CLOUD STORAGE FARMING USING IOT

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Abstract - As the globe embraces new technologies and implementations, it is imperative that agriculture likewise evolve. Numerous studies are conducted in the realm of agriculture. Most projects involve the usage of a wireless sensor network to collect data from various sensors place at various nodes and transmit it via the wireless protocol. The collected statistics provide information about numerous environmental elements. Monitoring environmental conditions is not a full strategy for increasing agricultural yields. There are several more factors that reduce production to a larger level. To address these issues, agricultural automation must be implemented. To address all of these issues, it is vital to create an integrated system that addresses all aspects influencing productivity at each level. However, comprehensive automation for farming is not possible due to a variety of challenges. Despite being applied at the research level; it is not provided to farmers as an item to benefit from the resources. As a result, this article focuses on establishing smart agriculture utilizing IoT and making it available to farmers. This proposed strategy employs machine learning technology to improve the green development sector's capacity to handle financial assets and increase innovative farming product development patterns. Thus, the fundamental circumstances for boosting nutritious food choices and encouraging the potential development of local and worldwide organic producers.
Keywords: node MCU, WI-FI Module, Humidity sensor, Temperature sensor, light sensor, soil moisture sensor, relay, ULN 2083.

1 INTRODUCTION

The project aims in designing a smart farm using IOT, Arduino controller. This is used to monitoring the farm conditions in thingspeak through Wi-Fi. Here we are using temperature, humidity, LDR, soil moisture sensor.

The Arduino Uno is an ATmega328-based microcontroller board. It has fourteen pins for digital input and output (6 of which may be utilized as PWM outputs), six analog inputs, a ceramic resonator with a frequency of 16 MHz an USB port, a power connector, a header for ICSP, and a button to reset it. It includes everything required to support the microcontroller. You can just connect it to a computer via USB connection or power it with an AC-to-DC converter or battery to get started.

It continually checks the data and sends it to an internet of things system. We can improve monitoring approaches by using new technologies. In this project, we are using technology to detect sensor data efficiency in order to give efficient services to smart farms.

The main control device of the project is the ARDUINO controller. The Arduino receives inputs from temperature, humidity, LDR, and Co2 sensors. The arduino controller collects data from sensors, which it then uploads to Thingspeak over WIFI.

The features of the project are:

- Living farm Environmental monitoring.
- Usage of Arduino to achieving this task.
- Updating the parameters values on THINGSPEAK website.

2 RELATED WORK

They suggested a revolutionary methodology for smart farming that connects a smart sensor system with a smart irrigator system using wireless communication technology. This work presents thorough modeling and control methodologies for an intelligent irrigator and intelligent agricultural system. The main cause for the poor performance is a lack of agricultural work automation. The Intelligent sensing system produces precise results, and the Intelligent irrigator system sprays the nutrients required by the crops.[1]

Automation in poly houses eliminates farmer mistake. They employ numerous sensors to monitor the soil's moisture, temperature, humidity, and light intensity in the poly home farm. Customers may simply monitor it from anywhere in the world using the mobile app. These methods produce greater yields than the current method. The amount produced product will be of higher quality. However, there may be a chance that the situation happened due to a manual error. [2]

Where applicable, cutting-edge IoT-based systems and platforms for agriculture are emphasized. Finally, based on our extensive assessment, we identify present and future IoT trends in agriculture, as well as possible research difficulties. To meet the increasing need for food of the world's expanding population in an environment of limited land for agriculture, an emphasis on smarter, more effectively, more effective and sustainable crop production practices is necessary. [3]

They proposed that agriculture is witnessing a fourth revolution, fueled by the exponentially rising use of technology for communication and information (ICT) in agriculture. These technological advancements represent an industrial revolution that will lead to disruptive modifications to agricultural methods. This trend applies to cultivating not only in advanced nations, but also in nations that are developing, where ICT deployments (e.g., mobile phone use, Internet access) are rapidly gaining traction and could become revolutionary developments in the future (e.g., seasonal drought forecasting, climate-smart agriculture). [4]

It enables farmers in obtaining live data (temperature and soil moisture) for optimal environmental monitoring. This stick was created utilizing a mixture of NodeMCU, Cloud computing, and Solar Technology on a breadboard with several sensors. Thingsspeak.com was utilized to obtain a live data stream. The author stated that the data streams retrieved from the sensors had an accuracy of 98%. [5]

