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Organic Manure : A Natural Fertilizer out of Leaves based on Cloud

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Abstract –Within the later times, Indian government has carried out certain show that the most issue related to edit development is inadequacy of fertilizers conjointly their fetched. There's need of balance between the request for supplement and the diminish in providers. For horticulture to preserve the wellbeing of the soil and the trim production is the challenge for up and coming times. Due to intemperate utilize of inorganic fertilizers, pesticides, etc. has brought about within the wellbeing of human, soil and environment which are been influenced a parcel. There's a diminish in edit surrender since the ripeness of the soil is influenced were much due to manufactured cultivating. Here we are attending to plan an observing circuit utilizing GSM module. To distinguish takes off droppings in an expansive zone we utilize three TCS3200 colour sensors. After colour discovery, the information is being put away and examined. Other parameters were too being utilized to gather the data related to decomposition. We measure PH level, ambient temperature, relative humidity, and dew point. Our developed cloud platform was used to monitor the remote areas. Our whole project is based on real time on site monitoring to the cloud platform.

Keywords – leaves compost, wireless sensors network, sensors, organic manure, cloud storage, cloud computing ,agriculture.

1. INTRODUCTION

Organic fertilizers are the first choice for farmers to provide the plants with the required amount of nutrients. It was widely used for growing crops. They strengthen the soil, which in turn provides essential phytonutrients for the plant. Organic fertilizers also increase the resistance of soil to retain moisture and help improve soil drainage. They have the ability to provide organic acids that help dissolve the soil nutrients themselves and can also be used for plant growth. Organic farming is

carried out by this such kind of organic manures. Decomposition of leaves can be beneficial for the soil as well as plant growth as it reduces the toxicity of the soil and prevent it from thickening , through secretion of the nutrients in leaves , which maintains the acidity and alkalinity of the soil. As degradation of leaves for organic manure from fallen leaves from trees detection of leaves using sensor and decompose leaves and manure is produced. Decompose leaves using sensing circuit to measure soil moisture, soil temperature, atmospheric temperature, relative humidity, and dew point. Once the leaves are completely decomposed and our manure is ready before using it , we will check what proportion of nutrient value does the manure have ? It helps us to know how much fertilizer should be mixed with cultivated land. Fertilizer contains nutrients stored in the clouds. With this in mind, we use organic fertilizers that grow crops accordingly, based on the three major nutrients that exist (nitrogen, potassium and phosphorus). Using the NPK sensor, you can easily calculate the amount of nitrogen, potassium and phosphorus present in the soil. Information is also stored in the cloud. This fertilizer can be used to grow crops, according to some information.

2. RELATED WORK

In this segment , the project's conceptual method of carrying out the whole process of organic manure based on cloud monitoring system is been known .Step by step dectection of leaves through color sensor , then moving towards the proper decomposition and finally then we measure the NPK content in manure . Variant papers were been available that contain such information on the whole process. Some of the reference paper are been discussed below.

2.1 Here, author states that the agricultural sector is important for the economic growth of agriculture in countries like South Africa. Agricultural problems are directly proportional to food prices and consumer health. Through this work, we learned about the problems associated with soil fertility during food production. It is important to understand that leaf debris can be broken down in soil as fertilizer, so this paper described the process and end results. The compact cloud monitoring circuit was developed using the GSM / GPRS module. Uses three TCS3200 color sensors to detect leaf droppings over a wide area. After color recognition, the data is saved and analyzed. Other parameters were also used to collect decomposition information. Measures pH, ambient temperature, relative humidity, and dew point. We used the cloud platform we developed to monitor remote locations. Our entire project is based on real-time onsite monitoring on a cloud platform [1].

2.2 Their view on this paper are for the benefits is to monitor the quality of soil that is extensively agriculture land by using wireless data communication the needs are been made. It will help us to maintain and installation the system. This study aims on creating a wireless sensor technology based on IOT(internet of things) for monitoring the pH and humidity in agriculture soil. The system is been designed using master and slave nodes that act as a communication tool through RF433 MHz radio module. Each slave node consists of pH sensor and YL69 sensor that are use to measure soil moisture. All collected data is sent from the slave node to the master node, where the data is processed by the Ethernet shield. Therefore, the stored data can be accessed from anywhere via a web application. The maximum range of the RF433MHz radio module is 50 meters to receive data from the transmitter. The cloud monitoring system can display pH and soil moisture values in real time, with error averages of 1 and 1.66 analyzer and , respectively. [2].

