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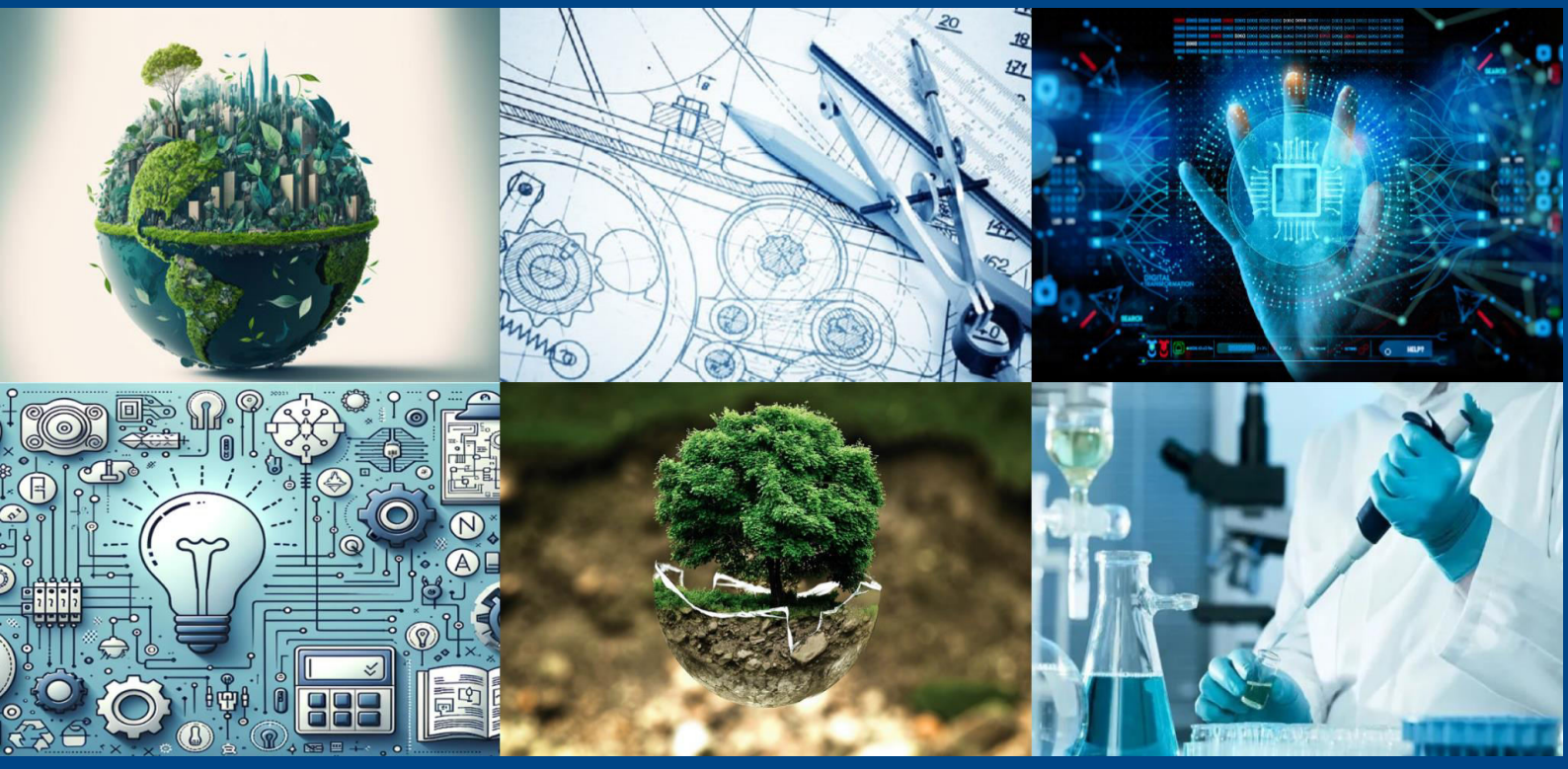

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Smart Agriculture System by using IOT

