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Review Paperon Smart Agriculture System Using Arduino And Cloud Computing

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ABSTRACT

Smart Agriculture System

The feature of this paper includes development of a system, which can measure soil moisture level and temperature level, provide basic knowledge to the farmers about to choose best fertilizer for the ideal N-P-K values required by their soil according to the crop they want to grow and give control of irrigation system digitally in the hands of farmer to get better agricultural results along with the quality. Smart Agriculture System uses Capacitive Soil Moisture sensor and Temperature Sensor, Arduino UNO, ESP8266 Wi-Fi module and RF transmitter-receiver to measure and upload soil moisture and temperature value to the server. Each Arduino is a separate entity and is committed to the user id of the farmer on the Smart Agriculture System website. Farmer can see the updates of his field's soil on his login page, suggestions of the fertilizer to use according to the crop he wants to grow and control over the water pump present in his field in order to regulate the moisture value of the soil which will automatically get turned off once the moisture level reaches above the required range for a particular crop. Not all entities will have their own individual ESP Wi-Fi module, but they will have a single Wi-Fi module embedded with a central Arduino entity which will upload the data of all other entities connected via RF transmitter-receiver module to their respective user id on the server. This will eventually reduce the cost of the system to meet one of the major expectation of this Project.

KEYWORDS - Arduino, Irrigation, Soil Moisture Sensor, RF Module, Website, HTML,CSS, ReactJS.

I INTRODUCTION

Smart Agriculture system is a farming management concept using modern technologies to increase the quantity and quality of agriculture products. Farmer in 21st century have access of internet and have enough knowledge that how to use it in a positive manner. So, in smart agriculture system we are using three different sensor i.e soil moisture sensor, soil temperature sensor and DHT11 sensor (This is use to detect the temperature and humidity of the environment) all these sensor will collect the data from the farmers field and then transfer it to the Arduino, then Arduino will be then connected to the ESP8266 WiFi module, now this device will collects data from the arduino and transfers it to our server and from that server the data will reflects on our website.

The arduino will also connect to a water pump and if the soil moisture level is less then the ideal moisture value of a crop the farmer is growing then from our website the farmer can switch on his/her water pump and when the moisture level reaches the ideal condition automatically it will switch. This device will also have a RF module which we are using for the inter-communication between two devices.

In our website we are also providing a weather forecast system and a link of fertilizers to farmers for there ease of work. This all will make the work of farmer easier and efficient.

II LITERATURESURVEY

1. "Automatic Irrigation System on Sensing Soil Moisture Content" by R.Vagulabranan, M.Karthikeyan, V.Sasikala.

This task on "Automatic Irrigation System on Sensing Soil Moisture Content" is expected to make a robotized water system instrument which turns the siphoning engine ON and OFF on distinguishing the dampness content of the earth. In the space of cultivating, use of fitting method for water system is critical. The advantage of utilizing these strategies is to diminish human impedance nevertheless make specific suitable water system. This robotized water system project brings into play an Arduino board ATmega328 miniature regulator ,is customized to gather the information sign of variable dampness conditions of the earth by means of dampness recognizing framework.

2. "Automatic Irrigation System For Agriculture Field Using Wireless Sensor Network" by Prof. Rashmi Jain, Shaunak Kulkarni, Ahtesham Shaikh, Akash Sood.

The Project is on "Programmed Irrigation System For Agriculture Field Using Wireless Sensor Network" assumes a significant part in making

Agriculture progressed. In our country, farming are
relies upon the rainstorm which isn't adequate wellspring of water. So the water system is utilized in agribusiness field. In Irrigation framework, contingent on the dirt kind, water is given to plant.