2.3 This document describes how plants can increase their fertility. It is important to determine the NPK value. H. The amount of nitrogen (N), phosphorus (P), and potassium (K) required by the plant. You need to determine the pH. The amount of fertilizer required for a crop can be determined in the laboratory by measuring the concentration of H + ions with a pH meter. It helps improve soil quality and crop yield. In this project, the NPK components present in the soil are determined using a color sensor with optical fiber. A pH sensor was used to find out the pH of the soil. Detection of NPK depends on the absorbance of the solution. [3]

2.4 Wireless sensor networks feature flexibility and scalability in any environment. These sensors play an important role in collecting the data that the sensors send to the surveillance system. This paper proposes reliable models for monitoring humidity and humidity in agricultural environments. Establish data source trust using public keys and digital signatures. The data generated by the sensor is real-time based on the environmental monitor and further analyzed according to your requirements. [4]

3. PROBLEM STATEMENT

The aim of this system was to monitor the fallen leaves of plant on ground to make manure. Here ,the leaves are been detected by using color sensor for segregating them on the basis of red, yellow and brown color. To carry out the proper decomposition process , we check the soil moisture, humidity and temperature by using respective sensors. Further to know the nature of manure , where we get the information if the nutrients are been present in our organic manure. The appropriate value of nitrogen, potassium and phosphorous content in the manure is been detected using NPK

sensor. At last all the sensed data from the sensor are been stored on cloud platform through the help of wireless network i.e. GSM module and WiFi module with the interconnection of Arduino Uno microcontroller.

4. MOTIVATION

The most important thing in agriculture is soil fertility, which must be of high quality. Today, farmers have switched from artificial fertilizers to organic fertilizers. They do not harm plants or increase soil fertility harmlessly. As we know, organic fertilizers help improve soil structure, increase water retention capacity and protect land from soil erosion. Comparing chemical and organic fertilizers, they are cheaper and may be free. Organic fertilizers help recultivate alkaline soil when applied to barren land. It actually takes nitrogen from the atmosphere and eventually activates the soil in low nitrogen conditions, adding yield to the crop.

Current scenario:

1) Farmers rely heavily on fertilizers to meet the need for good yields.
2) Despite the continued use of these harmful chemicals, it sometimes causes crop death and can also prove to be dangerous to humans.
3) Leaf composting is better than burning because it is good for a sustainable environment.
4) It was difficult to keep regular records of farmland, the problem was solved by using cloud-based storage for remote monitoring.

By keeping all this thoughts in mind , our chosen topic is " Organic Manure : A natural fertilizer out of leaves based on cloud"

5. PROPOSED WORK

The proposed system prepares manure to help run the process. Color-based leaf decomposition is recognized by color sensors. Soil and atmospheric temperatures for proper leaf decomposition are known

by humidity, temperature and humidity sensors. The type of fertilizer processed is recognized by the pH sensor. Nutrients present in the soil are recorded by the NPK sensor. All sensor readings are stored in cloud storage connected to the GSM module, allowing users to see the sensor from anywhere on the wireless network. Here, we will implement the entire project using a three-tier architecture. The first layer is the front end, which consists of different sensors for communication between the collected data and the microcontroller and acts as a gateway through the wireless communication module. The second layer, the gateway, also consists of a microcontroller. The microcontroller meets the processing and storage needs of the so that all the collected data is transferred to the cloud server for analysis.

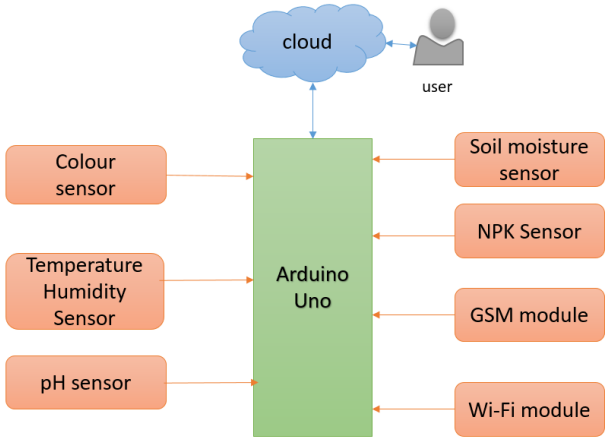

Fig :- 1 proposed system diagram.