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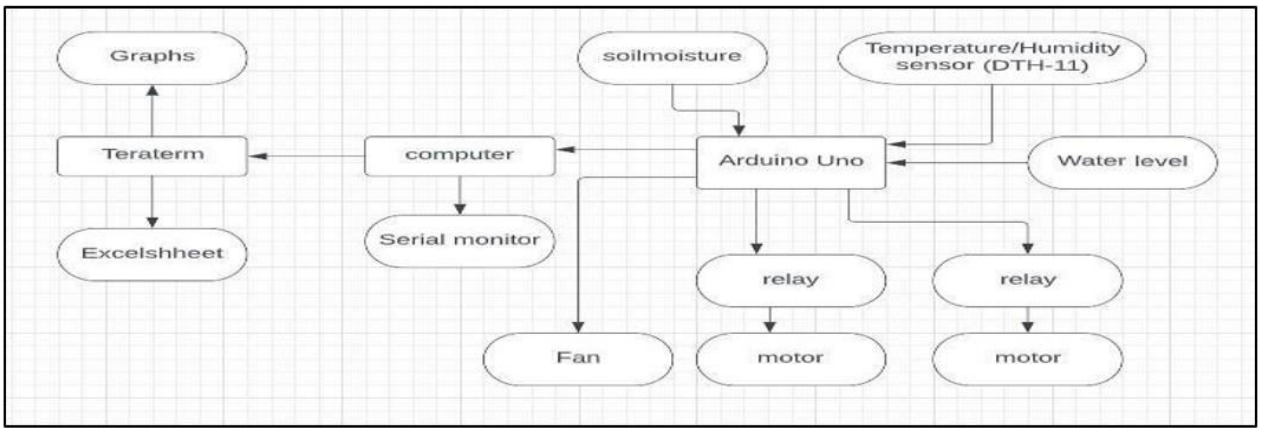
ABSTRACT: Focusing on making a smart agriculture controlled environment area to grow plants. By using a low cost more efficient programmable module to detect the climatic behaviour inside the agriculture and controlling the parameters according to their crop production need, through various techniques with the use of board module. The parameters that need optimization are the water content of the soil, the temperature and humidity of the field area. The design proposes monitoring by soil moisture sensor, Water Sensor, and DHT11(temperature and humidity) sensor; all these sensors collected the data and given to the Tera term , and then after processing the data all the parameters are controlled via water pump, motors, exhaust system, and as per the data calculations. With the help of serial monitoring , the setup module is connected to the computer to extract the data from the sensors and visualize them on the graphs. The collected environmental parameters data sent to excel via software tera term to the farmers to make the proper overlook on their fields. In the field of agriculture and food production, the technology has paced up very quickly and is still furnishing its way, to optimize and achieve maximum plant growth in the field of agriculture. An accurate system would surely bring the change in this world of smart farming by automating the agricultural practices using sensors and modern technology.

KEYWORDS: Arduino UNO, DTH11 Sensor, Soil Moisture Sensor, Water Level Sensor etc.

I. INTRODUCTION

The demand for increased crop production and quality affected the high quality Agriculture. This paper describes a wireless sensor network for monitoring the agriculture and environment. This sensor senses the vital parameters in the environment and the values are monitor and data is stored in Excel spreadsheet. The sensor is connected to a microcontroller which automatically turns on the motor when the soil moisture content is low. This method is focused on saving water, reducing environmental impacts on plant production and increasing efficiency. The user can monitor the from far way places and can control them



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II. LITERATURE REVIEW

Agriculture monitoring and controlling systems are essential in modern agriculture to enhance crop yield and quality. These systems integrate various sensors and automation technologies to maintain optimal growing conditions by monitoring parameters such as temperature, humidity, soil moisture, and light intensity.

Review of Related Work

Sensor Technologies:

- **DHT 11 Temperature and Humidity Sensor:**

HT11 is a Humidity and Temperature Sensor, which generates calibrated digital output. DHT11 can be interface with any microcontroller like Arduino, Raspberry Pi, etc. and get instantaneous results. DHT11 is a lowcost humidity and temperature sensor which provides high reliability and long-term stability.It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and outputs a digital signal on the data pin (no analog input pins needed). It's very simple to use, and libraries and sample codes are available for Arduino and Raspberry Pi. This module makes is easy to connect the DHT11 sensor to an Arduino or microcontroller as includes the pull up resistor required to use the sensor. Only three connections are required to be made to use the sensor - Vcc, Gnd and Output. It has high reliability and excellent long-term stability, thanks to the exclusive digital signal acquisition technique and temperature & humidity sensing technology

