IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 8, April 2023

Agriculture Assist: NPK Based Soil Analysis

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Abstract: *The goal of this project is to help the crew members of villages carry out awareness events. Through this project, they can store their data in an easy to use interface. It will allow them to prepare a schedule for the events, and it will also help them present their various documents. Through this project, the crew members can also monitor the various activities happening in the village at any given time. It will allow them to make informed decisions and improve the efficiency of their activities. One of the most important factors that the government of India considers when it comes to implementing this project is the availability of soil analysis facilities. One of the most important factors that the government of India considers when it comes to implementing this project is the availability of soil analysis facilities. In 2008, a national project was launched to improve the management of soil fertility and health. States are also providing significant funding for soil testing programmes through the "Rashtriya Krishi Vikas Yojana (RKVY)" and "Macro Management of Agriculture (MMA)" programmes. Our software offers the capability for farmers to input the values of the corresponding nitrogen, phosphorus, and potassium counts from the soil analysis report. As a result, the farmer is able to obtain reliable information on the soil's fertility and which crops are acceptable for it. The farmer will be able to make more money with less outlay.*

Keywords: Cloud computing, Mobile computing, Information and Communication technologies

I. INTRODUCTION

The foundation of the Indian economy is agriculture. This project focuses on helping farmers with several aspects, including crops, harvesting, fertilizer, etc. This user can use their effort and learn new agricultural techniques. The soil analysis is one of the most useful instruments for farmers. The inputs required for productively and economically efficient production are determined through soil analysis. The majority of soils contain a lot of nutrients. However, nutrients are lost every time a crop is harvested when soils are continuously employed for growing. Reduced nutrition causes a variety of plant diseases and lower production. The nutrients in the soil must be replenished for improved crop yield. Therefore, farmers must apply the proper amount of nutrients to the soil. Therefore, farmers must apply the proper amount of nutrients to the soil. The three main nutrients are nitrogen (N), phosphorus (P), and potassium (K). A proper soil test ensures the application of fertilizer to meet the needs of the crop by utilizing the nutrients already present in the soil. It is necessary to increase food production in order to meet the rising demand of the population. Fertilizers with nitrogen (N), phosphate (P), and potassium (K) are crucial for boosting crop output. In consequence, improper fertilizer application leads to inferior fruits and vegetables that are lacking in colour, size, taste, and even quantity. The amount of NPK that is advised depends on the type of crop and the stage of plant growth. The amount of fertilizer needed will also depend on the soil's current N, P, and K nutrition levels. Researchers are looking for strategies to maximize plant output while reducing fertilizer usage. Even on a small scale, macronutrients fluctuate in farmed fields; several researchers are working to create sensors that monitor these nutrient levels. Systems for integrated crop management are created to monitor the geographical and temporal behavior of N, P, and K. Continual monitoring of soil pH, moisture, and N, P, and K values results in automation of agricultural practices, which increases crop output. Using this application, you can compile and provide the right address on the various widgets to construct a graphical interface or human machine interface (HMI). Additionally, a mobile application is being developed to offer details about the NPK values of the soil and, if the farmer wants to grow a particular crop (other than the crop that is best suited to the soil), to suggest how much fertilizer should be added to the soil to make it possible. This essay explains the approach and solution used to resolve the current issue. The outcomes of the project and how the mobile

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application allows to view the nutrient values in real-time and advise the suggested fertilizers for the targeted crops will be covered later. This study was conducted in the Indian state of Maharashtra. In order to alleviate the present socioeconomic issue experienced by many farmers today, our system would suggest crops based on a farmer's region in Maharashtra. With a basic understanding of how to use the platform, this will allow the farmers to sell their goods across the entire state.

