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Agro Recommednder System Using Machine Learning

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ABSTRACT: Farming helps to meet the basic needs of human and their civilization by providing food, clothing, shelters, medicine and recreation. Hence, agriculture is the most important enterprise in the globe. Nowadays many IT professionals, are found to be passionate in farming.Our objective is to develop a WebApp-Agro Recommender System for those IT professionals using Machine Learning Algorithms suggesting the suitable crop to be cultivated on given area.When the user enters the data needed to predict the crop the already trained algorithm, which shows comparatively high accuracy will suggest the predicted crop to be cultivated based on user input. The algorithm used were Logistic Regression, Gaussian NB, Decision tree, SVM, Random Forest. The webapp will be deployedand hosted on cloud environment for accessing it remotely.

KEYWORDS: Machine Learning,SVM,ReactJS,IT,Webaapp

I. INTRODUCTION

Agriculture and its allied sectors are undoubtedly the largest providers of livelihoods in rural India. Blessing to the country is the overwhelming size of the agricultural sector. This paper proposes a viable and user-friendly yield prediction system for the IT professionals and youths from non-agricultural background. The WebApp will recommend the user for suitable crop based on the nature of their land. To predict the crop yield, selected Machine Learning algorithms such as Logistic Regression, Gaussian NB, Decision tree,SVM,Random Forestare used. Among them, the Random Forest showed the best results with 95% accuracy. The product is in a form of Web application hosted on Cloud environment so that it would be easily accessible by target audienceremotely.Todevelop app shows list of values to be value, temperature, humidity, phosphorous, nitrogen, rainfall and soil type.

II. THE RESEARCH METHOD

1.In this paper,the project has been separated into three parts namely front end, backend and the connecting part of both backend and frontend.The frontend is designed on ReactJS for our webpage. React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React offers a simpler programming model and better performance. React can also render on the server using Node, and it can power native apps using React Native. React implements one-way reactive data flow, which reduces the boilerplate and is easier to reason about than traditional data binding. The user must select the required values to predict crop.

2.The entered value will be used by python in backendMachine learning, a growing technology which enables computers to learn automatically from past data. Machine learning uses various algorithms for building mathematical models and making predictions using historical data or information. Currently, it is being used for various tasks such as image recognition**,** speech recognition**,** email filtering**,** Facebook auto-tagging**,** recommender system, and many more has been used to predict crops from given input data through csv dataset from Kaggle. Python Libraries like pandas,seaborn, sklearn,matplotlib,are imported from python for execution of ML algorithms.

3.Meanwhile the data distribution is handled in the middle by flask,a web application framework written in Python.develops Flask is based on Werkzeug WSGI toolkit and Jinja2 template engine. Both are Poccoprojects.Finally, our already trained ML algorithm will find the correct crop to be cultivated based on the given soil type and other parameters.

4.The predicted crop will be displayed in the front end to the user such as rice,millets, banana,peas etc. The user will now come to know which crop to be cultivated to get more yield and such crop should be cultivated on given area.

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III. PROPOSED SYSTEM

A) DESIGN CONSIDERATION:

- The Webpage used to get the requirements from the user.
- The values given by user is sent to the backend through flask.
- Before all the training of dataset will be done through following steps.
- Data from the Dataset is preprocessed
- Preferred Model is generated using python
- The generated model is validated
- Input Data required for the crop prediction is collected from the website such as nitrogen level, potassium level etc.
- The collected data is sent to the backend server using flask
- The collected data is given as a input to the Generated model and the model generates the predicted crop.
- The predicted crop data is sent to website and displayed in the website.

DATA FLOW DIAGRAM REPRESENTATION:

Figure 1.1 represents the proposed systems data flow.

