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Decision Making Support System for Prediction of Prices in Agricultural Commodity

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ABSTRACT: India is mainly an agricultural country the farmer is an important part of agriculture. Agriculture mainly depends on him. Even then the farmers cannot predict prices for their commodities because prediction of prices plays a major challenge. Several characteristics are taken into account so that the crop price forecast is accurate. The agricultural information system provides its users and researches to get online information about, the crop, statistical details and new tendencies. The main features of the information system includes information retrieval facilities for users from anywhere in the form of obtaining statistical information about fertilizer, research institutes and researches, land availability, diseases, suitable soil concentration for the corresponding crops, statistical information about exports and etc.

KEYWORDS : Agricultural Commodity, Crops, Decision Support System, Error, Economy, Farmers, Linear Regression, Price Prediction.

I. INTRODUCTION

The agriculture involves cultivation of crops and live stock commodities. Even though large areas in India are of irrigational land, the survey says that only 1/3rd of cropped part is irrigated. But productivity is extremely low [1]. The main objective of this proposal is to introduced an agricultural information system for the main crops of india, tea, coconut, rice and various spices. This agricultural system assist deferent users as Planters, Importers Exporters Prospective investors, and Researchers. It also provide facility to the main Agricultural Research Institutes in India to update the database though the internet [2]. India is an agricultural country. So far agriculture is the main industry in India. Nevertheless the income gain by the exporting cotton, wheat, corn, and spices is pretty high in addition rice is also and importing crop in India, because it is the main food consumed by the India. Any farmer wants to know how much harvest he expects. In the data mining procedure, training data is obtained from previous market price, and the collected data is used from a training perspective that has been leveraged [3].

II. PRICE PREDICTION SYSTEM

In the paper the emphasis is on machine learning technique to predict the Price of the Crop using the Naïve Bayes Algorithm. 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

Maximum Trade) 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 [4]. 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 [5]. The profit of the crop is determined so that the farmers are aware about their net profit before sowing the crop. The profit is calculated based on shortlisting the similarities found in the dataset values. The algorithm takes the parameters like yield, price, cultivation costs and actual seed cost [6]. The information contained is minimal when it comes to agriculture on the basis of the available data. There are two techniques classifying and clustering. Classifying is known some sample of data where we get to know about the unknown samples. A collection of unknown samples which can be broken into cluster is known as clustering. The different application of K-means and K-nearest algorithm are finding the changes in weather or the amount of pollution. Neural networks help in mapping data under machine learning. The information will be split into the set of training examples, validation and a test data [7].

III. RELATED WORK

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, aus rice, boro rice, wheat, aman rice and jute and the datasets of the previous years are collected respectively. The prediction which predicts the output is done by analysing the dataset using supervised machine learning technique such as Linear regression algorithm [8]. Agriculture stands to be the most important use and use of knowledge for agriculture will change the process of decision making [9]. Regression analysis lets researchers determine how much these predictors influence a target variable. In regression, a target variable is always numeric.

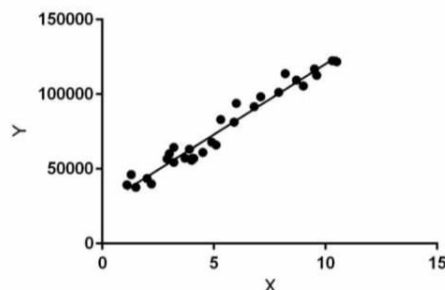
IV. METHODOLOGY

Linear Regression for Price Prediction

Linear Regression is a machine learning algorithm based on supervised learning. It performs a regression task. Regression models a target prediction value based on independent variables. It is mostly used for finding out the relationship between variables and forecasting. Different regression models differ based on the kind of relationship between dependent and independent variables, they are considering and the number of independent variables being used. Linear regression performs the task to predict a dependent variable value (y) based on a given independent variable (x). So, this regression technique finds out a linear relationship between x (input) and y(output). Hence, the name is Linear Regression [10].

Steps followed in the Algorithm –

- STEP 1= load the data set
- STEP 2= Have a glance at the shape
- STEP 3= Have a glance at datatype of attributes
- STEP 4= Cleaning and removing unwanted data attributes such as min price, max price, state name etc.
- STEP 5= Building a MODEL by dividing the data into independent and dependent variables
- STEP 6= Split the data into train and test sets
- STEP 7= Train the algorithm
- STEP 8= Evaluating algorithm and getting predicted modal price for crop with various attributes

**Fig 1 : Linear Regression**

The equation has the form $Y = a + bX$, where Y is the dependent variable (that's the variable that goes on the Y axis), X is the independent variable.

Supervised Learning

Naïve Bayesian Algorithm Steps

Step1: Take the Raw data and extract the data which is required

Step 2: We need to get the probability of all the entities. [ex: sunny, windy, soil]

Step 3: Now Applying the below formula

$$P = [n_c + (m \cdot p)] / (n + m)$$

Where:

- n_c = Count of the parameter when the price is same
- m = Number of parameters taken
- p = probability obtained
- n = Total number of prices
- P = price estimated

Step 4: The result obtained will be assigned to a particular region and for a particular year
Sample Example (Paddy) Parameters – P_1, P_2, P_3 [$m=3$] Outcomes – 50rs, 80rs [$p=1/2=0.5$]

V. RESULT AND DISCUSSION

In our system we can make the farmers to enter the details of the commodities and prices the customer can view the details and based on the predicted value they can fix the amount of the particular crop. Accuracy is above 85 and as given in the report error in percent is less than 10 percent so this system is effective for price prediction.

Market	Predicted Model Price	Actual Model Price	Error
Ahmednagar	3330.35	3365	1.03
Akola	3297.16	3275	0.68
Kopergaon	3203.04	3031	5.68
Newasa	3292.36	3320	0.83
Pathardi	3248.16	3225	0.72

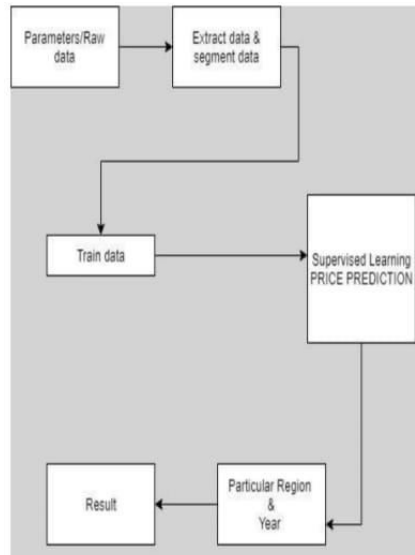


Fig 2 : Working Diagram of Price Prediction

VI. CONCLUSION

The research aims at predicting both the price and profit of the given crop before sowing. This web application 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.

VII. FUTURE WORK

The future enhancement of our application is to implement this application in every location (by taking a GPS module) as much as possible by extracting the dataset for that location which further increases the accuracy and probability. Implementing the chat portals making the application more user friendly can be another scope for enhancement. Thus, ensuring that the information is available at most ease for them and the more accurate prediction increases the probability of profit for the Farmers.

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