II. LITERATURE SURVEY

We went through papers as this project was being developed. Sumitha Thankachan and Dr. Kirubakaran (2014) investigated how technology has aided decision-making across a range of industries, particularly in agriculture. Due to a lack of agricultural expertise and environmental changes, agriculture has been underdeveloped for the past few years. This report aims to inform farmers about their understanding, application, and perception of e-agriculture. Statistical survey design was utilized in the study to get information on farmers' knowledge of ecommerce. The results showed that there is a lack of awareness to the point where e-agriculture is required for their support. EAgriculture is a platform that helps with agricultural product marketing. According to Santosh G. Karkhile and Sudarshan G. Ghuge, everyone uses mobile devices often today, even farmers and individuals who live in rural areas. Information and communication technologies (ICT) findings indicate that farmers' daily lives are significantly impacted by mobile technology. Farmers who formerly relied on clouds for rain are now looking to cloud computing (CC) for answers to cultivate better crops in the contemporary agricultural environment. Particularly in India, the farmers adopt slow, unreliable conventional methods. Due to bacterial attacks and a lack of information resources, a significant portion of the crop is suffering harm in the field. Such loss approaches 40% overall on an annual basis. As a result, the research provided here recommends numerous ways a farmer might use mobile computing (MC) on their handsets utilizing the application "Kissan" to help them for significantly better farming and goods. The main issues of market updates for various products, weather updates, and updates for the rainy season are all addressed in this effort, which focuses on Indian farmers and offers bilingual help. Farmers will be able to sell their goods on the world market and make a significant profit thanks to this. Therefore, this framework makes use of MC, which effectively gives the power to the farmer. Tools like the Android SDK are used in the experimental setup. Mobile devices with Android operating systems are tested in this study. According to Aakash G. Ratkal, Gangadhar Akalwadi, and Vinay N. Patil, barely 14% of India's GDP is attributable to agriculture, despite the fact that over half of the country's population depends on it for survival. The insufficient agricultural planning is one potential cause of this. The current system does not offer enough details about the best crops to farm. By examining trends in historical data, we attempt to anticipate crop production and price that a farmer can achieve from his property in this research. We employ a sliding window non-linear regression technique to produce predictions based on several aspects of agricultural production, including rainfall, temperature, market prices, the size of the land area, and previous crop yields. Several districts in the Indian state of Karnataka are the subject of the analysis. In order to address the current socioeconomic problem that many farmers are currently experiencing, our system aims to recommend the best crops for a farmer. This website and mobile application offer information on crop production forecasts, agricultural bank loans, and various government initiatives. The user will ultimately save time by using this programme instead of going to government offices, money by not having to fly, and time by not having to go through drawn-out official procedures. This essay also discusses how many services are made available in various Indian languages. Suman Rani (2016) talked about the many government services that the Indian government offers to citizens who live in rural areas. This essay also discusses the impact of Digital India on the economy, the environment, and society. The author has also covered a number of difficulties brought on by the creation of Digital India.

III. PROBLEM DEFINITION

While employing modern fertilizers and pesticides, Indian farmers still practice traditional farming methods. The main reason for this is a lack of knowledge about the new agricultural practices and the precautions that need be taken. This actually has negative effects like a bad crop, polluted farming land, etc.

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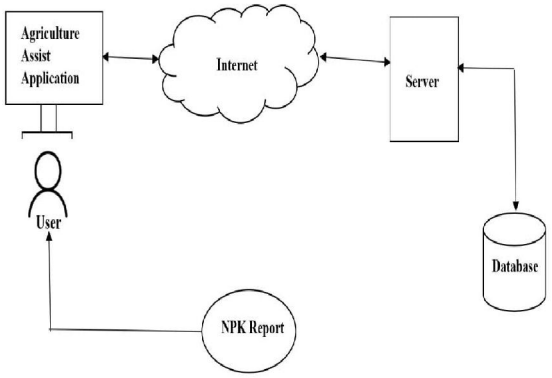
IV. PROPOSED WORKING



A system's structure, behavior, and other aspects are all defined by its conceptual model, or system architecture.A formal description and representation of a system that is set up to facilitate analysis of its structures and behaviors is called an architecture description. The user's first requirement is a soil analysis report with the necessary NPK values for the soil. Users must first provide the NPK values in the appropriate fields for our system. The machine then connects to a server and the server responds to the user after retrieving the record via the internet. Each land type has a suitable value stored in the database, which gives farmers precise information. The report can help farmers manage various types of crops and organize various activities on their farms.

V. RESULT

This method provides the output for numerous soil parameters for various soil samples and suggests the recommended amount of fertilizers, minimizing the use of extra fertilizers and increasing yield. Accurate results are now possible because to technological advancement, which promotes cultivation. Precision agriculture thus provides real-time responsive data that enhances farming practices.