The greenhouse based present day farming enterprises are the new prerequisite in all aspects of horticulture in India. In this innovation, the moistness and temperature of plants are unequivocally controlled. Because of the variable environmental conditions these circumstances at times might differ from one spot to another in huge farmhouse, which makes truly challenging to physically keep up with the consistency at every one of the spots in the farmhouse. It is seen that interestingly an android telephone control the Irrigation framework, which could give the offices of keeping up with uniform natural circumstances are proposed. The principal objective of the current paper is to foster a savvy remote sensor organization (WSN) for a horticultural climate. Checking horticultural climate for different factors, for example, soil dampness, temperature and mugginess alongside different variables can be of importance. A customary way to deal with measure these elements in a farming climate implied people physically taking estimations and really looking at them at different times. This paper examines a remote checking framework utilizing RF module. These hubs send information remotely to a focal server, which gathers the information, stores it and will permit it to be investigated then shown on a case by case basis and can likewise be shipped off he client portable.

3. "Automated Irrigation System and Detection of Nutrient Content in the Soil" by Abishek Prasad G.V, R. Sharmikha Shree, S.Meera, R.A Kalpana.

The task on "Automated Irrigation System and Detection of Nutrient Content in the Soil"introduces a smart irrigation system using Arduino for water the board with the supplement screen. Water system is the inventory of a fitting measure of water to the plants at an exact time. The principal objective of this task is to make water system exercises for the ranchers more straightforward and furthermore not squandering a tremendous measure of water. This programmed water system framework in view of sensor-based frameworks has been planned and executed as perhaps of the most generally utilized and favorable programmed framework. The sensors utilized are dampness sensors it is utilized to recognize the dampness level of the dirt and the water is siphoned to the4 soil or field consequently. This should likewise be possible physically by turning ON/OFF in the portable application. To begin with, the framework checks the dampness level, temperature level, and moistness level and it will check the level for the relating crops in light of the level. Assuming the levels are on the moderate state or with the necessary level no activity happens. Assuming that the levels are beneath the expected sum the framework works and the engine siphons the water to the dirt. Hence, it makes the turn out more straightforward for ranchers, and time utilization is additionally less. Alongside this water system process, the dirt's supplement content is likewise observed. On the off chance that the dirt's supplement content is beneath the expected sum the application will send a warning to the rancher through the application and the rancher can take care of the harvests with fundamental supplements. To make the interaction physically the application associated with the framework through WIFI has an ON/OFF button to work it. The task is valuable for the ranchers to make the water system process without accomplishing difficult work, and furthermore giving the fundamental nutrients is useful.

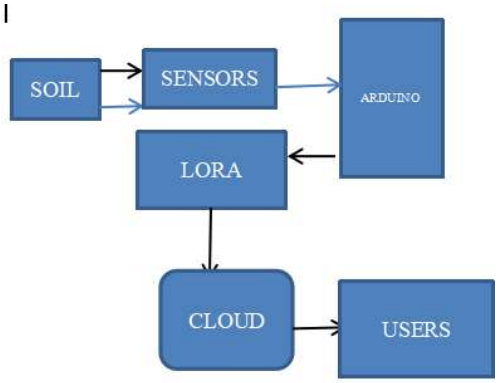
4) “Cloud Computing for Emerging Mobile Cloud Apps” by Mehdi Bahrami, Cloud lab Electrical Engineering and Computer Science, University of California at Merced, USA

The tutorial will begin with an explanation of the concepts behind cloud computing systems, cloud software architecture, the need for mobile cloud computing as an aspect of the app industry to deal with new mobile app design, network apps, app designing tools, and the motivation for migrating apps to cloud computing systems. The tutorial will review facts, goals and common architectures of mobile cloud computing systems, as well as introduce general mobile cloud services for app developers and marketers. This tutorial will highlight some of the major challenges and costs, and the role of mobile cloud computing architecture in the field of app design, as well as how the app-design industry has an opportunity to migrate to cloud computing systems with low investment. The tutorial will review privacy and security issues. It will describe major mobile cloud vendor services to illustrate how mobile cloud vendors can improve mobile app businesses. We will consider major cloud vendors, such as Microsoft Windows Azure, Amazon AWS and Google Cloud Platform. Finally, the tutorial will survey some of the cutting-edge practices in the field, and present some opportunities for future development.

