

Smart Agriculture System Using IoT for Sensing and Surveillance of Crops

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ABSTRACT:

The agriculture is an essential occupation as it provides the basic need of human beings. In Ancient times the agriculturists will give importance to analyze the soil content and developed different ways to bring a good yield of crops. The farmers may not aware of humidity conditions and the level of water which is to be irrigated to farm lands and the present climatic conditions which affects the farming lands. The most of the farming cannot be easy for production so some of the advanced technologies can be used for production. One of emerging technologies like Internet of things (IOT) is redesigning the agriculture by appealing the farmers by the broad scope of methodologies, for instance, precision just as realistic cultivating to manage difficulties in the agricultural fields. The Internet Of things employ farmers to get easily accessed to this system from anywhere as it is easy to control. The remote sensors are used for watching the crops conditions and the scale controllers are used for controlling and mechanize in the agricultural fields. For viewing the actual occurrence in the field we can use remote cameras for viewing the photos and videos for better understanding. In this system we are using sensors such as humidity, temperature, Soil moisture sensors for monitoring the field conditions which is the most important features in the growth of crops.

1. Introduction:

Smart Farming could be a way to manage the damage to standard technology that enhances the quality and quantity of agricultural products. Farmers in the middle of the first century could access soil scanning, data management, GPS, and Internet of Things technology. The purpose of clever, agricultural analysis is to make the option of creating a farm management net. Smart farming looks at the problems needed to address the challenges of rising, global warming and workers receiving a lot of technical attention from planting and irrigating crops to health and harvesting. In technology wise agriculture, our system is developed to monitor the field of plants with the help of sensors (humidity, light, temperature, soil condition, etc .) and automating an irrigation system IOT (internet of things) in the associate with agriculture frame work refers to use completely different sensors, cameras and devices to point of the accomplishment complicated the farming in to information we would like the smart agriculture to grow and from the current condition as the effects of this work will significantly reduce the negative environmental impacts of modern agriculture. Developed cities use the Internet of Things (IoT) objects such as connected sensors, lights, and meters to collect and analyze data. Cities use this data to expand infrastructure public services and more. For farmers, it has the potential for them to know the principles of technology and use of technology and collectively for farming.

Need of automatic irrigation:

- Simple and easy to install and configure the device.
- Saving energy and resources easily, so that it can be utilized in proper way.
- Farmers would be able to smear to correct amount of water at the right time by automatic irrigation system.
- Avoiding the water irrigation at the incorrect time of day, will reduce the overflow from

drowning saturated soils which will increase the crop performance.

- Smart irrigation system uses the values to turn motor ON and turn OFF. The motors can be controlled easily by using controllers easily and no need of labor to turn motor ON and OFF manually.
- It is one of the specific method for the smart irrigation and a valued tool for correct soil moisture control in highly vegetable production.
- It is time to saving, the human error elimination in changing available soil moisture levels.

The smart agriculture product uses one of the current technology IOT in farming for congregation of the field crops growth, environmental constraints in a very mounted place to support farmers for realizing the issues in a correct time. Agricultural consultants offers with specific data to extend financial gain and facilitate them within the interference and management of harvest ailments and pests. By the routine change of transportable apps, it is been enforced by the farming skill advancement and professional on-line. The organization growth comprises of following parts: The server, automaton consumer and consumer to attain measurability, high dependability, security, similarity of procedural demand

2. Literature Survey:

Experts have analyzed the data collected to determine the relationship between environmental work and productivity in traditional work. Focused on crop monitoring, temperature and rainfall data are collected as primary location data and analyzed to reduce crop losses and enhance crop production. The IoT Based Crop-field that monitors the automated irrigation system defines the field of crop. The classification is developed using radars and in accordance with selection from the sensor data supported by the server, the automatic irrigation system. The use of wireless data transfer technology has been transferred to high-level web data. On the off chance that the water system is done naturally it proposes that the dampness and temperature fields fall underneath the possible reach. The client can screen and control the framework distantly with the assistance of an application that gives a web boundary to the client. Author proposed a brilliant rural model in water system with ICT (Information Communication Technology). The ideal condition of constant and history is relied upon to help with accomplishing better administration and use of assets. The Smart Cultivation Monitoring Scheme utilizing IoT improves different highlights like dampness, stickiness and temperature, interruption recognition, GPS-controlled controller, leaf mugginess and reasonable water system offices. of Agriculture IoT Radar Monitoring Network Technologies use Cloud processing because of the spine.. Warmth made and checked in the farming area by a sensor utilizing the CC 3200 Single chip.