In the development of organic fertilizers, various parameters such as color sensor, soil moisture sensor, temperature / humidity sensor, pH sensor, and NPK sensor are used to make a complete judgment of the condition of the field and environment. Various sensors are used in the field to measure these parameters. Example:

We measured these parameters using various sensors. for example. :

1) Color sensor: Detects the color of leaves before disassembly.

2) Temperature sensor: Detects the temperature of the soil and knows the appropriate value for decomposing the leaves.

3) Humidity sensor: Measures the humidity of the environment. This helps to speed up the decomposition.

4) Moisture sensor: Measures the characteristics of the soil to understand the moisture content present in the soil.

5) pH sensor: Determines the type of fertilizer and grasps the minerals contained in the fertilizer.

6) NPK sensor: Determines the appropriate levels of nitrogen (N), phosphorus (P) and potassium (K) in fertilizer.

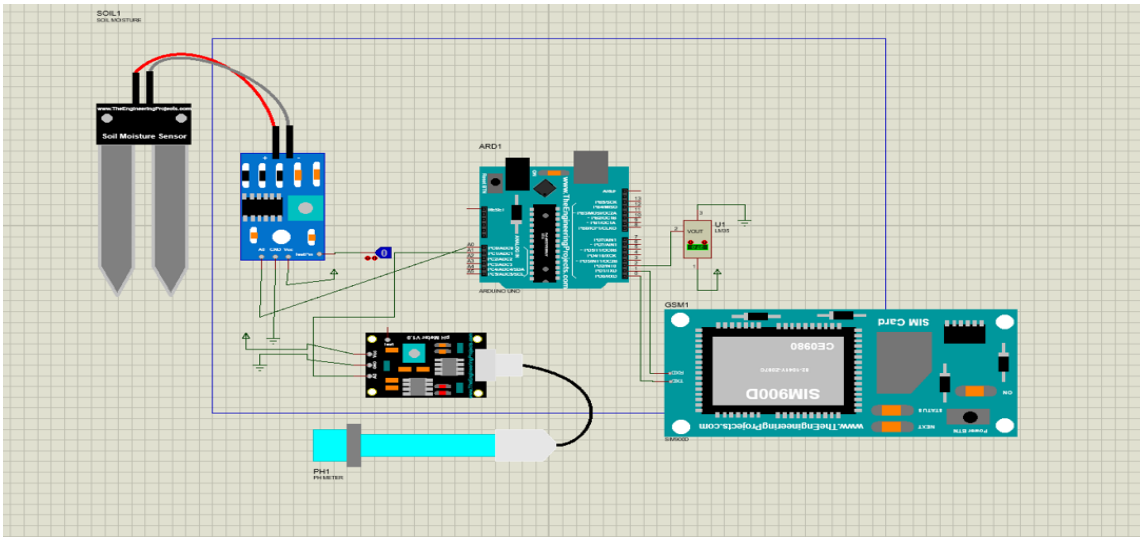

Fig : -2 circuit diagram.

In this three-tier architecture

implementation, the first tier consists of data acquisition from various sensors. The second layer is called the gateway layer. The third layer is the backend layer to which the cloud storage is connected.

A. *The layer 1*

Layer 1 is essentially the front-end layer, which contains the data collected by the sensor and the result of the collected data implemented in the field.

• Color sensors are used to detect the correct color of the leaves. In this project we are going to use TCS3200 which is a 8pin colour sensor ,it uses photodiodes that helps to detect the colours. The detected colours are then been displayed on the computer and that are been connected with Arduino Uno micro controller as shown in fig below.

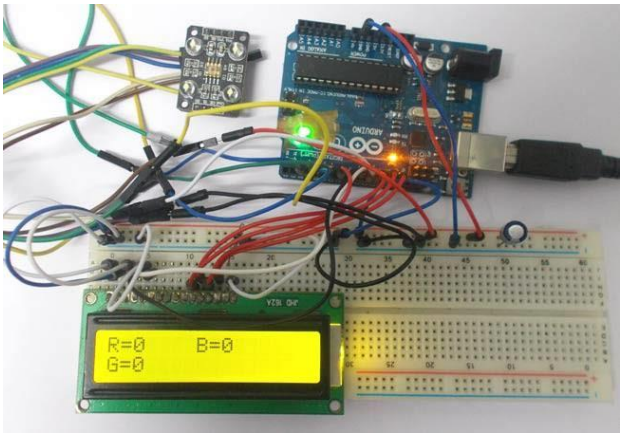

Fig :-3 colour sensor connection with Arduino .

