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Machine Learning based Decision Tree Regression algorithm For Easy Farming

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Abstract: *Agriculture is a major source of income in the United States. In recent years, due to the uncertainty of the development of the weather and many changes in the development of the load, the crop has increased to a higher level. Farmers are still unaware of the uncertainty, which causes the plants to deteriorate and cause large losses. They don't know what kind of culture will be most beneficial to them. Because they have limited information about various crop diseases and their correct treatment, the plants are damaged. This tool is handy, easy to use. This gives accurate results in predicting the value of crops. This framework uses a Machine Learning Decision Tree Regression algorithm to estimate the value of crops. The attributes needed for forecasting are precipitation, market value, month and year. Therefore, the gadget provides an increased estimate for farmers, which increases the amount of income for them and, therefore, for the economic system of the United States of America. This tool also includes different models such as weather forecast, crop advice, fertilizer advice, as well as a shop, chat portal and book.*

Keywords—*agriculture, decision tree regression, price prediction, weather forecast, fertilizer, machine learning*.

I INTRODUCTION

India is a rural state, its economy is dominated by agricultural development and integrated agribusiness. Today, the situation is rapidly evolving towards a completely opposite situation. India is now moving towards development. Smart farming is changing the face of agriculture in India. Technology can give way to the biggest challenges farmers face. This can help them better predict the weather, reduce waste, improve profits and increase revenue. The status quo makes it difficult for farmers and consumers in the real world to determine the value of a plant

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without first understanding price trends or weather conditions. Innovation will therefore develop for the benefit of agriculture. The aim of the document is to get the crops first. This work is entirely based on finding the necessary local information that helps us do correct and better work. Our system, Agro-industry, uses machine learning to create a price forecasting model.

Over the past few years, there have been many fluctuations in crop prices. This revealed the amount of damaged crops produced each year. The main objective of this betting machine is to ensure that farmers have a better idea of their profits and to resolve the price threat.

The weather has also been surprisingly unpredictable lately. This also affects agricultural production. The planning process will also forecast the weather to help the farmer make accurate decisions regarding plowing, harvest areas and much more. Likewise, fertilizers play an important role. Fertilizers load the soil with necessary vitamins that plants waste in the soil. Crop yields and production can be reduced if fertilizers are not used. It is for this reason that fertilizer is used to treat the soil in addition to food that can be mixed and used by the crops. Our equipment will provide fertilizers according to different plants and provide a portal to purchase fertilizers and seeds from customer's land. They can enter into close agreements with the fertilizer and seed market. The fertilizer provided is more profitable for farmers of the recommended planting material. It can also display crop interest based on planting date, month and location information, thereby maximizing crop yield.

It will provide multilingual and environmental manuals specifically aimed at farmers. All the farmers who are new to this field and should benefit from the information of their ancestors but have the same ideas which can be helpful nice We have also provided maps for farmers to gain knowledge. Our gadget will provide a unique map template for farmers to gain knowledge on how the land is used and where they should start farming. Irrigation maps show irrigated and non-irrigated areas in the United States of America. Farmland view map will provide the best view of farmland in various states of India and help farmers to search for non-agricultural lands that are similar. The map makes it easy for farmers to understand that they should just move to the country in which they want to start farming and they can get information about the country in which they can decide whether to move or start farming. If farmers are new to this discipline, it is best for them because the most important thing in farming is to first choose the soil and location of the farm.

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In the same way, our device will have interactive applications that are easy to share the truth. Most farmers have questions that cannot be answered due to their lack of understanding. We then create a platform where statistics can be exchanged. Words can create problems for those.

II LITERATURE REVIEW

The following lines are focused on predicting harvest costs using machine learning and reporting the results. As of April 2019, objective research has estimated the value and yield of the given crop before planting. Profitable data sets provide sufficient intelligence to predict cost effectiveness and demand throughout the industry[1]. The authors expected that the most profitable plants and their prices are expected during the harvest according to the land, estimating the specific process of the ancient raw materials used first -at-its-best system mastering algorithms. The work presented by Nishiba [2] is the hope of using the real mining method to estimate the yield based on the material, the average rainfall, and the location. The easy-to-use website designed to wait for the crop can be used by all customers by showing the regular rainfall and the area of that location. Different Data Mining techniques are used for specific data. This information can also include some models [11] that can help farmers make certain decisions based on the current harvest location or market. The machine can be expanded by seeing crop information on a detailed map, to help farmers see the details of crops in neighboring areas. The application system can be improved by providing a graphical view of the planned spending for more information.

This system is intended to help farmers monitor the best conditions for their crops and predict high prices for the crops. This further helps the farmers to analyze the past prices of different products. The tool can predict crop yield using [9] Random Woodland, Polynomial Regression and Decision Tree algorithms. Important crops and fertilizers are necessary to make farmers more aware of the crops and their benefits and in addition to our system will work in business [4] by predicting the total value of the crop based on the current market price. The concept of the gadget can be extended by including larger functions for the device, such as providing a place near the storage area for buying seeds and fertilizers.