3. Existing Sytem:

The Horticulture is one of the most basis of our Nation. In very long time historical days cultivators went to figure the matureness of soil and inclined suppositions to develop that to quite product. They did not trust the moistness, level of water and particularly climate condition that alarming associate raiser additional. They utilize pesticides in sight of some suspicions that created lead areal impact to the yield if the supposition is not right. The profit depends upon the last part of the yield on that raiser depends.

4. Proposed System:

To improve the effectiveness of the product there by supportive every maker and country which

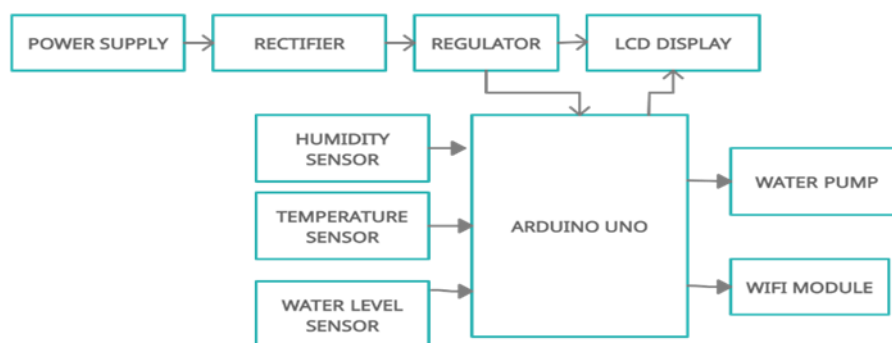
wish to usage the advance that assesses the personality of collect and giving proposals. Web of things (IOT) is recreating the corporate greed teaming up the ranchers by the wide combination of procedures, for instance, exactness and traditionalist development to go facing difficulties at spans the circle. IOT technology helps in gathering information on circumstances like climate, temperature and profitability of soil, collect web recognition connects with region of weed, level of water, bug affirmation, creature obstruction in to the circle, adjust improvement, development . IOT use ranchers to ask associated along with his home from any place and at regardless of direction. Far off gadget systems are utilized for checking the ranch conditions and little scope regulator's are to the board and robotizes the property shapes. Utilization of Wireless gadget Networks In accuracy Agriculture.

In this paper accuracy Agriculture has the upside of giving constant analysis on fluctuated unmistakable yield and site factors. As its name proposes, accuracy Agriculture is genuine in each the degree of the product region it screens and to boot at stretches the movement proportions of water, fertilizer, at that point forward.

This development can isolate a singular plant for checking at spans the tens or a few sq. feet. The WSN structure needs a welcomed on administration unit with UI. Exactness Agriculture needs an absolutely unmistakable programming model for each land an area, the trademark soil compose and furthermore the exact gather or plants.

For example, each territory will get its own particular ideal live of water, fertilizer and compound. It's all things considered endorsed that movement be done on an hourly reason. Visit action doesn't give further helpful information to the product show and transforms into a load to the Wireless gadget Network as such a ton as force use and information transmission. Less nonstop perceptive could likewise be palatable certain as shooting moderate improvement harvests and districts that have consistent, uniform environment conditions.

BLOCK DIAGRAM:



5. Working:

1) Sensor data acquisition:

The sensors in this connection interface with the Arduino Uno module just as the DHT11 temperature, moisture sensor, soil humidity and rain sensor.

2) Information preparing and Decision making:

Information preparing is the task of evaluating the number of different sensors received from the field with pre-configured data. The motor will automatically turn on if the ground moisture level changes below the edge and the other way around. The Agriculturists able to easily turn over the water pump from the mobile using the specific applications.

3) Remote information transmission:

Information or qualities accessible from sensors are sent to the web application utilizing remote communication.
 (WIFI module ESP8266).

4) Robotization and water system framework:

A smart water system framework is programmed when the regulator is identified from a web worker or portable application. The exchange used to move the web worker control structure to the force switches utilizing the Arduino regulator. The low force signal in the signs can be exact utilizing transmission.

