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Soil and Water Test based Seed Suggestion and Fertilizer Selection

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ABSTRACT: Agriculture is the of cultivating the soil and raising crops. The current agriculture system has a fixed way of manure preparing. We are proposing a new method that tests the soil and water parameters before every manuring process. This project detects both the nature of the soil by collecting samples from the field and provides a suitable fertilizer to increase the yield. Soil and water testing can provide important information about the fertility of the soil and the quality of the water, which can in turn help determine the types of seeds that will perform best in a particular location. The parameters of the NPK sensor, PH sensor, Moisture sensor, and temperature sensor are used for analyzing the nature of the soil.

KEYWORDS: NPK, Soil testing, Water testing

I. INTRODUCTION

An NPK sensor is a device that is used to measure the levels of nitrogen (N), phosphorus (P), and potassium (K) in soil. These three nutrients are essential for plant growth and are often added to soil in the form of fertilizers. The NPK sensor can help farmers and gardeners determine the levels of these nutrients in their soil, allowing them to make informed decisions about fertilization and crop management.

Soil testing: A soil test can provide information on the pH, nutrient levels, and organic matter content of the soil. Based on the results of the test, you can choose seeds that are well-suited to the soil conditions. For example, if the soil is acidic, you may want to choose seeds for plants that thrive in acidic soils, such as blueberries or rhododendrons. If the soil is lacking in certain nutrients, you may want to choose seeds for plants that are known to be good at scavenging those nutrients from the soil, such as legumes.

Water testing: Water testing can provide information on the pH, mineral content, and other characteristics of the water. Based on the results of the test, you can choose seeds that are well-suited to the water conditions. For example, if the water is alkaline, you may want to choose seeds for plants that are tolerant of alkaline soils, such as asparagus or cabbage. If the water is high in minerals, you may want to choose seeds for plants that are known to be tolerant of mineral-rich soils, such as tomatoes or peppers.

The Paper is organized as follows. Section II describes the related work done in different papers. The components and the methods used for implementation are given in Section III. Section IV shows the results and Finally, Section V presents the conclusion.

II. RELATED WORKS

The productivity of the crop depends on the factors of soil and environment. Several diseases that affect the growth of plants in the field. This paper provides a suitable Fertilizer to prevent the occurrence of the disease in plants. This method has a higher prediction rate as it depends on environmental factors. [1] Agriculture contribute to the GDP of our country. The nature and of nutrients present in the soil contributes to productivity. Hence this paper mainly focuses on the identification of nutrients present in the soil. The evaluation of essential nutrients present in the soil is done by



