A SUPERVISD LEARNING APPROACH FOR THE PREDICTION OF PRICES IN DIFFERENT AGRICULTURAL COMMODITIES

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Abstract : The objective of this paper is to to provide real time application which is an efficient tool for price prediction.This work is based on finding suitable data models that help in achieving high accuracy and generality of price prediction. Using Supervised learning technique, the knn algorithm predicts the future price for the crop using some of the parameters such as climate factor, supply details, demands and government policies.

Keywords: Machine Learning, Supervised Learning Technique, Crop price, Climate factor, Supply details and Demand.

I. INTRODUCTION

Agricultural commodity price keeps changing daily. Previously prediction of prices was done by checking and judging experience of the farmer on field on a particular crop. In order to make this process more accurate ,a decision model that makes use of different supervised learning and data mining techniques that suggest the accurate prices for the particular commodities based on agricultural parameters. Machine Learning provides the methodology to transform the data into useful information for decision making. Agricultural commodity price changes fast and unstable which makes great impact in our daily life. Supervised Learning techniques can be used to develop an innovative model to predict the market price of respective commodity. Government can also take decision whether to allow or not to export and import of respective commodities. This innovative application is not only useful for agriculture department and farmers but also useful for agriculture planning, framing polices and schemes in agriculture and market planning.

II. RELATED WORKS

Balaji Prabhu B V and Dr. M Dakshayini [1] The gap in the demand for various agricultural crops from the customers and the supply of the same crops from the farmers is huge, which has been a reason for unexpected price variation in the market due to which both consumers and farmers suffer with the loss. The problem could be solved by a Demand Prediction forecasting model.

Lakkana Ruekkasaem and Montalee Sasananan [2] Predictive data analysis for rice cultivation was planned to determine the suitable rotation crop from the following crops: turnips, muskmelons, kailan, peanuts, cantaloupes, and water mimosas under limited resources condition.

Rachana P S, Rashmi G , et al. [3] The emphasis was 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.

Ashwini Darekar and A Amarender Reddy [4] ARIMA (Box-Jenkins) model was employed to predict the future prices of paddy. Model parameters were estimated using the R programming software. The methodology is to forecast prices during harvest period and applied the method to forecast for the kharif .

Aman Vohra, Nitin Pandey, et al. [5] We investigated on proposing a decision making support model for prediction of prices in agricultural commodities. It includes techniques of data mining in agriculture that will help the farmers to predict the agricultural commodity prices.

III. METHODOLOGY:

Prediction is a statement about future events. Price Prediction for agricultural commodity has become the need of the hour for farmers. A supervised machine learning algorithm is one that relies on labeled input data to learn a function that produces an appropriate output when given new unlabeled data. ,The KNN algorithm is one such algorithm which assumes that similar things exist in close proximity.

The steps in KNN algorithm are as follows:

1. Load the training data
2. Initialize K value based on the records in the training set (k=5 in this project)

3. For each example in the training data
3.1. Calculate the distance between the query record and the current record from the training data.
3.2. Add the distance and the index of the example to an ordered collection.
4. Sort the ordered collection of distances and in ascending order.
5. Pick the first K entries from the sorted collection.
6. Get the labels of the selected K entries
7. If values of the labels of ordered collection is more of positive then the algorithm returns positive ,else returns negative.

KNN algorithm is very easy to implement. There are only two parameters required i.e. the value of K and the distance function (e.g. Euclidean or Manhattan etc.) .This algorithm is most suitable for this project as only numeric set of data is used for predictions, KNN is very efficient in classifying numeric data. It stores the training dataset and learns from it only at the time of making real time predictions. This makes the KNN algorithm much faster than other algorithms that require training

