Soil based Crop Prediction and Whether Forecasting

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ABSTRACT

In general, agriculture is the backbone of India and also plays an important role in Indian economy by providing a certain percentage of domestic product to ensure the food security. But now-a-days, food production and prediction is getting depleted due to unnatural climatic changes, which will adversely affect the economy of farmers by getting a poor yield and also help the farmers to remain less familiar in forecasting the future crops. This research work helps the beginner farmer in such a way to guide them for sowing the rea sonable crops by deploying machine learning, one of the advanced technologies in crop prediction. Naive Bayes, a supervised learning algorithm puts forth in the way to achieve it. The seed data of the crops are collected here, with the appropriate parameters like temperature, humidity and moisture content, which helps the crops to achieve a successful growth. In addition, as the software, a mobile application for Android is being developed. The users are encouraged to enter parameters like temperature and their location will be taken automatically in this application in order to start the prediction process.

Keyword: - *crop prediction, predictive analytics, soil fertility, sensors.*

1. INTRODUCTION

- There are so many soil series available in India. Every soil series have different features and every soil is suitable for different crop. Sometimes or we can say every time it happens that farmer soil is best for some specific crop but as he don't know. The main purpose of the proposed work is to create a suitable model for classifying various kinds of soil series data along with suitable crops suggestion.
- Series are recognized by machine learning methods using various chemical features and possible crops for that soil series are suggested using geographical attributes. Soil is one of the key components in agricultural field for yielding crops. Soil classification philosophies follow the existence knowledge and practical circumstances. On the land surfaces of earth, classification of soil creates a link between soil samples and various kinds of natural entity.

2. LITERATURE REVIEW

In [1] Paper Name: Crop Yield Analysis Using Machine Learning Algorithms
Agriculture is not only a huge aspect of the growing economy, but it's essential for us to survive. Predicting crop yield is not an easy task, as it depends on many parameters such as water, ultra-violet (UV), pesticides, fertilizer, and the area of the land covered for that region. In this paper, two different Machine Learning (ML) algorithms are proposed to analyze the crops' yield. These two algorithms, Support Vector Regression (SVR) and Linear Regression (LR), are quite suitable for validating the variable parameters in the predicting the continuous variable estimation with 140 data points that were acquired. The parameters mentioned above are key factors affecting the yield of crops. The error rate

was measured with the help of Mean Square Error (MSE) and Coefficient of Determination (R2), where MSE gave out approximately 0.005 and R2 gave around 0.85. The same dataset has been used for quick comparison between the algorithms' performances

In [2] Paper Name :- An Analytical Approach for Soil and Land Classification System
— In the last few decades researchers are interested in land mapping and its classification due to various reasons. The reasons for an increase in the focus of the research community are, the increasing demand for agricultural land and soil health analysis, as the health of the soil, is essential for the healthy production of crops. Image classification is one such approach for soil and land health analysis. It is a complex process having the effects of various factors. This paper has proposed the study of current researches, the problems it addressed, and its prospects. The emphasis is focused on the analytical study of various advanced and efficient classification mechanisms and techniques. Here, it has been attempted to study the factors these approaches have addressed to improve the accuracy of the classification. Proper utilization of the number of features of remotely sensed data and selecting the best suitable classifier are most important for improving the accuracy of the classification. The knowledgebase classification or non-parametric classifiers like decision tree classifier or neural network have gained more popularity for multisource data classification in recent times. However, there is still the scope of further research, to reduce uncertainties in the improvement of accuracy of the Image classification mechanisms

In [3] .Paper Name::Crop Yield Prediction using Machine Learning Techniques
Agriculture is the field which plays an important role in improving our countries economy. Agriculture is the one which gave birth to civilization. India is an agrarian country and its economy largely based upon crop productivity. Hence we can say that agriculture can be backbone of all business in our country. Selecting of every crop is very important in the agriculture planning. The selection of crops will depend upon the different parameters such as market price, production rate and the different government policies. Many changes are required in the agriculture field to improve changes in our Indian economy. We can improve agriculture by using machine learning techniques which are applied easily on farming sector. Along with all advances in the machines and technologies used in farming, useful and accurate information about different matters also plays a significant role in it. The concept of this paper is to implement the crop selection method so that this method helps in solving many agriculture and farmers problems. This improves our Indian economy by maximizing the yield rate of crop production

In [4] Paper Name:A Study on Various Data Mining Techniques for Crop Yield Prediction
India is a country where agriculture and agriculture related industries are the major source of living for the people. Agriculture is a major source of economy of the country. It is also one of the country which suffer from major natural calamities like drought or flood which damages the crop. This leads to huge financial loss for the farmers thus leading to the suicide. Predicting the crop yield well in advance prior to its harvest can help the farmers and Government organizations to make appropriate planning like storing, selling, fixing minimum support price, importing/exporting etc. Predicting a crop well in advance requires a systematic study of huge data coming from various variables like soil quality ,pH ,EC,N,P,K etc. As Prediction of crop deals with large set of database thus making this prediction system a perfect candidate for application of data mining. Through data mining we extract the knowledge from the huge size of data. This paper presents the study about the various data mining techniques used for predicting the crop yield. The success of any crop yield prediction system heavily relies on how accurately the features have been extracted and how appropriately classifiers have been employed. This paper summarizes the results obtained by various algorithms which are being used by var ious authors for crop yield prediction, with their accuracy and recommendation.

