CROP HAND-AN ANDROID BASED CROP AND FERTILIZER ADVISOR

[1]Sundrameenakshi.G, [2]Jayasuriya.A, [3]Srioviya.G, [4]Sumathi V.P

[1,2,3,4] Department of Computer Science and Engineering, Kumaraguru College Of Technology

Abstract-If you ate today thank a farmer.Agriculture is one of the most noble professions of mankind and as engineers we should lend a helping hand to our farming community. India is an agricultural country but is still using traditional ways of recommendations for agricultural reproductive system of the plant. With development in technology accessing any information requires just a click of a button.We propose to develop an android application which will suggest the best crops for farmers based on the soil test report and also aid in suggesting the best fertilizers for the crops. We make use of datamining techniques to analyze the most suited crops based on the nutrient content in soil using the past data of crop yield.Data mining is the practice of examining large pre-existing databases in order to generate new information and here we look at the preexisting databases present in the agriculture university at coimbatore to help our farmers with crop hand. Also it allows the farmers to view best fertilizers from the application itself. The crop recommendation will be based on ph and soiltype.The recommendation for fertilizers will be based on Nitrogen(N), Phosphorous(P), Potassium(K) values. The values will predict the growth and yield of fruits and flowers of the plants. This system also gives the crop name in regional language as well as English and the system has a very simple interface for the farmers to use .It is cost effecient as it helps them choose the best crop ad fertilisers and it eliminates statistical manual analysis and saves time.

I. Objectives

Aid farmers with the help of a mobile application to choose the best crop and the fertilizers in right proportions based on the soil test report.

Contributions

- Help farmers choose the best crop for their soil
- Best fertilizer for chosen crop in terms of affordability and quality
- The crops are suggested based on the farmers terrain
- Data Mining techniques are applied over agriculture land soil testing. Details to generate advisory reports which facilitate decision support to crop rotation, fertilizer requirements and harvesting procedures.
- Data Mining tools in the analysis of Agriculture data such as Soil Test reports improves the decision making quality of farmers.
- Integration of data mining techniques with Agriculture Server turns it into an automatedcultivation advisor and reduces laborious manual statistic analysis.
- Also improves accuracy in information extraction process.
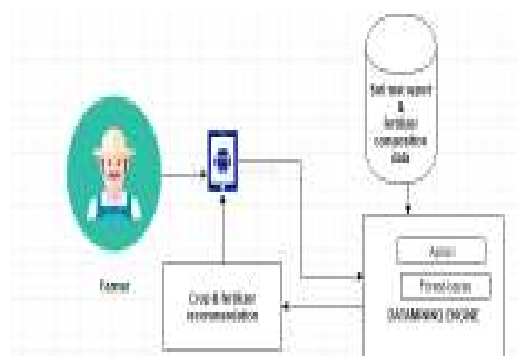
II. Methodology

Figure 1

This system involves the farmer (end user) ,mobile phones,data base server and datamining engine.

The farmer enters his soil test report through the crop advisor app in his mobile phone and the database server has preexisting soil test reports and fertilizer compositions which is accessed by the data mining engine.We make use of apriori classification and forest-bayes algorithm to choose the best crops and fertilizers for the farmers based on his test report.The recommendations are then given displaying the name,image and details of the best suited crop along with the fertilizer composition and brand of fertilizer.We aim to provide an easy to use interface for the farmers.

A)Soil-Testing:

Extraction process is preliminary stage for soil testing. Based on land nature to collect soil sample 5cm to 32 cm drilled into ground. For best results random samples must be extracted from lands. The Storage of samples is vital stage in this process. As shown in Fig 1 sealed tubes under 30˚C used to preserve soil nature. Soil samples shouldn't expose to air. Transport stage is crucial where samples are carefully transported to testing labs. Freezing boxes are

used to store collected samples for longtime preservation of soil.

B)Data collection:

A collection of soil testing reports are pre-processed to generate training datsets. The training data sets are subjected to data mining techniques like ARM, Grouping andclustering. Finallydecisions tracked based on group characterization rules implemented. The training data samples Mineral ratios, crop cultivation used to generate various interesting measures for decision support on cultivation.

C)Crop Recommendation:

The dataset for which we have taken the data as a training set and tried applying the algorithms on it by taking the data of past as a test set and then view the output. This obtained output is compared with the actual output. Crop with maximum points can be recommended to the farmer. The market trend of the crops is saved in the database. While recommending more than one of the crops, the first factor determined will be the year factor that will be followed by market factor and the ratio factor. For recommending the crop to the user, we are using the random forest algorithm.

D)Random Forest Algorithm:

The Naïve Bayes algorithm has 40 % efficiency on thedataset whereas the ID3 algorithm is 60%. The accuracy of the Random forest algorithm is about 80% which is greater than the ID3 as well as the Naïve Bayes algorithm. As the recommendation of the crop has to be accurate the efficiency of the algorithm should be higher. Hence we have decided to use the Random forest algorithm for the crop recommendation.

E)Clustering application:

The application of k-mean clustering technique to soil test reports collected resulted in formation of six major clusters based on soil nutrients ratios . They are salinity,humus,major low,minor low and secondary lowlands.

F)Association Rule Mining:

The application of apriori association rule mining technique on crops training set data resulted interesting rules with best crop nutrients requirement. The yield of crop also increased by suggesting best crop rotation for farmer along with estimated rotation schemes (Frequent Item sets) to assist farmers to improve farm productivity. Apriori algorithm applied on previous crop rotation data on the basis of yield factor.

G)Aproiri Algorithm:

The Apriori algorithm is a data mining algorithm. It is used for suggestion of frequently purchased item sets. This algorithm will provide the user recommendations for purchasing the fertilizers.

III. System Architecture

The user has to create an account and log into it. The random forest algorithm and fertilizer retrieval from database is used which enables crop and fertilizer recommendation to the users.The users can open their accounts to view recommended crops and fertilizers and also purchase them. To recommend the fertilizers to buy in pairs, we use apriori algorithm which give frequently purchased item sets. This application is very useful in terms of its applications as it provides both recommendation as well as the feature to purchase recommended products.

Advantages

1.Beneficial for the farmers to increase their crop yield.
2. It is user friendly.
3. Requires less memory.
4. Available in multiple languages.
5.Convenient for buying fertilizer after suggestion.

Applications

1.Fertilizers to be applied are recommended.
2. The amounts of fertilizer for various crop types are suggested.
3. The future scope of the application of this project is bridging this application for windows as well as android OS.
4. And region-wise recommendation of fertilizer quantity as well as crops depending on climate.

IV. Future Developments

Crop rotation suggestion based on the soil report and seasonof plantation.Rainfall based crop suggestion can be includeddetails on the most common diseases affecting the crops canbe given along with required insecticides.An inbuilt option to purchase recommended fertilizers withinthe app.

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