

Crop Recommendation System using AI

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Abstract: *Farmers can use this desktop-based application, which is useful. Analysts have become increasingly interested in ashore planning and its layout over the last several years for a variety of reasons. The growing interest in agricultural land and soil health research, since the strength of the soil is essential for the reliable development of yields, are the driving forces behind an increase in the focus of the research local region. One such technique for examining the health of soil and land is picture order. It is a perplexing measurement that takes the effects of various factors into account. The analysis of flow that has been suggested in this work addresses both its potential and the problems it tended to cause. The accentuation is centered on the logical investigation of different progressed and effective grouping systems and procedures. Here, it has been endeavored to consider the components these methodologies have routed to improve the precision of the characterization. Appropriate usage of the quantity of highlights of distantly detected information and choosing the best reasonable classifier are generally significant for improving the precision of the grouping. The information - based arrangement or non-parametric classifier like neural network have acquired ubiquity for multisource information grouping as of late. Not with standing, there is as yet the extent of additional exploration, to lessen vulnerabilities in the improvement of precision of the Image grouping instruments. By using support vector machine algorithm is used to recommend the crops based on the soil.*

Keywords: Convolutional Neural Network, Random Forest, Crop Recommendation System.

I. INTRODUCTION

In order to solve the problem through information analysis, data mining entails separating hidden samples from vast datasets and establishing a relationship among them. Research has benefited from the presentation of information mining in the agricultural sector. In order to establish the fundamentals, characterization is crucial in all scientific fields. Finding diversity among the objects and concepts might be helpful. It also provides crucial information that enables systematic exploration. One of the key components to a farming field's ability to produce crops is the soil. The presence of knowledge and common-sense circumstances guide soil arrangement thinking. Grouping of soil connects soil tests with several types of distinctive substance on the earth's land surfaces. classifying soil has become a highly well-liked issue in computer vision and image processing. In order to make the algorithm as accurate as possible, numerous new algorithms are being developed employing convolutional structures. The extraction of even pixel-level features is now achievable because to convolutional structures. The goal of this project is to create a binary face classifier that can extract features such as edges, color, and texture regardless of alignment. This study presents a technique for accurately classifying soil from input images of any size. Using a variety of chemical properties, cnn methods identify soil pictures, and possible crops for that soil series are proposed using geographic attributes and svm. It is a web-based tool that is extremely beneficial to farmers. The farmer will sell in that case. His product is available online as well without entering the market during this pandemic.

1.1 Motivation

The principle reason of the proposed work is to create a suitable model for classifying diverse types of soil information alongside suitable vegetation inspiration as well as providing the factory details for selling the crops which is very much helpful for the farmer or he/she purchase the product online also.



The problem with knowledge engineering method is that it requires constant updating of rules for classification which is very difficult. Over the last two decades, the application of Machine learning approach is increased due to various reasons like availability of large amount of data and the necessity of handling them in an efficient way.

1.2 Need

To develop a system that classify soil and suggesting crops with maximum precision and with minimum processing time to help in the agriculture sector.

II. LITERATURE SURVEY

Krizhevsky et al. [1] stated that, deep convolutional Neural network to categories the 1.2 million excessive-resolution snap shots in the image net lsvrc-2010 contest into the a thousand specific classes. On the take a look at facts, we achieved pinnacle-1 and pinnacle-five error quotes of 37. Five% and 17. 0% that's considerably better than the previous state-of-the-art. The neural network, which has 60 million parameters and 650,000 neurons, consists of five convolutional layers, a number of which might be accompanied with the aid of max-pooling layers, and three fully-connected layers with a final 1000-way SoftMax. To make training faster, we used non-saturating neurons and a very efficient GPU implementation of the convolution operation. To reduce overfitting in the fully-connected layers we employed a recently-developed regularization method called "dropout" that proved to be very effective. We also Entered a variant of this model within the ilsrv-2012 opposition and achieved a triumphing top-5 test mistakes charge of 15. Three%, as compared to 26. 2% carried out via the second-best entry.

