VEGETATION HEALTH MONITORING SYSTEM Using AGRICULTURAL IoT.

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ABSTRACT

Vegetation health monitoring project aims to measure and record data about crops in real time using the reflectance of light shined or water provided on the growing plants. Sensors can be installed across the application boom to collect information while the different span of time of the plant growth. The data is logged and mapped to be used in further analysis – or for real-time variable rate applications. This kind of data is the key to precision farming. Collect information in the fields, analyze and then make decisions based on the data.. A Sensor Network (SN) is a group of sensor nodes work collaboratively to perform a common task. Sensor Networks plays a major role in the development of monitoring air, soil and water, habitat monitoring, agricultural monitoring, military surveillance, inventory tracking etc. Sensors are used in agriculture to monitor Temperature, Humidity, Soil moisture, Wind (speed and direction), Pressure. In the existing system arduino, and the sensors are used to track the needs of the canopy growth. External server is used to collect the data. In proposed system, a plant growth will be monitored in terms of sunlight, temperature and soil moisture, and read values will be fed into the application on the user's mobile phone. With this Project, plant breeders can evaluate the performance of different plant varieties using measurements taken from remote sensors. These sensors monitor things like soil moisture, atmospheric temperature, and soil moisture and are often used for crop variety trials. The system has a great advantage, that is expandable and so new type of sensors and controllers can be added without affecting the existing infrastructure; power and communication are made using a single cable This allows planning appropriate necessities for the vegetation, and monitoring the vegetation's health.

Keyword : - *Sensors and IoT etc*

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1. INTRODUCTION

According to the development trend of modern vegetation growth and the requirements for science and technology. The traditional methods mainly rely on natural resources and low labor costs. It's difficult and inefficient, and the workload is heavy. So it cannot meet the requirements of modern vegetation growth which is high-yield, high quality, efficient, safe and ecological. Because the IOT (Internet of Things) technology was applied to agriculture, the modernization and the information technology of agriculture have been greatly improved. The paper introduces the concept of IOT and summarizes applications in the modern breeding, crop growth, quality and safety of products monitoring with using IOT. Nowadays, with the rapid development of wireless network technology, control technology and Internet of Things, the concept of smart home has become increasingly more common. As an element of smart home, smart pot has become more popular than ever among a growing number of young people.. This project puts forward a remote smart pot based on wireless signal transmission. The productivity of plant growth is heavily influenced by the change in environmental. When water in the soil, solar radiation, humidity and all factors affecting the production. The crop management can be carried out by gathering the present status of these parameters of the field and user can take necessary action to improve the growth. A group of sensor nodes work collaboratively to perform a common task. Recently sensor make revolution into many segments of our economy and life, from environmental monitoring, to automation in the transportation, to manufacturing and business asset management and health care industries. In environmental monitoring agriculture need for increasing the production and simultaneously the efforts for minimizing the environmental impact and for saving costs make the sensor systems the best. Wireless Sensor Network is widely used in electronics. The design to implement for monitoring the growth of canopy using sensor network which manages information. The use of crop sensing technology in grains, cereals and other production this is one technique to increase plant health and yield potential. Sensors measure the needs of your crop and provide application rate recommendations for their needs in real time to maximize your profit.

1.1 Problem Definition

This project aims to measure and record data about crops in real time using the reflectance of light shined on the growing plants. Sensors can be installed across the application boom to collect information while driving through the POTS. The data is logged and mapped to be used in further analysis – or for real-time variable rate applications. This kind of data is the key to precision farming. Collect information in the fields, analyse and then make decisions based on the data .This helps growers based on crop vigour. For example, the sensor tells the applicator to apply less nitrogen on healthy corn plants and more nitrogen on weaker, unhealthy corn plants, according to a calibration specific to that field.

1.2 Scope and Limitations

This system involves three phases such as collecting the sensor readings, calibration and displaying on the application aims to measure and record data about crops in real time using the reflectance of light shined on the growing plants. Sensors can be installed across the application boom to collect information while driving through the field. The data is logged and mapped to be used in further analysis – or for real-time variable rate applications. This kind of data is the key to precision farming. Collect information in the fields, analyse and then make decisions based on the data .

