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"ANALYSIS SOIL MOISTURE SENSOR & WATER LEVEL SENSOR IN SMART AGRICULTURE"

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ABSTRACT

The purpose of this paper is to find out how efficient soil moisture sensors and water level sensors are for farmers. Smart agriculture is a rising concept, because IOT sensors are successful of presenting information about agriculture fields and then act upon primarily based on the user input. The function of this paper consists of improvement of a system which can reveal temperature, stage of water, moisture and even the motion if any takes place in the field which may also ruin the vegetation in agricultural area through sensors the usage of Arduino UNO board.

The assignment objectives at making use of evolving technologies i.e. IOT and smart agriculture using automation. Once hardware has been developed relying on the exchange in necessities and software program needs the updating. The new hardware is referred to as new model of the software.

This new model is required to be examined in order to make certain modifications that are made in the historic model work correctly and it will no longer convey bugs in different phases of the software. This is quintessential because updating in one phase of the hardware might also deliver some undesirable results in different section of the hardware.

Keywords*: Internet of Things (IOT), Arduino, Soil Moisture Sensor, Water level Sensor*

1. INTRODUCTION

Smart farming is a farming management concept that focuses on increasing the quantity and quality of agricultural products via the use of contemporary technologies. Soil Moisture Sensors, Water Level Sensors and Internet of Things technologies are all available to farmers in the twenty-first century. The purpose of smart agriculture research is to develop a farm management decision-making assistance system.

From crop planting and watering to health and harvesting, smart farming considers it important to address the concerns of population expansion, climate change, and labour, all of which have received a lot of technological attention. A system for monitoring the crop field using sensors (light, humidity, temperature, soil moisture, etc.) and automating the irrigation system is constructed in IOT-based smart agriculture. The use of sensors, cameras, and other devices to turn every aspect and action involved in farming into data is referred to as IOT (Internet of Things) in the agricultural setting.

We need smart agriculture to extend and evolve beyond where it is now because it will significantly reduce modern agriculture's negative environmental externalities. To collect and analyse data, smart cities rely on Internet of Things (IOT) devices such connected sensors, lights, and metres. The data is then used by the cities to improve infrastructure, public utilities and services, and other aspects of their operations. It's difficult for farmers to make a living.

2. LITERATURE REVIEW

This paper explains how Internet of Things (IOT) technology has revolutionized every aspect of the average man's life by making everything smart and connected. The Internet of Things (IoT) is a collection of interconnected devices that form a network. A network that configures itself Intelligent Systems Development.

[1] Improving Nitrogen and Water Management in Crop Production on a National Scale. His paper has some drawback with the accurate success rate of the devices he was mentioning.

[2] "Estimates for World Population and Global Food Availability for Global Health". This paper states if the crop production is healthy then the food will be healthy which is truth. But IOT can't help with each agriculture problem.

[3] “Internet of Things Applications for Agriculture". In, Internet of Things A to Z: Technologies and Applications. He stated the benefits of IOT in agriculture and disadvantages also occurs.

[4] "Agricultural Management through Wireless Sensors and Internet of Things" this paper was based on the wireless sensors and their use. But it has some flaws that the internet connection needs to be stable

3. PROBLEM DEFINITION

In terms of hardware and cost, it should use the bare minimum. This eliminates the need for manual operations in both automatic and manual modes to monitor and maintain agricultural lands. It should be able to detect changes in water levels as well as moisture levels in the soil.

To build an effective decision-making system based on a wireless sensor network that manages various agricultural activities and provides important farm information like Moisture, Temperature, and Humidity Content in the Soil. The water level is rising due to the weather. Farmers are subjected to several distractions, which is detrimental to their productivity and Agriculture. Farmers can control the water level using the mobile application, you may set it up to be automatic or manual.

4. OBJECTIVE/SCOPE

Here are a few of the most important advantages that smart farming provides.