Dharesh Vadalia [2] proposed that Farming is done by conventional approach, farmer's plant plants traditionally without knowing the content of soil and fine of that soil. As a result, farmers will not gain sufficient take advantage of there farming. The present technique of soil testing is guide approach which starts through taking soil samples after which sends to laboratories for checking out. This manual technique is time consuming and no longer so feasible. Due to human intervention, there are possibilities of human errors so farmers may additionally receive incorrect file. So, there is need of computerized procedure for soil testing and crop prediction. Testing of soil is important due to the fact soil checking out facilitates to decide fertility of soil and hence crop prediction may be performed. So, we proposed a machine on the way to have a hand held tool which offers ph value and we can estimate nitrogen (n), phosphorus (p) and potassium (k) from the ph of that soil. We are the use of class set of rules to are expecting suitable crops primarily based at the values we get from our device and we can also provide appropriate fertilizers required for that land.

M. P. K., Anthiyuret al. stated that [3] Agribusiness is a spine of Indian economy that is the fundamental pay hotspot for a large portion of the populace in India. So, ranchers are consistently inquisitive about yield forecast. Harvest yield relies upon different elements like soil, climate, downpour, composts and pesticides. A few components contrastingly affect farming, which can be evaluated utilizing fitting measurable systems. Applying such systems and methods on recorded yield of harvests, it is feasible to acquire data or information which can be useful to ranchers and government associations for settling on better choice and arrangements which lead to expanded creation. The goal of the work is to look at different information mining strategies which gives the most extreme exactness. Information mining is just the way that helps to change over colossal information into advancements and make them accessible to the ranchers. The colossal measure of information can be used to mine piece of information that can be valuable for ranchers and chiefs to take viable and brief choice. In this paper one of significant boundary which is utilized to build crop creation is thought of; that is soil. Distinctive characterization calculations are applied to soil informational index to foresee its richness. This paper centers around arrangement of soil fruitfulness rate utilizing K-Means, Random Tree, and Apriori.

Sk Al Zaminur Rahman et al. [5] proposed that Soil is an vital ingredient of agriculture. There are numerous sorts of soil. Each sort of soil could have extraordinary styles of functions and distinctive styles of crops develop on special kinds of soils. We need to recognise the features and traits of numerous soil types to recognize which vegetation grow better in certain soil types. Machine gaining knowledge of strategies can be beneficial in this case. In current years, it's far advanced loads. Gadget learning remains an rising and tough research subject in agricultural information analysis. On this paper, we've proposed a version that may predict soil series with land kind and in step with prediction it could advise suitable plants. Numerous machine gaining knowledge of algorithms along with weighted k-nearest neighbor

(okay-nn), bagged timber, and gaussian kernel-based guide vector machines (svm) are used for soil class. Experimental consequences show that the proposed svm based approach performs higher than many present techniques.

III. PROPOSED METHOD AND ALGORITHM

3.1 Proposed Methodology

With a small collection of trained data, we are proposing an experiment on soil color recognition and crop recommendation in the suggested system. The System architecture of the proposed model is shown in fig. 1.