New innovative IOT applications are addressing these issues and increasing the quality, quantity, sustainability and cost effectiveness of vegetation production. For example, leverage IOT to remotely monitor sensors that can detect soil moisture, crop growth and livestock feed levels, remotely manage and control their smart connected harvesters and irrigation equipment, and utilize artificial intelligence based analytics to quickly analyse operational data combined with 3rd party information, such as weather services, to provide new insights and improve decision making**.**

Problems in existing system are as follows: Implementation of the system in a compact manner., calibration of the constant readings given by the sensors, storage of the vales into the database which would be displayed in the application for the user, smooth working of the information flow.

2. Overview of Proposed Systems

Process:

Step 1: The sensors i.e temperature & humidity sensor, soil moisture sensor, light sensor are placed near or in the soil. These sensors send reading to the server.

Step 2: The range for all the sensors i.e temperature, humidity, soil moisture & light are set by the user with the help of information provided in the website.

Step 3: The readings which are generated by the sensors are sent to the server to compare with the prescribed range set by the user.
Step 4: There is an alert messaging system which sends a message to the user after 300th reading. An average is then taken of the 300 readings and an output is generated. This output might be in the range or out of it, a message is sent to the user accordingly. After the 301th reading, the previous 300 readings are truncated and the counter is restarted.
Step 5: According to the alert message sent, instructions given should be carried out to ensure proper growth of the plant.

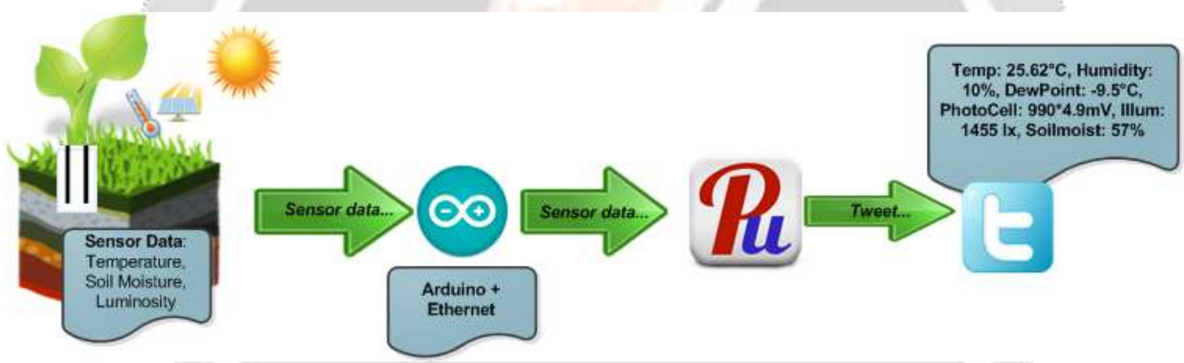

Fig -1: Proposed System

2.1 Architecture of Book Recommendation System

The system architecture is as follows:

The user wishes to monitor the growth of the plant. The sensors are placed near the soil or in it. There are 4 different sensors to monitor elements such as the temperature, humidity soil moisture & light. The sensors log the data into the servers. The server has tables for 4 different sensors to store their reading.
The website which is created has a section to preview the data log when the user logs in. There is a page where you need to set the range of all the four elements. The data which comes from the sensor are compared to the range which is set by the user.
The average of the data is taken after every 300 data entry in the table. There is an alert message sent at the 301th reading. This message sent is according to the average taken and the result obtained from it.
The user is given instruction in the alert message according to which steps need to be carried out.

