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Real Time IOT-based Crop Protection and soil maintenance

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***Keywords*— Internet of Things, soil moisture sensor, DHT sensor, pH sensor, Arduino, CloudStorage Brokerage, Crop protection soil maintenance.**

***Abstract*—** *Nowadays IOT is implemented in almost every field. IOT in agricultural field plays a major role. It is very easy to monitor and manage the water flow. The moisture level in the soil is measured using moisture level sensor. When the soil is dry and reaches the threshold point, the Cloud Service Brokerage triggers the relay to start the motor. Once the motor starts to pump, it pumps the water from a storage tank and the water flows to the field. pH sensor senses the pH level of the water. The sensor will check pH level of the water whether it is alkaline or acidic. DHT sensor is used to measure the humidity of the environment. Our main objective of this system is to maintain and manage the optimized moisture content in the soil, pH of the water and to have a knowledge about the humidity content in the environment.*

I. INTRODUCTION

Traditional farming method and agricultural practices are transforming into smart agriculture due to the emerging importance of Internet of Things. Low cost and low power are the main factors that makes IOT network much friendly to the farmers. Water use efficiency and energy use efficiency are the key focus of the innovation in the modern agricultural fields. Irrigation ensures the proper crop yield overall also it might lead to the wastage of water resources. The key thing in IOT is communication between the devices with the help of internet connection . Agriculture is the backbone of our country and it is the main source of income for many people. Irrigation is the method of regulating the amount of water flow to the crops in a regular interval of time in order to keep the crop healthy. As our population keeps on growing, it is very hard to see a good yield. In order a yield good, we are in need for freshwater for irrigation purpose. To avoid the wastage of freshwater, we can use IOT. Unless there is need for water, the water will not be pumped. Hence wecan reduce the water consumption and wastage. With help of IOT we can able to consume water in an optimised manner. With optimised irrigation, the growth of weed can be controlled in the field. Internet of Things is a huge network of connected devices in which data are collected, shared or canbe used for some other purpose based on the requirements.

II. PROBLEM IDENTIFICATION

Recent days agriculture plays a major role in the society. To improve this urgent need of the farmers, the youngsters have developed many technologies which are more useful for the farmers and are available at our door steps. The farmers have confusion about the cultivation in different seasons. In “REAL TIME IOT BASED CROP PROTECTION AND SOIL MAINTENANCE”, we have analysed the environmental conditions like temperature, humidity, pH level of water and finally the moisture level of the soil. By measuring these fields, the growth and cultivation of the crops can be increased ata significant amount. The above mentioned parameters will be measured

and those things will be stored to a database in a cloud platform which can be used for future purpose.

III. LITERATURE SURVEY

Ayush Kumar utilized IOT and picture handling to locate the supplement and mineral deficiencies that influence the yield development [1]. M.K. Gayathri and her team had done their work on quick development on agrarian modernization and helps to acknowledge answer for horticulture and explained in detail about the issues identified with ranchers [2].

Dr.M.Suchitra and her team utilized IOT for reduce the hassle in agriculture due to migration of people from one place to another place. The Internet of factors (IOT) is remodeling the agriculture permitting the farmers with the extensive variety of techniques consisting of precision and sustainable agriculture to face demanding situations in the field [3]. In [4], they have proposed little or very less technological development is found right here that has expanded the manufacturing performance extensively. To increase the productiveness, a singular design method is supplied on this paper. Smart farming with the help of Internet of Things (IOT) has been designed. P. Munisami has proposed the farmers had failed to reflect on con sideration on the humidity, level of water and especially climate circumstance which horrible a farmer increasingly more The Internet of factors (IOT) is reworking the agribusiness empowering the agriculturists thru the massive range of strategies, as an instance, accuracy as well as sensible forming to deal with demanding situations in the subject. He installed remote cameras to monitor the situations which requires power back all the times.

IV. PROPOSED SYSTEM

In this paper, we have proposed a low power, low cost IOT network for smart agriculture. To monitor the soil moisture level an in-house development sor is used In the proposed network, the IITH mote i s been used as a sync and sensor node which gives us a low power communication. We have evaluate d for the condition of the art networks for the agricultural monitoring. The proposed network consume s less power and in average provides 83% longer lifetime at a very lower cost. The idea is to manage t he water level in the farmland which results crop protection and soil maintenance.The soil moisture sensor senses the moisture level of the soil in the farmland. The pH sensor senses the pH level of the soil.

The DHT sensor is used to measure the humidity and the temperature of the environment. These readings are then send to the cloud server brokerage using the network node.

The sensor reading transmitted to a Thing speak channel for the analysis. The cloud storage brokerage instructs the relay to turn ON/OFF the motor for managing the water level based on the analysis of the pH value and the mo isture value. The proposed system is also capable of performing weather prediction based on the list o f the available records of the sensor reading.This system helps in the good and proper maintenance of the crops in case of water and nutrients availability. This results in the better yield of good crops which in turn gives the farmer huge profit.