- A soil moisture sensor was used to estimate the volumetric water content in the soil and perform appropriate leaf degradation. The appropriate frequency range should be between 500 and 750. Figure 4 shows the connection.

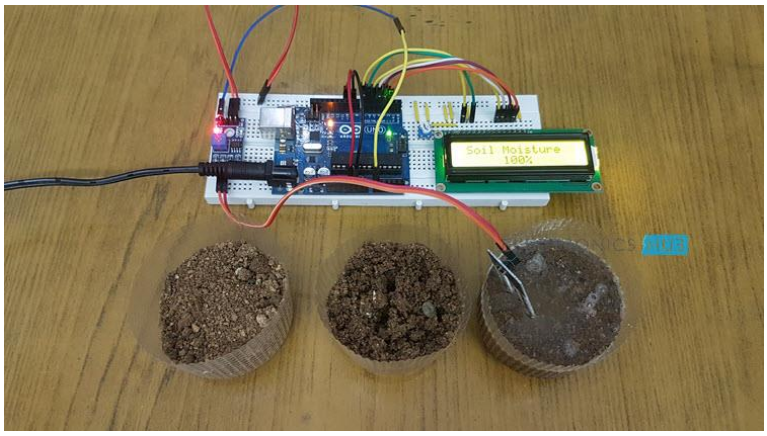

Fig :- 4 soil moisture sensor.

- To calculate humidity and temperature (DHT22), measure the ambient air, which plays an important role in the decomposition process. As the graph below clearly shows, the temperature measurement range is between 40 ° C and + 125 ° C, which gives an accuracy of +0.5.

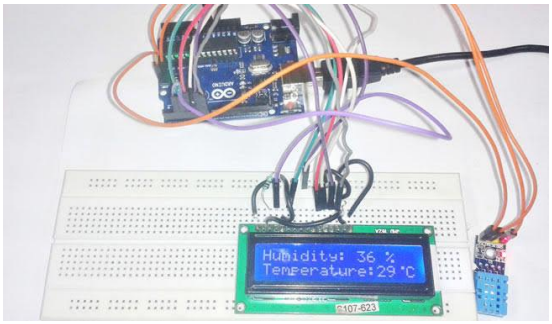

Fig:- 5 DHT sensor

- The pH meter is used to calculate the condition of the soil, so you can know the nutrient deficiency of organic fertilizer. Performing this process also supports plant growth. If the pH meter shows a range of 6.5 to 7.2, the fertilizer contains important nutrients and can be mixed on the farm to further increase the fertility of the soil.

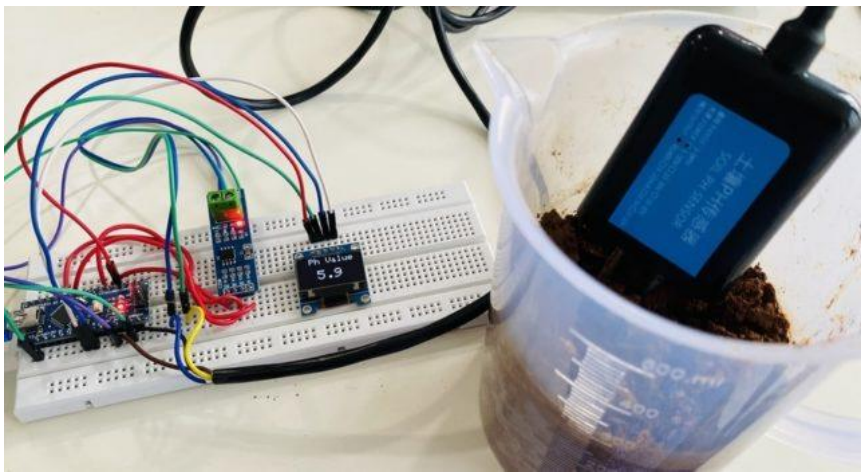

Fig :- 6 pH meter

- The NPK sensor detects basic nutrient levels such as nitrogen (N), phosphorus (P) and potassium (K) in fertilizers. These three nutrients are very beneficial with each plant growth, so you need to add the right amount of fertilizer, including the balance of these nutrients. This sensor insert makes it easy to calculate the value.