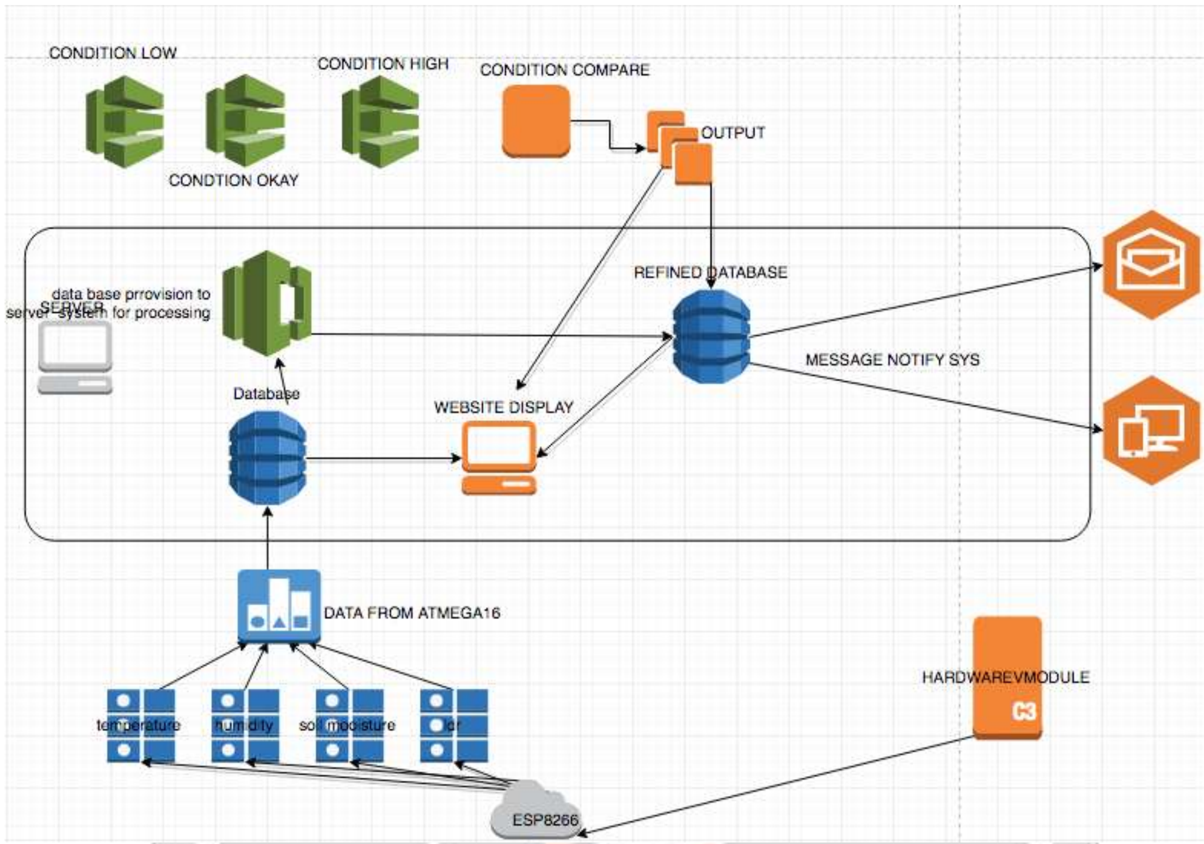

Fig -2: Architecture of System

3. MODULAR IMPLEMENTATION

The basic idea underlying modular design is to organize a complex system (such as a large program, an electronic circuit, or a mechanical device) as a set of distinct components that can be developed independently and then plugged together. Although this may appear a simple idea, experience shows that the effectiveness of the technique depends critically on the manner in which systems are divided into components and the mechanisms used to plug components together. The following design principles are particularly relevant to parallel programming.

3.1 Module 1: Hardware setup

The module 1 is the hardware setup of the VHM. It consists of the board with required sensors and the microcontroller with the wifi module for transmission. The sensors include the LD for sunlight, ambient temperature and humidity sensor and the soil moisture sensor. These will be connected to the microcontroller and thus the calibration and comparison and aggregation of the values will take place simultaneously, to give an appropriate solution or output. The module is implemented in the following manner:

3.2 Module 2: Data Flow

The module 2 is the overall setup of the system and how the flow is actually going to take place. The generation of the data from the senors and the loading of the data into the database would take place with the help of the server. The values would be caliiberated and fit into the database for the generation, of aveare records which would be compared to the prescribed data, and thus an appropriate solution for a particular plant would be given.

3.3 Module 3: Server processing

The module 3 consists of the server working of the system. The server module is most crucial because the sensor values will be stored in the server. The sensor generated continuous values which is constantly being fed and stored. The separate sensors, will be maintained I a separate manner and hence will be calibrated in the same format.

4. CONCLUSIONS

What this project introduces is a remote smart pot system combining network technology & control technology, which, compared with the foreign and domestic similar technologies or products, is innovative to some degrees: Different from existing foreign and domestic systems or products of the same kind, it is a real remote wireless smart pot with all operations completed through a website. This system can facilitate the end user with real-time information. This information can be accessed from anywhere around the work over the internet. This approach will play a greater role in the gathering of environmental information, and will help in the development of agricultural information resources. It is a compact system, no need to worry about heavy equipment or a complicated circuitry. It is portable enough to remove the sensors from one plant and plant them in another plant. It helps in keeping track of the plant's health and make sure it contains the right amount of water & fertilizer. The information of the amount of water needed & sunlight required is mentioned in the website. We have implemented an alert system in which even if any one or more sensor reading is out of the range prescribed, an alert message will be sent to the user. This message will contain the necessary steps to be taken to keep the plant healthy.

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