This enables real-time reasoning over several heterogeneous sensor data streams. In order to ensure smooth interoperability across sensors, services, processes, operations, farmers, and other important actors—including online information sources and linked open datasets and streams accessible on the Web—the framework also supports large-scale data analytics and event detection. In order to test this concept, they placed between 100 and 300 sensors in the field. The results demonstrate a comparative analysis of two RDF Stream Processing (RSP) engines: CSPARQL and CQELS.[6]

The fusion of cutting-edge technologies with conventional farming methods, such as sensors, wireless communication, the Internet of Things (IoT), artificial intelligence (AI), and robots, is known as smart farming. Water and fertilizer shortages are undoubtedly bad for crop productivity. Overfeeding crops with fertilizers and water may not be beneficial for them either, as it pollutes the environment. It has been thought that the use of sensors and modern technology is the only practical way to comprehend and regulate the aspects covered above. Soil conditions can be tracked via sensors. [7]

It is an essential goal, given the global trend toward new technology and their applications. The manual method of checking the parameters is the current approach and among the oldest in agriculture. Using this procedure, the farmers compute the readings and independently validate all the parameters. It focuses on creating tools and devices that take advantage of a wireless sensor network system to manage, display, and notify users. Cloud computing devices have the ability to build entire computing systems from sensors to tools that can precisely feed data into repositories together with GPS coordinates, observing data from agricultural field photographs and from human actors on the ground. [8]

Order to develop sustainable agriculture, smart farming is essential. Robotic, autonomous vehicles have been created for agricultural tasks such mechanical weeding, fertilizer application, and fruit harvesting. Sophisticated farm management advice is now possible thanks to the development of unmanned aerial vehicles (UAVs) with autonomous flight control and lightweight, powerful hyperspectral snapshot cameras that can be used to calculate crop fertilization status and biomass development. Agricultural practices will undergo significant disruptions due to the technological revolution brought about by the advancements in agriculture. This pattern applies to farming in both industrialized and developing nations, where ICT installations (such as mobile phone use and Internet access) are gaining traction quickly and have the potential to revolutionize agriculture.[9]

3 METHODOLOGY

The Internet of Things and cloud-based technologies are employed in the suggested Cloud-Based Organic Agriculture System to promote sustainable agriculture. It uses sensors to track the health of the cattle, the weather, and the soil, sending data in real time to a cloud-based system.

Farmers may have control and monitoring from afar with the use of a smartphone app. The technology facilitates improved production, resource efficiency, traceability, and animal wellbeing by integrating with weather and supply chain forecasts.

Organic farming is modernized by the comprehensive approach, which also ensures openness from farm to marketplace and encourages environmental care.

BLOCK DIAGRAM

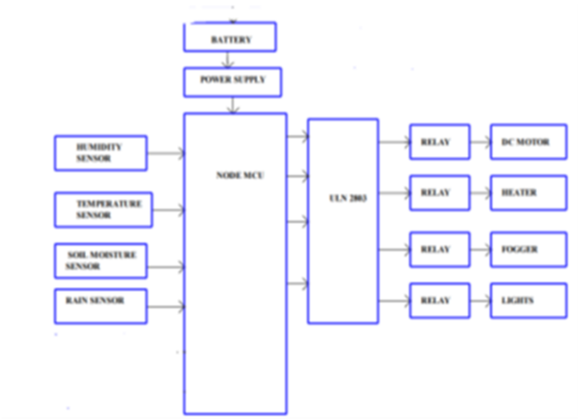

Fig 1: Block Diagram

5 HARDWARE REQUIREMENTS

- **Node MCU**: Node MCU is an open-source IoT platform. It comprises software that operates on electronic stability program ESP8266 Wi-Fi SOC and hardware based on its ESP-12 module. By default, the phrase "Node MCU" refers to the firmware, not the dev kits. It has 128KBytes of ram and 4Mbytes of storage space, and it is powered via USB. It is a single-board microcontroller with 16 GPIO pins.