This article focuses on load forecasting and forecasting from web software and they run on machine learning techniques such as using the model of auto regressive integrated moving average (ARIMA) , the traditional ARIMA [6], the support vector regression algorithm [8], and the technology has a similar model to use for customers.

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University data has emerged [7] providing sufficient insight to estimate the appropriate costs [10] and business needs. The results are based on quality services so that poor farmers can easily access them. The model can be improved by integrating with different areas such as horticulture, agriculture and others in the development practice of our country. Different farms have many problems in today's world. Their integration will not only expand, but will also help farmers new to this part of the spectrum. Their work can be improved by building a foundation for advise on agricultural products and distribute them to farmers. Using this framework, we must achieve the same truth when using information-self-management. Also, it can make more demands by developing Android software for the same.

III PROPOSED SYSTEM

A description

We used Python for basic operations in all modules. Flask is used for hosting. Socket programming is used for a chat application. Chart. Js is used to visualize charts. JavaScript is used for validation functions. For Air Weather [12] and nearby fertilizer products, we used APIs. Using self-generated data and the concept of linear regression in the knowledge-based system, we have developed crop tips so that the farmer can learn about the crops interested in the chosen location. In Fertilizer Recommendations, we used a data set to estimate which fertilizer should be used for crop diseases. Socket programming is used for communication between farmers using social networking software [3]. Google API is used to make the website multilingual for easy reading.

TABLE I. COMPARISON OF THE ALGORITHMS

Parameter	KNN	Naive Bayes	Decision Tree
Deterministic/ Non-deterministic	Non-deterministic	Non-deterministic	Deterministic
Effectiveness on	Small data	Huge Data	Large Data
Speed	Slower for large data	Faster than KNN	Faster
Dataset	It can't deal with noisy data	It can deal with noisy data	It can deal with noisy data
Accuracy	Provides high accuracy	For acquiring great outcomes, it requires an enormous number of records	High accuracy

So, we can use decision tree regression algorithm for crop prediction which gives about 95-97% accuracy.

C. Decision tree regression algorithm

Decision tree regression tool to get knowledge of the way to monitor the potential of a season and train the model in the form of a tree to expect the truth in a period to get good and regular results. Continuous output means that the output is not always discrete, a recognized sequence of numbers or values.

The entries in the right set are:-

1. Input parameters

2.Training data set The model used for prediction

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Where y1 and y2 are the values of the standard deviations in the organization s1 and s2, this is the wholesale price measured in the data.

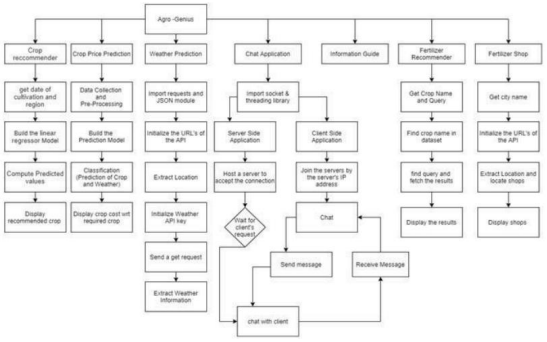

Fig. 1. Flow Diagram of Agro Genius (all modules)

For bunch s1 and s2 that is rainfall, it will recursively part the indicator esteems inside gatherings. The process stops when the sample size of the split group falls below a certain threshold.

Steps to Implement the Algorithm

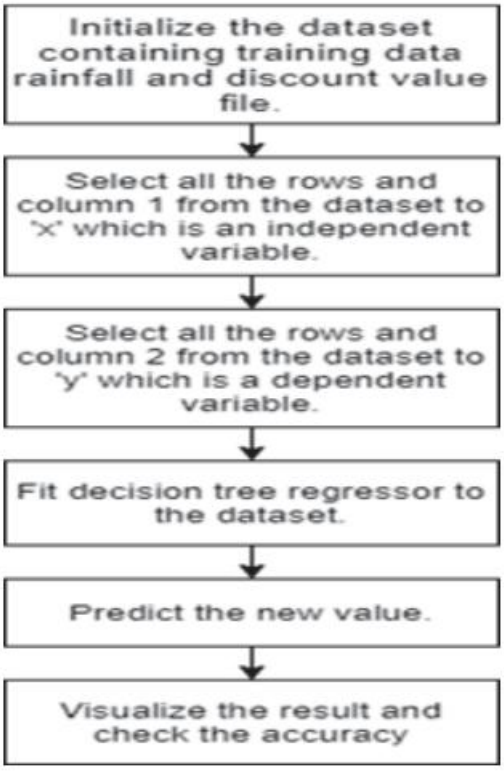

Fig. 2. Steps to Implement the Algorithm

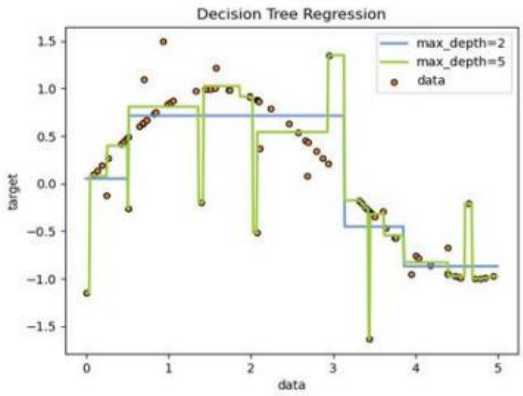

Fig. 3. Decision Tree Regression

IV IMPLEMENTATION

The information used is obtained from the official website of the Indian authorities.

