

CROP PREDICTION SYSTEM USING MACHINE LEARNING

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Abstract : Machine learning is an important decision support tool for crop yield prediction, including supporting decisions on what crops to grow and what to do during the growing season of the crops. Agriculture depends on the various soil properties. Production of crops is a difficult task since it involves various factors like soil type, temperature, humidity etc. If it is possible to find the crop before sowing it, would be of great help to the farmers. Machine learning in agriculture is used to improve the productivity and quality of the crops in the agriculture sector. Use of appropriate algorithms on the sensed data can help in recommendation of suitable crop. This system thus reduces the financial losses faced by the farmers caused by planting the wrong crops and also it helps the farmers to find new types of crops that can be cultivated in their area. To predict the crop yield in future accurately Random Forest, a most powerful and popular supervised machine learning algorithm is used.

Keywords: Crop Analysis; Crop Yield; Machine learning; Prediction; Supervised algorithms.

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1.INTRODUCTION

Agriculture is the backbone of the Indian economy. In India, agricultural yield primarily depends on weather conditions. Rice cultivation mainly depends on rainfall. Timely advice to predict the future crop productivity and an analysis is to be made in order to help the farmers to maximize the crop production of crops. Yield prediction is an important agricultural problem. In the past farmers used to predict their yield from previous year yield experiences. Thus, for this kind of data analytics in crop prediction, there are different techniques or algorithms, and with the help of those algorithms we can predict crop yield. Random forest algorithm is used. Using all these algorithms and with the help of inter-relation between them, there are growing range of applications and the role of Big data analytics techniques in agriculture. Since the creation of new innovative technologies and techniques the agriculture field is slowly degrading.

Due to these, abundant invention people are concentrated on cultivating artificial products that are hybrid products where there leads to an unhealthy life. Nowadays, modern people don't have awareness about the cultivation of the crops at the right time and at the right place. Because of these cultivating techniques the seasonal climatic conditions are also being changed against the fundamental assets like soil, water and air which lead to insecurity of food. By analyzing all these issues and problems like weather, temperature and several factors, there is no proper solution and technologies to overcome the situation faced by us. In India, there are several ways to increase the economic growth in the field of agriculture. There are multiple ways to increase and improve the crop yield and the quality of the crops. Data mining is also useful for predicting crop yield production.

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2.DESIGN

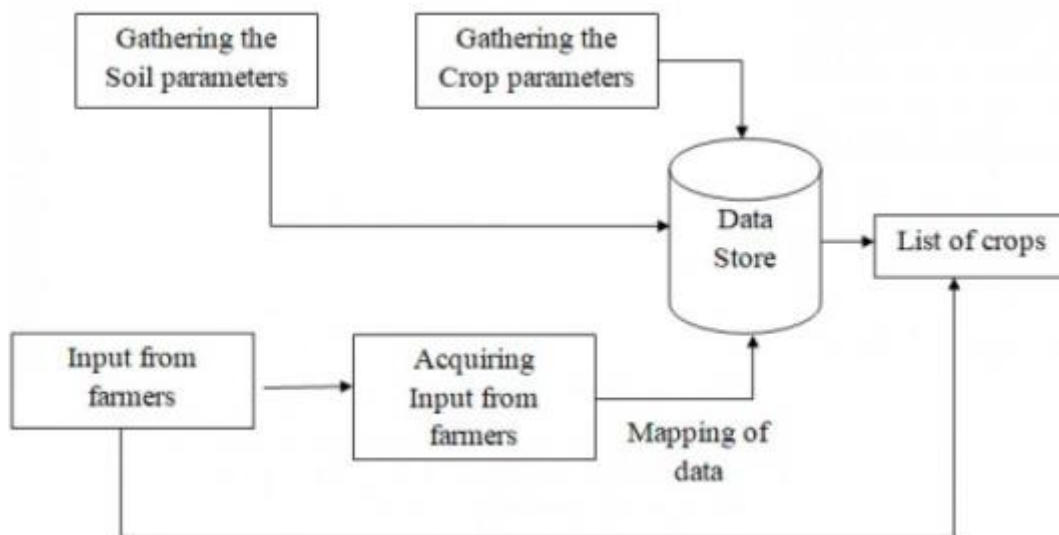
A system can only be intended to fit into the required environment when properly defined requirement specifications. It depends mainly on the current system customers to give the requirement specifications because they are the individuals who end up using the system. This is because it is necessary to know the demands during the original phases so that the system can be designed according to these demands. Once designed, changing the system is very hard and, on the other hand, designing a system that does not fulfill the demands of the user is of no use. The requirements for any scheme can be specified as follows:

- The system should be able to interface with the existing system
- The system should be accurate
- The system should be better than the existing system.

Systems design is the method by which the architecture, elements, modules, interfaces and information of a system are defined to meet specific requirements. It could be viewed as applying the system theory to product development. Object-oriented evaluation and design methods become the most widely used computer system design techniques.

Colaboratory, or “Colab” for short, is a product from Google Research. Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning, data analysis and education. More technically, Colab is a hosted Jupiter notebook service that requires no setup to use, while providing free access to computing resources including GPUs. Colab notebooks are stored in Google Drive, or can be loaded from GitHub. Colab notebooks can be shared just as you would with Google Docs or Sheets. Simply click the Share button at the top right of any Colab notebook, or follow these Google Drive file sharing instructions.

Figure



3.ANALYSIS

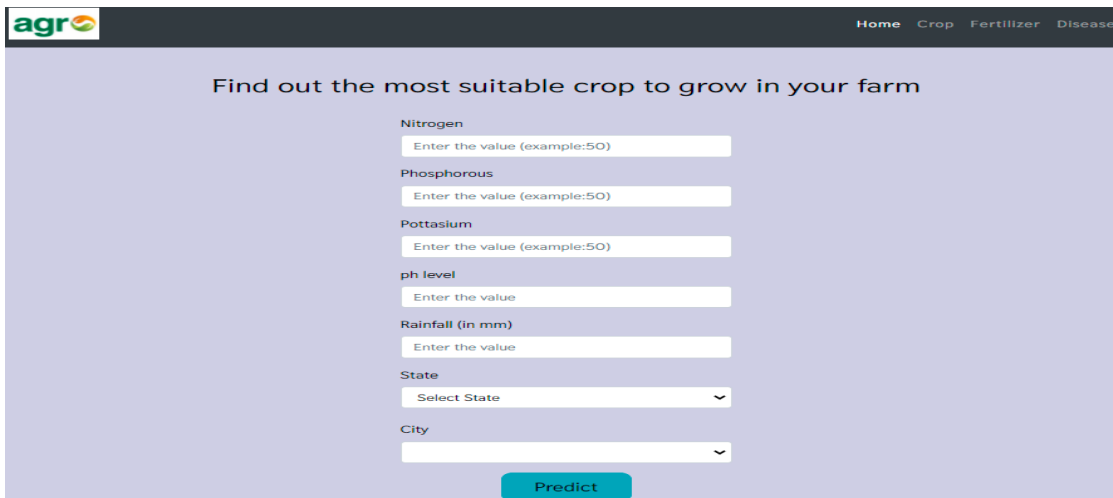
Analysis is a detailed study of the various operations performed by a system and their relationships within and outside the system. System Analysis is first stage according to System Development Life Cycle model. This System Analysis is a process that starts with the analyst. Analysis is a detailed study of the various operations performed by a system and their relationships within and outside the system. One aspect of analysis is defining the boundaries of the system and determining whether or not a candidate should consider other related systems. During analysis, data is collected from the available files, decision points, and transactions handled by the present system. Logical system models and tools are used in analysis. Training, experience, and common sense are required for collection of the information needed to do the analysis Logical system models and tools are used in analysis. Training, experience, and common sense are required for collection of the information needed to do the analysis. This System Analysis is a process that starts with the analyst.