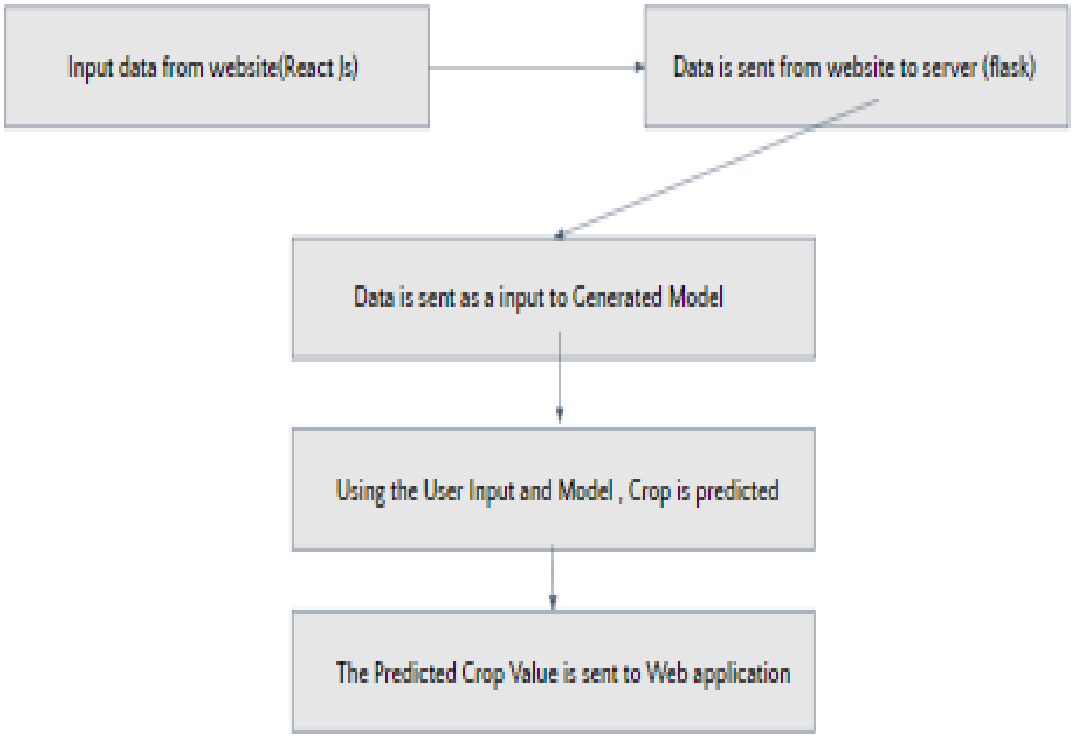

Figure 1.1

B) DESCRIPTION OF THE PROPOSED SYSTEM:

Our proposed system Agrorecommender will guide IT professionals and youths from non-agricultural background.
The WebApp will recommend the user for suitable crop based on the nature of their land.
The primary purpose is to recommend the suitable crop for the newbie IT professionals and guide them.
Software and technical terminologies used for proposed system are:

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a)Visual Studio Code
b)React JS
c)Python
d)Machine Learning Algorithms
e)Flask

C)MODULES:

Figure 1.2 represents the overall architecture as frontend and backend modules

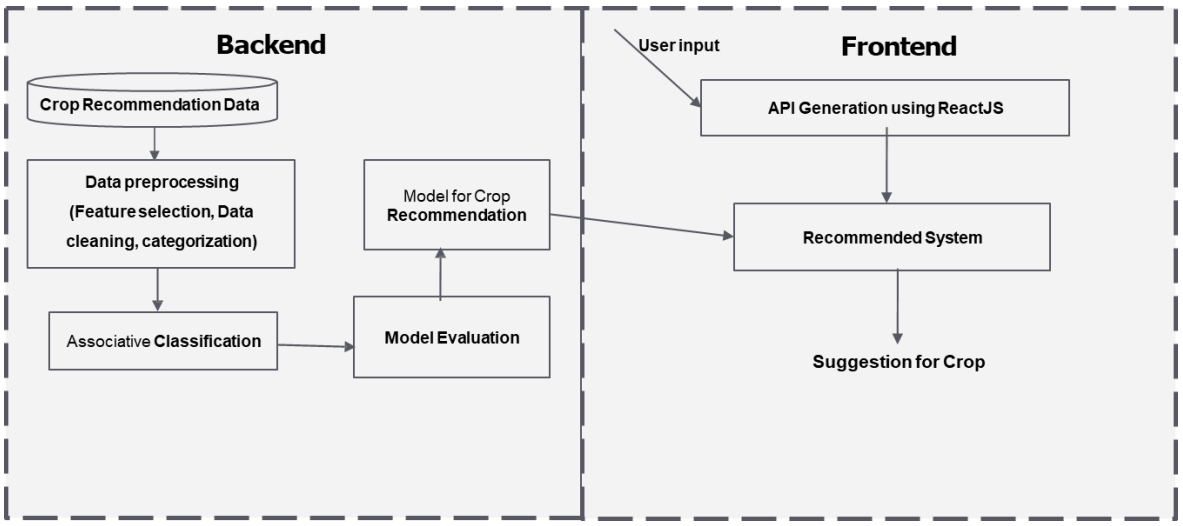

Figure 1.2

The project has been separated into three parts namely frontend, backend and the connecting part of both backend and frontend.The Webpage used to get the requirements from the user. The values given by user is sent to the backend through flask.Before all the training of dataset will be done through following steps. Data from the Dataset is preprocessed. Preferred Model is generated using python The generated model is validatedInput Data required for the crop prediction is collected from the website such as nitrogen level , potassium level etc. The collected data is sent to the backend server using flask. The collected data is given as a input to the Generated model and the model generates the predicted crop. The predicted crop data is sent to website and displayed in the website.