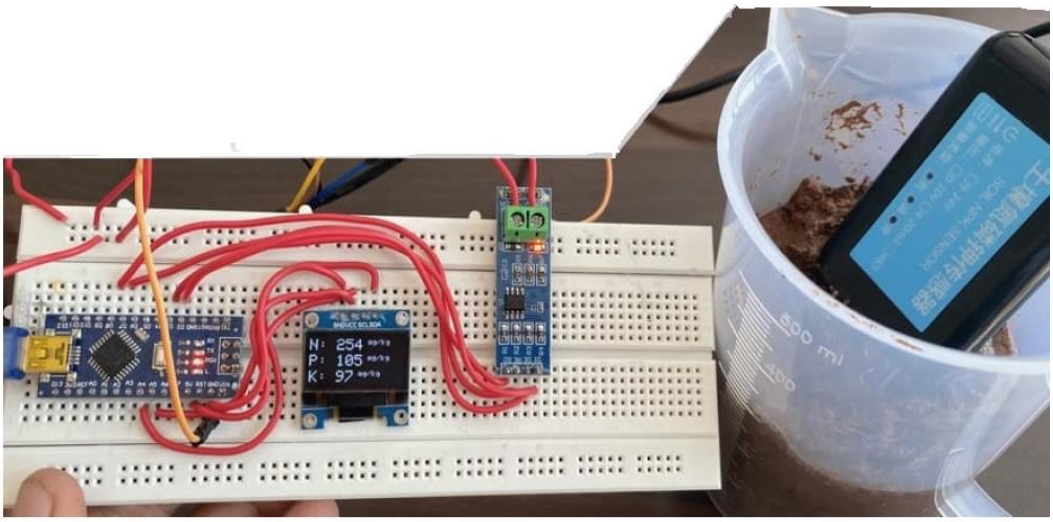

Fig :- 7 NPK sensor

B. *The gate way layer*

The 2nd layer is called as gateway layer. It acts as a communication barrier between the front end and back end layer , it is performed by microcontroller Arudino. Here in this project we are using Arduino Uno as main processing unit. All the sensors that will be interfaced with this controller and will act as a receiver from the sensor to communicate the sensed data to the cloud based datastorage. Due to its feature to send and receive the data from the cloud storage through the help of GSM module , most of the farmers and the users found it fruitful for monitoring and controlling the on site work.

Fig :- 8 microcontroller Arduino Uno

The gateway tier acts as an interactive tier for communication between the cloud and the frontend tier. The data collected from the front end is sent directly to the cloud data storage backend (where you can visualize data, processed data, and data center allocation for analytical purposes) and the front end interface. increase. Users can track the condition and treatment of fertilizers. In general, data processing can be done by comparing the collected data values to thresholds, and based on this data analysis, the information is displayed in the appropriate application so that the user treats it as a state. .. The gateway implemented using a microcontroller and the communication barrier between the backend and this layer are provided by the GSM and WIFI modules

Fig :- 9 GSM module.

C. The 3rd layer of our system

This part of the project uses the open source software ThingSpeak, which allows users to communicate with Internet-enabled devices. This allows users to instantly visualize the stored data, making it easy to monitor all the data collected from various sensors. It works on private and public channels that you can use to share your data with others. Once the data is stored here, users can analyze and visualize the data and compare the new data with the old data via the wireless network module

6. RESULTS

It collects fallen leaves and separates leaves such as green, red, yellow and brown leaves with a color sensor. After that, the sensor checks the soil moisture, humidity, and temperature. The leaves are decomposed by checking the soil with a sensor. Nutrients present in the soil are transferred to the cloud server ThingSpeak. The user needs to log in and connect the WiFi module to the server. Users can use it anywhere.

Sustainable development is committed to development, recognizing the importance of taking responsibility for the environment in which we live. Recycle the leaves of plants containing the nutrients contained in the fertilizer into harvestable vegetable foods and dry matter, preventing the fertilizer's contribution to deterioration of air and water quality. Soil is an important source of nutrients that plants need to grow. The three main nutrients are nitrogen, phosphorus and potassium. Together they form a trio known as NPK. Other important nutrients are calcium, magnesium and sulfur. Plants also require small amounts of iron, manganese, zinc, and copper, known as trace minerals. Plants need only those traces. This advanced technology allows you to easily monitor fertilizer production and obtain fertilizer quality that is significantly better than commercially available packaged fertilizers.