IV. PROPOSED WORK

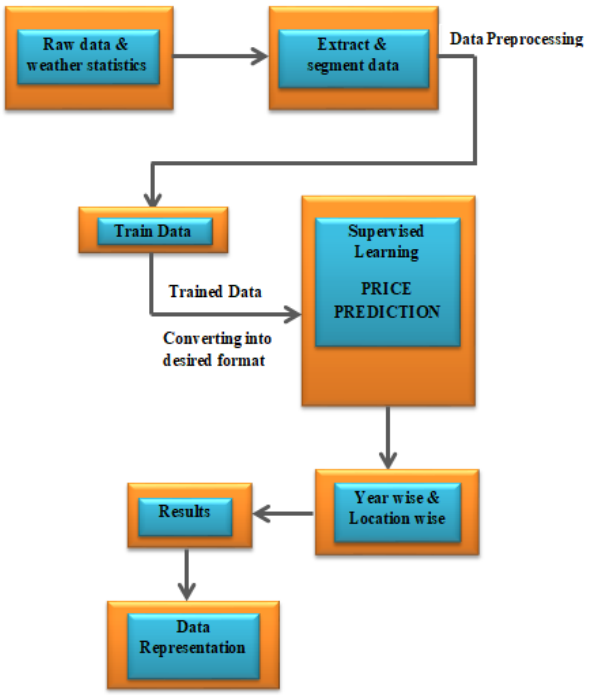


Fig 1: System architecture

Fig 1 depicts the system architecture where the raw data & weather statistics information will be extracted and transformed into understandable format during data preprocessing step. The train data is then trained using Supervised learning and KNN algorithm which provides data along with its year and location The results will be thus displayed in the appropriate portal. The application includes a portal in which agricultural department and farmers are required to login their account with the credentials which can be their name and mobile number, Farmers has to choose commodity name. Based on the previous prices, the application will able to provide average prices for a particular crop which will be beneficial for farmers to make better decisions and predict prices.

V. System design

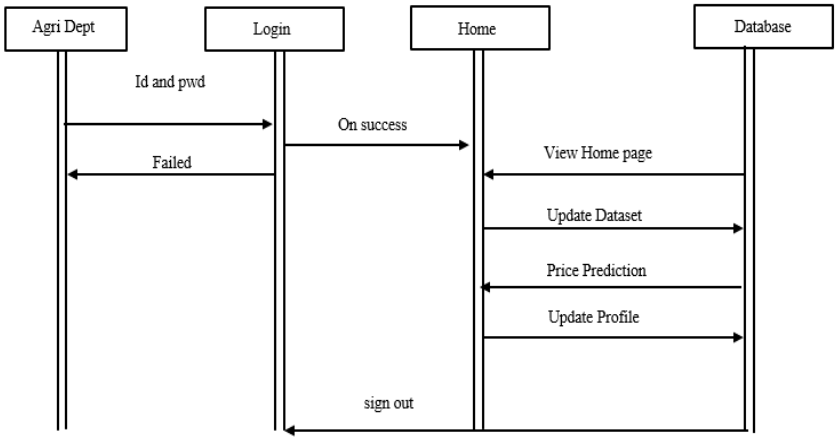
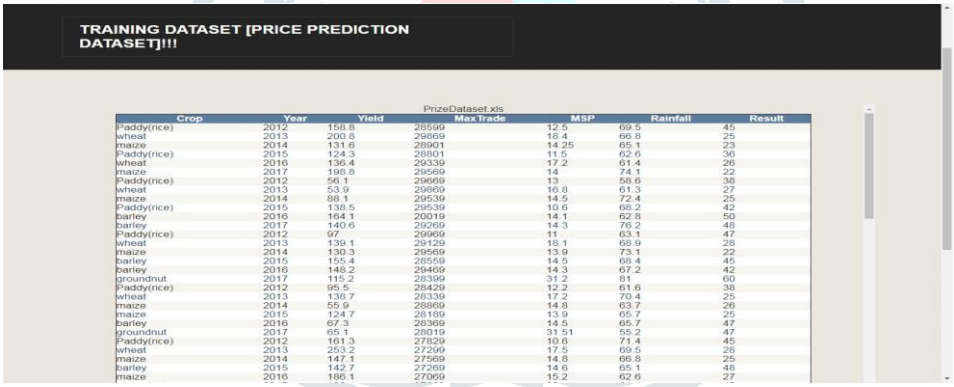