V. FLOW CHART

RECEIVER SIDE:

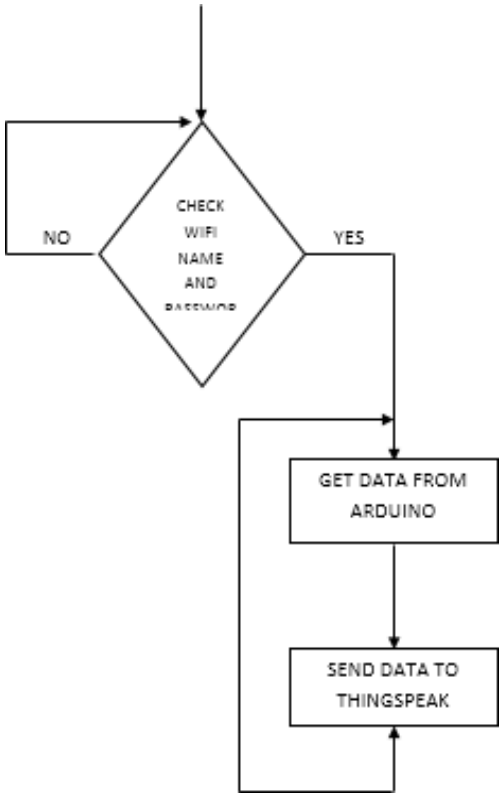

Fig 1: Block diagram of receiver side

TRANSMITTER SIDE:

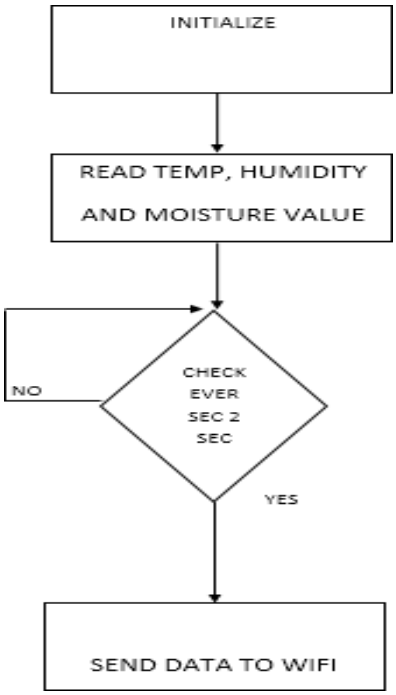

Fig 2 : Block diagram of transmitter side

VI. SYSTEM ARCHITECTURE

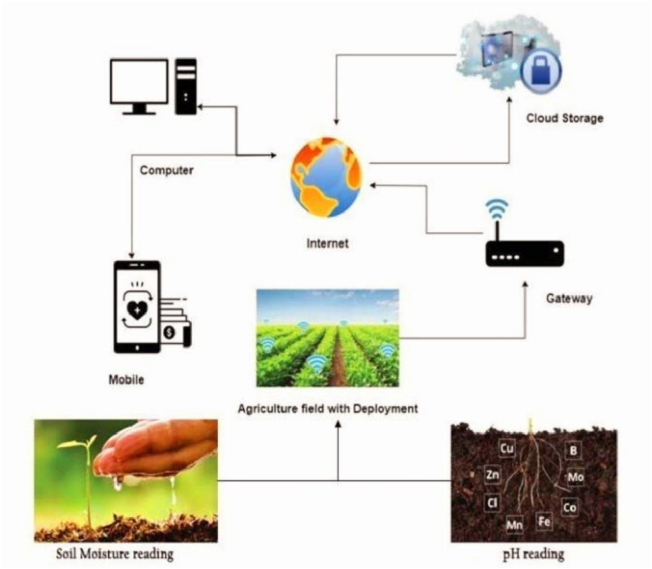

Fig 3: system architecture of the Real Time IOT based crop protection and soil maintenance

VII. TABULATION(DATASHEET):

Table.1: Agriculture Irrigation system by using IOT

Field Name	Attribute	Type	Size	Description
Id	Primary key	Int	10	It uniquely store id in the table
Temperature	Null	Int	12	It store Temperature of the Agriculture Irrigation
Humidity	Null	Int	12	It store Humidity of the Agriculture Irrigation
Moisture	Null	Int	12	It store Moisture of the Agriculture Irrigation