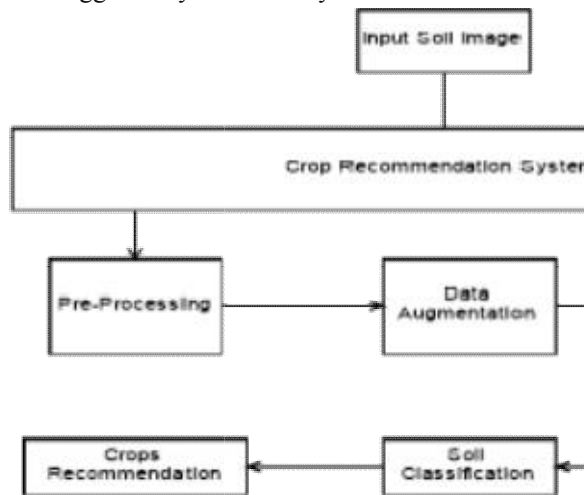
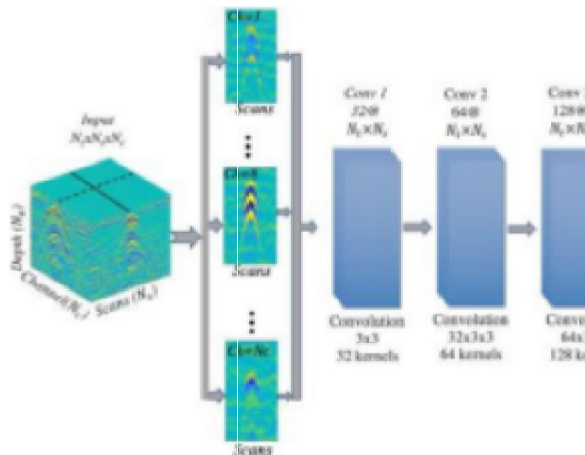


Fig1. Proposed Architecture

3.2 Algorithms

A. CNN

In this proposed research paper Convolution Neural Network will be used for feature extraction. CNN can fetch exact features from the image data, rather than taking the features one by one. Generated weights are extracted from the different layers of CNN such as convolution layers, pooling layers, activation layer and fully connected layers. Convolution layer is the key role of this network, which does the extraction of the features from the training image data.



A. Random Forest

An irregular timberland is an AI procedure that is utilized to take care of relapse and order issues. It uses group realizing, which is a procedure that joins numerous classifiers to give answers for complex issues. An irregular woodland calculation comprises of numerous choice trees. The 'backwoods' created by the irregular timberland calculation is prepared through packing or bootstrap totaling. Packing is a group meta-calculation that works on the exactness of AI calculations.

The (arbitrary backwoods) calculation lays out the result in light of the expectations of the choice trees. It predicts by taking the normal or mean of the result from different trees. Expanding the quantity of trees builds the accuracy of the result.

IV. CONCLUSION

A model is proposed for predicting soil and providing suitable crop yield notion for that particular soil. In this paper, we propose a CNN model improved from the traditional CNN model and developed from ConvNet. We are using CNN model for soil image classification, which has four classes (Alluvial, Clay, Red, Black) images classification problem. Based on every class we are suggesting the crops by using random forests.

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REFERENCES

- [1]. A. Krizhevsky, I. Sutskever and G. E. Hinton, "Imagenet type with deep convolutional neural networks," advances in neural information processing systems, pp. 1097-1105, 2012.
- [2]. Dhareesh Vadalia, Minal Vaity, Krutika Tawate, Dnyaneshwar Kapse, "real time soil fertility analyzer and crop prediction," worldwide studies magazine of engineering and technology, vol. 04, 2017.
- [3]. Devi, M. P. K., Anthiyur, U., & Shenbagavadivu, M. S. (2016). Enhanced Crop Yield Prediction and Soil Data Analysis Using Data Mining.
- [4]. International Journal of Modern Computer Science, 4(6).
- [5]. Surili Agarwal, Neha Bhangale, Kameya Dhanure, Shreeya Gavhane, V.A. Chakkarwar, Dr. M.B.Nagori "Application of Colorimetry to determine Soil Fertility through Naive Bayes Classification Algorithm" 9th ICCNT 2018 July 10-12, 2018, IISC, Bengaluru.
- [6]. Sk Al Zaminur Rahman, Kaushikchandramitra, S. M. Mohidulislam "soil class the usage of gadget studying methods and crop notion based on soil series" 2018 21st worldwide convention of computer and facts era (iccit), 21-23 December, 2

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