

Monitoring and Automation of Smart Farming System for Crop Growth Using IOT Devices

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ABSTRACT

Wise agriculture is a developing structure which uses IoT advancement. This emerging system constructs the sum and nature of agrarian things. IoT devices give information about nature of developing fields and a short time later take an action dependent upon the farmer input. In this paper, an IoT based advanced response for noticing the soil conditions and air for successful yield improvement is presented. The made structure is good for noticing temperature, soddenness, soil soggianness level using Arduino UNO and a couple of sensors related with it. Moreover, a notification as SMS will be delivered off farmer's phone using Wi-Fi about biological condition of the field.

Keywords: *Sensors, Arduino UNO, Wi-Fi, soil moisture*

INTRODUCTION

Agriculture is the fundamental occupation in India and is the establishment of Indian monetary structure. Cultivating gives work opportunities to commonplace people for a colossal extension in juvenile and non-modern countries just as giving food.

It is the path toward making food, fiber and various other needed things by the turn of events and raising of local animals. Agriculture is the fundamental wellspring of work for about more than 58% of India's general population. Climate changes will essentially influence agribusiness by growing water interest and confining harvest helpfulness in districts where water framework is by and large required.

Water framework structure, deluge dealt with agribusiness, groundwater water framework are a segment of the techniques familiar with produce better yields which may not use water successfully. To use water capably a clever structure is arranged. In the system farmer need not

make the water stream into fields genuinely, anyway the structure normally does that gainfully. The standard methods practiced by people may achieve massive wastage of water. Along these lines, the possibility of robotized developing with mix of IoT has been made [1]. The imaginative movements began to extend the usefulness of creation incredibly thusly, making it a strong structure.

The data on properties of soil chooses the water supply to be driven in an adroit manner. The demonstration of cultivating in a savvy way helps with getting data on soil and temperature conditions. Encouraging the quick agribusiness using IoT based structures extends the creation just as avoids wastage of water [2].

The soil soggianness sensor, tenacity and temperature sensor reliably screens the earth and biological conditions, sends the live data to wireless through cloud organization. While descending, the soggianness substance may extend a couple of times. A deluge drop recognizing sensor

infer the controller if there is precipitation, making the water supply to decrease or stop dependent upon the clamminess content at this moment. The yield necessities like proportion of soddenness, temperature and moistness content are to be analyzed and can be acquainted again in the controller with meet its conditions.

In this paper, the system uses relatively few sensors which gives the proportion of clamminess in the soil, the dampness and temperature of the area, and a storm recognizing sensor which and can be used in picking whether the yield is sensible for creating. This heap of sensors close by Arduino are related with the web and a PDA.

BACKGROUND WORK

A Model for Smart Agriculture Using IOT

Climate changes and precipitation has been conflicting over the earlier decade. In view of this in late time, climate sharp procedures called as clever agribusiness is gotten by various Indian farmers. Clever agribusiness is a motorized and composed information development completed with the IOT (Internet of Things). IOT is developing rapidly and comprehensively applied in each distant environment.

In this paper, sensor development and distant associations joining of IOT advancement has been mulled over and overviewed reliant upon the genuine condition of agrarian structure. A got procedure together with web and far off correspondences, Remote Monitoring System (RMS) is proposed.

Huge objective is to accumulate persistent data of agriculture creation environment that gives basic induction to cultivating workplaces like alerts through Short Messaging Service (SMS) and advices on environment configuration, crops, etc.[5,6]

Smart Agriculture System using IoT Technology

Cultivating expects a fundamental part in the advancement of a country, it has been found in late assessments that we need to twofold our food creation. As the advancement in the agribusiness region has been flat over the span of late years subsequently it is expected to execute new advances around here to improve food creation. This structure proposes a splendid developing method in a limited area by using sensor centers like temperature and moisture sensor and soil soddenness sensor. This system is made in such a way to keep the cost restricted and give a fundamental stage to evaluate the limits for advancement of crops through the web over IoT.

IOT based smart agriculture

Smart cultivation is an emerging thought, because IOT sensors are good for giving information about cultivating fields and a short time later development on subject to the customer input. In this Paper, it is proposed to cultivate a Smart agribusiness System that usages advantages of cutting edge headways like Arduino, IOT and Wireless Sensor Network. The paper targets using propelling development for instance IOT and sagacious cultivation using robotization.

