Crop Price Prediction and Forecasting System using Supervised Machine Learning Algorithms

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Abstract: Our countries economy is mainly based on agriculture. Farmers plays an important role in agriculture, At present scenario due to variation in climatic change and other price influencing parameter farmers face massive loss due to uncertainties in the price fluctuation. The developed crop price prediction and forecasting system helps farmers to predict price of the commodity. The system gives detailed forecast up to next 12 month .The methodology we use in the system is decision tree regression which is machine learning regression technique. The parameter considered for prediction are:- rainfall, wholesale price index (minimum support price, cultivation cost). Accurate prediction of crop price; plays important role in crop production management. Such prediction will also support the allied industries for strategizing the logistics of their business.

In general with help of this application farmers get a beforehand prediction which helps to increase their profit and prevent massive lose. Which in turn increase countries economy.

Keywords: Forecasting System, Decision Tree Regression, Price Prediction

I. INTRODUCTION

Agriculture is the main pillar of economy in our country. Most of the families rely on Agriculture. Country's Gross Development predominantly lean on Agriculture. 60%ofthe land is utilized for Agriculture to adequate the requirements of the Country's population. To meet the requirements, modernization in Agricultural practices is required. Thus, heading towards the growth in Farmers' and Country's economy. Our project aims to solve crop value prediction problem in an efficient way to ensure the guaranteed benefits to the poor farmers. It use Machine Learning techniques on various data to came out with better solution. This solution uses Support Vector Regression technique to predict the crop value using the data trained from authenticated dataset. By this application productivity can be increased by understanding and Forecasting cropper form acne in a variety of environmental conditions. An effective Crop price forecasting system can give out possibilities for customers which can satisfy the customers to a greater context. Finally, the results are displayed as web application so that poor farmers can access easily

1.1 Price Prediction System

In the paper the emphasis is on machine learning technique to predict the Price of the Crop using the support vector regression Algorithm. Regression is one such data mining technique where learning acts as a method to get the price of the crop. The regression task will be considered as classification tasks and task with defined class labels. The price of the crop is determined by recognizing the patterns in our training dataset which is given as one of the inputs to the Algorithm. The inputs values for the parameters (Yield, Rainfall, Minimum Support Price, and wholesale price index) are taken by the user and fed to the algorithm. The other Parameters to the Algorithm are- Probability, New Record Input and number of Dataset Parameters.

1.2 Forecasting System

In the paper there is also focus on various mechanism to forecast the predicted data to the poor farmers. We use flask libraries from python and linear regression to continuously forecast the price of the crop to the users and it will be open-source so that everyone can access it

II. RELATEDWORK

[1]   The paper aims at analyzing the demand of the crop by the predicting the price of the crop at the correct scenario. The researcher collects the dataset from the Taiwan markets by the knowledge of market prices of over 15 local markets. The price is predicted using the well-known algorithms such as the Partial Least Square (PLS), Autoregressive Integrated Moving Average (ARIMA) and the Artificial Neural Network (ANN). The paper compares the performance of these four algorithms with the prices so obtained from the local markets. The crops considered for

analyzing are cabbage, watermelon, bokchoy and cauliflower. According to the results so obtained the PLS and ANN algorithms gave a Better result than others for both short term and long-term forecasting.

[2] The research aims over choosing an appropriate crop for an area selected by the user thus helping the farmer to take better and wise decisions. It also suggests the rank of the crop based the suitability to that area. Thus, the farmers get to know the compatibility of the chosen crop and the area selected. The research is carried out for 6 crops which are potato, ausrice, bororice, wheat, amen rice and jute and the data sets of the previous years are collected respectively. The prediction which predicts the output is done by analyzing the dataset using supervised machine learning technique such as K nearest neighbor regression algorithm and decision tree learning(ID3).

III. METHODOLOGY

Decision Tree Regression Algorithm for Price Prediction

Decision tree regression machine learning regression technique ,it observe features of an object and train a model in the structure of a tree to predict data in the future to produce meaningful continuous output. Continuous output means that the output is not discrete ,known set of number or values. The input to the algorithm is :-
- The input parameter(current rainfall)
- The training dataset
- Formulas used for prediction

$$SSE = \sum_{i \in s1} (y_i - y1) + \sum_{i \in s2} (y_i - y2)$$

Where y1and y2 are the values of the dependent variable in group s1and s2 that is wholesale price index parameter in dataset
For group s1 and s2 that is rainfall.it will recursively split the predictor values within groups. The process stops when the sample size of the split group falls below certain threshold

The ID3 algorithm can be used to construct decision tree for regression by replacing information gain with standard reduction that is

