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Smart Plant Communicator System Using IBM Cloud

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Abstract
As we can see, only certain devices, like PCs and mobile phones, are connected to the internet in today's world. The internet and the internet of things have completely taken over the world in recent times. Every human being relies on the internet for essential needs. The physical object network is known as the Internet of Things (IOT). It simply refers to monitoring a machine or physical device, or it can refer to the interconnection of physical devices that are embedded with electronics, sensors, software, and network connectivity to enable them to achieve greater value and services by exchanging data with the manufacturer. The majority of people rely on agriculture. Water scarcity is the primary issue in agriculture. Water is wasted because the resource is not utilized effectively. This irrigation procedure can be automated to overcome it. In this field, using the Internet of Things will help cut down on water waste. Using sensors, the temperature, humidity, and light can be measured, and subsequent processing can be based on the results. The Internet of Things (IoT) enables objects to be sensed or controlled remotely across the network infrastructure. We propose a system that will use a variety of sensors to record every detail about the soil and the temperature. The outcome reduces human intervention and improves accuracy, efficiency, and economic benefits. We will discuss fundamental and significant IOT concepts and their future scope in this paper. This paper provides brief information about IOT and examines the need for IOT in everyday life for various applications. The Internet of Things (IoT) significantly contributes to revolutionary farming practices. Therefore, our goal is to demonstrate IOT through an automated watering system. The soil's approximate moisture content is monitored and maintained by an automatic watering system. The control unit is implemented with the help of an Arduino UNO microcontroller. The setup makes use of a temperature, moisture, and humidity sensor to approximate the soil's temperature, moisture, and humidity. The system can use the right amount of water thanks to this value, preventing over- or under-irrigation.

1. Introduction

Because plants are the foundation of a food chain pyramid and play a crucial role in maintaining the ecological cycle, adequate monitoring is required to ensure that plants grow and stay healthy. Therefore, automation and Internet of Things (IoT) technology are being used to make plant monitoring systems smarter. Intelligent decision-making based on real-time soil moisture data is one feature that is highlighted in this topic.

The IOT-enabled computerized water system framework is practical and financially sufficient for planning plantation water resources. Utilizing the automatic water system framework, we are able to demonstrate that various plantations (groups of plants) can use less water.

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Through a soil moisture sensor, an appropriate microwaves (wireless) chain of moisture content in the soil, a humidity and temperature sensor in the plant root zone, and an ultrasonic level of water sensor in the tank for checking the tank's water level are all part of the system framework. The sensors will collect data that will be sent to the web server (cloud).

The chapter's background highlights the study of IOT in agriculture. This demonstrates how we can implement IOT technology to make our plantings intelligent and dependable by providing them with updated data in real time. Additionally, this chapter provides novices with assistance in implementing IOT technology and learning its fundamentals.

The Internet of Things (IOT) plays a significant role in the majority of industries. Because of the many benefits it offers, IOT became increasingly popular. Because agriculture is one of the most important needs and involves a large number of people, it is the area that requires the most improvement. Water scarcity is the primary issue in the majority of the region due to low rainfall, and even when rain falls, water is wasted due to inadequate water storage. In the IOT, numerous strategies for improving crop irrigation are proposed. The Internet of Things (IoT) devices can also be used at home to monitor the garden in real time.

Fig.1 Plant Monitoring

2. Literature Review

We have concentrated on numerous past works done in this handle by various scientists. The application of technology in the field of agriculture has a significant impact on both the increase in production and the decrease in the amount of labor required. According to a review paper on the IOT-Based Plant Monitoring System, approximately 35% of India's land was not reliably irrigated. Additionally, the monsoon provides water to two-thirds of the land. Irrigation lessens the need to rely on the monsoon, increases food security, and boosts productivity. However, there are issues with the watering system—how much water is needed and at what times? Sometimes, crops are damaged and water is wasted when crops are overwatered. Therefore, we must maintain an approximate soil water level in order to avoid

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such damage. Farmers are the backbone of agriculture, which expands employment opportunities in rural areas.

The development of an Internet of Things (IOT) product begins with a prototype, as described in a review paper titled "Internet of Things and Node MCU" [3]. The user interface, hardware devices like sensors, actuators, and processors, backend software, and connectivity make up an IOT prototype. For prototyping, an IOT microcontroller unit (MCU) or development board is utilized. The IoT microcontroller unit (MCU) or development board has low-power processors that support a variety of programming environments. They can use the firmware to collect data from the sensor and send it to a local or cloud-based server as raw or processed data. The open-source, LUA-based firmware developed for the ESP8266 Wi-Fi chip is NodeMCU.