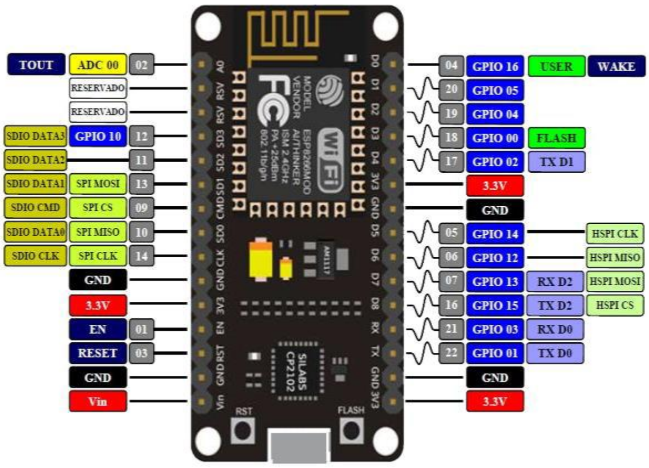

Fig 1: Node MCU

- **WIFI Module:** Wi-Fi is a technique for wireless networking in local areas that uses IEEE 802.11 specifications. There are several WIFI features that make wireless networks easier and simpler. Wi-Fi Technology is essentially a local area network that is wireless that replaces Ethernet lines. Today, millions of users use this built-in capability with fantastic wireless technology.

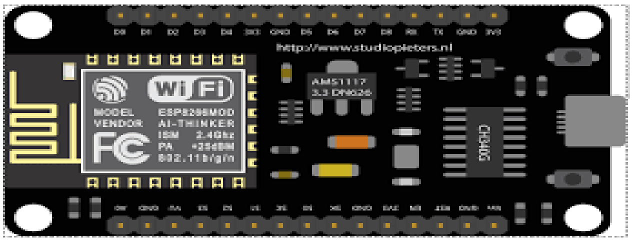

Fig. 2: WIFI Module

- **Humidity sensor:** The DHT11temperature and humidity detectors are ideal for a variety of do-it-yourself electronics applications due to their affordable price and compact design. Remote observation stations, home climate control structures, and agricultural/garden surveillance systems are a few applications in which DHT11 would be helpful. The combination DHT11 digital humidity and temperature sensor A standardized digital signal indicating both temperature and humidity is contained in the sensor.

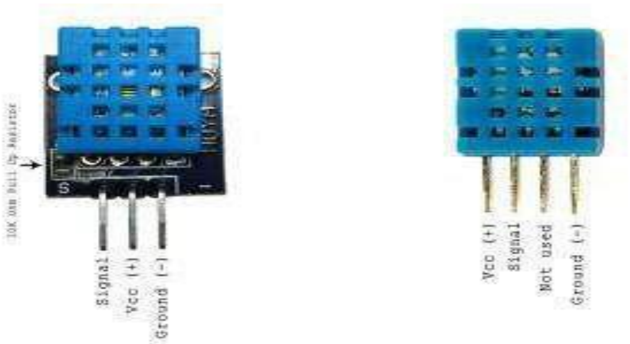

Fig 3: Humidity sensor

- **Temperature sensor:** Precise integrated-circuit sensors for temperature, or LM35-series devices, have an output voltage that is directly proportional to the temperature in centigrade. One benefit of the LM35 device over temperature sensors that are linear and calibrated in Kelvin is that it may deliver typical accuracy levels of ± ¼ °C at ambient temperature and ± ¾ °C across the whole temperature range of −55°C to 150°C without the need for extra calibration or trimming.

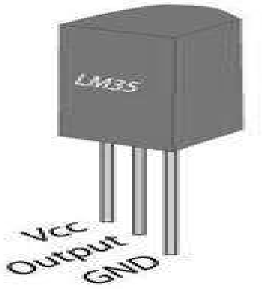

Fig 4: Temperature sensor

- **Light Sensor:** The polyhouse's light sensor is used to assess the quantity of light that is present. A light sensor detects how much light is in the surrounding area and how dark or light it is. The device used is an INVNT_10 Lm393 type sensitive to light optical photosensitive LDR sensor.

