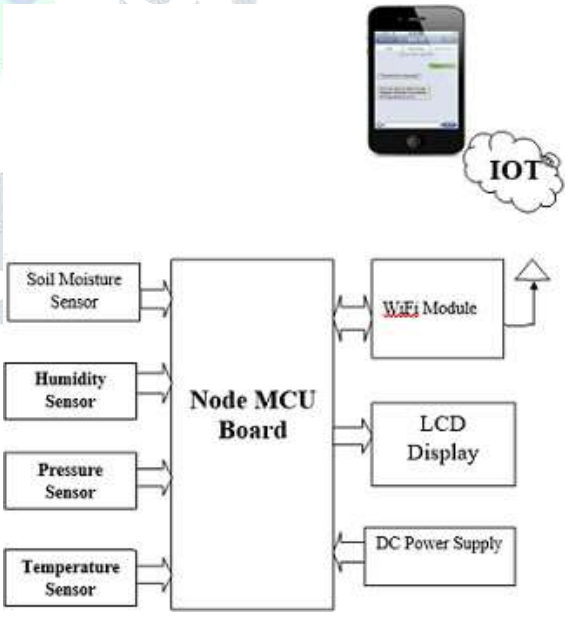

Figure 1: general Block Working Diagram of IOT Based Smart Crop Monitoring in Farm Land.

Unlimited distance crop filed monitoring system is implemented using IOT protocol networks. Node MCU board has WIFI module which is used for IOT data communication purpose. In IOT system cloud storage is used for **physically**

storing the data and make it available online to users via smart phone app.

Hardware Requirements:

SLNO	HARWARE	QUANTITY
1	NODE MCU development board	1
2	Humidity Sensor	1
3	Temperature Sensor	1
4	Pressure Sensor	1
5	Soil Moisture Sensor	1
6	DC Power Supply	1
7	LCD Display	1
8	Smart Phone (your phone)	1

Software Requirement:

SLNO	SOFTWARE
1	Embedded C
2	Arduino IDE
3	Blynk App

III. LITERATURE REVIEW

R.Mythili, Meenakshi Kumari, Apoorv Tripathi, Neha Pal[1] We have created a useful IOT-based Agriculture Stick to assist farmers with real-time monitoring of farm data (such as temperature and soil moisture). With the use of these characteristics, farmers may experiment with innovative agricultural methods and raise the quality of their crops. Farming operations may be improved by using this Arduino-based smart embedded technology, which gives farmers access to and control over real-time agricultural data. In this project Arduino uno board, soil moisture sensor, DHT11 senor and GSM Modem are used. SMS Based alert system isimplemented in this project.

Jash Doshi, Tirth Kumar Patel, Santosh Kumar Bharti [2] presented a solution that would allow farmers to be alerted through many channels at the same time. With the use of this equipment, farmers were able to collect real-time data from the farms (such as temperature, humidity, soil moisture, UV index, and infrared radiation) and take the actions required to practice smart farming, which increased crop yields while conserving resources (water, fertilizers). Breadboard, DHT11 Temperature/Humidity/IR Sensor, Jumper wires, LEDs and live data stream can be watched on serial monitor and Blynk mobile were all utilized in this project. Farmer may now manage their crop in a modern way using this technology.

Vaishnavi S, Varsha O M, Yashaswini T V, Poorvika V M" [3] It has been claimed that cutting-edge technologies like Arduino, IOT, and Wireless Sensor Networks may be used to construct a smart agricultural system. Automation and IoT-based smart agricultural systems were the primary objectives of the research. Temperature, humidity, water level, and even animal activity may all be monitored using sensors on the Arduino board. If an impediment is identified, a notice is sent to the farmer's smartphone via Wi-Fi. We are working on temperature sensor-based water supply automation here. A PIR sensor-based object detection and needle rotation system is in place. Using the blink program, all parameters alerts are transmitted to the old smart phones.

Varshini B.M, Sushma A.V [4] An intruder detection system has been devised that can identify intruders, monitor suspicious activities, and then notify the field's owner. With this technology, farmers can be certain that their property is completely protected from any threats or trespassing. In this project, a microcontroller-based Arduino Uno framework was employed to automate the system. PIR sensors, smoke sensors, and soil moisture sensors are all used to spot intruders near the field and to estimate the volumetric water content of the soil. They implemented GSM Modem based SMS alert system for former monitoring purpose.

Krutika B L, Dr Usha J [5] implemented for farm monitoring system by using Smartphone application and Internet of Things. This system is implemented for farmers agriculture monitoring and control purpose. Rural chores are managed and automated utilizing a microcontroller and sensors including soil dampness sensor, pH sensor, temperature sensor, and moistness sensor, all of which are connected to the same chip. Android Application on his phone is used to register the farmer in the system. The first retrieves information about agricultural requirements as a whole, such as the number of acres registered by other farmers and the current demand status for specific crops. The information gets updated in real time. This is a predicted demand information that a farmer would get to make the right decision of crops tomaintain it properly.