1. Better farms = more data

Having access to large amounts of data and sophisticated analytics could provide a farmer with a slew of unexpected benefits. Analytics can provide a farmer with crucial information into the health of his business and enable better monitoring of equipment efficiency, employee performance, and other factors.

2. Reduced production risks and waste

Smart farming allows us to develop more accurate output/production forecasts. This is significant because it aids farm owners in product distribution and crop output estimation. If you can create a realistic estimate of how much crop you will harvest, you will discover a means to ensure that your product does not decay.

3. More cost effective

Agriculture based on data provides a high level of control. All kinds of minor variables can be fine-tuned with extreme precision. This results in bigger yields and, as a result, greater savings. Furthermore, with smart farming, anomalies can be recognised early. This means there's a far lesser chance of losing the full harvest.

4. Improved yields and higher crop quality

Data-driven farming allows the farmer to keep strict control over the farming process while maintaining high quality standards. Higher yields are also a result of smart technology since crop health is improved.

5. METHODOLOGY

Soil Moisture sensor:

The amount of water in the soil is measured or estimated by soil moisture sensors. Sensors can be fixed or movable, such as handheld probes. Portable soil moisture probes can detect soil moisture at many sites while stationary sensors are put at predetermined locations and depths in the field.

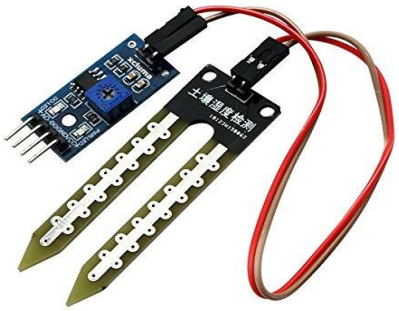
To efficiently use soil moisture sensors, it is necessary to have a deeper understanding of the underlying principles, definitions, and words that govern the soil-water-plant relationship.

They are three type of soil moisture sensors:

1. Volumetric sensor
2. Tensiometers
3. Solid state sensors

Benefits of Soil Moisture sensor:

Increased crop yields, water savings, protection of local water resources from runoff, energy savings, fertiliser savings, and increased farmer profitability are all advantages of optimising irrigation schedule with soil moisture sensors.



Soil Moisture sensor

Water Level Sensor:

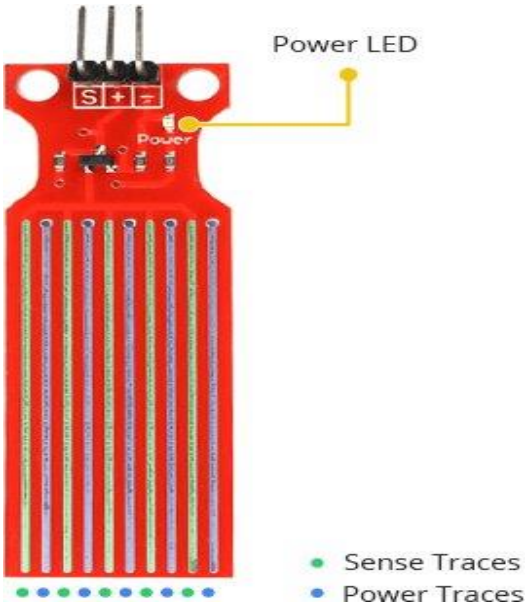
A water level sensor is a device that detects if a liquid is at a high or low level in a fixed vessel. There are two different types of liquid level measurement methods: contact and non-contact. What we refer to as an input water level transmitter is a contact measurement that converts the height of the liquid level into an electrical signal. It is currently a frequently used water level transmitter.

They are seven types of water level sensors:

1. Optical water level sensor.
2. Capacitance liquid level sensor.
3. Tuning fork level sensor.
4. Diaphragm liquid level sensor.
5. Float water level sensor.
6. Ultrasonic liquid level sensor.
7. Radar level gauge.

