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IOT Based Smart Agriculture System

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ABSTRACT

Technological significance has been an extraordinary help for settling on choices in different fields particularly in agriculture. The improvement of agriculture has been on a work in progress for as far back as couple of years because of absence of Agriculture information and ecological changes. Here, it principally concentrating on the enhancement of rustic and farming improvement through cutting edge data and correspondence forms. It stretches out the agriculture association's capacity to address the issues of its ranchers. By utilizing IoT, it upgrades the simple access monitoring framework to lessen the human worry in agriculture. The monitoring got, through Arduino Uno and send to the controller in case of crisis, he can ready to see the factual study report by independent of area and engine has been ON/OFF consequently if the water level is diminished. This examination gives the ideal data at any moment of time from any piece of world and review their concern quickly at any piece of the area.

Keywords : Internet of Things, Soil Sensor, pH Sensor, Motor pump

I. INTRODUCTION

Agriculture has been the most imperative practice from soonest reference purpose of the human advancement. It has seen various cycles of enhancement in advancement with time. A not too bad cultivating practice is so far workmanship. Natural parameters, for instance, soil clamminess, temperature, stickiness, pH, sun put together radiation thus with respect to accept crucial part when all is said in the done enhancement of the plant. Temperature impacts countless activities, for instance, treatment, germination, etc. It is watched that, at the higher temperature, breath rate extends that result in reducing of sugar substance of nourishments developed starting from the earliest stage. At cut down temperatures photosynthesis activity is supported off [1].

Humidity is responsible for moistness incident and temperature organization of the plant. For high damp condition, evaporation will be less and more water will be submerged in the leaf an area. This results in expansion and improvement of life form in the porous domain of the leaf. Moistness is essential for seed germination and take-up of enhancements by the plant. Excess water may stop vaporous exchange among soil and the air which diminishes root breath and root improvement. The perfect dimension of clamminess ensures the strong improvement of the root and general progression of the plant [2]. A supportable methodology is required to keep up alter between these parameters and condition. In this way, there is a need of successful monitoring and control structure. In the present time, the standard systems that are used for irrigation, for instance, overhead sprinkler and flood form, isn't that much benefit. They realize a significant proportion of wastage of water and can similarly propel ailment, for instance, development improvement due to over sogginess in the earth. Automated irrigation structure is crucial for assurance of the water and by suggestion

possibility of the farm since it is a basic item. Around 85% of total available water resources over the world are solely used for the irrigation reason [3].

Generally, most of the irrigation structures are physically worked one. These standard techniques are being been displaced with semi-automated and automated strategies proposed an automated thought of irrigation to use the water capable and satisfactorily Automated Drip Irrigation system is executed either in perspective of the earth moisture or in light of the customer contribution through SMS teaching structures. The past methodology is a disengaged irrigation structure where the agriculturist doesn't revive with the irrigation status and later slacks in savvy utilization of water in light of customer arrange without pondering the condition of the soil. From that reliably creating need of the people, present day techniques are familiar with control of the structure.

To give proper thought with respect to the land arranged a long way from the human settlement, supervisory modified control structures like multi-terminal control systems are used since in various strategies, factors like soil, saltiness, irrigation, temperature, light power, etc needs repeated endeavors and need to work in uncommon natural conditions of the earth and to crush the deformities in the present system here we are flooding the land in perspective of the earth dampness and meanwhile the status of the irrigation is revived remotely to Server through sequential

In this framework, we utilize different sensors for estimating the status of the dirt. The Temperature sensor, Water level sensor, and moisture sensor are the sensors which estimate the status of the dirt. The moisture sensor is utilized to quantify the volumetric water content in the dirt with the goal that dirt is Dry or Wet can be distinguished. The temperature sensor estimates the temperature sensor. The water level sensor estimates the water level.

II. LITERATURE REVIEW

We have dissected a few papers beneath.

This paper [4] has genius represented a framework that is extremely essential and doesn't convey anything new to the table. It utilizes a framework that has sensors for moisture, temperature, and humidity, and utilizations Arduino to execute its capacities. It is halfway automated as the client needs to keep a mind the water dimension of the framework. This framework utilizes a GSM module for correspondence.

This paper [5] proposes a strategy that utilizes various sensors i.e Temperature, moisture, humidity and light to make a savvy irrigation framework. The information is sent to a web server for information dissecting and preparing, it is put away in JSON design. The light sensor detects the light, to expand the working of the plant, light is conveyed too. They intend to utilize keen calculations to improve the framework. It publicizes that it has 92% productivity than the rest.

This paper [6] IoT is utilized for irrigation in this task as the moisture sensor identifies the substance of water inside the dirt and in like manner educates the client through the PC it is associated with by means of warnings. The framework contrasts the moisture and the limit esteem and begins the water siphon in agreement and stops the siphon in like manner. The framework has constrained range as it is utilizing a PC to associate with the Arduino board through USB link since it isn't plausible to use for a homestead. The framework makes utilization of an Arduino board, moisture sensors, and a water siphon.

