CROP RECOMMENDATION SYSTEM

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Abstract: **Encouraged to enter In general, agriculture is the backbone of India and also plays an important role in the Indian economy by providing a certain percentage of domestic products to ensure 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 reasonable crops by deploying machine learning, one of the advanced technologies in crop prediction. Random Forest, a machine 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 to the so Gware, a mobile application for Android is being developed. The users are parameters like temperature and theirs oil condition will be taken automatically in this application in order to start the prediction process.**

Keywords:- **Machine Learning, RandomForest Algorithm, Django**

I. INTRODUCTION

Weather plays an important role in agriculture production. For optimal productivity at a given condition crops must be such that their weather requirement matches the Current weather system. So we need to plan them according to the weather conditions and soil fertility. This is a prototype for a crop recommendation algorithm in Python using Machine Learning and Data Analytics. This work presents a system, in the form of a website. The business logic in Python uses Machine Learning techniques in order to predict the most profitable crop in the forecasted weather and soil conditions. The proposed system will integrate the data obtained from soil and by applying machine learning algorithm. This provides a farmer with a variety of options of crops that can be cultivated.

II. PROBLEM STATEMENT

Crop prediction is one of the challenging problems in precision agriculture, and many models have been proposed and validated so far. This problem requires the use of several datasets since crop yield depends on many different factors such as climate, weather, and soil, use of fertilizer etc. To develop Soil detection and Crop prediction system.

III. LITERATURE SURVEY

1. Paper Name: Crop Yield Analysis Using Machine Learning Algorithms
Author: Fatin Farhan Haque, Ahmed Abdelgawad, Venkata Prasanth Yanambaka, Kumar Yelamarthi
Abstract::-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, asit 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 Co efficient 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.

2. Paper Name::-An Analytical Approach for Soil and Land Classification System using Image Processing
Author: Prof. A. V. Deorankar
Abstract:—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 knowledge based 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.

IV. MATERIALS ANDMETHODS

A.Dataset:- we are using the Crop Recommendation Dataset from Kaggel. It contains 2.5k total summaries.

Table1

NITROGEN	PHOSPHORUS	POTASSIUM	TEMPERATURE	HUMIDITY	PH	RAINFALL	CROP
90	42	43	21	82	6.5	203	rice
71	54	16	23	64	5.7	88	maize
40	72	77	17	17	7.5	89	chickpea
13	60	25	17	21	5.7	128	kidneybeans
2	24	38	25	92	5.9	112	pomegranate
91	94	46	29	76	6.1	93	banana

As shown in Table 1, Dataset contains 7 entities:

Data fields
- N - the ratio of Nitrogen content in the soil
- P - the ratio of Phosphorus content in the soil
- K - the ratio of Potassium content in the soil
- temperature - temperature in degree Celsius
- humidity - relative humidity in%
- ph-ph value of the soil
- rainfall - rainfall in mm

V. IMPLEMENTATION DETAILS OF MODULES.

A.MODULESANDSYSTEMARCHITECTURE:-
Module 1: Preprocessing of Data
-Clean dataset
-Reduce noise Data
Input: Training & Testing Data
Output: Required Data for the Prediction

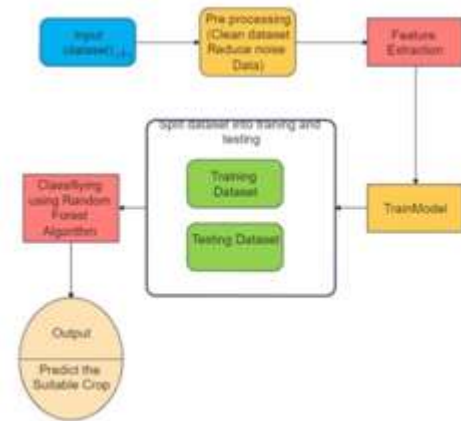**Module 2: Classification based on different factors.**
-Feature Extraction(Similar features are extracted from the dataset for Training Model)
-Training Model and splitting it into Training Dataset and Testing Dataset.

Module 3: Suggestion of Crop
-Classifying model using Random Forest Algorithm and Predicting the suitable crop.


System Architecture

B.ALGORITHM:-
Random Forest Algorithm-
Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML
Random Forest is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset.
Instead of relying on one decision tree, the random forest takes the prediction from each tree, and based on the majority votes of predictions, it predicts the final output.
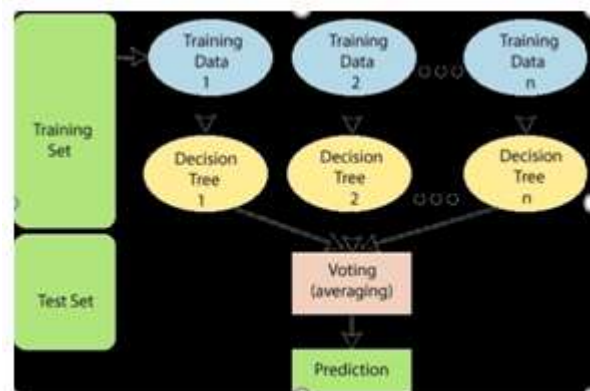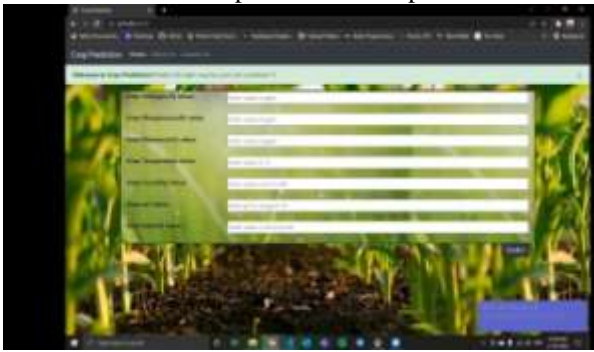

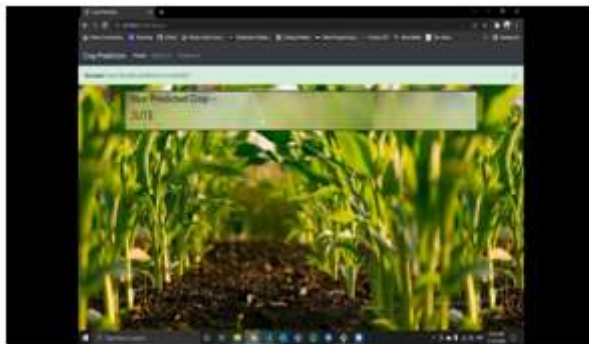Working of RFA (Random Forest Algorithm)

C. features
1. Input values:- fig(1) shows the webpage for taking entities values from users. Total seven values of entities

must be needed for prediction of crops.

fig(1)

2. Prediction:- fig(2) shows the predicted crop according to given input data.

fig(2)

VI. CONCLUSION

Amodel is proposed for predicting oil series and providing suitable crop yield suggestions for that specific soil and weather. The model has been tested by applying different kinds of algorithms. RANDOM FOREST shows highest accuracy in soil classification and suggests crops with less time. It gives us more accuracy as compared to existing systems and gives more benefit to farmers.

In reference to rain fall c and e pict whether extra water availability is needed ornot. This research work can be enhanced to a higher level by availing it to the whole India.

VII. REFERENCES

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