Random forest is a most popular and powerful supervised machine learning algorithm capable of performing both classification, regression tasks, that operate by constructing a multitude of decision trees at training time and outputting the

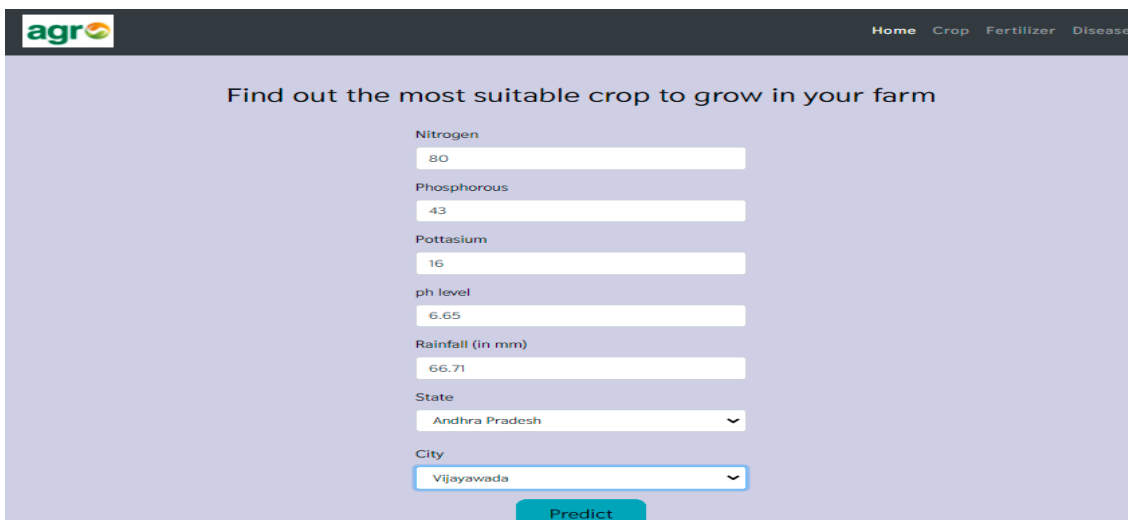
class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. The more trees in a forest the more robust the prediction. Random decision forests correct for decision trees habit of over fitting to their training set. This algorithm runs efficiently on large

4.RESULTS

The user need to give the input parameters like nitrogen, potassium and phosphorous values of the soil. After we need to select the city and state. Then it connects with the weather API and checks the present temperature , humidity etc. So, that based on the climatic conditions in that state and also city then, it recommends a crop. The user want to enter the parameters like nitrogen, potassium and phosphorous values of the soil. Also, we want to select which crop to grow. If the parameters are not suitable for that crop that we want to grow it gives some suggestions.



The screenshot shows a web form titled "Find out the most suitable crop to grow in your farm". The form includes input fields for Nitrogen, Phosphorous, Pottasium, ph level, and Rainfall (in mm). It also has dropdown menus for State and City. A "Predict" button is located at the bottom of the form.



The screenshot shows the same web form as above, but with the following values entered: Nitrogen: 80, Phosphorous: 43, Pottasium: 16, ph level: 6.65, Rainfall (in mm): 66.71, State: Andhra Pradesh, and City: Vijayawada. The "Predict" button is still visible at the bottom.



This is a partial screenshot showing the top navigation bar with the "agr" logo and links for Home, Crop, Fertilizer, and Disease.

You should grow *maize* in your farm

5. CONCLUSION

In this paper we have proposed an innovative approach for smart agriculture using Machine Learning Technique. Machine learning is mainly used for prediction. Based on the climatic input parameters the present study provided the demonstration of the potential use of data mining techniques in predicting the crop yield based. The developed webpage is user friendly and the accuracy of predictions are above 75 per cent in all the crops and districts selected in the study indicating higher accuracy of prediction. By providing climatic data of that place the user friendly web page developed for predicting crop yield can be used by any user their choice of crop. The Results shows that we can attain an accurate crop yield prediction using the Random Forest algorithm. Random Forest algorithm achieves a largest number of crop yield models with a lowest models. It is suitable for massive crop yield prediction in agricultural planning. This makes the farmers to take the right decision for right crop such that the agricultural sector will be developed by innovative idea.

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