Evaluating E-Farming Methodology with Reference to Nutrients Availability in Soil Using IoT

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ABSTRACT

The main objective is to improve the agriculture field E-Farming parameter in agriculture i.e. the main causes for low productivity of agriculture is due to social climate. It includes customs and traditions. Most of the Indian farmers are illiterate and they have no knowledge about the latest techniques of yield a best out of the crop. In India agriculture dependents only on rain for watering. Even after 60 years of independence only 40% of the agriculture land has permanent irrigation facility. As a result of incorrect irrigation facility, farmer can harvest only one crop in a year. Indian soil has got so many complications like soil destruction, water desertification, nitrogen insufficiency and marshland. So, the main motivation of the project is to develop an application that gives solution for farmers. In this project, the application provides advice to the farmers to sow a particular crop in appropriate soil based on the nutrients availability using IoT.

Keywords: Soil erosion, Water logging, Nitrogen deficiency, Internet of Things.

I. INTRODUCTION

Agriculture is the utmost important facet of human englightenment.The usages of information and communication technologies (ICT) have contributed more and more for the agricultures in last two decades. Internet of things (IOT) is a automation, where real life materialistic objects (e.g. sensor nodes) that work as a collectively to make an information based and automotive and self driven system to magnify the benefits (e.g. improve the production of agriculture) with minimum risks (e.g. impacts that it creates in the environment). By Implementing the IOT based solutions, at each level of the system, this could become a game changer for whole agricultural prospective, i.e. from seeding to selling and beyond. This article presents you a brief introduction about IOT, and the IOT framework for agricultural applications and scenarios, e.g. agriculture resource optimization, opinion support system, environment supervise and control systems, etc. The article concludes with the future research directions in this area. Introduction of IOT in the field of agriculture makes the work easy for the farmer. Here we are going to discuss the advancements which can be made in the field using the Internet Of Things(IOT).The Internet Of Things (IoT) has revolutionalized all the major business sectors and industries of the world. This system study deals with the process of defining the functioning of existing system. The advantages of the existing system are elaborately discussed to prove the way for the proposed system. Then the advantages of the proposed system are also defined in this paper.

Role of Nutrients in Agriculture

There are three types of nutrients in soil they are as follows

1. Primary nutrients
2. Intermediate nutrients
3. Micro nutrients

1.1 Primary Nutrients

The primary nutrients are **nitrogen, phosphorus** and **potassium**. The farmer must be familiar with all these three type of nutrients because **they are recommended in larger quantities than other nutrients**.
Eg: N, P and K

1.2 Intermediate Nutrients

The secondary nutrients are as follows sulfur, magnesium, and calcium. Together, primary and **intermediate nutrients are referred to as macronutrients**.
E.g.: Ca, Mg & S

1.3 Micronutrients

The remaining indispensable aspects are **the micronutrients and they are required in very less quantities**.

1.4 Need Of NPK

Nitrogen (N) – Is responsible for green leafy growth and overall plant health.

Phosphorous (P) – Is necessary for root, flower and fruit development. Phosphorus is much needed element for plants growth.

Potassium (K) – Plant health and vigour. It helps plant to fight diseases and pests.

II. RELATED WORK

This related work is used by the farmers who are cropping fruits .As it is given this has got three platforms namely

1. Production intelligent management platform
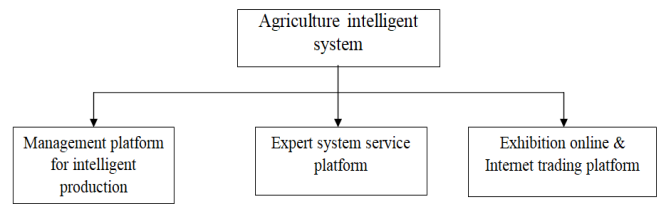2. An expert system service platform
3. The exhibition online platform

Figure 1: Related Work

III. PROPOSED SYSTEM

The Proposed system has two parts namely
* Image processing
*Availability of nutrients

3.1 Image Processing

Soil texture is a tool for soil classification and it is used in both on field and laboratory to find out the classification based on their appearances texture. The soil texture can be found in two ways they are:

1. Qualitative method
2. Quantitative method

The soil texture has agricultural applications that are used for determining crop suitability and to predict the acknowledgment of the soil to environmental and regulating the conditions such as desiccation or calcium (lime) requirements.