Machine Learning-Backend:
The suitable dataset from Kaggle is chosen,Data preprocessing,cleaning of dataset, preferred model is generated and readily trained ML algorithm which has comparatively high accuracy is chosen,namely Random forest with 99% accuracy.Now,thedata such as nitrogen, potassium, phosphorous, humidity, temperature, ph-levels and, rainfall, soil type which is entered by the user is given as input for thetrained model. Now the input is processed along with trained data and the predicted crop is displayed in frontend webpage.

React JS-Frontend:
The description about project, value from the user and predicted crops are displayed in frontend part i.e., webpage. This is the main part which interacts directly with the user and stores values and reacts with the user. This module is kept interactive for seamless prediction of crop.

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IV. PSEUDO CODE

Step 1: Allow the user to enter required values.
Step 2: Data from the Dataset is preprocessed
Step 3:Preferred Model is generated using python.
Step 4:The generated model is validated.
Step 5:Input Data required for the crop prediction is collected from the website such as phlevel,potassium level etc.
Step6:The collected data is sent to the backend server using flask.
Step 7:The collected data is given as a input to the Generated modeland the model generates the predicted crop.
Step 8:The predicted crop data is sent to website and displayed in the website.
Step 9:End.

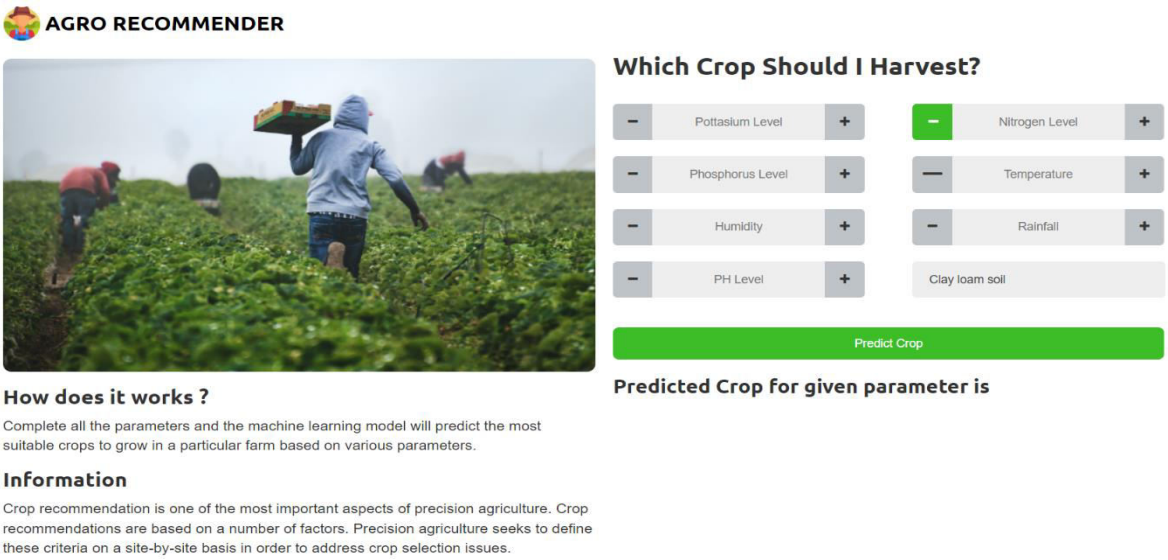
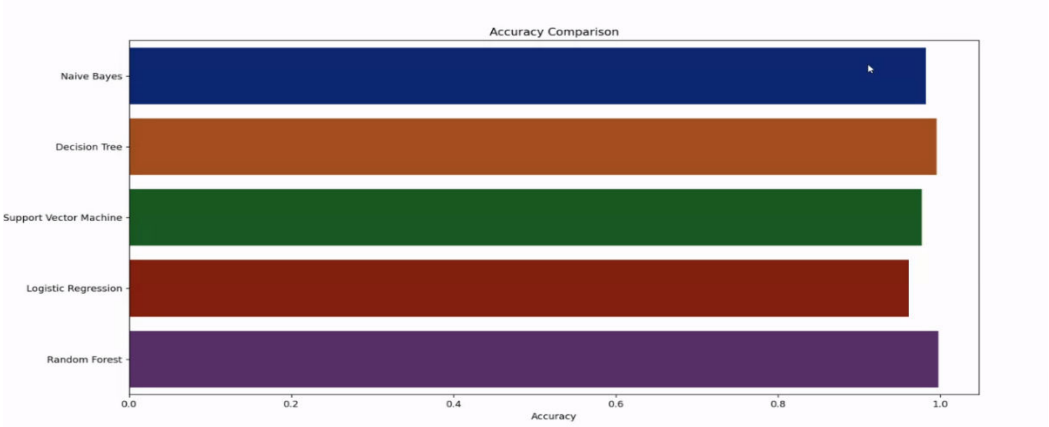


