FEATURES IDENTIFICATION FOR GROWTH OF CERTAIN CROPS IN INDIAN AGRICULTURE

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Abstract: In India agriculture contributes approximately 20% of GDP with employed workforce of 41%. India is the second-largest producer of agriculture crops. The technological contribution may help the farmer to get more yield. The research focuses mainly on South Indian agricultural crops from Karnataka ,Kerala, Tamil Nadu and Andhra Pradesh. In this study we have proposed a system for crop selection and to identify parameters that are responsible for growth of certain crops. There are many machine learning algorithms that can be used for such predictions one among them is Random Forest Regressor. Here we have used Random Forest Regressor algorithm to know the exact crop to be grown based on the parameters entered by the user along with other crops suitable for that region .The data of crop cycle for summer, Kharif, rabi, autumn and whole year is used. The dataset is resourced by gathering data from kaggle and climate-data.org .The experimental parameters considered for study are cultivation area, crop, state, district, season, year , rainfall ,soil pH and temperature. The concept of this paper is to implement crop selection method by identifying the features responsible for growth.

I. INTRODUCTION

From the very beginning agriculture is regarded as the key occupation in many of the countries. In order to have good income it is necessary to know appropriate crop for that particular region. People in olden days were just considering the environmental conditions by looking at their surroundings and would make some predictions on the future weather conditions. Their predictions would however work in the past. But nowadays there is increase in the earth's temperature due to retaining of the greenhouse gases and also there is severe changes in our atmosphere, the bare predictions would not work.

There are many technological approaches which can help farmers to know whether they can have good yield in the future by sowing a particular crop at the present. One among them is machine learning which can be helpful the farmers to know which kind of crop they can sow. There are many machine learning algorithms that can be used for such predictions one among them is Random Forest Regressor. Here we have used Random Forest Regressor algorithm to know the exact crop to be grown based on the parameters entered by the user along with other crops suitable for that region and also the features making the crops to be highly grown .In the dataset there are 4 different states with __ different districts, which consists of 128 different crops along with the Season, Area, Production, Temperature, Humidity and pH.

Index Terms **- Random Forest Regressor, Crop Prediction, Machine Learning.**

II. LITERATURE SURVEY

Crop Prediction using Machine Learning

[1]In this study, they have proposed supervised machine learning using naive Bayes Gaussian classifier with boosting algorithm is developed to predict the crop at high accuracy. Crop Yield Prediction using Machine Learning Techniques

[2]In this study they have used two different methods. First is Naive Bayes method and second is K-Nearest neighbour method. We can get the accuracy of performance by using these two methods. To predict the crop yield rate they have created a java application .Naive bayes algorithm helps in finding the probability of predicted classes. K-nearest neighbour method can be used for both regression and classification predictive problems.

[3]The paper presented the various machine learning algorithms for predicting the yield of the crop on the basis of temperature, rainfall, season and area. Experiments were conducted on Indian government dataset and it has been established that Random Forest Regressor gives the highest yield prediction accuracy. Sequential model that is Simple Recurrent Neural Network performs better on rainfall prediction while LSTM is good for temperature prediction. Crop Yield Prediction Using Deep Reinforcement Learning Model for Sustainable Agrarian Applications

[4]The proposed method can precisely define the characteristics for crop yield. The combination of RNN based feature processing and DQN based self-experimental analysis is the key objective to attain favourable results. Unlike the supervised learning-based crop yield prediction process, DRQN based process provides a complete solution that independently mines the non-linear mapping between the crop yield and the climatic, soil and groundwater parameters. This advantage can definitely minimize expert dependency and prior knowledge for developing crop yield prediction models. Hence the proposed approach provides a perception of implementing a more generalized model for yield prediction. Agro Consultant: Intelligent Crop Recommendation System Using Machine Learning Algorithms

[5]In this paper, they have successfully proposed and implemented an intelligent crop recommendation system, which can be easily used by farmers all over India. This system would assist the farmers in making an informed decision about which crop to grow depending on a variety of environmental and geographical factors. The model proposed in this paper can be further extended in the future to incorporate a feature to predict crop rotations. This would ensure maximized yield as the decision about which crop to grow would now also depend upon which crop was harvested in the previous cycle. A Machine Learning Approach to Predict Crop Yield and Success Rate