Checking natural conditions is the main issue to improve yield of the compelling harvests. The component of this paper joins improvement of a system which can screen temperature, moistness, clamminess and shockingly the advancement of animals which may decimate the harvests in green field through sensors using Arduino board and in case of any irregularity send a SMS notice similarly as a notification on the application made for something almost identical to the farmer's wireless using Wi-Fi/3G/4G. The structure has a duplex correspondence associate ward on a cell Internet interface that

contemplates data assessment and water framework booking to be modified through an android application. Because of its energy self-rule and insignificant cost, the system can be significant in water confined geographically isolated areas.[7,8]

PROPOSED SYSTEM

The below Figure shows the Block diagram of the proposed system which has been implemented

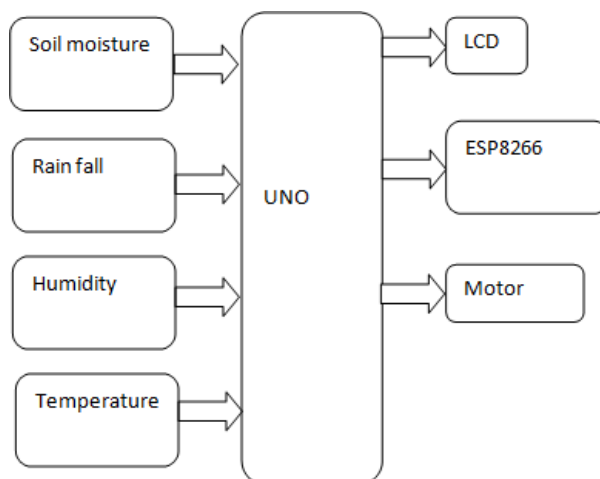
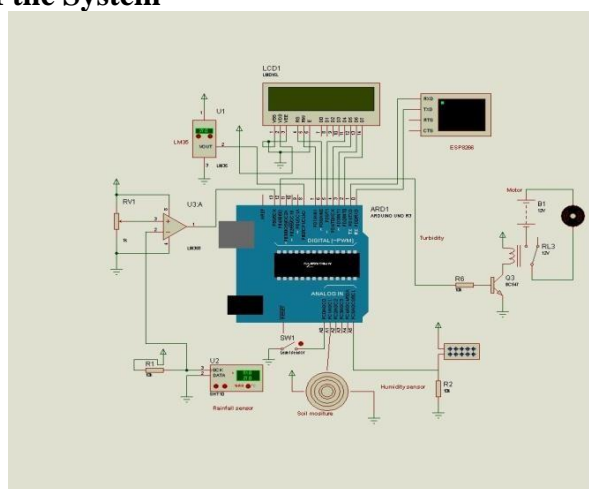


Fig: 1. Block diagram of the proposed system.

Schematic Diagram of the System



DESCRIPTION

The proposed system uses Soil moisture sensor, humidity and temperature sensor (DHT11) and rain detection sensors along with DC motor and deek robot are used. This DC motor is connected to a water pump which pumps water to the crops when the DC motor is ON.

The soil moisture sensor senses the moisture level in the soil. Depending on

the level of moisture, Arduino decides whether to water the crop or not.

By using appropriate functions and conditional statements in the code written for the Arduino functioning, the watering of the crop starts by Arduino making DC motor ON when the moisture content is below a threshold value and is made OFF when there is enough moisture content in the soil.

The raindrop sensor measures the intensity of rain. If there is enough rainfall to provide soil with required water, the crops are not watered. Even after raining, if the crops are not having sufficient water then water is pumped again by making DC motor ON.

Data reaches the Thingspeak cloud from Arduino through Wi-Fi from Wi-Fi module present on Arduino by which the data then goes to IoT server where the user can see the humidity, temperature, soil moisture levels and get the notifications if there is rainfall and if the DC motor is ON.

Modules Arduino UNO

The Arduino Uno is an open-source microcontroller board subject to the Microchip ATmega328P microcontroller and made by Arduino.cc.[2][3] The board is outfitted with sets of automated and straightforward data/yield (I/O) sticks that may be interfaced to various expansion sheets (shields) and other circuits.[1] The board has 14 progressed I/O pins (six fit for PWM yield), 6 basic I/O sticks, and is programmable with the Arduino IDE (Integrated Development Environment), through a thoughtful B USB cable.[4] It can be powered by the USB connect or by an external 9-volt battery, anyway it recognizes voltages some place in the scope of 7 and 20 volts.

Resistive Humidity Sensor, Model: DHT11

HR202 is another kind of dampness sensitive resistor delivered utilizing normal macromolecule materials; it will in general be used in occasions like: clinical centers, storing, workshop, material industry, tobaccos, drug field, meteorology, etc.

Temperature Sensor LM35

The LM35 is a joined circuit sensor that can be used to measure temperature with

an electrical yield comparing to the temperature (in C)

Rain Fall

The downpour sensor module/board is displayed beneath. Fundamentally, this board incorporates nickel covered lines and it chips away at the obstruction guideline. This sensor module grants to measure dampness through simple yield pins and it's anything but a computerized yield while dampness limit outperforms.