3. PROPOSED SYSTEM

We need to know the features and characteristics of various soil types to understand which crops grow better in certain soil types.
Machine learning techniques can be helpful in this case.
Then apply apriority Mining process to generate an association rule for finding suitable crops for the specific soil.
Soil series and land type combine represents the soil class in the database.
The machine learning methods are used to find the soil class (i.e. soil series and land type). Algorithm are used: CNN.

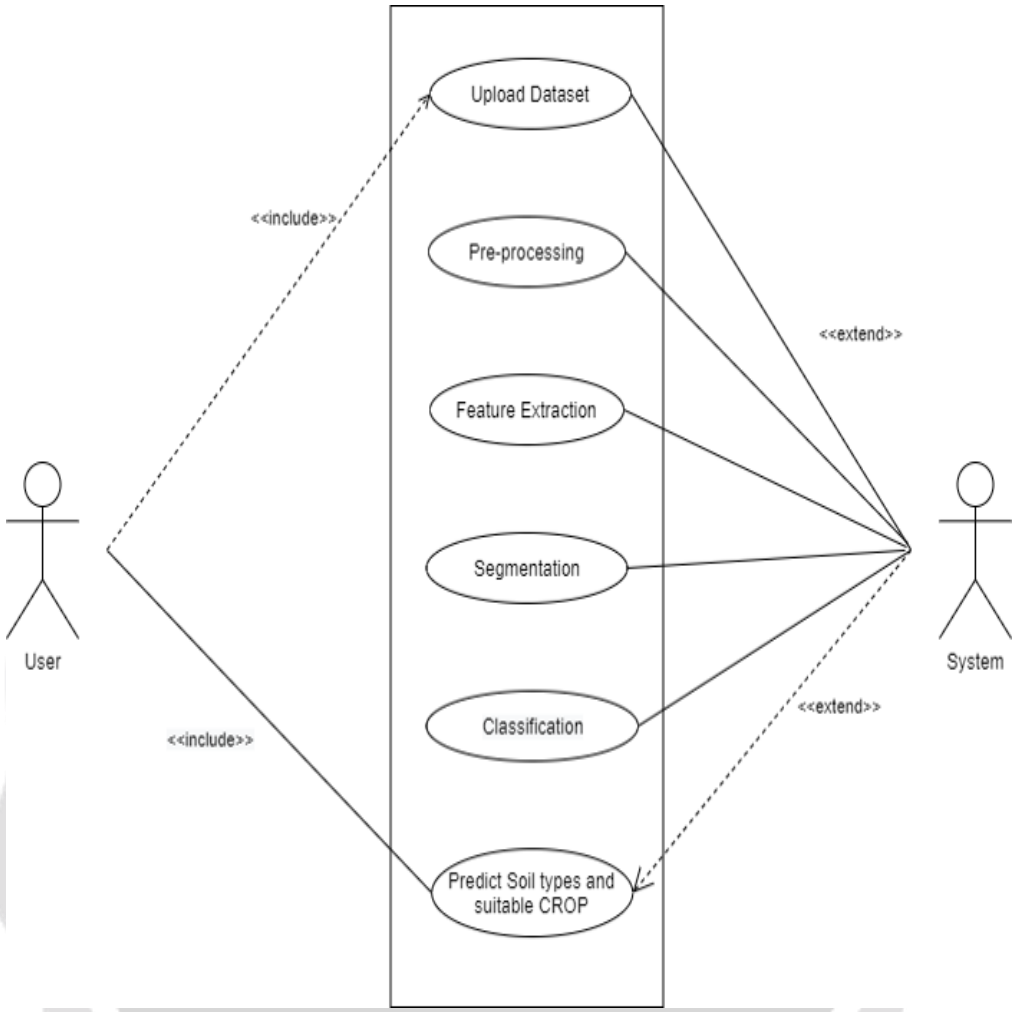

Fig -1: UML diagram of Use case Diagram

3.1 MULTILAYER PERCEPTRON

The Multilayer Perceptron (MLP) is a supervised learning algorithm that can learn a function by training on a dataset. It's a type of artificial neural network that can approximate any continuous function. MLPs are significant in machine learning because they can learn nonlinear relationships in data. They're used for tasks such as classification, regression, and pattern recognition. Working with non-linear problems, handling complex problems with large datasets, Higher accuracy rate, reducing prediction error, and quickly predicting output. A typical learning algorithm for MLP networks is also called back propagation's algorithm. A multilayer perceptron (MLP) is a feed forward artificial neural network that generates a set of outputs from a set of inputs. The MLP learning procedure is as follows:

Starting with the input layer, propagate data forward to the output layer. This step is the forward propagation. Based on the output, calculate the error (the difference between the predicted and known outcome). The error needs to be minimized. Back propagate the error. Find its derivative with respect to each weight in the network, and update the model. Repeat the three steps given above over multiple epochs to learn ideal weights. Finally, the output is taken via a threshold function to obtain the predicted class labels.

