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IOT Based Smart Precision Agriculture in Rural Areas

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Abstract - Agriculture is one of the major industries affecting the economic growth of a country. In a country like India, the majority of the people depend on agriculture. Many new technologies, such as Internet of Things (IoT), are being implemented into agriculture to make it easier for farmers to grow crops and maximize yields. Along with weather conditions, soil fertility, temperature and humidity play an important role in determining plant health. However, most farmers who own small plots of land are not fully equipped to monitor the soil quality of their plots. With the help of the Internet of Things, this initiative aims to provide the farmer with a whole irrigation system. It can be difficult to setup an efficient automatic irrigation system to reduce the waste of standing water.

To determine the ideal amount of water for plants, it is crucial to offer a variety of factors. The suggested system uses a variety of inexpensive, low-power-consumption sensors. For eg- soil moisture sensor, temperature sensor. The Node MCU is built with sensors to control the opening of the irrigation valve. Remote control is performed using the phone. Both sensors communicate with Node MCU. In case of any presence of animals, the sound module is used to produce sound via Buzzer. The PIR sensor is used to detect people, animals. The soil moisture sensor is employed to gauge the amount of soil moisture. Additionally, the mobile entity accessing the website is also given the moisture level value.

Keywords – Node MCU, PIR Sensor, Temperature Sensor, Humidity Sensor, Buzzer.

I. INTRODUCTION

Around 97 of Earth's freshwater are saltwater stored by lakes and aqueducts, while only the 3 remaining is fresh water. In the shape of glaciers and polar ice caps, around two- thirds of the volume of water is firmed. Just0.5 of the defrosted groundwater, while the remainder resides underground, is above the earth or in the air. In brief, humanity depends on this0.5 to meet all its requirements and save the world, while acceptable fresh water must be maintained in gutters, heads, and other affiliated budgets to support it. The condition in India is that it ranks second in ranch affair with 64 of thunderstorm- grounded cultivated fields. In India, 55- 75 of water use is reckoned for by irrigation. Nearly 60 of the important irrigation water is lost.(needed reference for a bold point or cancel the chance else).

The development of an automatic agrarian monitoring system has acquired considerable significance in recent times due to its capability to increase yields and to drop water consumption. Precision husbandry has made it possible to ameliorate product from the dwindling spreads that will in the future be suitable to feed India's billion- plus population. Precision husbandry is nothing further than a husbandry system that makes use of information technologies to ensure that crops and soil gain just what they need for optimal health and productivity.

This system accesses real- time data on the conditions of the soil water quality, the temperature of the atmosphere, and other affiliated details. It's not an easy task to rightly prognosticate crop water demand, involving variables similar as crop type, irrigation system, soil type, temperature, crop requirements, and soil humidity retention. Considering this aspect, using the wireless detectors, precise soil, and air humidity operation system not only allows optimum use of water but also contributes to better crop health. It's anticipated that the present situation in irrigation practices will be altered by introducing new IoT technology. The use of IoT- grounded styles, similar as the crop water stress indicator, is anticipated to increase crop product dramatically.