Soil Moisture

Soil soddenness sensors measure the volumetric water content in soil.[1] Since the direct gravimetric assessment of free soil soggy requires wiping out, drying, and weighing of a model, soil clamminess sensors measure the volumetric water content indirectly by using some other property of the earth, as electrical resistance, dielectric predictable, or association with neutrons, as a mediator for the moistness content.

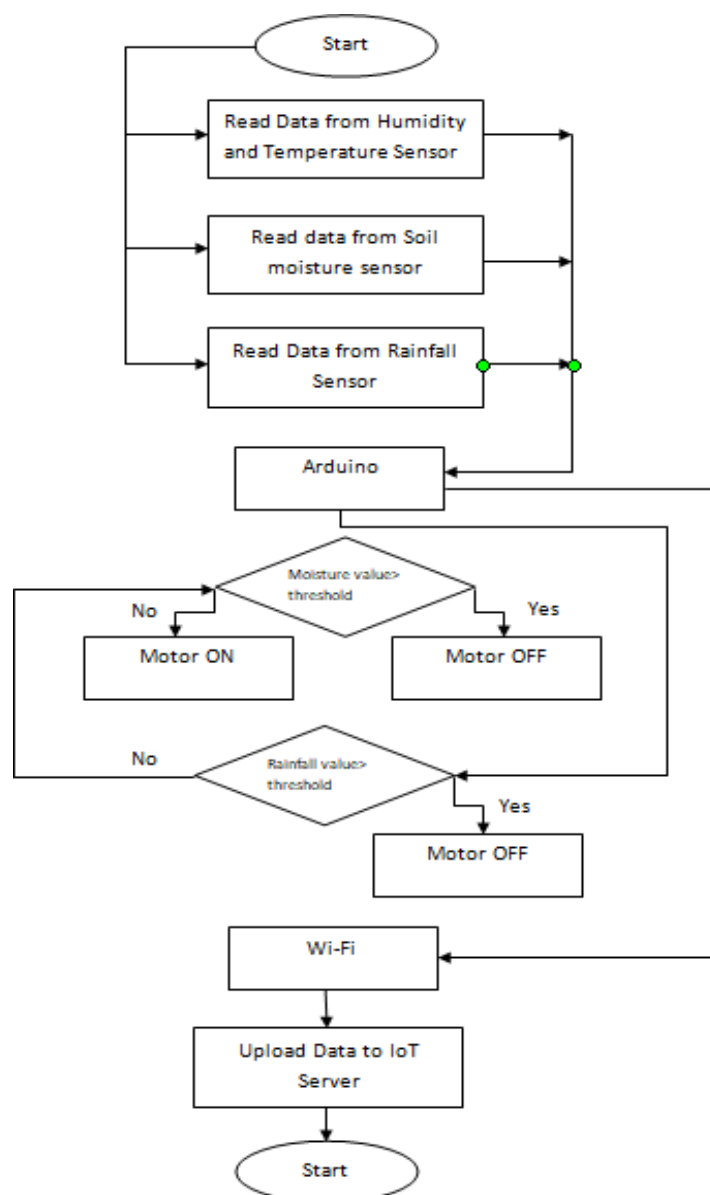
Soil moistness sensors routinely imply sensors that measure volumetric water content. Another class of sensors measure another property of soddenness in soils called water potential; these sensors are normally implied as soil water likely sensors and fuse tensiometers and gypsum blocks.

IOT Server

The Internet of things (IoT) is the between systems association of genuine gadgets, vehicles (besides inferred as "related contraptions" and "skillful gadgets"), structures, and different things inserted with hardware, programming, sensors, actuators, and affiliation network which empower these things to gather and trade information. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) depicted the IoT as "a general framework for the data society, empowering progressed benefits by interconnecting

(physical and virtual) things subject to existing and advancing interoperable data and correspondence degrees of progress" and henceforth a "thing" is "an object of

this present reality (genuine articles) or the data world (virtual things), which is ready for being seen and worked with into correspondence affiliations".



RELAYS

An exchange is an electrically worked switch. These are regulator electrical switches that are compelled by another switch, for instance, a horn switch or a PC as in a power train control module, contraptions in ventures, privately settled applications. Moves grant a little current

pin, 4-pin, 5-pin, and 6-pin, single switch or twofold switches. Moves are used all through the auto. Moves which come in masterminded sizes, evaluations, and applications, are used as regulator switches. A normal vehicle can have 20 exchanges or more.

