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SMART CULTIVATION SYTEM USING IOT

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ABSTRACT

Agriculture has been practiced in every country since ancient times, representing the scientific and artistic cultivation of plants. Its emergence played a pivotal role in the development of settled human civilizations. For generations, agriculture has predominantly relied on manual labor. However, as the world embraces new technologies and advancements, it becomes imperative to elevate theagricultural sector as well.

One significant challenge facing agriculture today is the migration of people from rural to urban areas, which poses obstacles to traditional faring practices. To overcome this issue, we have proposed an IoT and smart agriculture system. IoT technology plays a crucial role in this system, with IoT sensors capable of providing valuable information about agricultural fields. BY employing wireless sensor networks, our IoT-based agriculture monitoring system collects data from various sensors deployed at different nodes and transmits it wirelessly using a designated protocol. The system's functionality is powered by Arduino and includes essential sensors such as temperature, humidity, and water level sensors. Upon activation, the IoT-based agriculture monitoringsystem initiates comprehensive assessment of water levels,humidity, and moisture levels. If any parameter deviates from the desired range, the system promptly sends an SMS alert to the user's phone, providing real-time updates on water levels. Controlling and monitoring these parameters can be conveniently executed through any remote device or internet service, with the system's operations facilitated by sensor interfacing, Wi-Fi, a camera, and a microcontroller.

This concept has been transformed in to a tangible product,, with the aim of benefiting farmers and their welfare.

Keywords: ARDIUNO UNO, Soil moisture sensor, Humiditysensor, Temperature sensor, PH sensor, WIFI module, 16*2 Display, Motor.

I.INTRODUCTION

Cash crops refer to agricultural products that yield significantly higher profits for farmers compared to regular crops. However, in India, the cultivation of such crops is often limited due to the country's climatic constraints. These crops require meticulous care to achieve optimal yields, as they are susceptible to disease and pests. To address this challenge, the implementation of automated greenhouse technology utilizing advanced Internet of Things (IoT) technologies, including sensors, actuators, and microcontrollers, can be highly beneficial. This technology offers a promising solution for farmers across India. In this paper, we propose a cost-effective

greenhouse technology that can be easily affordable for Indian farmers. In case of financial limitations, farmers can explore various government schemes aimed at rural and agricultural development, offering loans and assistance

Motivation:

The majority of farming techniques in India include routinely cultivating or growing plants, which typically doesn't provide enough profit for farmers to live comfortably. This is the main reason why so many farmers commit suicide nowadays, and they also find themselves unable to pay back to the loans they frequently receive from the Indian government. Simply because of this, people are less interested in such ancient agriculture methods, which has led to wide spread industrialization and urbanization.

Objective:

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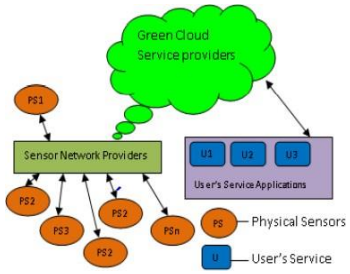
The Primary objective of this project is to develop an affordable automated greenhouse system for cultivating cash crops in India. The aim is to make this technology accessible to farmers across all income groups in the country. The proposed design of the automated greenhouse presents a promising alternative to traditional farming practiced and encourages the cultivation of cash crops through innovative methods, with an estimated cost of 1-2 lakhs, depending on the size of the cultivation area,the proposed model is economically viable and withinreach for farmers. It is crucial to raise awareness about technology-driven farming techniques that have the potential to generate higher profits and contribute to improved living standards for Indian farmers.

IOT in the field of technology:

The field of IoT gained significant prominence in the realm of Science and Technology. It involves the interconnection of physical device or things through the Internet, enabling remote control of devices from anywhere via the cloud or the Internet. IoT seamlessly integrates a wide range of diverse and heterogeneous end systems, allowing selective access to data for the development of numerous digital services. This integration is made possible by the vast array of devices and link layer technologies available. While machine-to- machine technology forms the initial phase, it paves the way foe new applications and the bridging of different technologies, facilitating the intelligent connection of physical objects.

The core concept of the model revolves around the seamless accessibility of physical sensors by the sensor network provider, enabling the collecting of sensory data. This data plays a crucial role in storage, data processing, and communication to the cloud, facilitated by the cloud service provider. The cloud, in turn,store6s and processes the data, delivering it to the user's service demand applications. In the context of Green cloud computing, these sensor network providers serve as the primary data sources.



II. LITERATURE SURVEY

In their research article titled" IoT-Based Smart Greenhouse Automation Using Arduino," D.O.Shirsath et al. explore IoT applications in Indian farming, shedding light on different aspects of automated greenhouse systems and the construction methods employed. The paper also discusses the generic architecture commonly utilized in various automated designs and structures.

