RECOMMENDATION OF CROP, FERTILIZERS AND CROP DISEASE DETECTION SYSTEM

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ABSTRACT:

India is a highly populated country and randomly change in the climatic conditions need to secure the world food resources. Framers face serious problems in drought conditions. Type of soil plays a major role in the crop yield. Suggesting the use of fertilizers may help the farmers to make the best decision for their cropping situation .The number of studies Information and Communication Technology (ICT) can be applied for prediction of crop yield By the use of Data Mining, we can also predict the crop yield. By fully analyze the previous data we can suggest the farmer for a better crop for the better yield. This application also provide model which predicts the type of crop disease based on textural similarity of leaves.

Keywords- Fertilizers, Recommendation, Crop, Neural Network, Decision Tree, Random Forest

INTRODUCTION

we present an intelligent system, called Argo Consultant system, which consist of three models:

1] Crop Recommendation- This model assist the Indian farmers in making a decision about which crop to grow depending on the season, his farm's geographical location, soil characteristics as well as environmental factors such as temperature and rainfall.

2] Fertilizers Recommendation- The system also comes with a model to be precise, accurate in recommendations about required fertilizer based on atmospheric and soil parameters of the land which enhance to increase the crop yield and increase farmer revenue.

3] Crop Disease Detection- The system comes with a deep learning-based model which is trained using public dataset containing images of healthy and diseased crop leaves. The model serves its objective by classifying images of leaves into diseased based on the pattern of defect and gives solution on disease

OBJECTIVE

- We study and understand Machine learningtechniques.
- We analyze and design Deep Learning Model
- We implemented on Jupiter Notebook
- We evaluate the performance by Appling various testcases.

REQUIREMENT SPECIFICATION

Hardware Requirements

- Processor - I3•Speed - 1.1 GHz
- RAM - 2 GB(min)
- Hard Disk - 20 GB
- Floppy Drive - 1.44 MB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor – SVGA

Software Requirements

- Operating System - Windows 7 and above
- Application Server – Anaconda
- Front End – HTML
- Database - CSV File
- IDE – Jupiter

METHODOLOGY

a) For Machine Learning we uses algorithm as follow

We uses **Multi label classification(MLB)** algorithm which include

KNN(K Nearest Neighbors)

It is a non-parametric method used for making predictions. In this, the predicted value is a class membership. The first step of the K-NN algorithm is to identify the k nearest neighbors for each incoming new instance. The instance is classified by a majority vote of these neighbors. In the second step, depending on the label sets of the k neighbors, a label is predicted for the new instance.

Random Forest

It is an ensemble method of learning that is commonly used for both classification and regression. In order to train the model to perform prediction using this algorithm, the test features must be passed through the rules of each randomly created tree. As a result of this, a different target will be predicted by each random forest for the same test feature. Then, votes are calculated on the basis of each predicted target. The final prediction of the algorithm is the highest votes predicted target. The fact that random forest algorithm can efficiently handle missing values and that the classifier can never over-fit the model are huge benefits for using this algorithm

Neural Network

Neural Network systems progressively improve their performance by learning from examples. They are based on a collection of connected nodes called neurons. Signals are then be transmitted between these neurons using connections. Theneurons and connections have a weight associated with them, which is updated and adjusted as learning proceeds.

Decision Tree

It is a supervised learning algorithm where attributes and class labels are represented using a tree. Here, root attributes are compared with the record's attribute and subsequently, depending upon the comparison, a new node is reached. This comparison is continued until a leaf node with a predicted class value is reached. Therefore, a modeled decision tree is very efficient for prediction purposes.

In order to ensure that AgroConsultant has the highest possible accuracy, we implemented all the four above mentioned algorithms individually. The performances of the four were then compared, and the one with the highest accuracy was selected for the model.

b) For Deep Learning we use algorithm as follow

Conventional Neural Network (CNN)

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

c) Modules:-

1) **Crop Recommendation:-**

This module take content of soil and predict which crop is best.

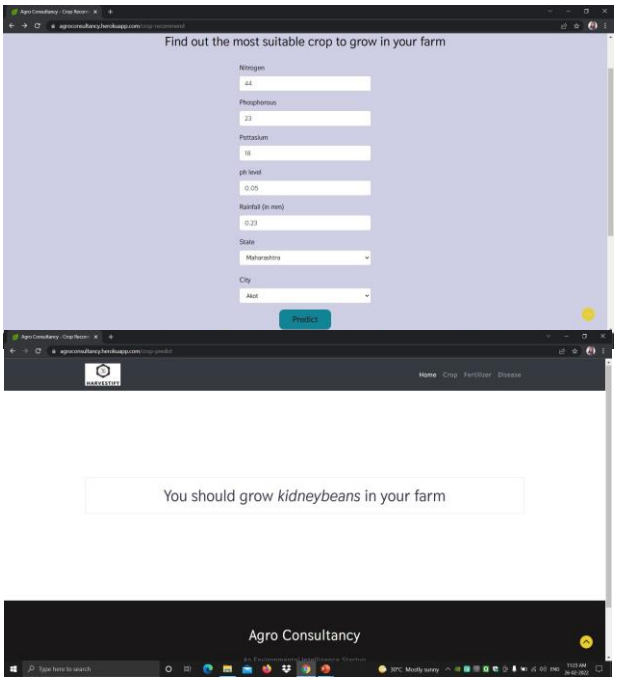

Fig.1.1- Crop Recommendation Input

Fig.1.2- Crop Recommendation Result

2) Fertilizers Recommendation:-

This module take content of soil and Recommend which fertilizers are required to put in your farm.