Benefits of water level sensor:

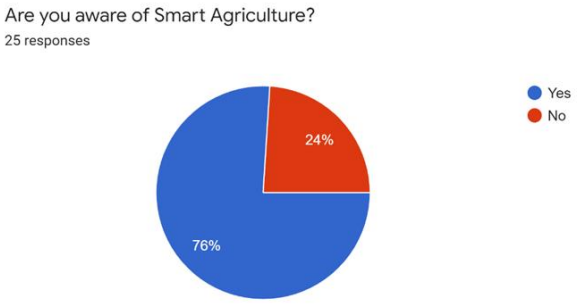
1. **Simple to use**: Connect one end of the wire appropriately before inserting the other end of the water level probe into the solution to be measured.
2. **Range Optional**: It can measure the water level in a range of 1-200 metres, and other measurement ranges can be modified as well.
3. **It has a wide range of applications**: including high-temperature and high-pressure liquid level monitoring, severe corrosion, high pollution, and other media.

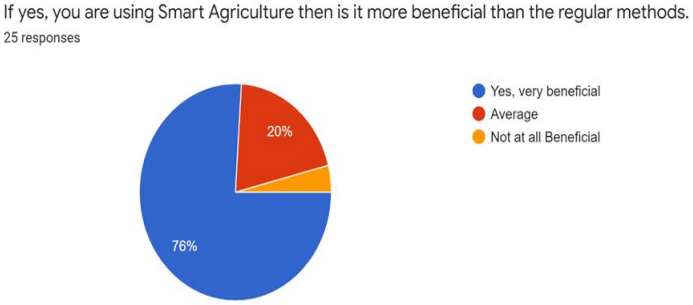


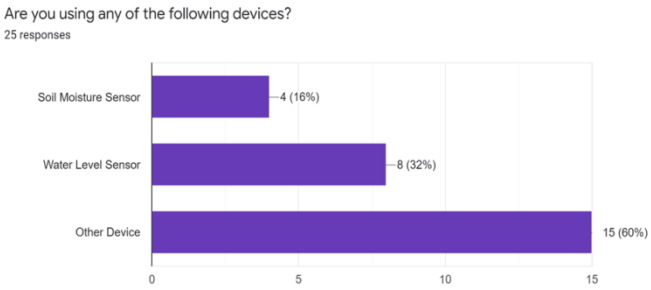
Water Level Sensor

6. ANALYSIS FINDINGS:

We have done a survey over Analysis of Soil Moisture Sensor&Water Level Sensor in Smart Agriculture. And we came to know that the people are aware about the IOT devices and are using water level sensor and soil moisture sensor in their crop production. If they get proper guidance with the internet and more knowledge about devices then the work for our farmers will get easy and beneficial for all







7. LIMITATION/FUTURE SCOPE

Smart farming foresees a future in which our food is cultivated with the least amount of pesticides and fertilisers possible. Food traceability will improve as a result of the internet of things, which will have a knock-on effect on food safety. More importantly, the environmental benefits of smart farming are incredibly encouraging - IoT-driven agriculture may help us save water and ensure that we feed a vast global population in an environmentally friendly manner.

IoT – smart farming continually requires internet connectivity. The developing countries 'rural portion did not follow those criteria and the internet is slower.

1. The IoT related equipment allows the farmer to understand the use of technology and to learn. It is the biggest challenge for the large-scale implementation of smart agricultural framing across the continues.

2. Given any security measures, the system offers little power and can lead to various kinds of network attacks.

3. It is very complicated to plan, build, manage and allow the broad technology to IoT framework.

8. CONCLUSION

We've created an automated Smart Agriculture solution that saves time and resources as compared to doing it manually. The technology used in this system is that of the Internet of Things (IoT) is a term that refer the technology also monitors soil moisture. and the amount of water in the fields This system performs admirably in the field. There are ideal conditions, and there is room for improvement when the conditions aren't optimal, such as adequate lighting or lightning.

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