The framework [7] proposes a technique in which it will utilize an ace and slave design where the raspberry pi will control different Arduino gadgets with Zigbee convention. The raspberry pi will continue searching its email for any directions which will be as "Turn on the siphon for Y minutes." This order will turn on the transfer to the water siphon

for the said Y minutes. There is an ultrasonic sensor that continues monitoring the water tank level and it will advise the client with an email as it were.

The framework [5] proposes a strategy to execute a technique for brilliant irrigation with an Arduino and a Raspberry Pi. The framework utilizes Zigbee as a specialized strategy between the two. The framework can be controlled through cherry py with the IP address of the raspberry pi board, i.e it has a short range. In this framework, the raspberry pi does every one of the estimations and guides the aftereffect of it to Arduino's through ZigBee.

III. PROPOSED WORK

The proposed system will detect the moisture, salinity and pH level of soil by using the sensors like moisture Sensor, Salinity detector, pH detector which will be connected to the Arduino board (ARDUINO UNO R3). In this system pH of soil and Salinity will be tested on that basis the farmer can choose the fertilizers for crops. After that one can test the moisture of soil by using Moisture sensor, if the moisture of soil is less than the threshold value, then it sends the alert to the micro-controller and Micro-controller switches ON the power supply of the water pump. After full filling the requirement of water for soil then again it will generate an alert and micro-controller will switch off the system.

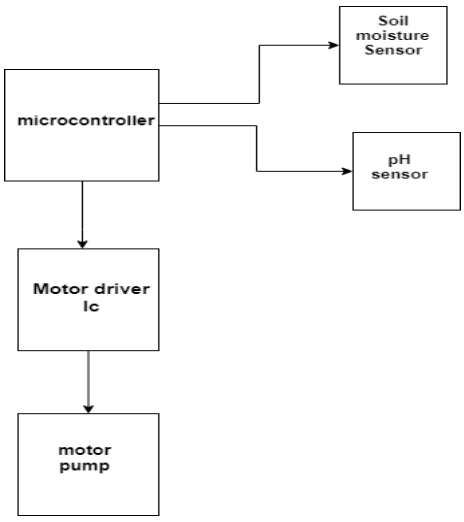

Figure 1. Block Diagram for Proposed System

The development of system can be carried on different level comprising of different modules.

A. Soil Moisture sensing module:

The Soil Moisture Sensor is used to measure the volumetric water content of soil. This makes it ideal for performing experiments in courses such as soil science, agricultural science, environmental science, horticulture, botany, and biology.

The Soil Moisture Sensor uses capacitance to measure the water content of soil (by measuring the dielectric permittivity of the soil, which is a function of the water content). Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent.

B. PH and Salinity Detecting Module:

Test the pH level of soil by using the pH detector.
When you think of pH, you probably think of liquid acids and bases. But soil can be acidic or basic, too. Soils with pH above 7 are basic or sweet. Soils with pH below 7 are acidic or sour.

The pH of soil is an important factor in determining which plants will grow because it controls which nutrients are available for the plants to use. Three primary plant nutrients—nitrogen, phosphorus, and potassium—are required for healthy plant growth. They are the main ingredients of most fertilizers that farmers and gardeners add to their soil. Other nutrients, such as iron and manganese, are also needed by plants, but only in very small amounts.

To Test the Salinity of soil by using salinity detector.
Salinity is the measurement of presence of the concentration of dissolved salts in water. Salinity is measured by testing the electrical conductivity (EC) of the water. Saltwater conducts more electricity than water with no salt. Fresh water has less amount of dissolved salt, whereas ocean water has a salinity in the range of around 34 to 36 parts per thousand (ppt). Brackish water is a mixture of fresh and

saltwater. By using salinity sensor we detect the presence of salt in water, if salt is present in the water then the farmer need to take the precaution. Because the presence of salt in water damages the crop growth. The value of the salinity is high then this water cannot used for the crops.

C. Integration of all Module:

To Test the moisture level of soil and on the level of moisture present in the soil micro-controller generate an alert.

Presence of moisture in the soil is beneficial for crops if the moisture level of soil is get decreased then crops get harmed.

If the moisture level of soil is minimum then the sensor send an alert to the micro-controller and based on that alert the micro-controller switch on the motor (Flow of water), and the soil satisfied the condition of moisture level then the sensor generates an alert to micro-controller to switch off the pump/motor.

IV. CONCLUSIONS

By using Internet of Things, majority of Farmers were aware about the monitoring and warning detection method in agriculture. This will facilitate the e-agriculture to assessing the performance of the farmers doing independently. It enables to provide the alert messages and statistical survey report to the farmers by irrespective of location. This study is to provide great potential for improving decision making in agriculture. From this report it extend the agriculture organization's ability to meet the needs of its farmers

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