5) Web application:

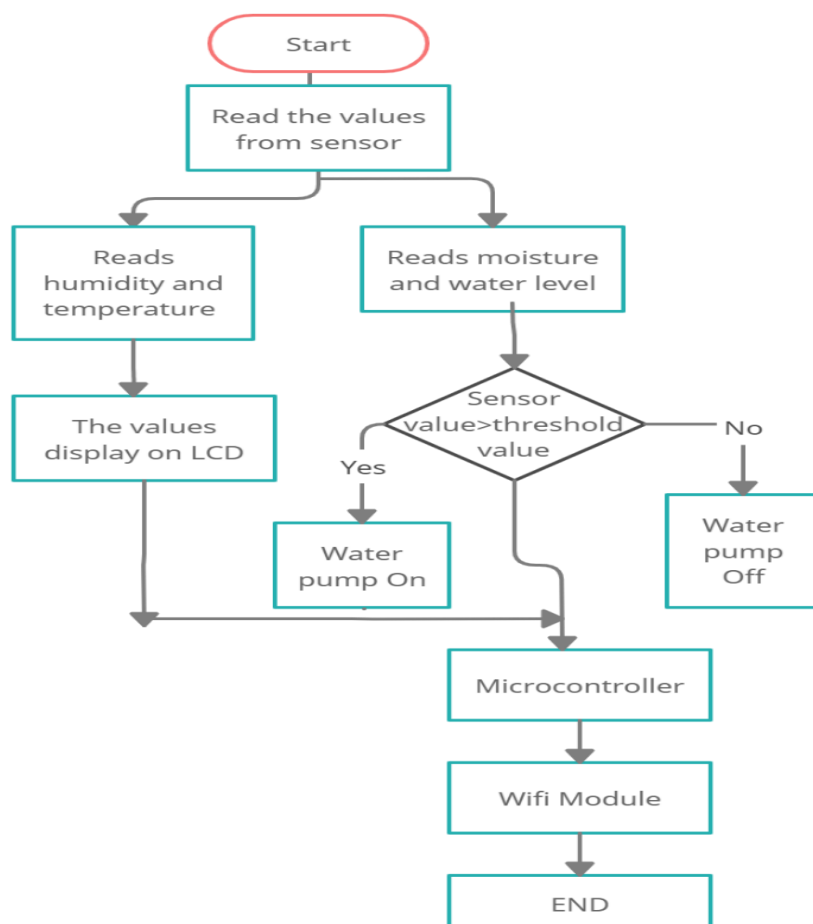
The web application will be designed to monitor the field and Crops from anywhere in the world using internet connection.

To control the Arduino IDE is used. The webpage can be Communicate using the processing Arduino IDE.

6) Mobile Application:

In automaton application the versatile application will be set up. The application in the portable assists with observing to control the crop fields from anyplace on the planet.

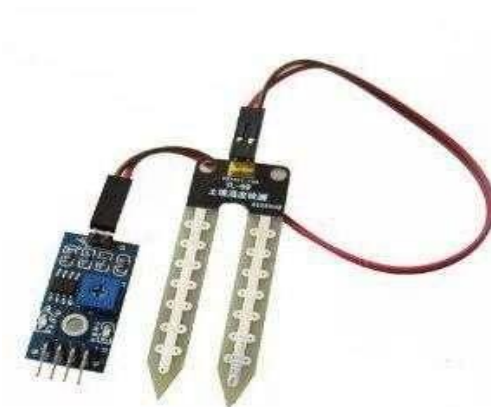
FLOW CHART:



HARDWAREUSED:

Soil MoistureSensor:-

By using this Soil status sensor the status of the soil contented is measured. The sensor has every analog and digital output. The digital output is mounted and conjointly the simple yield limit could also be varied. It applies to the principal of open circuits and short circuits. When the output results in high or low it will be indicated by the semiconductor. Once the soil wetness is dry this will not expertise it so it will act as circuit. Then the production is claimed to be most. When the wetness of soil is high, it will get passed from one signal to another and together the region is said to be shorter and more productive.



Temperature Sensor:-

The LM35 device is overused as its output power effects are matched to the stargazer temperature measurement. It's a good operating sensor. The leading output is 5V. The output of the circuits gets increased at range of 10 mV with each temperature increase. Variations from -55 degrees to +150 degrees. The Ground, VCC and an analog device are three terminals present in this device. It uses a small amount of electricity. Therefore, it will save energy and save economically in farming and it is one of the easy methods to use.