In their paper titled "Greenhouse Monitoring and Control Based on IoT Using WSN, "Remya Koshy et al. explore the operation of a greenhouse through automatic control facilitated by a microcontroller. The authors highlight the functionality of different sensors, such as temperature, pressure, and moisture sensors, which are operated by the microcontroller. Furthermore, the paper emphasizes the utilization of Wireless Sensor Network (WSN) technology to transmit data to our mobile devise for monitoring and control purposes.

In their paper titled "Greenhoue Automation Using IoT," C.R. Dongarsane et al. highlight the significance of IoT in connecting various hardware devices over the internet. The authors also emphasize how IoT technology enables the operation of greenhouse through the use of sensors and actuators. The IoT based approach enhances the efficiency andeffectiveness of greenhouse management.

M.F. Siddique et al. present their paper on "Automation and Monitoring of Greenhouse." They discussthe global issue of food shortage and propose that implementing automated greenhouse techniques, as outlined intheir paper, can significantly alleviate this problem. The authors emphasize the benefits of the proposed automated greenhouse in providing optimal protection to plants against climatic adversities, resulting in better yields. The paper also highlights the cost-saving potential and increased efficiency achieved through automation, reducing labor costs.

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III. PROPOSED SYSTEM

The microcontroller receives the data from the sensor, such as the DHT11, PIR sensor, ad soil moisture sensor, which initially collects it from the field. Nowthat the microcontroller has compared the newly received data with previously stored data, it determines whether the values are above a threshold that triggersthe activation of the associated devices. The microcontroller initially compares the temperature inside the farm to a pre-defined value, and if it is higher, than fan is turned on. Later, soil moisture inside the farm is compared to a predefined value in the microcontroller, and if it exceeds the threshold point, alert messages are delivered to the thing speak IOT web page via WI-FI module and are shown in a graphic design. When the level is reached, these gadgets automatically turn off. Each sensor's data upload typically takes 15 seconds, and this process is iterative. Where information is continuously passed and every update from the field.

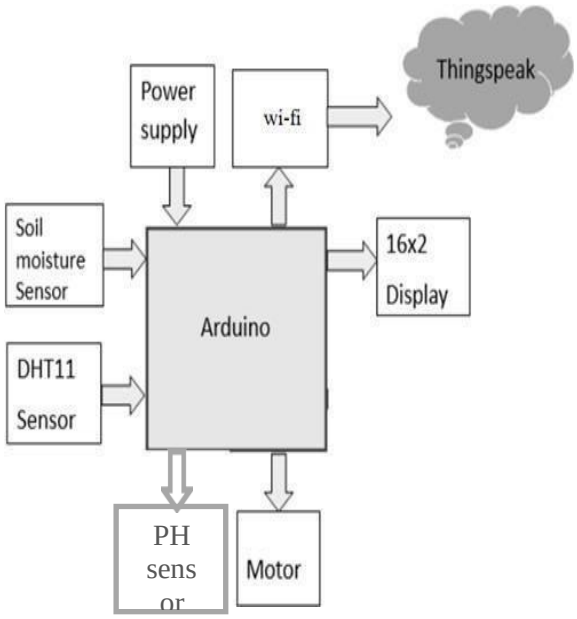

Fig 1: Block diagram

Advantages of proposed system

- The proposed design is fully automated, with all operation being controlled by microcontroller.
- This automation significantly reduces the reliance on labor resources and requires only minimal supervision to ensure smooth operation.
- The Indian government offers substantial loans through various schemes to support the development of farmers and rural communities.
- Therefore, financial constraints should not pose asignificant barrier to the construction process.
- Moreover, the anticipated profits from this venture are expected to exceed expectations, allowing farmers to easily repay the loans soon after the yield is obtained.
- By implementing this technology and cultivating cash crops, the quality of life for farmers and rural communities in India can be greatly improved.

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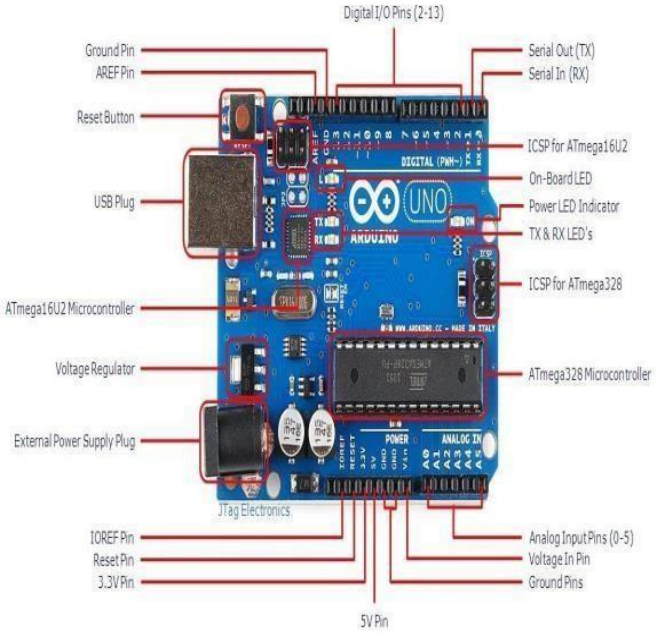