GUI MODEL :

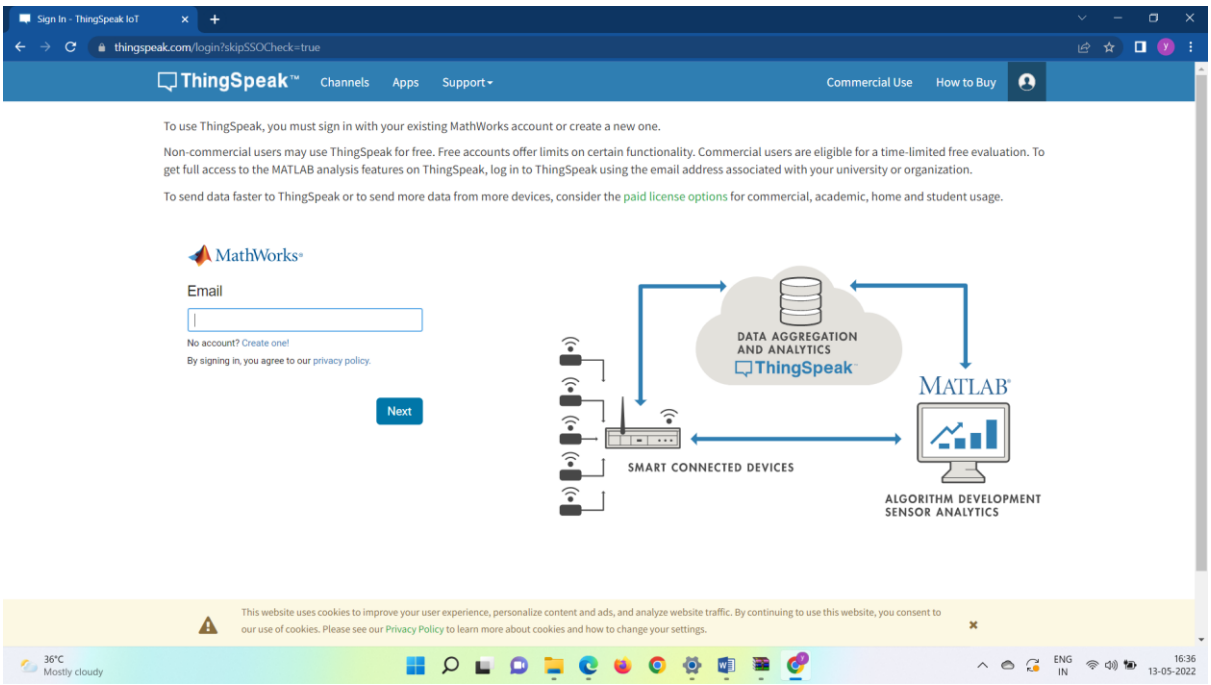

Fig :- 10 Login Page.