Naveen G Balaji, Nandhini V, Mithra S, R.Naveena, N.Priya [6] installed to keep animals out and keep track of how much water is being used by the crops. This technique boosts agricultural yields while posing no threat to the farm's animals or workers. The primary goal of this system was to keep animals out of the crops by employing sensors and image processing to detect when they tried to get in. Using IOT technology and a camera installed in an agricultural field, they devised a way for monitoring crops that would boost crop yield while also reducing damage from animal infiltration.

Sushma A. Mane, Snehal T. Bhosale, Pournima D. Nikam, A.G Patil" [7] developed for making agriculture smart using automation and IoT technologies. LCD displays are used to construct the Smart Display system in this instance. Sensors for temperature, humidity, and wetness have been developed for this project. Using real-time data from the field and intelligent control, the irrigation system was made smarter. Basic parameters are monitored and moisture-based water supply automation is designed here. GSM based automatic message notification system is implemented.

Mr.Meganathan Arun Kumar, Balaji R, S.Bhuvanneswar [8] The PIC Microcontroller was used to construct a crop protection system. A motion sensor is used in this project to keep tabs on any nearby wild creatures that could be in the area. Motion sensor signals are sent to the microcontroller

through this device. When motion is detected, the microcontroller plays an alarm to entice animals away from the field and sends an SMS to the farmer, alerting him to the problem and allowing him to respond quickly if the animals do not flee. The farmers' losses are protected by this technique, which assures the protection of crops against animals. In this project PIC microcontroller, LCD Display, Motion sensor, alarm systemand GSM modem was used.

Muhammad Umar Farooq, Ayesha Hakim, Irfan Ahmed Baig, Prashant Khanna, Javeria Jabeen and Umar Ijaz Ahmad" [9] The proper quantity of water at the right time is critical to the growth of any crop, and an integrated automation system that provides this water is essential. Commercially accessible smart irrigation equipment are too expensive for farmers to buy, but manual irrigation wastes water and harms crops due to accidental watering. Smart crop monitoring and irrigation systems using IoT and mobile applications are given to solve these concerns. We hope that by minimizing crop decay during rainstorms, we can reduce irrigation water wastage. A probable danger to the farm might be detected and communicated to it in this method. Water flow and crop development may be managed by farmers to boost agricultural production in this way. Mobile applications are used to construct a smart wireless network-based monitoring system.

Prof.Caroline El Fiorenza, Sushmita Sharma, Soumya Ranjan, Shashank [10] designed an Arduino-based system to monitor environmental parameters that are constantly updated and managed in order to achieve optimum plant growth and productivity. In order to send SMS messages indicating the present state of agricultural field characteristics, GSM (Global System for Mobile Communication) modems are utilized. The devices' malfunctions were also automatically diagnosed and remedied using prediction technology, which was used throughout. The Arduino uno board, DHT11 sensor, soil moisture sensor, water pump driver, and GSM modem are all used in the development of this project. This technique prevents over-irrigation, under-irrigation, soil erosion, and water wasting. Basic parameters are monitored using GSM Modem. Soil moisture sensor based water automation is designed to save water.

R. Nivetha, M. Anitha, D. Elavarasi, V. Vivetha [11] In the growing season, a wireless sensor network system is used to capture basic field information such air moisture, temperature and salinity of agricultural land. An IOT device posts data to the user. Users may monitor field conditions based on sensor measurements and motor status, which are routinely updated to the cloud. An IoT-based monitoring system has been presented for continuous monitoring of a field using a defined user address. These researchers used an 8-channel, 2-GHz-specified RF transceiver to send the data they collected from the field to a user computer. Additional features include a browser-based motor controller and a motor controlled by soil moisture. The agricultural land's moisture level was automatically managed by a motor, and this status was sent to a monitoring area. In order to transport data quickly and efficiently across long distances, they devised a new method that used little energy.

Ery Muchyar Hasiri, Asniati, Mohamad Arif Suryawan, Rasmuin [12] As a result of this research, not only were data on moisture content from sensors in the soil and air, temperature from a temperature sensor and rainfall data from a Rain Sensor obtained, but it was also possible to schedule watering times using an automatic Real-Time Clock (RTC) that was developed to assist farmers in solving manual watering problems. It consists of both hardware and software. A large portion of the hardware consists of operating systems and apps that run on Android devices. Sensor block, farm station controller, and farmer's house controller make up the system's three components. According to the study's final findings, the technologies used may help farmers adopt smart agricultural systems. Conclusion. Several temperature, soil humidity, and rain sensor tests were a success, demonstrating this. As an additional benefit, 2.4GHz Wireless ZigBee and the ESP8266 sensor block on the farm station server may communicate with each other and relay real-time data to the base station. In addition, the sprinkler watering system has no issues when it receives commands from the application to irrigate agricultural land.

IV. CONCLUSION

IOT based crop monitoring system has been designed and demonstrated successfully. Soil moisture, temperature, humidity, pressure parameters are measured and updated on LCD display for crop field monitoring purposed. Node MCU board 12E is used which has esp8266 inbuilt WIFI module. IOT based unlimited distance wireless crop field monitoring is successfully designed with the help of Node MCU and smart phone. This project is designed for real time agriculture field. Blynk app based smart IOT app is designed for live monitoring of crop field.

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