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Measuring Soil Moisture using Thingspeak by IoT Sensing Device

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ABSTRACT - Population of world increases drastically in recent years requires more and more food supply. To overcome this significant need, there is advancement in cultivation to meet the required food. For yield more, need to analyze the soil and the moisture level of the soil. For analyzing soil moisture is a useful way to verify the soil minerals and estimate the quantity of water required for cultivation. Our aim is to develop a device which can be able to detect the moisture content in soil and display it on the digital screen. A sensor is used to measure the volumetric water content in soil. It will also be able to detect at all temperature conditions. By utilizing the measurement of direct gravimetric measurement of soil moisture needs eradicating, desiccating, and weighting of a test. By using sensors for measuring soil moisture measures the water content indirectly by utilizing electrical confrontation as a proxy for the moisture content. Our experiment results of the detected moisture value are displayed on the digital screen through Internet of things technology.

Keywords: soil, moisture, conditions, measure, IoT, sensor.

1. INTRODUCTION

The cultivation in India is very poor due to lack of interest, scarcity of agriculture land, water and some farmers with their own interest doing the cultivation which produces very less. This is due to lack of awareness about the land dryness, no proper usage of timely pesticide and suitable crops for land. To overcome this smart agriculture plays a vital role in promoting cultivation. This introduces the sensors in the cultivation land to measure the efficiency of the land. In this work, how the sensed data will be processed and stored in cloud and from cloud the data will be relayed to the registered farm owners through their pH one or device in user understandable form. This will be very helpful to the farmer who are away from the land, and improves the crop cultivation.

Now a day's IOT (Internet of Things) [1] is utilizing many application including agriculture which will provide information and enabling farmers to face numerous challenges. Mainly farmers' face the water shortages, lack of knowledge about lands, labor cost etc., and while achieving the required food consumption through the world population that will be grow drastically by 70% in the year 2050[2]. To overcome this many researcher are developed innovative IoT applications for addressing these issues and producing cultivation in increasing the quality, quantity, sustainability and cost effectiveness. For instance, influence IoT sensors monitor remotely which can also analyze soil moisture, growth of the crop growth and also handle and control their smart connected irrigation equipment [3]. With the help of AI (artificial intelligence) based analytics to analyze data which contains 3rd party information, such as climate services, to provide new insights and improve decision making. Georeferenced communication and control network [4] develop a precision agriculture which is optimized supply management, in accordance with the crop needs. This method contains a databases technology which includes satellite positioning systems for example, GPS, remote sensing and the Internet, to handle and increase crops by decreasing the usage of fertilizers, pesticides and water. IoT sensors designed to meet the needed food requirement and these sensors also deliver the security and scalability to maintain millions of transactions.

In our proposed work it is going to be focused on the agriculture. By using the wireless sensors, the soils, water level can be monitored. Report generated by these sensors contains their land information via wireless network and can test their pH rate at their convenient time. In the report if any abnormalities are noticed immediately provide suggestion to use pesticides to overcome the anomalies. In this work, we design a system which is capable of tracking the soil resource level and monitoring water level alerts. It will reduce the farmer's workload, Alerts on soil resources to the predefined number, works remotely.

2. RELATED WORK:

Utilizing in-situ sensors [5] based on a smart wireless sensor web technology based system which was used for measurement of soil moisture. This is integrated with other sensor like EC-5 soil moisture and XBee pro module for providing field three dimensional soil moisture information as a function of time. By taking environmental parameters [6] are received from the sensors in Smart phone application (software) to process and analyze the soil information. This is integrated with ATMega2560 Microcontroller, LM35 temperature sensor, DTH22 humidity sensor and TDR100 soil moisture sensor. Rajagopal et al., developed a system which contain sensors are placed in a monitored area and measures the soil moisture, temperature and humidity. GPRS system [8] is utilized for determining and handling the cultivation Indian Agrarian areas. In this system the moisture and temperature sensors are laid in the root region of the plant.

Essential soil properties [9] and contents information are measuring by using sensors which are embedded in IoT are being developed which can either to handle variable rate

application equipment in conjunction with a GPS (Global Positioning System) to make field maps of soil land. The number of measurement points per acre varies depending on the spacing between passes, travel speed, and sampling and/or measurement frequency, which is greater than the compactness of manual grid sampling in many cases. The cost of mapping usually is reduced as well.

3. EXPERIMENT RESULTS

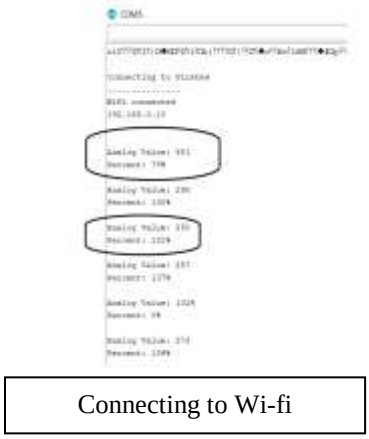

Fig 1. Different Moisture Values

Fig 2. Thingspeak value 1

4. CONCLUSION

This Soil Moisture Sensor based agriculture monitoring system serves as a reliable and efficient system for monitoring agricultural parameters. The corrective action can be taken. In this work, an IoT based system for soil moisture measurement has been presented. Sensor designs for pH, temperature and moisture have been successfully implemented and tested with minimal error.

The rate of percentage increase in data readings by sensors concerning soil moisture conditions tends to increase faster depending on how much water volume is given to the soil. This indicates that the performance of the sensor and monitoring system goes according to the process of infiltration of water into the soil and runs well. The rate of moisture degradation in data readings by the sensor tends to be slower, as this depends on the evaporation processes occurring in the soil. The faster the evaporation process will decrease soil moisture will be faster too. However, if the evaporation process is slow, then the percentage decline will be slow as well. This rate of percentage decline will require a notification system capable of informing the researcher if the monitored soil is equal to or less than the parameter limit monitored by the researcher.

5. FUTURE SCOPE

As technology advances, so does the requirement for food, which is directly related with the increasing population. There is an immense potential in the agricultural domain for the application of emerging technologies such as IoT, cloud computing, robotics, GIS and remote sensing, among others. Here, we list some specific areas, which are among the most important ones for further research work relating to ICT in agriculture.

6. REFERENCES

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