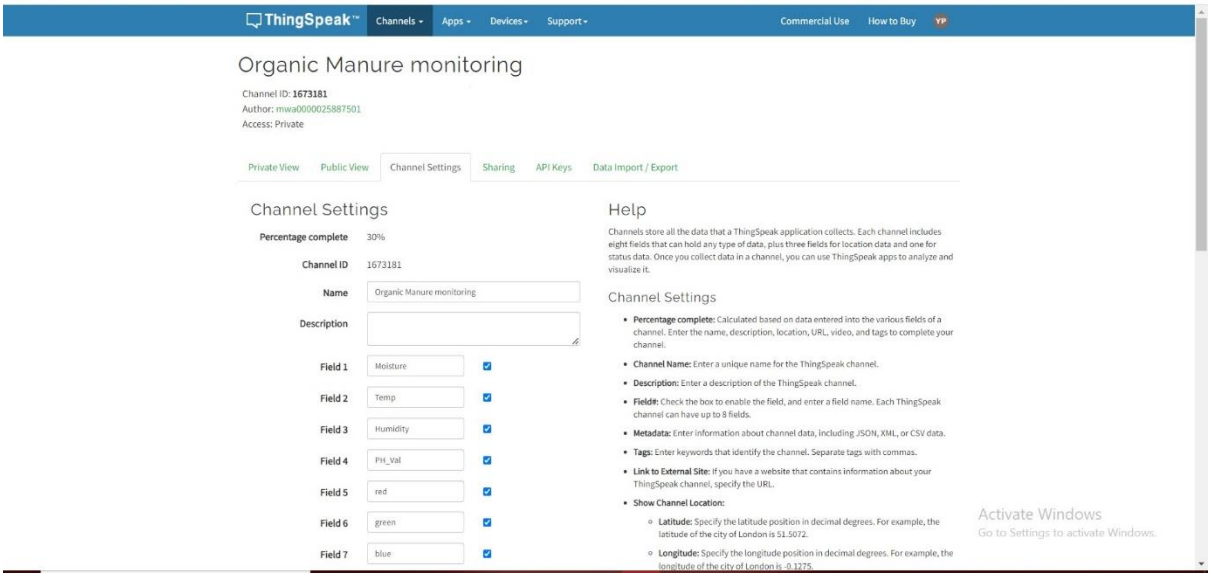

Fig :- 11 Creation of Channels

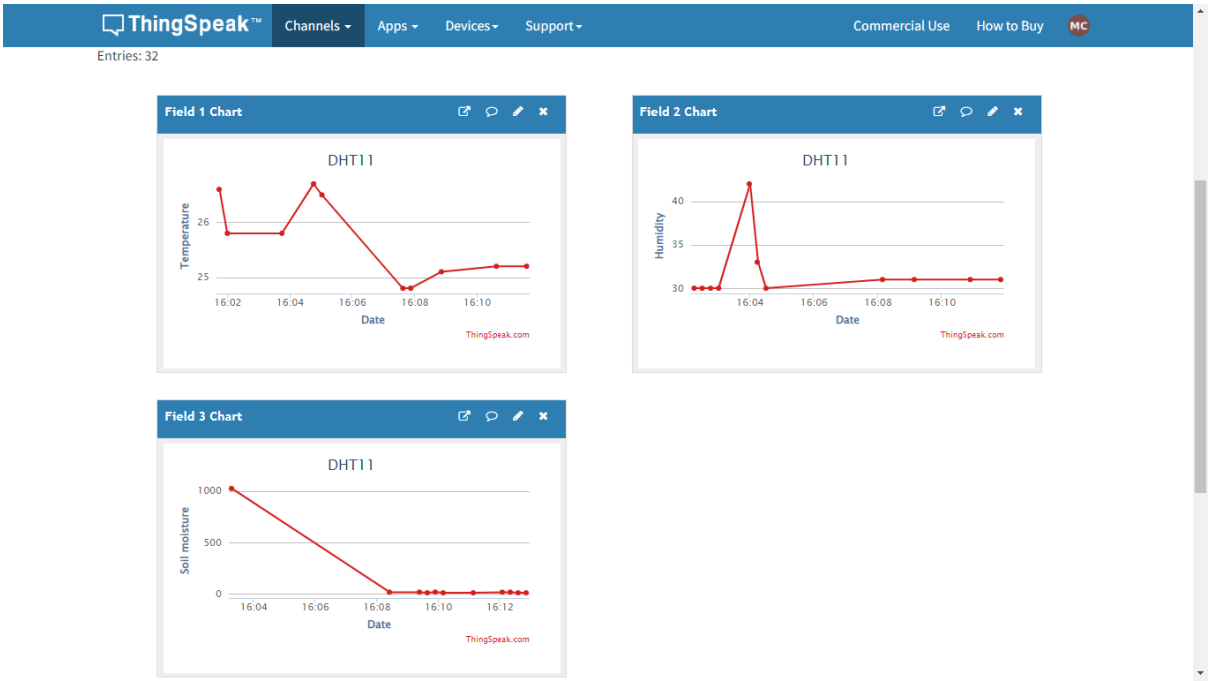

Fig :- 12 Graphic Representation of Sensor Readings.

7. CONCLUSION

From now on, we can see that organic fertilizers help improve soil health, air circulation in the soil, and drainage channels. The ingredients in the slurry increase the ability of sandy soil to retain water quickly and without dripping, increasing stability and porosity. Soil erosion is automatically reduced. We were able to observe changes in the chemical properties of the soil. The continuous increase in leaf fall increases the fall rate. The work done in this project shows that the cloud-based monitoring platform has been successfully implemented. Uses a WiFi connection to send environmental parameters to the cloud system via GPRS. Three

color sensors were used to cover a large area of farmland and combined with algorithms for near-accurate color detection. Detecting leaf color was cheaper than installing a visual camera. Before decomposing the leaves, it is necessary to check the humidity and temperature of the soil . You also need to check the exact temperature using various sensors. Then, when the organic fertilizer is ready, measure the nutrients in the fertilizer so that you can continue to use it as needed. However, understanding the decomposition status of these leaves will lead to the adoption of fertilizer manufacturing methods. Organic fertilizers are one of the most commonly used techniques for improving soil health and also meet the nutritional needs of healthy crops. In addition, adding organic fertilizer to the soil can prevent the nitrogen concentration from decreasing. Organic fertilizers are beneficial for soil erosion, improve the physical and chemical properties of the soil, and biologically protect plants. The use of organic fertilizers helps prevent soil degradation, improve soil quality and restore , thus achieving sustainable and evergreen farming.