Fig 2: Circuit Diagram

The ability to connect to a power source is a must for every Arduino board. Using either a USB cable from your computer or a wall outlet with a barrel jack as the termination, theArduino board Uno may be powered. It automatically chooses the power source. Your Arduino board can be programmed using the USB connection as well. On an external supply ranging from 6 to 20 volts, the board can function.

The board could become unstable if the 5V pin is proved withless than 5V or less than 7V, though. Thevoltage regulator could become overhead and harmed if morethan 12V is used. 7 to 12 volts is the suggested range.

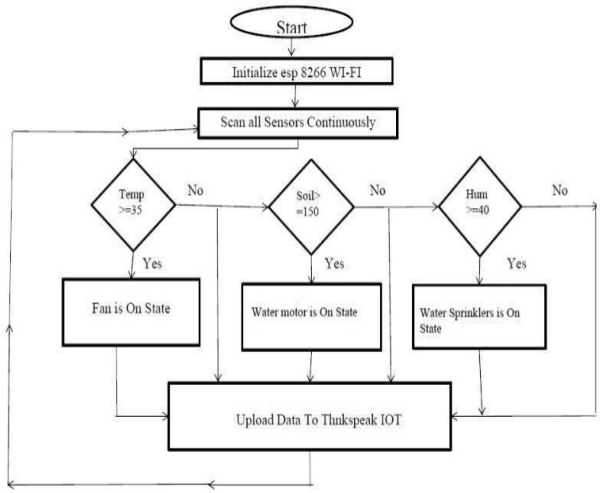

Fig 3: Flow chart of agriculture monitoring system

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RESULTS

This challenge's main goal is to implement modern science in necessary fields like agriculture. This device simplifies agriculture monitoring by utilizing IoT technology. In the current agricultural state of affairs, the benefits like saving water and labor are most important. As a result, watering in agricultural fields is wise when the sensor community is used. IoT data is sent to the consumer via the cloud. As a result, any changes within the crop can also be easily detected and early evaluation is done as such.

Temperature, humidity, and soil moisture are among the measured and observed variables.

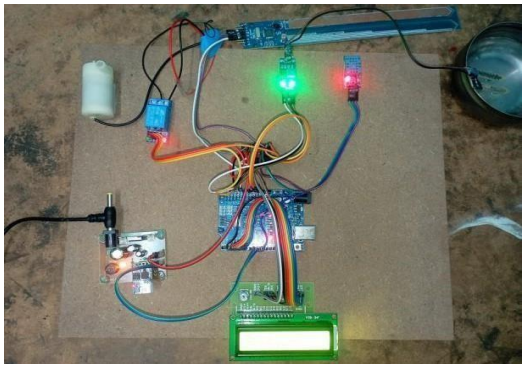

Fig 4: Hardware setup of Smartagriculture monitoring system

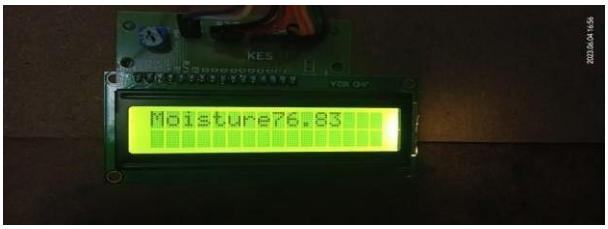

Fig 5: Output of moisture sensor

Fig 6: Output of Humidity and Temperature sensor

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Fig 6: Output of PH sensor

CONCLUSION

In a developing country like India, where agriculture is the primary source of income in most regions, it is crucial for people to be aware of new technologies in this field. This awareness would enable them to incorporate these advancements to their farming practices and reap significant benefits. It is essential for individuals to gain knowledge about cultivating cash crops and utilization of automated designs and technologies. By implementing these practices in their daily lives, they can contribute to significant social, economic, and financial, improvements for both themselves and the country.

FUTURE SCOPE

In the greenhouse, We have currently employed a shading sensor capable of distinguishing only three colors: red, yellow, and blue. However, in the future, we can leverage the capabilities of an Arduino camera that supports image processing. This advancement would allow us to visualize the processed images conveniently on our computer screen, enabling more detailed and comprehensive analysis in the greenhouse.

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