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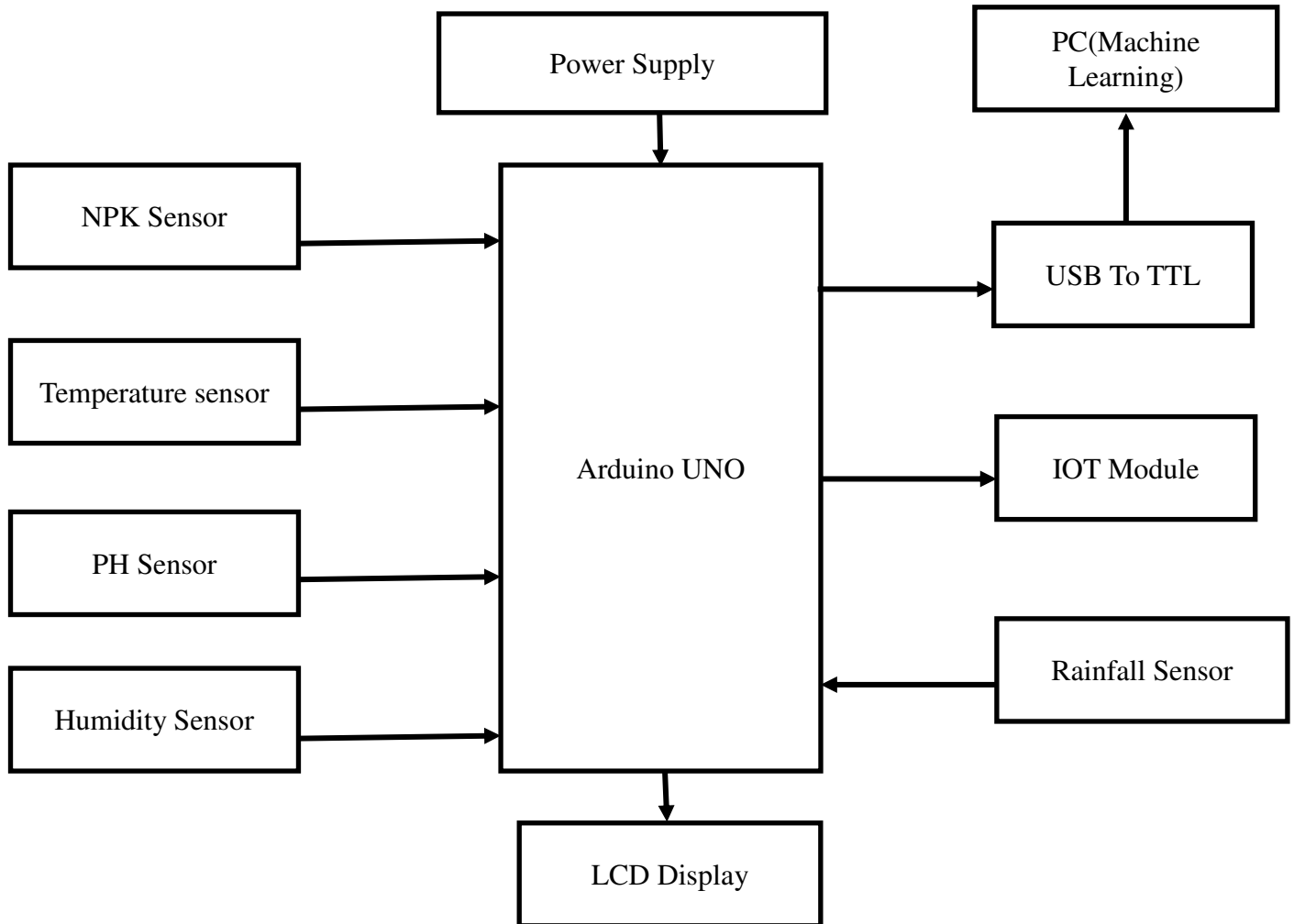
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using suitable smart sensors. Insufficiency in the number nutrients leads to various effects on the crops. Therefore the analysis of the soil helps in maintaining the health of crops and also increases productivity.[2]Agriculture is the backbone of our Country. There are variations in the climate throughout the year. The variation in the climatic conditions affects the growth of the crops. Therefore it is necessary to monitor the changes in the climate. This paper proposes a smart agricultural practice that helps the crops to adapt any climatic conditions. Sensors are used to monitor the parameters and the moisture content of soil. The obtained results are used for effective agricultural practice.[3]The testing of soil is a very important process in agriculture. This paper proposes a new technology that uses a mobile application to test the soil. It consists of a sampling device to test the samples from the soil. The soil is tested to determine the nature and the nutrients present in the soil. This paper includes the implementation of the robot which helps in the collection and estimation of samples over a large area of fields. As a result, an accurate value of nutrients present in the soil is determined.[4]Agriculture contributes to the GDP of a country. Therefore it is necessary to improve productivity. The prediction of the parameters helps in improving the yield. The soil parameters include the nature of the soil, nutrients, and the PH value of the soil. This paper uses IOT technology with sensors to predict the yield. It detects the PH and temperature values. This prediction helps the farmers to increase their profit.[5]This paper proposes the utilization of water resources for agricultural practices. The lack of water in China aims at an effective usage of water for agriculture. It aims at improving the yield with the available water resources. It improves the efficiency of the nutrients and provides a suitable technique to overcome the scarcity of water. It provides an overall development in agriculture.[6]

III. METHODOLOGY

Arduino UNO is used for Interfacing the different Sensors namely NPK Sensor, PH sensor, Humidity Sensor, Temperature Sensor, and Rainfall Sensor. The data collected from all the sensors are displayed using the LCD Display. The analyzed data is to be given to the Python IDLE for suggesting the appropriate seed and fertilizer. IOT is used for displaying the output for the farmers through a mobile application. NPK Sensor (Nitrogen, Phosphorus, Potassium) is used to check the soil quality, and the PH sensor to check the water quality level. All the data are sent serially to the controller for machine learning (pc). Through machine learning, we predict the suitable seed and the fertilizer. And finally, we have to update all the data collected from the sensor to check all the information through an application. As a result, a suitable seed for the field is suggested and an appropriate fertilizer is also recommended.

Figure 1 Block Diagram



IV. EXPERIMENTAL RESULTS

Figure A represents the Arduino connected with the NPK sensor, Moisture Sensor, Temperature Sensor, Rain Sensor, and LCD Display for output, Figure B represents the Experimental Setup and Figure C represents the LCD Output Display which shows the temperature, humidity, rain, nitrogen, potassium, phosphorous values.



Figure2 Arduino and Sensors connected kit



Figure3 Experimental setup

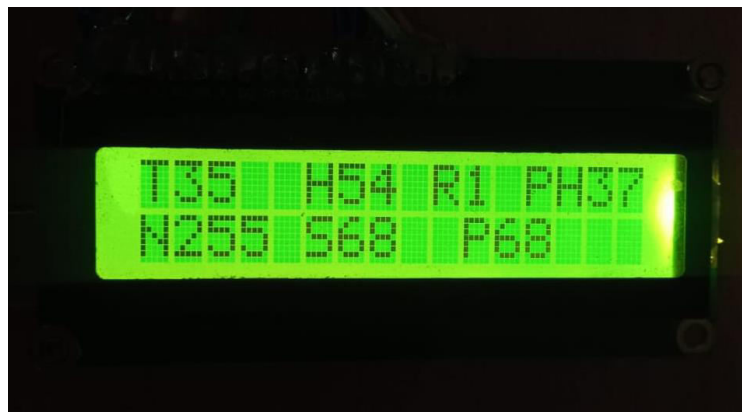


Figure4 LCD Output Display



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V. CONCLUSION

We have implemented a technique from the different parameters of the soil and water for suggesting suitable seeds and for selecting the appropriate fertilizer. Our algorithm successfully selects the seed for different types of soil and provides the fertilizer.

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