3.1.1. Qualitative method

This type is very easy to find the classification of the soil. Hand analysis is a simple one and also known as an effective one by means of rapidly assesses and classifies the soil's physical condition quickly.

3.1.2. Quantitative method

The hydrometer method of determining the soil texture is also known as a quantitative measurement which provides estimated percentage of sand, clay, and silt in the soil. The hydrometer method was developed in 1927 and is still widely used today.

Working Principle

Getting the images from the camera which is fixed in the field and which is immigrated to the central

System. From the central system the stored texture is compared with the image which comes from the field after comparison of the texture and the image system specifies the type of the soil to the farmers. Even Soil pH affects nutrient availability by changing its form of the nutrient in the soil. Some Adjustment's are needed in soil pH to a suggested value can increase the availability of extensive nutrients. Plants commonly grow well when pH value is above 5.5.When Soil pH is 6.5 it is commonly considered as best for nutrient availability.

Advancements which can be made in existing system

The main objective is to improve the agriculture field E-Farming parameter in agriculture i.e. the main causes for low productivity of agriculture is due to social climate. It includes customs and traditions. Most of the Indian farmers are illiterate and they have no knowledge about the latest techniques of yield a best out of the crop. In India agriculture dependents only on rain for watering. Even after 60 years of independence only 40% of the agriculture land has permanent irrigation facility.

IV. CONCLUSION

As to conclude that the IoT in agriculture can save the farmers energy physically and economically. At first retrieving the images from camera and comparing it with texture and mentioning the type of the soil. Secondly, As to conclude this farmers can know about the nutrients presence in the soil and also in this project we use about three sensors namely Potassium, Moisture, Light which helps the farmers to keep track of the soil, wealth of the soil, Crop maintenance, all these will be sent to the farmers as alerts thus they can know about it instantly if the soil has low amount of nitrogen means the alert will be sent and the fertilizer is used as well as weather sensors are used to predict the weather conditions to ensure the increase of productivity in the field.

REFERENCES

[1]. Tan, L.; Wang, N. Future Internet: The Internet of Things. In Proceedings of the IEEE 3rd International Conference on Advanced Computer Theory and Engineering (ICACTE), Chengdu, China, 20–22 August 2010; Volume 5.

[2]. Z. Liqiang, Y. Shouyi, L. Leibo, Z. Zhen, and W. Shaojun., "A crop monitoring system based on wireless sensor network," Procedia Environmental Sciences, vol. 11, Part B, pp. 558 – 565, 2011.

[3]. Fan TongKe,"Smart Agriculture Based on Cloud Computing and IOT", Journal of Convergence Information Technology (JCIT), Volume 8, Number 2, Jan 2013.

[4]. Luigi Atzori, Antonio Iera, GiacomoMorabito, "Smart Objects" to "Social Objects": The Next Evolutionary Step of the Internet of Things", IEEE Communications Magazine, January 2014.

[5]. Bruce Erickson, "Field Experience Validates OnThe-Go- Soil pH Sensor", Purdue Top Farmer Crop Workshop Newsletter, December 2004.

[6]. RamkrishnanIyer, Radharaman Mishra, "Building Intelligent Internet of Things Application using Microsoft StreamInsight", CSI Communications, April 2014.

[7]. Irena Bojanova, George Hurlburt, Jeffrey Voas, "Imagineering an Internet of Anything", Published by IEEE Computer Society, June 2014.

[8]. Kalpana. R, Shanti N., Arumugam, "A Survey on Data Mining Techniques in Agriculture", International Journal of Advances in Computer Science and Technology, Volume 3, No.8, August 2014.