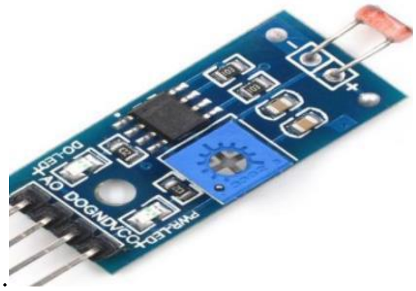

Fig. 5: Light Sensor

- **Soil moisture sensor:** A sensor for soil moisture is the device that measures the amount of water present in the soil. It is crucial to measure soil moisture in order to help farmers manage their irrigation systems. This device's two probes are used for measuring the volume content of water. More water in the soil enables it to conduct more electrical, which reduces resistance. There will be more resistance because the soil is going to conduct fewer volts if there isn't as much water around because the moisture content will be higher. As a result, the amount of moisture will decrease

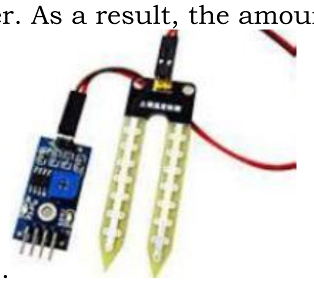

Fig. 6: Soil moisture sensor

- **Relay:** Due to its internal design, the Single Pole Double Throw SPDT relay may be quite helpful in several situations. It features two contacts in two alternative configurations: normally closed and opened, or normally open and closed. It also includes a single common terminal. Essentially, the SPDT relay functions as a means of switching between two circuits: one "receives" current while there is no voltage supplied to the coil, while the other circuit does not, and the opposite occurs when the coil becomes activated.

Fig. 7: Relay

- **ULN 2083:** For a wide range of computer, industrial, and consumer applications, the eight NPN Darlington connected transistors in this family of arrays are perfectly suited for interfacing between low logic level digital circuitry (such as TTL, CMOS, or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers, or other similar loads. For transient suppression, all devices have freewheeling clamp diodes and open-collector outputs. While the ULN2804 is geared for 6-to-15-volt high level CMOS or PMOS, the ULN2803 is made to work with normal TTL families.

Fig. 8: ULN 2083

6 RESULT:

The project “Sustainable Smart Farming Using IOT” was designed an organic farming surveilling system using thingspeak cloud. Based on sensor data NodeMCU will control the respective device through relays.

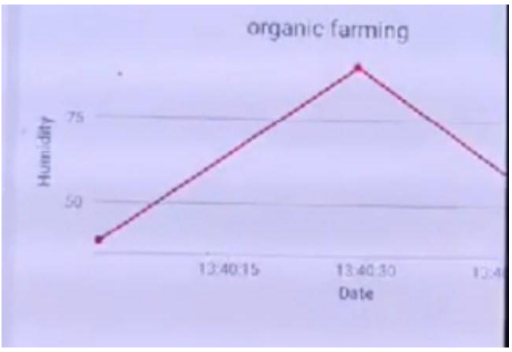

Fig. 9: visualization on thingspeak 1

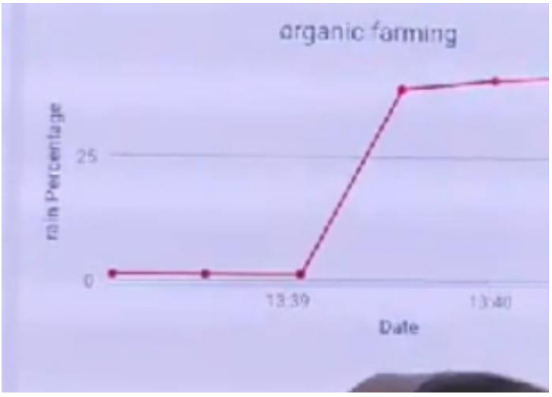

Fig. 10: visualization on thingspeak 2

	B	C	D	E
1	y_id	field1	field2	field3
2		1nan	nan	
3		2nan	nan	
4		3nan	nan	
5		4nan	nan	
6		5	38	34.7
7		6	91	35.3
8		7	37	35
9				

Fig. 11: Table for data recorded

7 CONCLUSION

Humans are going to require to eat and drink, but markets will rise and fall and revolutionary business concepts will either flourish or fail. Because of this, the advancement of industries like agriculture and food will always be crucial, especially in light of the current global dynamics. As a result, IoT for farming has a bright future ahead of it as the engine for productivity, sustainability, and sustainability in this sector.

Future Scope:

- In future we can add solar panel to run the project.
- In future we can add some more sensors like soil moisture sensor, water motor in this project we can control the water motor automatically based on moisture content in the soil.

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