IOT BASED SMART AGRICULTURE

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ABSTRACT

Internet of Things (IoT) has revolutionized various industries, including agriculture. IoT-based smart agriculture is an innovative approach that enables farmers to use technology to increase productivity and efficiency, while reducing costs and waste. This system involves the use of sensor, automation and data analytics to control and monitor the farming process. With IoT-based smart agriculture, farmers can remotely monitor soil moisture, temperature, and nutrient levels, as well as automate irrigation, fertilization, and pest control processes. This abstract highlights the benefits of IoT-based smart agriculture and its potential to transform the agriculture industry by improving yields, reducing environmental impact, and creating sustainable farming practices..

Keyword: - *IoT, Arduino Uno, Soil Moisture Sensor, Relay, DHT11, ESP2866, DC Motor, Power Supply, LDR*.

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1. INTRODUCTION

Agriculture has been a fundamental part of human civilization since the beginning of time. The evolution of technology has transformed agriculture into a more efficient and productive industry. With the rise of the Internet of Things (IoT), agriculture has entered a era of new smart farming, which has the potential to revolutionize the industry.IoT-based smart agriculture is a system that involves the use of sensor, automation and data analytics to control and monitor the farming process. The system enables ranchers to remotely monitor their farms, automate irrigation and fertilization processes, and optimize resource utilization. By using IoT technology, farmers can reduce costs, improve efficiency, and increase productivity. The use of IoT in agriculture is not a new concept, but recent advancements in technology have made it more accessible and affordable. IoT-based smart agriculture has the potential to transform the agriculture industry by creating sustainable farming practices, improving yields, and reducing environmental impact. This paper aims to explore the benefits of IoT-based smart agriculture, the technology behind it, and its potential to revolutionize the agriculture industry.

1.1 Proposed System

In this paper,The methodology of IoT-based smart agriculture involves the integration of various technologies and processes to create a system that is both efficient and sustainable. The methodology of IoT-based smart agriculture is constantly evolving as new technologies are developed and implemented. The goal is to create a system that is sustainable, efficient, and capable of meeting the increasing demand for food production.

1.2 Objective

The primary goal of the project is to expand the efficiency of the harvests regarding quality as well as with amount. It comprises of two primary parts: ThingSpeak and IoT.

2. METHODOLOGY

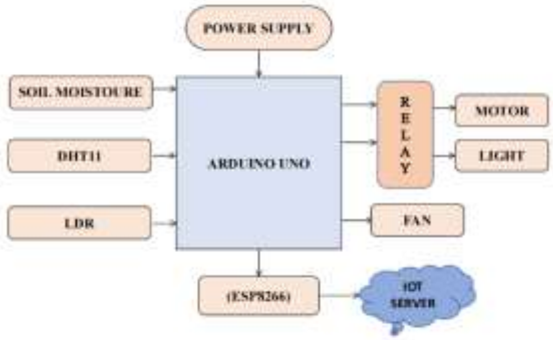

Fig. 1. Block Diagram

Connect the DHT11 temperature and humidity sensor to the digital input pins to the Arduino Uno Board. Connect to the soil moisture sensor and to the (light dependent resistor) LDR to the analog input pins of the Arduino Uno Board. Connect the ESP8266 Wi-Fi module to Arduino Uno. The Arduino Uno reads the data from sensors and stores it in its memory. The ESP8266 Wi-Fi module sends the collected data to ThingSpeak using an HTTP request over Wi-Fi. ThingSpeak stores the collected data in the cloud. The collected data is then processed using ThingSpeak's built-in MATLAB analysis tools or custom MATLAB code to derive insights into the current condition of the farm. Based on the insights obtained from data processing, the system makes decisions regarding irrigation, fertilization, pest control, and other aspects of farm management. The system automatically controls various devices, such as water pumps, irrigation systems, and fertilization systems, based on the decisions made by the system. Arduino Uno digital output pins the relay can be connected to control the devices. The system continuously monitors the farm's condition and sends alerts to farmers if any critical issues are detected, such as a sudden drop in soil moisture or an infestation of pests. The collected data is presented in a visual format, such as graphs and charts, using ThingSpeak's built-in visualization tools.