Figure 1.3

V. EXPERIMENT RESULTS

Prediction of crop is made difficult as soil types differ from crops and other varying values. So the use of machine learning is made compulsory to get the unknown predictable continuous values. We have compared five different algorithms such as Naïve bayes, Decision tree, Support Vector Machine, Logistic Regression, Random forest as given in figure 1.4 to find which algorithm suits crop prediction for given dataset.

Figure 1.4 represents accuracy levels of ML algorithms.



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As shown in figure 1.4 Random forest accurate the most with 99.7%,from which we come to know that this random forest algorithm can be used for crop prediction.

Figure 1.5 represents how the user enter values.

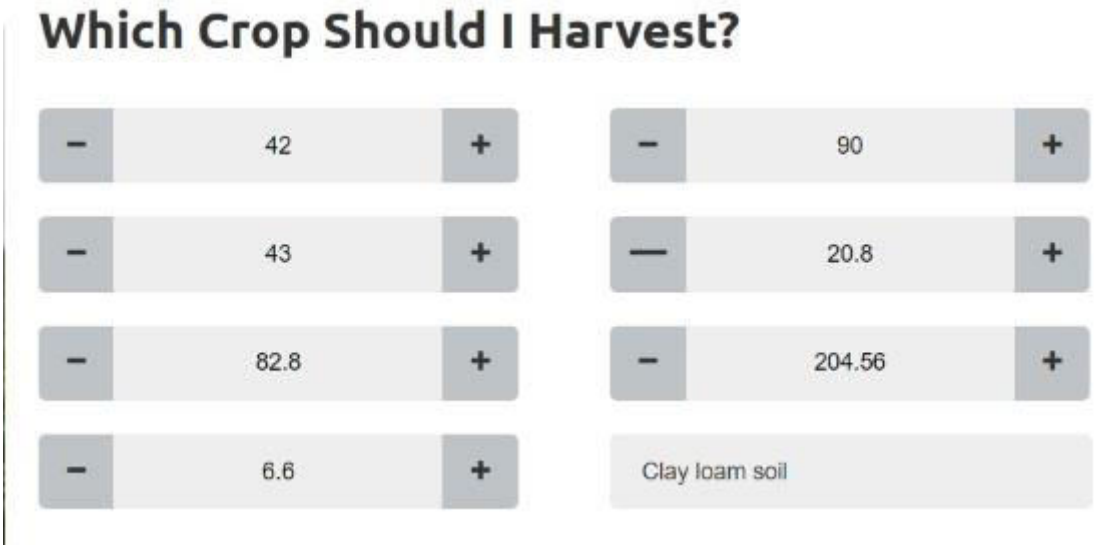

Figure 1.5

The numerical values given in figure1.5 is just an example not the accurate values.

After entering these values click the predict button displayed below to predict the crop.The predicted crop will be displayed such as shown in figure1.6.

Figure1.6

VI. CONCLUSIONS AND FUTURE WORKS

Agro recommender-crop prediction using machine learning technique helps the user mainly IT professionals who are really passionate about farming and have no idea about what to cultivate on which type of soil.The developed webpage is user friendly and can be made more informative by providingadditional useful information like intercropping, fertilizers etc. to the user. We can create moreinteractive User Interface by adding chatbots andspeech recognition systems and use IoT devices to get the values automatically from soil instead being typed by user.

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