STEPS TO IMPLEMENT THE ALGORITHM:

**Step 1:-**Initialize the dataset containing training data rainfall and wholesale price index
Step 2:-Select all the rows and column 1from dataset to "x" Which is independent variable
**Step 3:-**Select all of the rows and column 2 from dataset to "y" Which is dependent variable
Step 4:- Fit decision tree regress or to the dataset
step 5:-Predict the new value
step 6:-Visualize the result and check the accuracy
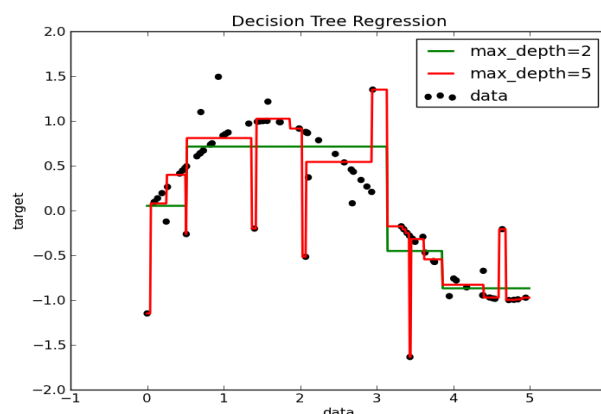
The default values for the parameter controlling the size of the tree is max_depth.to reduce memory consumption and complexity and size of the trees max_depth parameter is used
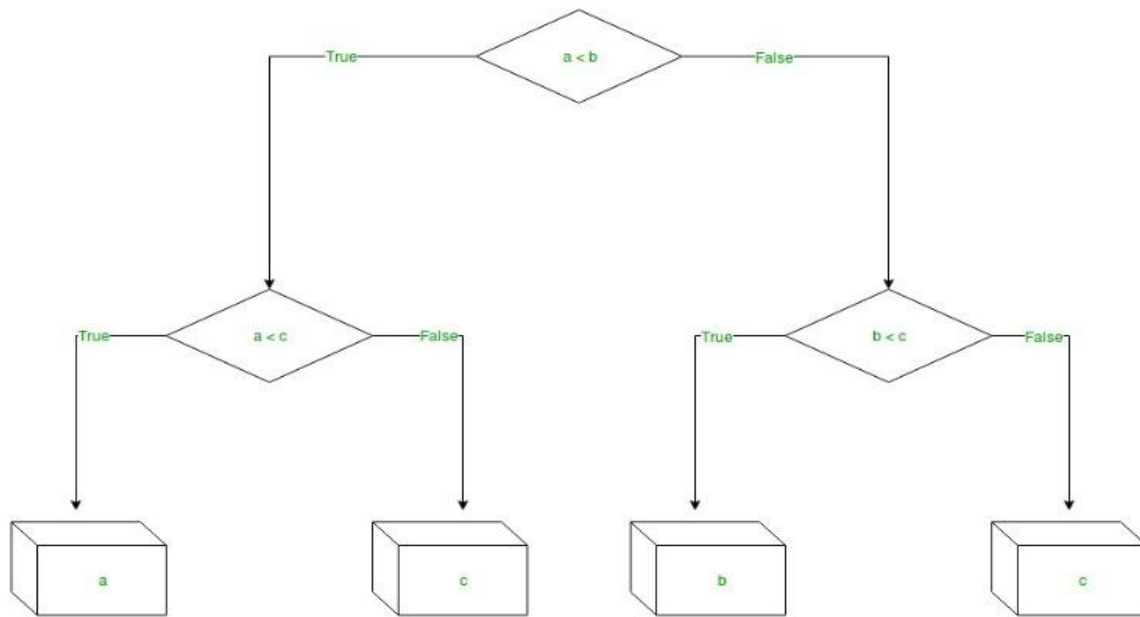
The performance of decision tree regression is measured by three equation they are:-
1. Mean absolute error
2. Mean squared error
3. R^2 score

IV. FUTUREENHANCEMENTS

The future enhancement of our application is to implement more feature to it. That is for cultivation; fertilizers are important factor so in our application we include a feature to shop the appropriate organic fertilizer for the crop to yield better and efficient way. The portal for shopping the fertilizer will be based machine learning algorithm that which fertilizer give more yield and quality for the specific crop

V. CONCLUSION

The research aims at predicting the price and forecast through web application and it is runs on efficient machine learning algorithms and technologies having an overall user-friendly interface to the users. The training datasets so obtained provide the enough insights for predicting the appropriate price and demand in the markets. Thus, the system helps the farmers in reducing their difficulties and stop them by attempting suicides.

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