Table Description: This table stored Agriculture Irrigation information

VIII. TABULATION OF PERFORMANCE METRICS

Created_at	entry_id	temperature	humidity	pH_level	Moisture_level
2021-02-27 08:29:12 UTC	21	31	32	NORMAL WATER	10
2021-02-27 08:29:34 UTC	22	31	32	NORMAL WATER	10
2021-02-27 08:38:08 UTC	23	30	30	NORMAL WATER	20
2021-02-27 08:38:49 UTC	24	30	33	EMPTY	20
2021-03-21 06:43:31 UTC	25	30	30	NORMAL WATER	20
2021-03-21 06:51:50 UTC	26	30	30	NORMAL WATER	20
2021-03-21 06:55:24 UTC	27	31	30	NORMAL WATER	10
2021-03-21 06:55:44 UTC	28	30	43	EMPTY	10
2021-03-21 06:55:59 UTC	29	30	43	EMPTY	20

The values of temperature, humidity, moisture a variable id is created for every parameter. The value is being analysed by taking various reading of the temperature, humidity, moisture. If the moisture is zero, the motor has to be switched ON. When the moisture value reaches the threshold, the moisture content in the field is good and the motor has to be switched OFF. It gives a clear viewof the changes in the value for the respective change of time.

IX. RESULT

The implementation of new scientific methods into this field can bring about positive changes in the productivity of the crop. . Different type of sensors are used to collect the information of the farmland with the environmental conditions and this information is transmitted through network and its been stored in the cloud. With the data in the thingspeak channel we can analyze and visualize it and calculate new data.

Fig.4: Soil moisture

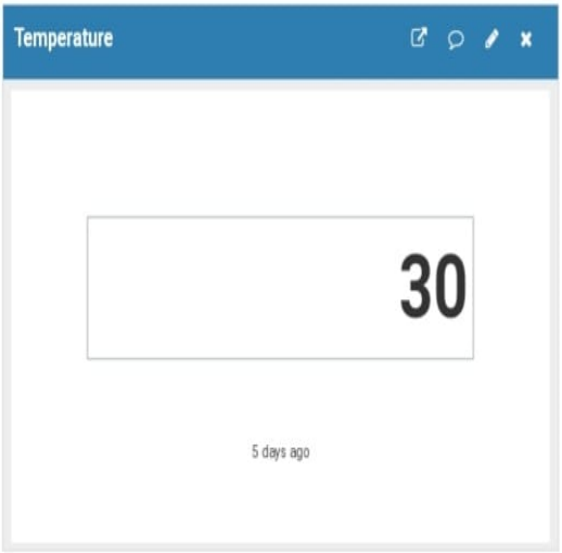

Fig.4: Temperature

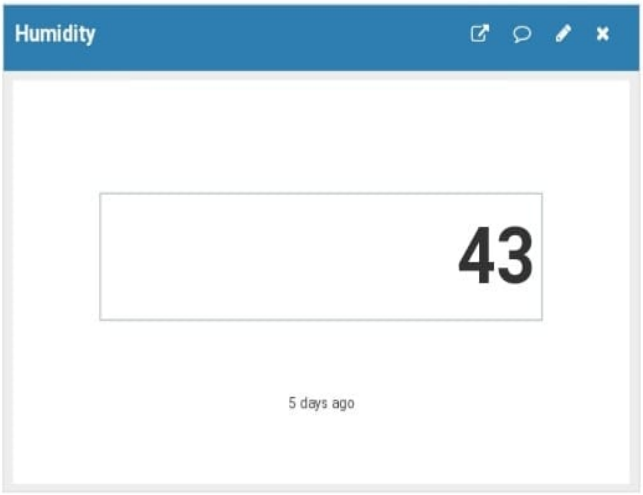

Fig.5: Humidity

X. ADVANTAGES

The system can bring large areas of land under cultivation.It includes the design of the system that may monitor the farm by installing sensors at the boundary of farm.It has the capacity of reducing the manpower.It can use only the exact amount of water.

XI. APPLICATIONS

This proposed system can be improvised by using a sensor to note the soil ph value.the senors are successfully interfaced with Arduino and wireless communication is achieved.All observations and tests prove that this project is a complete solution to field activities irrigation problems. Implementation of such a system in the field can help to improve the yield of the crops aids to manage the water resources effectively reducing the wastage.

XII. CONCLUSION

Agriculture is evolving day by day and its gradually being replaced and enhanced by more sophisticated techniques which uses electronic devices. A high percentage of agriculture revenue is lost to power loss and incorrect methods of practices. These errors can be reduced with the help of smart devices. Our proposal is to perform the agriculture in smart and more efficient way. In addition, this method advocates for the use of the Internet of Things. Internet of Things has enablesthe agriculture crop protection and maintenance in a easy and more efficient to enhance the productivity of the crop and hence profits the farmer. Different types of sensors are used to collect the information of crop conditions and environmental changes and this information is transmitted through network to the

farmer/devices that initiates corrective actions. Farmers are connected and aware of the conditions of the agriculture field at anytime and anywhere in the world.

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