RESULTS

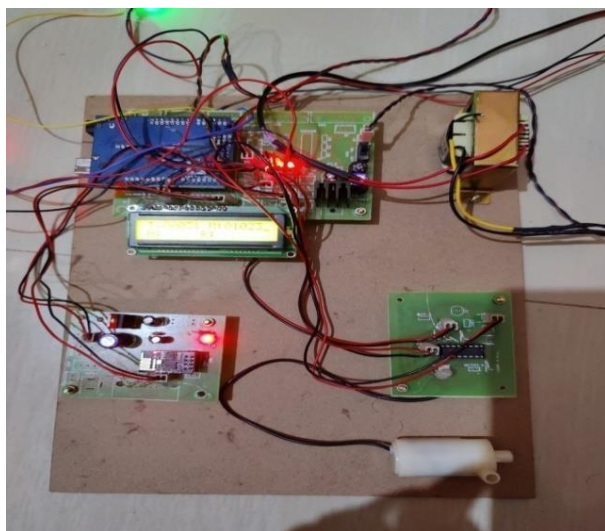


Fig. 2: Prototype of our Proposed System.

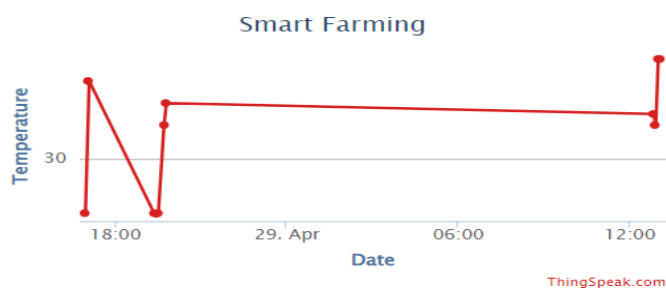


Fig. 3: Temperature readings in IOTServer

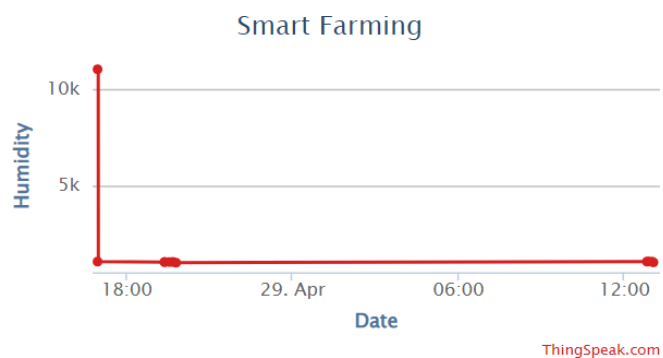


Fig. 4: Humidity readings in IOT Server.

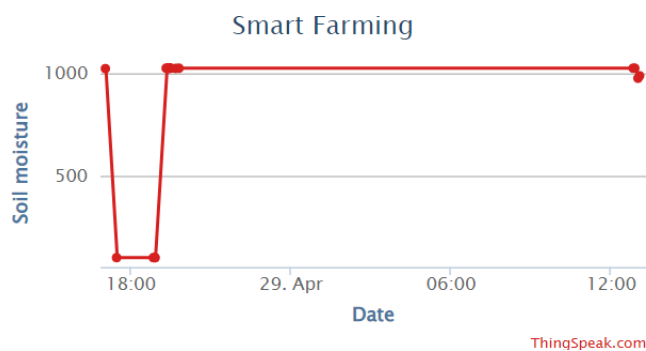


Fig. 5: Soil moisture readings in IOTServer

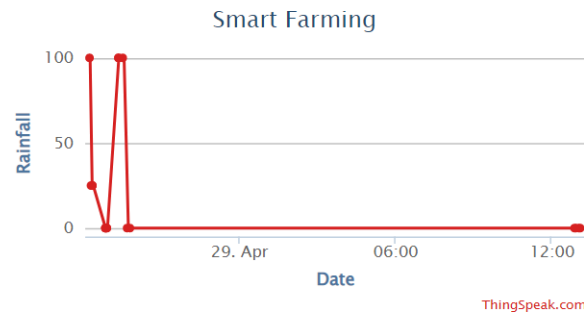


Fig. 6: Rainfall readings in IOT Server

CONCLOUSION

In this paper, IoT advancement is used to recognize and separate the temperature, moistness level, soil soddenness level and the deluge condition and DC motor is controlled using ARDUNIO UNO. This heap of characteristics are dispatched off the high level cell using Wi-Fi. In view of the usage of this system, adequate water is siphoned and deluge is furthermore utilized gainfully.

This system is especially valuable to farmers as they need to regularly siphon water and check the circumstance with each gather. From wherever in the world, farmers can know the potential gains of moisture, temperature and soil soddenness and if the DC motor is ON through the blynk application present in their mobile phones.

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