We studied the model of KNN, Naive Bayers and Decision Tree Regression algorithms and concluded that Decision Tree Regression algorithm reduces the over fitting problem. This also significantly increased accuracy.

We perform testing and training on our data. The model changes in the study and therefore the results obtained are stated.

Then compare the resulting estimate with the original truth. After that, we use the monitoring model to evaluate the accuracy of the model. We are waiting for the correct version with different algorithms. Of the three algorithms used, we conclude that decision tree regression performs well and therefore use them to inform our model.

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In Weather Map, using weatherperson API, we predicted weather using city name per person.

For confirmation, the user must disclose information excluding age and location. Using a self-created data set from the state of Maharashtra and using the linear regression cultivation strategy model so that it shows the maximum suitable plants and minimum plants.

For fertilizer recommendations, we take into account crop calls and current crop conflicts and, using the data, present the best results.

To see nearby Agra-Shop, we launch the Google API and use the area and recommended fertilizer, the location of nearby stores is displayed.

For Session, we start a socket and establish a connection between client and server.

V RESULT

Using this framework, we should achieve the same accuracy when self-reporting is used.

For testing purposes, we calculated the instruction error, dedication coefficient R2, and variance score of school and test data. With this, we calculated the accuracy of the test data.

For Paddy:

R^2 of the Test
Set: ~0.9999
R^2 of the Train
Set: 1.0
Mean absolute error
test set: 1.64Test
Variance score:
0.98
Mean absolute error
Training Set: 4.72
Training Variance score:
0.70
Test Set Accuracy ~ 0.9773

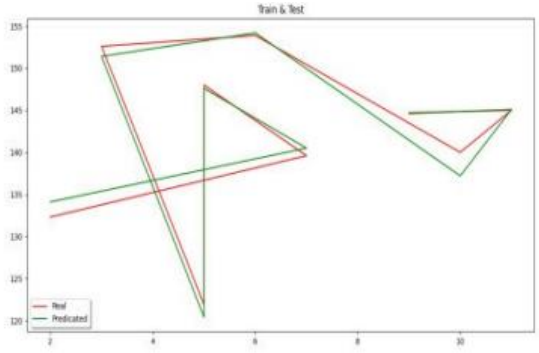

Fig. 4. Real Values versus Predicted Values

In this graph, the Real values are plotted with “Red” colour and the Predicted values are plotted with “Green” colour.

In Figure 4, output shows a little deviation from the real values. We have achieved an accuracy of ~97% after trainingthe model.

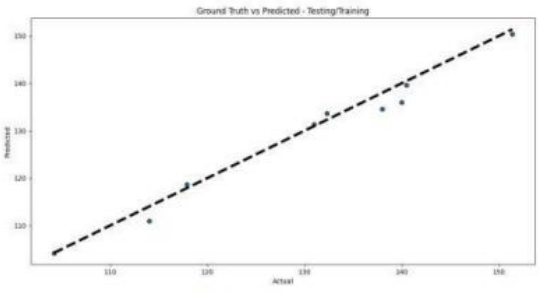

Fig. 5. Prediction Errors

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Figure 5 shows the prediction error.

We get 5 days of weather forecast with 3 hours of programming showing temperature, maximum, minimum temperature, humidity, weather organization and weather description.

Farmers receive advice on which crops are suitable and which crops are least acceptable for a given location.

The farmer receives the recommended fertilizer on behalf of the disease by using the farmer for the crops.

When the farmer finds the fertilizer, he can easily collect the fertilizer and some seeds that are suitable for production.

Farmers can communicate with each other easily by selecting the chat option. Group discussions are also made available.

To make the website multilingual, we use Google Translate to translate the website into more than 20 languages.

VI CONCLUSION

This work is done using gadget mastery and evaluating overall performance using KNN, Naive Bayes, and Decision Tree algorithms. In our proposed model of the 3 algorithms, the decision tree algorithm gives the best result to be estimated compared to the different algorithms.

As the maximum amount of harvest can be ensured in this system, farmers can also become more familiar with the results which may be unchanged. The diagram shows the need to use the gadget to gain knowledge about the strategy to predict the amount collected based on the given behavior. The Internet application is easy to understand and the accuracy check is over 90%.

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