REQUIREMENTS

i. Arduino UNO Board

Fig. 2. Arduino UNO Board

This board is designed to manage other parts. 14 digital I/O pins are included. By using the Arduino programming language, which relies on wire and is managed by the use of Arduino software, commands are sent to the microcontroller.

ii. LED

Fig. 3. LED

LED is a light emitting diode, in the hardware there is a semiconductor gadget that transmits light.

iii. RGB LED

Fig. 4. RGB LED

RGB LED is a white light mixture of 3 colors like RGB-Red, Green, and Blue is a RGB Driven.

iv. LDR

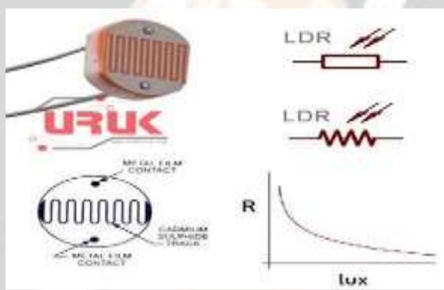

Fig. 5. LDR

A LDR (light dependent resistor) show the presence or absence of light, or to quantify the light power.

v. Relay

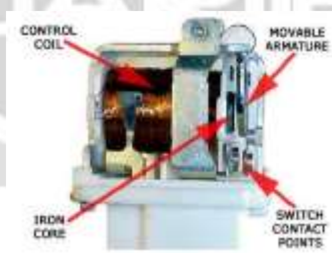

Fig. 6. Relay

A relay is an electrical worked switch. It consists of a bunch of information terminals for various control signals, and a bunch of working contact terminals.

vi. Soil Moisture Sensor

Fig. 7. Soil Moisture Sensor

The sensor estimate and detects dampness level in soil.

vii. DHT11 Module

Fig. 8. DHT11 Module

DHT11 is a sensor senses overall humidity and temperature.

4. RESULT

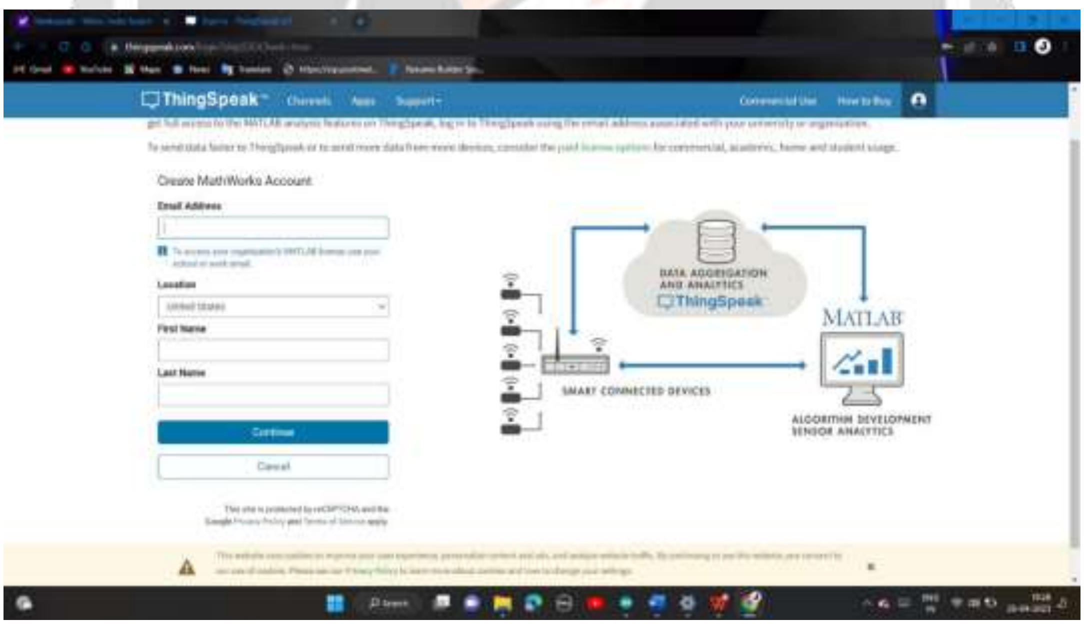

Fig. 9. Thingspeak Account

The ThingSpeak account will be connected to Hardware Module for collecting the information of the various conditions. The tenperature and humidity sensor (DHT11) and soil moisture sensor along with the LED will get on as soon as the hardware connected to the ThingSpeak account. Both of them connected through the Wi-Fi under the name “smart”.