8. FUTURE SCOPE

To check leaf nutrients and compare them to organic fertilizers, compare how much the fertilizer's nutrient content has increased after the leaves have decomposed. Depending on the season, you can calculate the duration of fertilizer. Therefore, you can develop modules that help reduce the work of the sensor. Instead of using ThingSpeak, you can develop your own Android app.

9. REFERENCES

1) *Real Time Design of a Cloud-based Monitoring System for Potential Leaves Decomposition for Manures by author* Kayode E. Adetunji, Chidi E. Ngene.
2) *The IoT-Based Monitoring Systems for Humidity and Soil Acidity Us- ing Wireless Communication.by Author Lia Kamelia, Yuga Setya Nugraha, Mufid Ridlo Effendi, Tedi Priatna.*
3) *Detection of NPK and pH components of soil.by Author:- Dr. D. B. Bhoyar,Ms. S. K. Mohod, Dr. S. S. Khade, Dr. R. A. Burange.*
4) *Trustworthy Wireless Sensor Networks for Monitoring Humidity and Moisture Environments by Author:- Radomir Prodanovi´c , Sohail Sarang, Igor Baranovski ,and Dušan Maksovi´c.*
5) *Green manures: Nature's gift to improve soil fertility by author Arulanandam Vakeesan, Tharshani Nishanthan and Gunasingham Mikunthan.*
6) *IOT BASED SMART CROP-FIELD MONITORING AND AUTOMATION IRRIGATION SYSTEM by author R. Nageswara Rao, B.Sridhar.*
7) *Smart Agriculture Based on IoT and Cloud Computing by author Sriveni Namani and Bilal Gonen.*
8) *Agricultural Management using Cloud Computing in India by author Dinesh Kumar Baghel and Arun Singh, Pratyush Kumar Deka.*
9) *Smart Crop Cultivation Monitoring System by Using IoT by author Khampheth Bounnady, Poutthasone Sibounnavong ,.*
10) *Impact of Agriculture Areas Using Cloud Computing by author Prof. C. Rajagopal.*
11) *IOT Enabled Smart Drip Irrigation System Using Web/Android Applications by author Ravi Kant Jain, Bikash Gupta and Mustaq Ansari, Partha Pratim Ray.*
12) *Soil NPK and Moisture analysis using Wireless Sensor Networks by author R. Madhumathi , T. Arumuganathan , R. Shruthi..*
13) *Automatic Soil Nutrient Detection and Fertilizer Dispensary System by author Amrutha A, Lekha R, A Sreedevi.*
14) Design of a Cloud-based Monitoring System for Potential Leaves Decomposition for Manures by Kayode E. Adetunji and Chidi E. Ngene Electrical and Electronics Engineering Technology University of Johannesburg Johannesburg, South Africa .
15) Trustworthy Wireless Sensor Networks for Monitoring Humidity and Moisture Environments

16) Smart Home Gardening Management System: A Cloud-Based Internetof-Things (IoT) Application in VANET by Sachin Sharma , Abhinav Sharma and Tanya Goel Department of Computer Science and Engineering Graphic Era Deemed to be University Dehradun, India .

17) Green manures: Nature's gift to improve soil fertility.

18) Smart Crop Cultivation Monitoring System by Using IoT by Khampheth Bounnady Department of Computer Engineering and Information Technology, Faculty of Engineering, National University of Laos, Vientiane, Lao PDR and Savath Saypadith Department of Computer Engineering and Information Technology, Faculty of Engineering, National University of Laos, Vientiane, Lao PD.

19) W. M. Nooriman, A. H. Abdullah, N. A. Rahim and K. Kamarudin, "Development of wireless sensor network for Harumanis Mango orchard's temperature, humidity and soil moisture monitoring.

20) D. S. Rahul, S. K. Sudarshan, K. Meghana, K. N. Nandan, R. Kirthana and P. Sure, "IoT based solar powered Agribot for irrigation and farm monitoring: Agribot for irrigation and farm monitoring,".