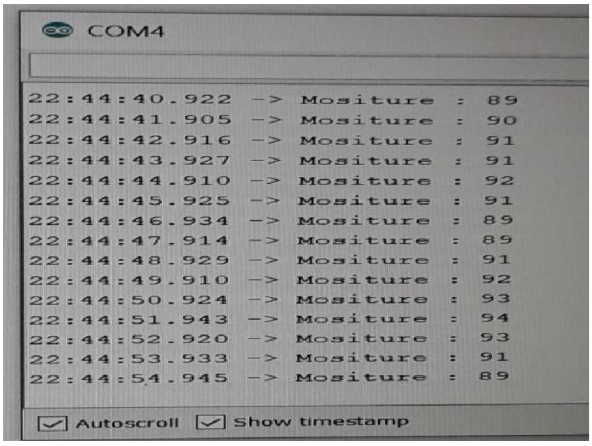


Fig 5. Moisture value shown in Ardunio IDE

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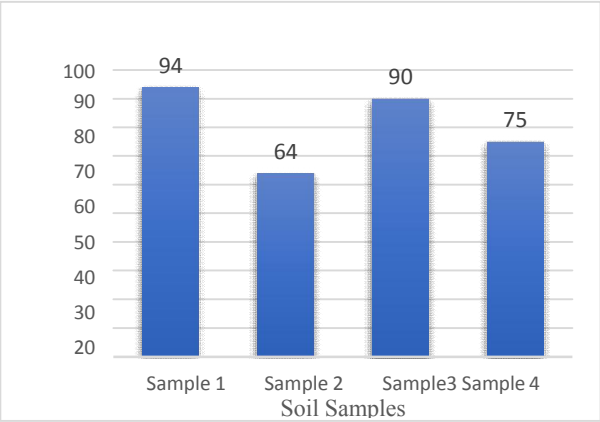

Fertilizer values for phosphorus in soil

Fertility Rating for Phosphorus	
Levels	**Range**
Low	0-11 Kg p/ha
Medium	11-22 Kg p/ha
High	>22 Kg p/ha

Fertilizer values for nitrogen in soil

Fertility Rating for Nitrogen	
Levels	**Range**
Low	0-280 Kg/ha
Medium	280-450 Kg/ha
High	>450 Kg/ha

Fertilizer values for potassium in soil

Fertility Rating for Potassium	
Levels	**Range**
Low	0 – 118kg K/ha
Medium	118 – 280 kg K/ha
High	>280kg K/ha

VI. CONCLUSION

The group that manages events in villages benefits from this project. In this project, we give the teams access to a storage interface so they can manage awareness campaigns effectively. Through this initiative, they can plan the events' schedule and gather the information they need, such as crop-related videos, PowerPoint presentations, and documentation. They are able to double-check the equipment needed at any moment before attending a programme in a certain village.

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REFERENCES

[1]. J. Wang and M. Cohen, "Optimized Color Sampling for Robust Matting," Proc. IEEE Conf. Computer Vision and Pattern Recognition, pp. 1-8, 2007.

[2]. F. Rosenblatt, "Remarks on Some Nonparametric Estimates of a Density Function," Annals of Math & Statistics, vol. 27, pp. 832-837, 2004.

[3]. Prof. Kumbharde M. V., GhodkeTushar D., DevdeNitin N., AgwanSagar C., KudalYogesh N, "E- Farming: an Innovative Approach for an Indian Farmer"- International Journal on Recent and Innovation Trends in Computing and Communication, September-2015

[4]. Abdullah Na, William Isaac, Shashank Varshney, and Ekram Khan. An iot based system for remote monitoring of soil characteristics. In 2016 International Conference on Information Technology (InCITe)-The Next Generation IT Summit on the Theme-Internet of Things: Connect your Worlds, pages 316–320. IEEE, 2016.

[5]. Monali Paul, Santosh K Vishwakarma, and Ashok Verma. Analysis of soil behaviour and prediction of crop yield using data mining approach. In 2015 International Conference on Computational Intelligence and Communication Networks (CICN), pages 766–771. IEEE, 2015

[6]. Satish Babu. A software model for precision agriculture for small and marginal farmers. In 2013 IEEE Global Humanitarian Technology Conference: South Asia Satellite (GHTCSAS), pages 352–355. IEEE, 2013.

[7]. S Nagini, TV Rajini Kanth, and BV Kiranmayee. Agriculture yield prediction using predictive analytic techniques. In 2016 2nd International Conference on Contemporary Computing and Informatics (ic3i), pages 783–788. IEEE, 2016.