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II. RELATED WORK

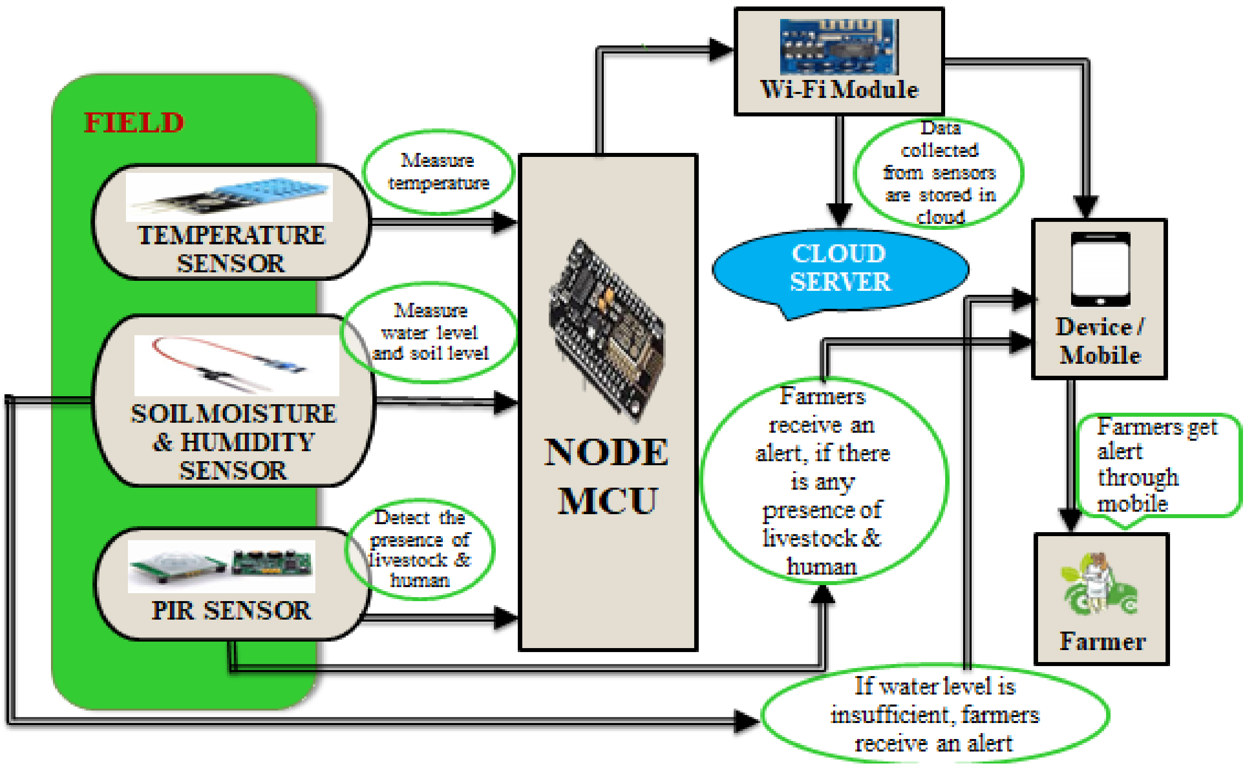
A. Internet of Things (IOT) for Precision Agriculture-Manish Kumar Dholu, Mrs. K. A. Ghodinde, (2016) With the number of gadgets attached to it, the Internet is witnessing a very volatile creation nowadays. We used to only have personal computers and cell phones connecting to the internet but now we have the internet of things, i.e. IoT idea of linking items to the internet linking millions of users to it. This IoT implementation leads to the idea of a machine-to-machine connexion that means that two machines can connect to each other and that any previously available data on a private server can now be viewed on the internet so that the user can access it remotely.

B. A Model for Smart irrigation Using IoT - PrDweepayan Mishra, Arzeena Khan, Rajeev Tiwari, ShuchiUpadhay of. K. A. Patil, Prof. N. R. Kale, (2016) Most of the drainage is performed using conventional stream flow techniques from one end to the other. Such supply will leave the file with various quantities of moisture. Control of water networks can be improved by using a designed watering device configuration connected to the cloud platform and data collection.

C. IoT based low-cost smart irrigation system- Deweyan Mishra, Arzeena Khan, Rajeev Tiwari, ShuchiUpadhay, (2018) The Moisture and Temperature Sensor detects both the quality of water vapour and the temperature around the farm. The Soil Moisture Sensor senses the soil moisture of a plant, if the water content is below the minimum requirement then water is supplied by a water supply relay and the Ultrasonic Sensor checks the water.

III. METHODOLOGY

Through a data communication network, IOT may gather, process, and share data. Numerous techniques exist for identifying items; some, such Radio Frequency Identification (RFID), Barcode/2D codes, IP addresses, and Electronic Product Codes (EPC), have been around since the inception of the Internet of Things**.** Determining the function and requirements of the system is the first stage in the design methodology for IoT systems. The goal, behaviour and needs of the system are recorded in this step. The goal of a home automation system is to provide remote control of a home's lighting through a web application.



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IV. EXPERIMENTAL RESULTS

On Node MCU, a monitoring and control system focused mostly on agriculture is anticipated. The IOT sensor, soil moisture sensor, sound module, and PIR, which offer the precise value of temperature, humidity, and wetness material, are the major sensors employed in this project. This method is designed to monitor and observe environmental parameters in a greenhouse using a straightforward data transmission from the Lora board. The information's parameters will be provided to the Lora receiver by the Lora transmitter. The Lora recipient obtains all data that demonstrates the status of the environmental parameters at any given time. This strategy reduces complexity, servicing, and resource use. This project is mostly employed inside the facility, in a nursery environment, and in the agricultural industry.

V. CONCLUSION

The main benefit is that the activity of the framework may be altered by the environment (crops, weather, soil, etc.). By implementing this rural, green areas like as fairways, parks, and gardens may be flooded, which is more cost-effective than using another type of robotization framework. High affectivity sensors can be used in large-scale applications to cover extensive areas of farmland. Additionally, using this method of implementation, we can probably surely reduce the disintegration of dirt and water waste.

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