METHODOLOGY

1. All the data will collected from soil using sensors and (like Wi-Fi module, water motor, nrf module etc) to react correctly on the basis of data fetched by sensors.
2. Then using LORA and NRF2401 we will dthe long range communication and inter communication between devices to share data.
3. All the data then uploded on the cloud using Wi-Fi module from where we will distribute data on users id.
4. Now, each user will have personal user id and password and as they enter our website using id and password then all the data of that device will be available on there id from where they can monitor the condition of the crop

BLOCK DIAGRAM



HARDWARE REQUIRMENT

1) Capacitive Soil Moisture Sensor

To measure the Soil Moisture Level we really want a Soil Moisture Sensor. For this application, a capacitive kind of Soil Moisture Sensor is liked. We will utilize a simple capacitive soil dampness sensor that actions soil dampness levels by capacitive detecting. It implies the capacitance is shifted based on water content present in the dirt. The deliberate capacitance is changed over into voltage level fundamentally from 1.2V to 3.0V greatest. The benefit of capacitive Soil Moisture Sensoris that they are made of a consumption safe material giving it long help life.

2)Arduino Board

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a micro controller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board

3) ESP8266

The ESP8266 series, or family, of Wi-Fi chips is delivered by Espressif Systems, a fabless semiconductor organization working out of Shanghai, China. The ESP8266 series as of now incorporates the ESP8266 and ESP8285 chips. ESP8266 (essentially alluded to as ESP8266) is a framework on-chip (SoC) which coordinates a 32-bit Tensilica miniature regulator, standard computerized fringe interfaces, radio wire switches, RF balun, power intensifier, low commotion get enhancer, channels and power the executives modules into a little bundle. It gives capacities to 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2), generalpurpose input/yield (16 GPIO), Inter-Integrated Circuit (I²C), simple to-computerized change (10-bit ADC), Serial Peripheral Interface (SPI), I²S connects with DMA (offering pins to GPIO), UART (on devoted pins, in addition to a send just UART can be empowered on GPIO2), and beat width regulation (PWM). The processor center, called "L106" by Espressif, depends on Tensilica's Diamond Standard 106Micro 32-bit processor regulator center and runs at 80 MHz.

4) RF Wireless Transceiver Module

The RF is a wireless transceiver module, i.e. each module can both send & receive data. It works within the frequency of 433Hz. The modules when operated efficiently can cover a distance of 100 meters. Used forintercommunication between 2 separate devices for the exchange of data.

SOFTWARE REQUIRMENTS

1) Front-end Designing

Front-end configuration includes making the HTML, CSS, and presentational JavaScript code that makes up a UI. It is being utilized to make an easy to use site which will go about as a point of interaction between all clients of the item to investigate what is happening like harvest quality and meteorological forecast of their area.

2) Cloud Computing

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software. The AWS Cloud Computing Services will be to store the data of all individual soil samples and sharing it among the farmers.

OBJECTIVES

1) To study and understand different types of soil and nutrients present using sensors.

2) To analyze and process the sensor data to improve theproductivity of the crops by proper irrigation and fertilization.

3) To design user friendly User Interface to help farmers to know crop details in different stages.

4) Collect sensor data efficiently from farming fields with standard WiFi transceivers

5) Analyze and process the sensor data and to improve the productivity of the crops by proper irrigation and fertilization.

6) Provide user friendly interface to farmers for monitoring the crop data.

USES AND FUTURE SCOPE

IOT based SMART FARMING SYSTEM for Live Monitoring of Temperature and Soil Moisture has been proposed using Arduino and Cloud Computing .

The System has high efficiency and accuracy in fetching the live data of temperature and soil moisture.

The IOT based smart farming System being proposed via this report will assist farmers in increasing the agriculture yield and take efficient care of food production as the System will always provide helping hand to farmers for getting accurate live feed of environmental temperature and soil moisture with more than 99% accurate results.

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