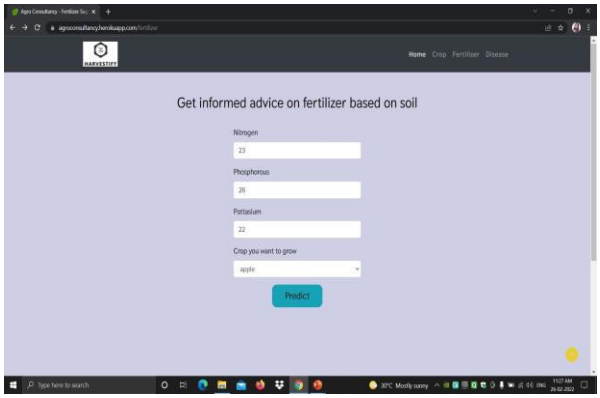

Fig.2.1- Fertilizers Recommendation Input

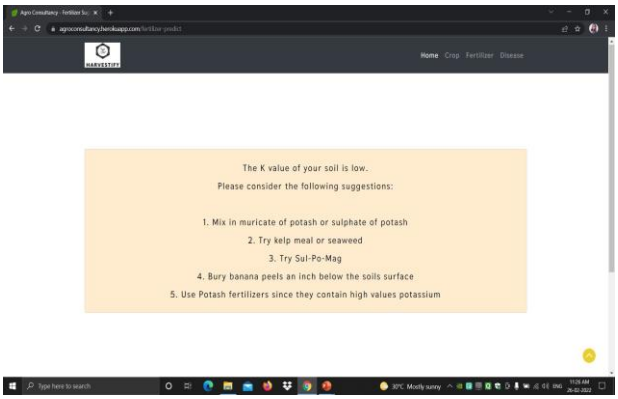

Fig.2.1- Fertilizers Recommendation Result

3) Crop Disease Detection:-

This module required one effected leaf image and after processing it provide us a information about crop disease andsolution on that disease.

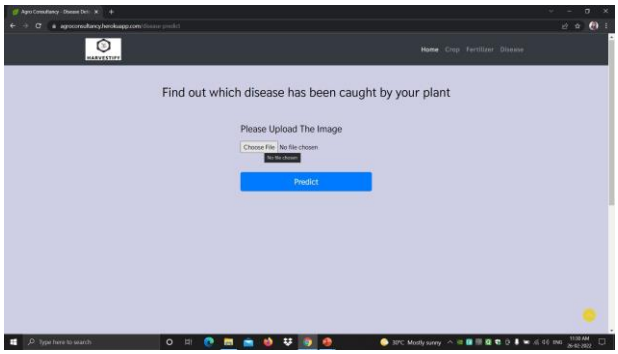

Fig.3.1- Crop Disease Detection Input

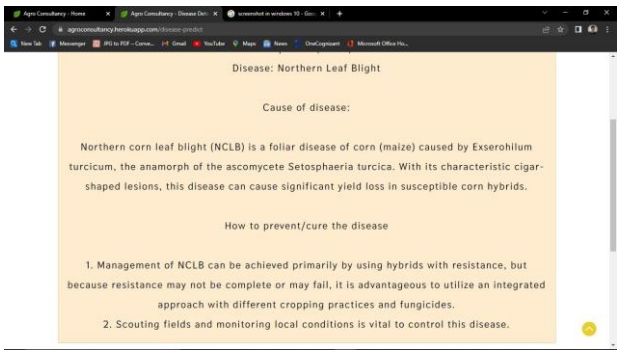

Fig.3.2- Crop Disease Detection Result

d) Systems Architecture

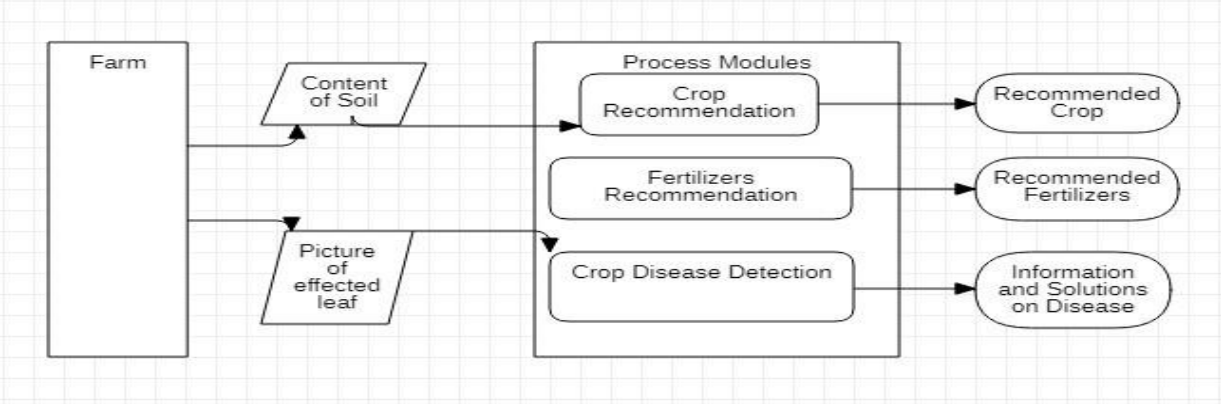

Fig.4- Systems Architecture

CONCLUSION

- We have successfully proposed and implemented an intelligent crop recommendation system, which canbe easily used by farmers all over India. This systemwould assist the farmers in making an informed decision about which crop to grow and efficient useof the fertilizers.
- We have also implemented a secondary system, called Crop Disease Detection which predicts the type of crop disease based on textural similarity of leaves.

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