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A Review on Soil Classification using Machine Learning and Crop Suggestions

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ABSTRACT

India is a primarily agricultural nation. Agriculture is currently the most significant emerging sector in the actual world and the key industry and economic pillar of our nation. The area of agricultural information technology has recently undergone significant changes that have made crop yield prediction an interesting research topic. Crop yield prediction is a technique for estimating crop yield using many characteristics, including temperature, rainfall, fertilizer, insecticides, and other climatic variables and parameters. The use of data mining tools is very common in agriculture. Agriculture uses data mining tools to forecast agricultural production for upcoming years and evaluates these techniques. This system provides an overview of the investigation of agricultural yield prediction using Support Vector Machines(SVM) and K-Nearest Neighbors (KNN).

Keyword – Yield Prediction, Data sets, K-Nearest Neighbor(KNN) Algorithm and Support Vector Machine.

I. INTRODUCTION

Small farms are prevalent in India. More than 75% of the nation's total land area is less than 5 acres. The majority of crops are fed by rain, with only approximately. The amount of agricultural area is 45%. According to some estimates, roughly 55% of India's population is dependent on agriculture. It is roughly 5% in the US due to the extensive mechanisation of agriculture. India is one of the countries that produces the most agricultural goods, yet its farm productivity is still quite low. So that farmers can earn more from the same plot of land with less labour, productivity needs to be raised. The solution is provided by precision agriculture. As the name suggests, precision farming involves providing accurate and appropriate amounts of inputs to the crop—such as pee, fertilisers, soil, etc.—at the right moment to increase production and yields. Not all precision agriculture techniques produce the best outcomes. However, it is crucial that the advice offered in agriculture are correct and precise because mistakes could result in material loss and financial loss. To develop a reliable and effective model for

crop prediction, numerous studies are being conducted. One such method used in these research projects is assembling. One of the many machine learning methods being applied in this area.

The focus of the problem statement is on utilising machine learning techniques to forecast agricultural yield. The project's objective is to assist users in selecting the best crop to produce in order to maximise output and, consequently, profit. The suggested system makes predictions by evaluating structured data in an effort to get around the limitations of existing systems. The approach we suggest is to create a system that takes into account the factors that have the greatest influence on how well a crop grows and to increase the variety of crops that may be cultivated throughout the season. This would make it easier for farmers to choose crops that will provide a high yield and optimize income, which will lower the rate of suicide.

II. LITERATURE SURVEY

Ashwani kumar Kushwaha, Portrays crop yield estimate strategies and a propose sensible collect with the objective that it will chip away at the advantage for the farmer and nature of the agribusiness region. In this paper for crop yield assumption they get tremendous volume data, it's been called as huge data (soil and environment information) using Hadoop stage and agro computation. In this manner based store data will predict the propriety crop for explicit condition what's more improvement crop quality.

Girish L, depict the collect yield and storm fall assumption using a man-made intelligence methodology. In this paper they gone through an other simulated intelligence approaches for the expectation of precipitation and collect yield and besides notice the adequacy of another simulated intelligence computation like liner backslide, SVM, KNN procedure and decision tree. In that estimation they assume that SVM have the most raised efficiency for precipitation assumption.

Rahul katarya, Depicts the unmistakable man-made intelligence systems used for accelerating crop

yield. In this paper they gone through different man-made mental ability techniques such as artificial intelligence estimation, gigantic data examination for precision agribusiness. They explain about crop recommender structure using KNN, Outfit based Models, Brain organizations, and so forward.

The arranged system will propose the most sensible yield for explicit land. Considering environment limit and soil content like Precipitation, Temperature, Dampness furthermore, pH. They are assembled from V C Ranch Mandya, Government site besides environment office. The system takes the fundamental data from the farmers or sensors like Temperature, Dampness what's more pH. This all wellsprings of data applies to computer based intelligence farsighted estimations like Help Vector Machine (SVM) additionally Choice tree to perceive the model among data andthen, by then, process it as indicated by incorporate circumstances.

III. OBJECTIVES OF SYSTEM

- Gather information on the weather, crop yield, soil type, and rainfall, combine these facts in an organized manner, and clean the data. Data cleaning improves the quality of the data and, as a result, productivity overall by removing erroneous, incomplete, and inappropriate data.
- Split the crop data into training and testing sets after it has been analysed, and then train the model with the training data to forecast the crop output for a set of inputs.
- Evaluate the accuracy and error rate of various algorithms by running the analysed dataset through them. The method with the best accuracy and lowest error rate should be chosen.

- Create a web application system and incorporate the algorithm at the back end.

IV. IMPLEMENTATION DETAILS OF MODULE

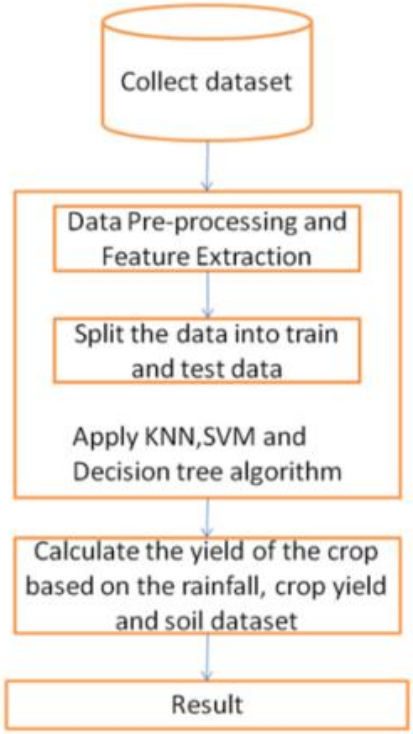

Figure a: Block Diagram

The proposed system is described in following stages:

1. Dataset Collection: Data is collected from a variety of sources and prepared for data sets. And this data is used for descriptive analysis.

2. Preprocessing step: This step is a very important step in machine learning. Preprocessing consists of inserting the missing values, the appropriate data range, and extracting the functionality.

3. Feature Selection: Feature extraction should simplify the amount of data involved to represent a large data set. The soil and crop characteristics extract from the pre-treatment phase constitute the final set of training.

4. Data Prediction: In Advance to this step there need to split the data into train dataset and test dataset. By applying the KNN , SVM and decision tree algorithm the data is trained with available input and output data. Then the new data is predicted by machine learning modules.

V. CONCLUSION

For survival, agriculture has traditionally been the most crucial industry. These days, our farmers confront many challenges because of a variety of unforeseeable factors. Therefore, it is our responsibility as engineers to work with farmers to develop a solution that would increase crop quality and yield. The first step in that direction is our project. We can use prediction to inform our crop production strategy. We gain knowledge about the crop life using machine learning, which can be highly advantageous. This work has the potential to be improved. For farmers, we can create a recommendation system for agricultural production and distribution. how farmers can decide which crop to plant and when in order to maximise their benefits. The technology is designed to handle structured datasets. Future plans include the implementation of data independent systems. It implies that regardless of the data's format, our system should operate effectively.

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