Rain Detection Sensor:-

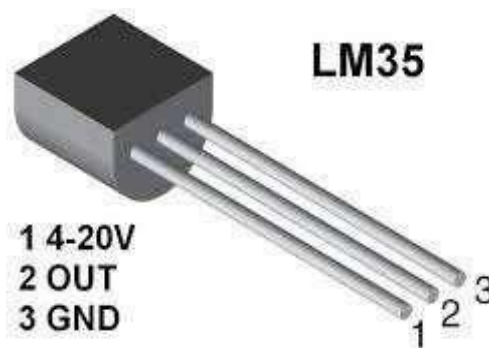
The rain sensor module can be easily done for detecting the rain. When raindrop falls through the raining board it is used as switch for operating and it is also used for measuring the rainfall intensity. This element features, a rain board and the manipulate board this is separate for extra convenience, strength indicator LED and an adjustable sensitivity via a potentiometer. The

analog output utilized in detection of drops in quantity of rainfall .Connected to a 5V power supply, the LED will work when the input board is free of rain, and the DO output is maximum. When you put a little water, the output is low, the switch indicator will open, Drop the water condensations, and it when reinstated to its original state, it releases a high level.



Humidity Sensor:-

Its small size, low power completes signal transmission of up to 20 meters creation is the greatest choice for a variety of applications, This DHT11 sensor which is also used for measuring humidity incorporates a moisture sensor complex with digital signal output. The use of special digital signal detection technology as well as temperature and humidity technology which senses the humidity level, it ensures good long-term steadiness and high consistency . This sensor incorporates part of the resistive humidity measure.



Communication Wi-Fi Module:-

The communication module ESP8266 is an notable, small cost Wi-Fi module which is appropriate for accumulation Wi-Fi functionality via the UART by serial communication .The Features includes, WiFiDirect(P2P)soft-AP,802.11b/g/n protocol, Integrated TCP/IP protocol stack.



ARDUINO UNO:

Arduino board is a type of microcontroller based on atmega328. This is an open source electronic hardware and software is easy to use. external electricity. The 14 digital anchors in Arduino Uno is used as for both input and output by the help of some functions such as pin Mode(), digital Write (), and Digital Read ()

6. Limitations:

- The Agribusiness being a genius relies absolutely upon nature, and man forecasts or panels nature, its downpour, dry season, sunshine comfort and control of pests, and so forth accordingly, ever execution IOT framework farming.
- The smart farming cravings comfort on the web perpetually. Rustic a piece of the agricultural nations neglected to satisfy these necessities. In addition, the web is slow.
- Culpability locator or information handling motors will cause defective determinations which can bring about the abuse of water, composts and diverse wastage of resources.
- The smart farm cultivating dependent on composition need
- farmer to know and become familiar with the service of innovation.
- This can be the main test in embracing keen farming outlining at a huge scope across the countries.
- It collectively has a few issues that should be followed appropriately to accomplish the absolute beneficial thing related to farming.

Difficulties in IOT Agriculture in India:

- The Less information regarding the local climate. Absence of deals of dispersion information sources.
- Lacking information among the agriculturalists regarding the benefits of intensecultivating.
- The investment for smart farming is a high cost, Supplementary physical work.
- Keep a characteristic of record physically.

- Absence of right examination of statistical surveying abilities just as exploration Centre
- Changes on account of the climate conditions.
- Lack of interest in the horticulture calling by youthful and taught proficient.

CONNECTION:



OUTPUT:

ADVANTAGES:

- To increase the productivity of crops where we support our farmers and the country we had to practice new ingredients which assess the type of harvest and provide recommendations for high yielding.



- The Internet of Things (IoT) arouses the agribusiness by Concerning the farmers through a wide range of approaches, for
- example, exactness and protection farming to address the problem in field challenges.
- The IoT growth resources like in social media knowledge in the circumstances such as wind, soil temperature and
- productivity, harvesting web views including weed area, water level, recognizing bedbugs, disturbing wildlife
- in the field, transforming development, farming.
- The IoT uses farmers to relate to its environment from anywhere and at any time. Remote control panels are used to monitor farm conditions and are used by small-scale controllers to control and a robotic condition.

7. Future Scope:

By continuing to improve this activity farmers can bring in more arable land. Only the right amount of fungicide and pesticide can be used. The system can be further enhanced by introducing new learning methods that can be used in the cloud to understand the functionality of auditory data and can make independent decisions. Another problem farmers face is the destruction of crops by wildlife. Future work therefore involves the formation of a farm-viewing system by inserting sensors at the boundary of the farm and camera section that can take a picture when the sensor detects and transmits real-time images by associating them with other information.

8. Conclusion:

This paper describes the exploitation of the irrigation system operated by IoT machines. The web of material and cloud computing makes the system that governs the agricultural sector more effective. This strategy can see every one of the actual limitations and send the data to the client through the cloud. The client can make a genuine move if this should be possible in a harmful way. This quality permits the rancher to develop the yield in abundance of the ideal harvest. It is limited to high crop production, long production value, high quality and limited use of protective chemicals.

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