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Smart Agriculture Using Evana Sensor and Decision Tree Algorithm

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Abstract: *Checking of ecological factors is vital throughout the most recent couple of many years. Specifically observing agrarian conditions for different factors like temperature, dampness and pH esteem alongside different components can be of more importance. A traditional approach to measure these factors in an agricultural environment meant individuals are taking measurements manually and checking the mat various times. Soil investigation is the significant job for ranchers to develop and deliver to the legitimate harvest. In this paper the soil condition and nutrients level in soil are analyzed by EVANA Sensor. By doing so the decision tree algorithm is predict the nutrient level, crop grown and accuracy level.*

Key Word: *Data Mining, Decision Tree Algorithm, Data prediction*

I. INTRODUCTION

Automated soil testing device is an electronic device which can be used to measure moisture, humidity, temperature values to ensure the fertility of soil in the field of agriculture to select the suitable crop and also the type of fertilizer to be used .the ionic particles present in soil sample are sensed by sensor and the output of sensor is processed by signal conditioning circuit. Nowadays, awareness about implementing technology for agricultural environment has increased into the industries.

Automated soil testing device is a portable device which can be used either in laboratories or on the identified spot selected for farming so that the farmer need not take the pain of visiting the soil testing laboratories which are normally located in district headquarters. Automated soil testing device is a simple and user friendly device so that any person can test the soil without the presence of an operator, it is an economical device and thus a common man can easily afford it. Manual collection of data for desired factors can be sporadic, not continuous and produce variations from incorrect measurement taking.

II.RELATED WORK

1. TEST IMPLEMENTATION OF A SENSOR DEVICE FOR MEASURING SOIL MACRONUTRIENTS

In this paper, we have presented the architecture of our proposed sensing system design. We have presented the detail working procedure of the soil macronutrient measurements and remote data collection system. The results obtained from our developed sensing system are almost accurate and very close to the laboratory test readings. However, the measurement using our current sensing system is limited by only three macronutrients of the soil and it requires soil solution, which needs to be prepared in a chemical laboratory. In future, we will concentrate to test more number of soil macronutrients and explore the way to measure the soil nutrients without requiring any chemical laboratory-based solution.

2.RECENT ADVANCES IN CHEMICAL SENSORS FOR SOIL ANALYSIS: A REVIEW

Updates on applications of chemical sensors, biosensors, and bioassays for soil analysis reported over the last two decades have constituted the present review. Chemical sensors are of great interest for many high-impact social and economic fields. The rising levels of pollution due to expanding economies, along with the ongoing tightening of air, water, and land quality standards, have supported the high demand for chemical sensors (Mordor Intelligence, GLOBAL CHEMICAL SENSOR MARKET, 2021–2026). In fact, the sensor market over the last decade has been experiencing a constant increment, with a nearly five percent increase per year. In 2020 it was valued at USD 21.39 billion, and is expected to reach a value of USD 32.96 billion by 2026, with growth of 7.51%. The latest trends in chemical sensors' applications for soil analysis underpin the great potential of these devices, due to their simplicity, low costs, and sufficient selectivity, allowing rapid, nondestructive, and user-friendly assessments of soil vulnerability and quality parameters, such as contents of main soil nutrients and pollutants, soil mobile fertility, microelement contents and bioavailability, moisture, salinity, and pH.

3. OPTICAL SENSOR BASED SOIL NUTRIENTS AND PH LEVEL MEASUREMENT SYSTEM

We have designed and constructed an optical sensor based soil nutrients and pH level measurement system. When compared with the existing measurement system the amount of difference of the measurement was found minimal. From agriculture and plantation point of view such small variation has no impact and is absolutely acceptable. Therefore we validate the correctness of the newly designed measurement system. The biggest advantage of this system is its ability to digitize the

measured data. The measured data can be displayed and can also be sent to the computer for further processing and storage. By this kind of digitization we will be able to observe how the soil is qualitatively changed in different seasons, after growing certain crops, after any natural calamity or over very long period of time. Information on the impact of surrounding environment (e.g. presence of industry), cultivation of certain crops and global climate change on the qualitative change of the soil will be valuable for future research on agriculture and environment.

4. AUTOMATIC SOIL NUTRIENTS AND CROP DETECTION MANAGEMENT SYSTEM USING IOT

The IOT Based "Automatic Soil Nutrients and Crop Detection Management System using IOT" This paper reveals, but outrageous laboratory soil can be shipped to an inexpensive and value-effective soil control exploitation package to take a look at. The package is designed and the device is also coded and checked, taking into account all potential error occurrences. The soil sample is taken by the expected method since the input carries out victimization reagents for the chemical reactions. The color sensors detect related variations in the color of the sample and address them using quantitative analysis techniques. The soil wetness detector and the temperature detector were used jointly to analyze the degree and temperature of the wetness. A GPS was used to obtain the sector condition in order to realize the weather forecast from the nearest meteorological observation. The research has prompted the farmers to have different indications that finding the soil reports victimization mobile IoT - cloud-based mostly soil package - instead of counting on time daunting lab soil paper. In addition, in the system, chemicals and sensors are used rather than chemical sensors to make it reasonable for the tip farmers. Conjointly the special planning of the kit has increased the property of the system.

III.MATERIAL AND METHODS

Decision tree is the most powerful and popular tool for classification and prediction. A Decision tree is a flowchart like tree structure, where each internal node denotes a test on an attribute, each branch represents an outcome of the test, and each leaf node (terminal node) holds a class label.

In Decision Tree the major challenge is to identification of the attribute for the root node in each level. This process is known as attribute selection. We have two popular attribute selection measures:

- Information Gain
- Gini Index

The logging of data allows for reduction of data being lost or misplaced. Also it would allow placement in critical locations without the need to put personnel in hazardous situations. Monitoring system scan ensures quicker response times to adverse factor sand conditions, better quality control of the produce and a lower labour cost. The utilization of technology would allow for remote measurement of factors such as temperature, soil moisture, water level and pH Value. Different organizations and researchers find the root causes for decrease in yield and tried to develop the efficient system that will help to increase the production.

IV.RESULT

In this project Decision tree algorithm is proposed to predict the nutrient level, crop grown and accuracy level.Growing concern about environmental pollution by inordinate use of diseases lead to increases in requirements to cover soil nutrients needed for crop growth. The detector network technology will help the growers to know the soil conditions which will help them take better opinions and preventative measures at the right time. This will lead to tremendous enhancement in the crop productivity. This, intern, will save their time, labour, plutocrat and make effective use of coffers.

V.CONCLUSION AND FUTURE WORK

Soil Testing Device has been developed for soil testing of agricultural farm. The pH values vary from one type of soil to others. The pH values of soil sample are measured in real-time and compared with the pre-stored values received from the agricultural department. The system also provides the information about the crops that can be grown in respective soils. And that the Decision tree Classifier executes the prediction process with high accuracy. In future this process of analysis of data is done which are stored on Cloud and after getting the results, decisions are taken that which crops will be suitable for that particular environment where farmers will irrigate the crops. Farmers can analysis and see the result of parameters using cloud Storage values and then the values for future reference.

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