[6]The model will able to predict better in the real-time dataset which will be a more effective suggestion to the farmer for making crop choice. Using ANN with linear regression with forward and backward propagation the model predicted the dependent variable with 82 % accuracy and very little loss. The model also suggest success rate for the crops as per input given by the farmer. So model suggest best possible crop with highest success rate.
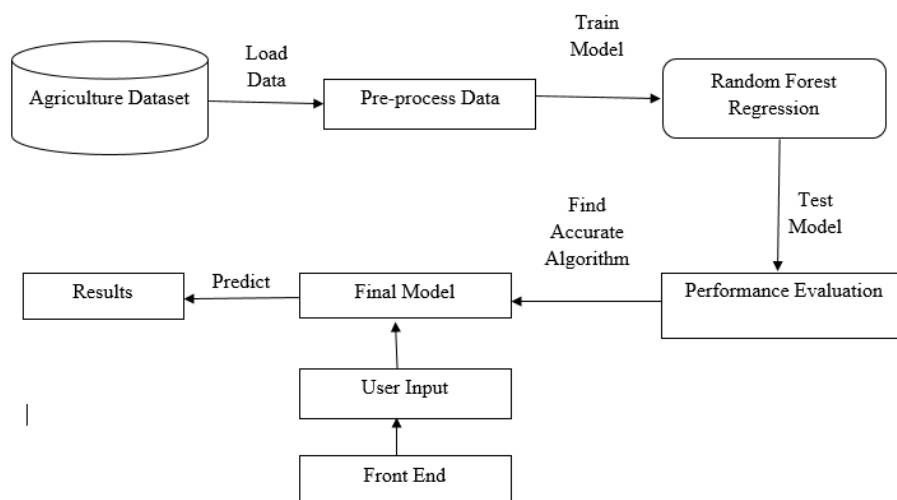
## III. PROPOSED SYSTEM

Fig 1. Dataflow Diagram

A Dataflow Diagram is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated We have proposed a machine learning technique using the algorithm Random Forest Regressor to predict the crop that can be grown based on different attributes entered by the user like state and district name, season, area and production. It also suggests the appropriate other crops for that region along with the necessary features.
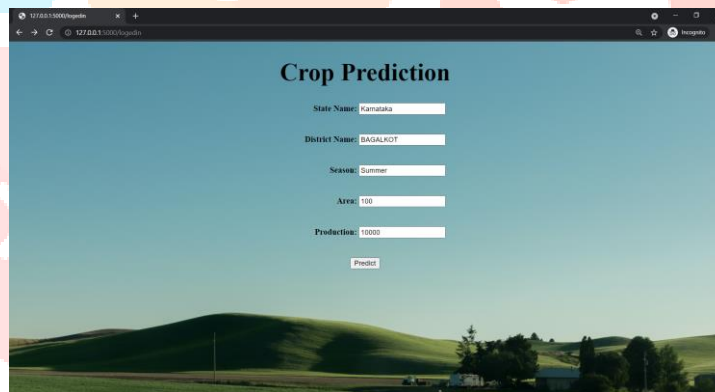
MODULES:

Registration Module: In this, user can register to the system.
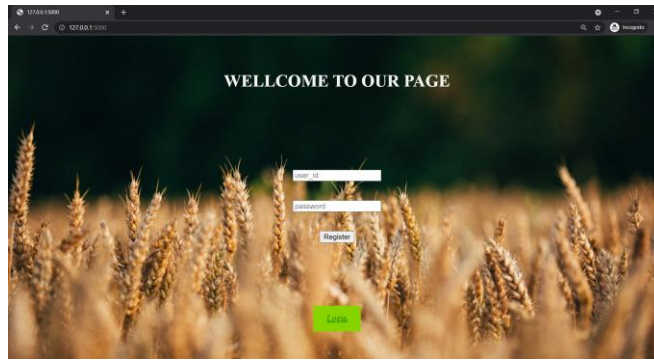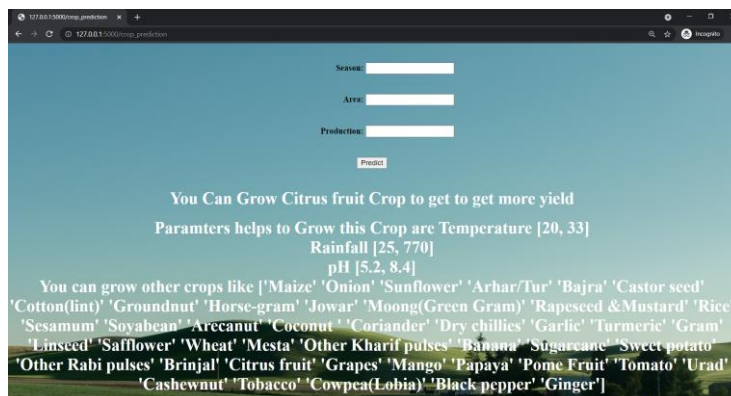