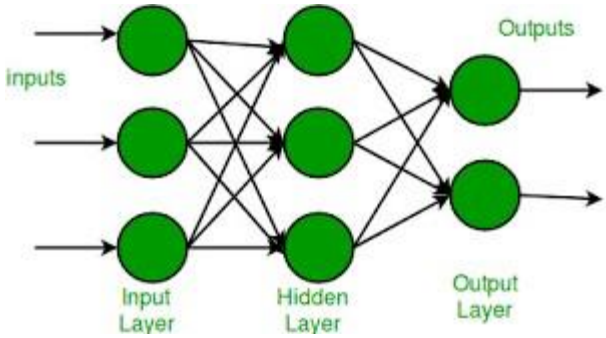

Fig -2: Multilayer Perceptron

3.2 ADVANTAGES

- Easy to collect information about Soils and Crops.
- It is User friendly.
- An accurate crop prediction model can help farmers to decide on what to grow and when to grow.

4. SYSTEM DESIGN

- The next phase is about to bring down all the knowledge of requirements, analysis, and design of the software project. This phase is the product of the last two, like inputs from the customer and requirement gathering.

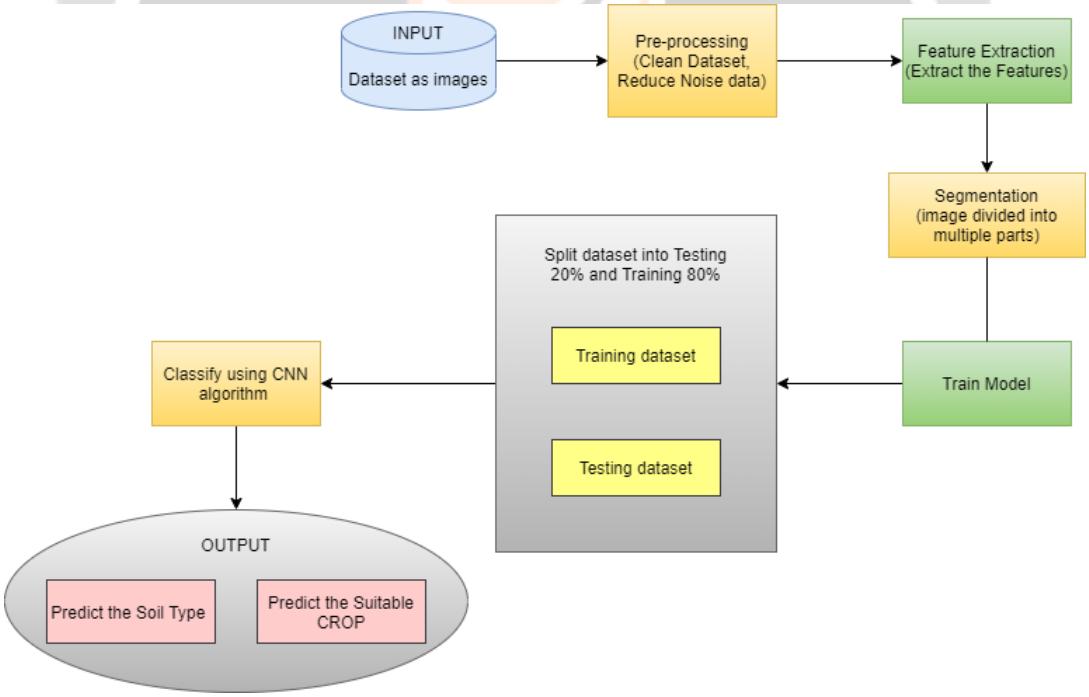

Figure -3: System Architecture 1

Input :- Input as image(images of soil)

Preprosessing :- Preprocess dataset, data mining, transforming raw data into under standable format, remove the noise and blurr part of the dataset.

Feature extraction :- Exatract the features for classifications.

Classification :- Classify the soil through algorithm.

Output :- Detect the type of soil and suggest suitable crops

4. CONCLUSIONS

A model is proposed for predicting soil series and providing suitable crop yield suggestion for that specific soil and weather.
The model has been tested by applying different kinds of Deep algorithm.
CNN shows highest accuracy in soil classification and suggests crops with less time. It gives us more accuracy as compared to existing system and gives more benefit to farmers.

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6. REFERENCES

[1]Y Jeevan Nagendra Kumar; V. Spandana; V.S. Vaishnavi; K. Neha;V.G.R.R Devi., 2020. Supervised Machine learning Approach for Crop Yield Prediction in Agriculture Sector.
[2]Fatin Farhan Haque; Ahmed Abdelgawd; Venkata Prasanth Yangmbaka; Kumar Yelamarathi.,2020,Crop Yield Analysis Using Machine Learning Algorithms.
[3] R. Nikhil; B.S. Anisha; Ramakanth Kumar P., 2020,Real-Time Monitoring of Agricultural Land with Crop Prediction and Animal Intrusion Prevention using Internet of Things and Machine Learning at Edge.