3. Proposed System

The majority of rural residents continue to rely on agricultural activities as one of their primary means of earning a living. Food crops are only produced using indigenous agricultural knowledge that has been passed down through experience and careful observation from generation to generation. There is no formal farming knowledge required for this process. In order to cultivate their food crops, resource-poor farmers, particularly in rural areas, employ traditional farming practices that are specifically tailored to their environments. Men are primarily responsible for plowing, while women are primarily responsible for planting, weeding, and harvesting. Household members are the primary source of farm labor. In order to minimize losses, farmers use traditional methods to protect crops from pests by combining various pest control solutions made from locally available resources. However, they rely on rain, the flow of water upstream to downstream, and the canal watering system for weather monitoring, moisture dampness, and water management. Traditional farmers have become much more expensive and riskier as agriculture has become more labor-intensive and skilled workers have migrated to urban communities for a comfortable life and a means of earning a living. We heard about farmer's suicide versus yield. A smart agriculture system is proposed to replace traditional farming, which produces losses, with farming that produces high crop yields and profits.

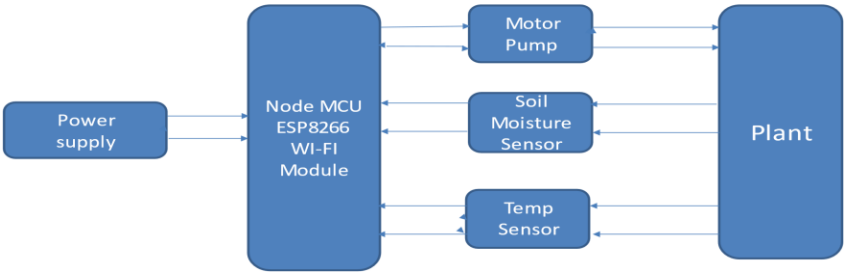

Fig.2 Block Of The Project

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Soil moisture sensor is used to detect the moisture of the soil. This sensor is made up of two pieces: the electronic board at the right, and the probe with two pads, that detects the moisture content of soil. The Soil Moisture Sensor is a straightforward breakout for determining the moisture content of soil and other similar materials. The soil moisture sensor is simple to set up and operate.

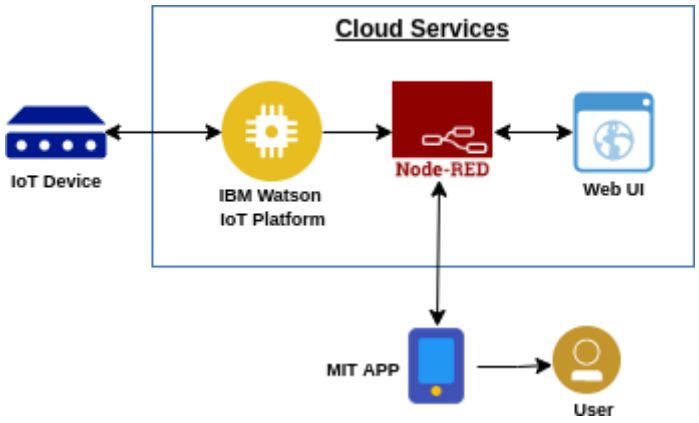

Fig.3 Proposed Architecture

The sensor's two big exposed pads serve as probes, and combined they operate as a variable resistor. The greater the amount of water in the soil, the better the conductivity between the pads will be, resulting in a lower resistance and a larger SINOUT.

4. Conclusion

The Node MCU microcontroller, a sensor, node-red, and the internet of things are the foundations of the proposed method for smart plant monitoring. It gives farmers and users in the area real-time statistics on plant factors so they can properly care for their plants. Environmental factors include soil moisture, relative humidity, and temperature of the soil. During the simulation, the outcomes are displayed. In the chrome URL, you can also see the result on a mobile device. The waste of water and excess water received by the plant can both be reduced with this strategy. We will eventually include an interface for archiving all of the historical records in order to improve the system's functionality. We will also include the general maintenance properties and precautions of well-known plants, which will be displayed as a warning against particular parametric values. Therefore, users or gardeners can manage their plants with greater care with ease. Additionally, automated irrigation and fertilization features will be added.

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