Login Module: In this, user can login to the system
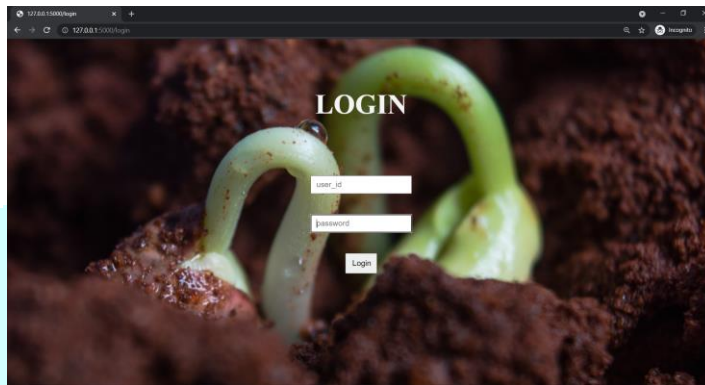
Crop Prediction Module: In this the System predict the Best Suitable crop that can be grown in the region.

Output Module: In this, user can See the Best crop and their features with other alternative crop which can be grown in that area.

IV . METHODOLOGY

4.1Dataset Collection

Initially we collected data from Kaggle Dataset .But the dataset was not sufficient so we used historical data of temperature ,ph. and rainfall of the location from the online resources. By the collection of these data set the random forest Regressor is able predict the crop with high accuracy.

4.2Soil analysis and crop prediction

Agriculture dataset is taken .The dataset is loaded and preprocessed with various machine learning techniques. The preprocessed data is divided into training and testing data. The prediction model is built using machine algorithm Random Forest Regressor The model is trained using training dataset and once the model has been trained successfully it has to be tested. The trained model is tested using testing dataset and accuracy is calculated. The algorithm which gives the best accuracy is taken as our final prediction model. The finalized model is converted into pickle model (binary format data) and saved .A Front End is developed with the help of Flask and HTML.

Now user will enter the state name, district name, season, area and production data in the front end. The collected data from the user is given as input to our finalized algorithm to predict the crop can be grown. Finally the predicted Crop output is displayed on the front end and also suggested list of crops can be grown on that district based on district name entered by the user in the front end.

4.3Algorithm for Crop Prediction analysis:

A Random Forest is an ensemble technique capable of performing both regression and classification tasks with the use of multiple decision trees and a technique called Bootstrap and Aggregation, commonly known as bagging. The basic idea behind this is to combine multiple decision trees in determining the final output rather than relying on individual decision trees.

Random Forest has multiple decision trees as base learning models. We randomly perform row sampling and feature sampling from the dataset forming sample datasets for every model.

The Working process can be explained in step:

Step-1: Select random K data points from the training set.

Step-2: Build the decision trees associated with the selected data points (Subsets).

Step-3: Choose the number N for decision trees that you want to build.

Step-4: Repeat Step 1 & 2.

Step-5: For new data points, find the predictions of each decision tree, and assign the new data points to the category that wins the majority votes.

Random forests is considered as a highly accurate and robust method because of the number of decision trees participating in the process. It does not suffer from the over fitting problem. The main reason is that it takes the average of all the predictions, which cancels out the biases.

V.CONCLUSION

In this paper, There is prediction of highly grown crop based on the district, in order to increase the farmer's economy and also the other there is suggestion of other crops that can be grown, which helps in proper crop rotation and retention of nutrients of the soil to improve its health. It also gives the features like temperature, humidity and pH that is best suited for the crops to have more yield by displaying its range .By using the attributes available in the dataset with the Random Forest Regressor gives the best accuracy for the prediction of crop for the farmers to best yield. This helps in improving the production level of the farmers and also global food production. Thus by helping the farmers know what to grow and when to grow there can be increase in the country's economy development with the industrialization and urbanization. It can also be the fundamental for ensuring food security, poverty alleviation and overall sustainable development.

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