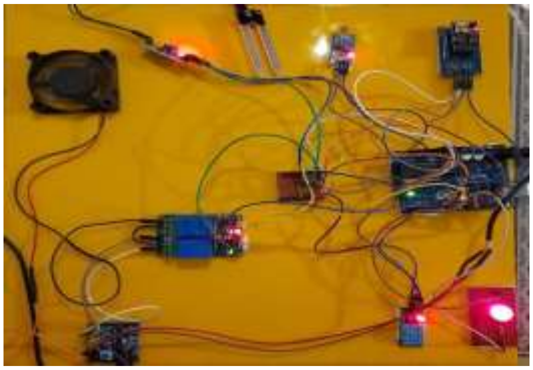

Fig. 10. Hardware Model

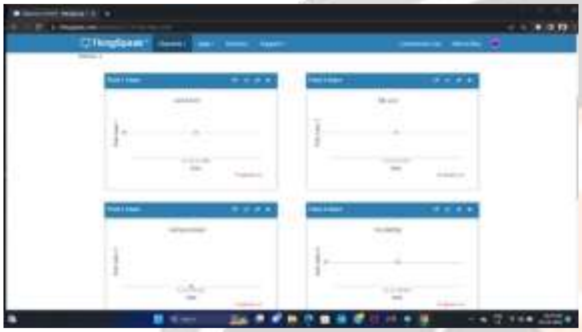

Fig. 11. Starting Condition

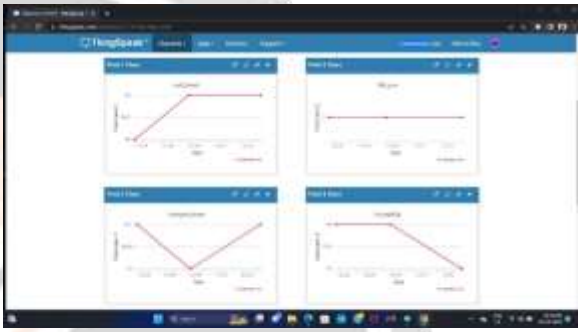

Fig. 12. Condition at highest level

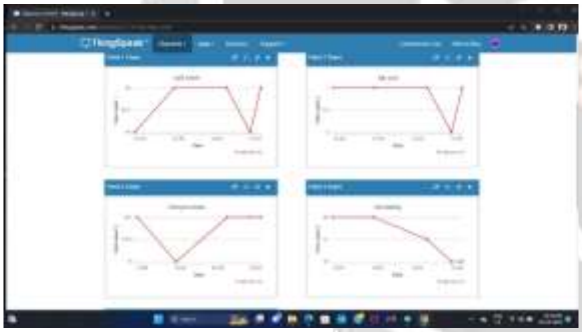

Fig. 13. Condition is varying

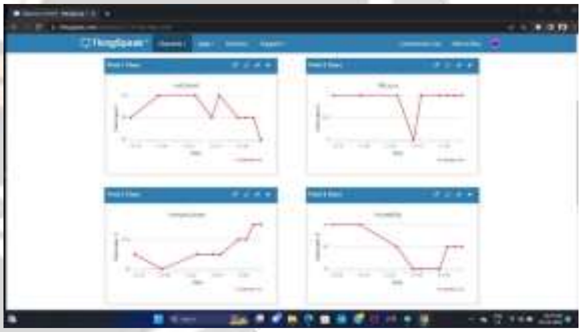

Fig. 14. Condition is fluctuating at different levels

5. CONCLUSION

Smart agriculture utilizing IoT is a quick and solid framework which helps ranchers in observing the fields successfully. The project assists them with taking restorative measure for the security besides, improved yield of the harvest. Actually taking a look at fields from distant regions not just makes a difference in better usage of the labor yet furthermore nature of the reap. The gathered information could be utilized for arranging the techniques to get improved yield.

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