- **Soil Moisture Sensors**: Soil moisture sensor measures soil mositure levels by capacitive sensing rather than resistive sensing like other sensors on the market. It is made of corrosion resistant material which gives it an excellent service life. Insert it in to the soil around your plants and impress your friends with real-time soil moisture data! This module includes an on-board voltage regulator which gives it an operating voltage range of 3.3 ~ 5.5V. It is perfect for low-voltage MCUs, both 3.3V and 5V. For compatibility with a Raspberry Pi it will need an ADC converter. This soil moisture sensor is compatible withour 3-pin "Gravity" interface, which can be directly connected to the Gravity I/O expansion shield.

- **Water level sensor**: Water level sensors are used in a number of areas involving monitoring the levels and flow of water like in tanks for irrigation systems, swimming pools and fish ponds. Working of water level sensor: This sensor actually responds to conductivity of the water where it is immersed. The conductivity of water depends on the amount of impurities in the water therefore pure water is not conductive. The sensor has ten copper traces, five of which are power traces and five are sense traces. These traces are not connected but are bridged by water when submerged and act as a variable resistor whose resistance varies according to the water level. This resistance is inversely proportional to the height of the water, that is, the more water the sensor is immersed in, results in better conductivity and will result in a lower resistance and vice versa. The sensor produces an output voltage according to the resistance and this voltage is interpreted by a microcontroller to determine the water level..

- ∟ **IoT and Cloud Computing:**
- **IoT Integration**: Connecting sensors and actuators to the internet for realtime data access and control via cloud platforms.

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Sr.No	Paper	Author	Year and Publication
1	"Providing Smart Agricultural Solutions to Farmers for Better Yielding Using IOT	M.K Gayathri and J. Jayasakthi	2015 IEEE International Conference on Technological Innovations for Agriculture and Rural Development
2	"IOT based Green House Monitoring System"	Viswanath Naik	International Journal for Electronics & Communication Engineering and Technology, vol 6,issue 6,June 2015,pp 45-47
3	"An Effective Method of Controlling Green House and Crop Monitoring Using GSM",	P.S Asolkar	2015 International Conference on Computing Communication Control and Automation
4	"Hybrid Wireless Networking Infrastructure for Samrt Agriculture Mangement Management",	Orazio Mirabella,	IEEE transactions on Instrumentations and Measurement ,Vol 60,February 2011

III. METHODOLOGY OF PROPOSED SURVEY

- **Sensor Data Collection:**

Sensors deployed in the agriculture continuously monitor environmental parameters such as temperature, humidity, soil moisture, and light intensity.

- **Data Processing:**

The microcontroller processes raw sensor data to filter out noise and convert it into meaningful information.
For instance, soil moisture levels are converted to percentage values indicating the need for irrigation.

- **Control Mechanisms:**

Based on the sensor data, the microcontroller triggers appropriate actuators:
Activates the water pump if soil moisture is below a predefined threshold.

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Turns on fans or heaters to maintain optimal temperature and humidity levels.
Controls supplemental lighting based on light intensity readings.

- **User Interface:**

A mobile application provides a user-friendly interface for real-time monitoring and control.

- **Automation and Optimization:**

The system can be programmed to automatically adjust parameters based on predefined rules and machine learning algorithms.
For example, it can optimize irrigation schedules based on weather forecasts and soil moisture trends.

- **Sensor Deployment:**

Install sensors in appropriate locations within the agriculture to ensure accurate monitoring of environmental conditions.

- **Testing and Calibration:**

Test the system under various conditions to ensure accuracy and reliability.
Calibrate sensors and adjust control algorithms based on test results.

- **Deployment and Maintenance:**

Deploy the system in the agriculture and conduct regular maintenance to ensure continuous operation.
Update firmware and software as needed to improve performance and add new features.

IV. CONCLUSION AND FUTURE WORK

The Smart Agriculture System project has successfully demonstrated the feasibility and effectiveness of integrating modern technology into agricultural practices. By leveraging sensor networks, microcontroller-based processing, cloud computing, and data analytics, the system provides a robust solution for optimizing environmental conditions within a agriculture. This, in turn, enhances plant growth, improves crop yields, and ensures resource efficiency.

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