Fig 2: Sequence Diagram

A sequence diagram simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. The Fig 2 shows the sequence diagram for the agricultural department which shows the interactions of the department with the system. On login the system checks if the credentials are valid or not and grants a login success after the login, departments performs various functions and interact with the database to store and retrieve the data from it. Similar Sequence diagrams are implicated for admin and farmers module.

VI. RESULTS



Crop	Year	Yield	MaxTrade	MSP	Rainfall	Result
Paddy(rice)	2012	158.8	28599	12.5	69.5	45
wheat	2013	200.8	29869	18.4	66.8	25
maize	2014	131.6	28901	14.25	65.1	23
Paddy(rice)	2015	124.3	28801	11.5	62.6	36
wheat	2016	136.4	29339	17.2	61.4	26
maize	2017	198.8	29569	14	74.1	22
Paddy(rice)	2012	56.1	29669	13	58.6	38
wheat	2013	53.9	29869	16.8	61.3	27
maize	2014	88.1	29539	14.5	72.4	25
Paddy(rice)	2015	138.5	29539	10.6	68.2	42
barley	2016	164.1	20019	14.1	62.8	50
barley	2017	140.6	29269	14.3	76.2	48
Paddy(rice)	2012	97	29969	11	63.1	47
wheat	2013	139.1	29129	18.1	68.9	28
maize	2014	130.3	29569	13.9	73.1	22
barley	2015	155.4	28559	14.5	68.4	45
barley	2016	148.2	29469	14.3	67.2	42
groundnut	2017	115.2	28399	31.2	81	60
Paddy(rice)	2012	95.5	28429	12.2	61.6	38
wheat	2013	138.7	28339	17.2	70.4	25
maize	2014	55.9	28869	14.8	63.7	26
maize	2015	124.7	28189	13.9	65.7	25
barley	2016	67.3	28369	14.5	65.7	47
groundnut	2017	65.1	28019	31.51	55.2	47
Paddy(rice)	2012	161.3	27829	10.6	71.4	45
wheat	2013	253.2	27299	17.5	69.5	28
maize	2014	147.1	27569	14.8	66.8	25
barley	2015	142.7	27269	14.6	65.1	48
maize	2016	186.1	27069	15.2	62.6	27

Fig 3:Training dataset

The KNN algorithm uses the training dataset as shown in Fig 3 to train itself and predict the prices based on its region.

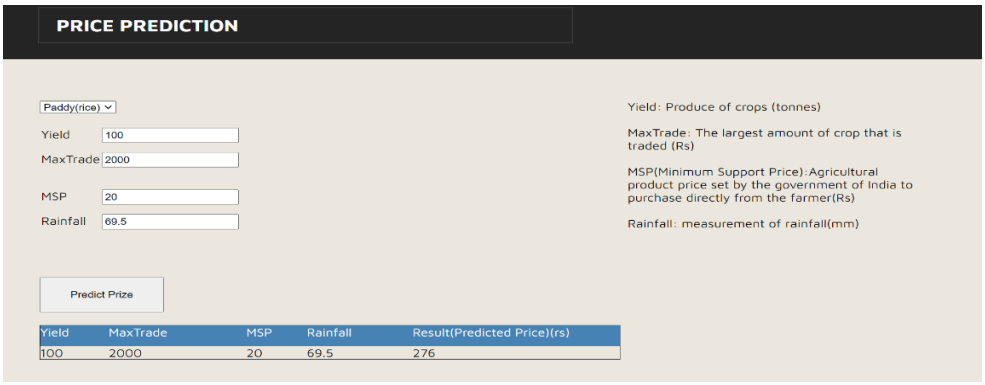


Fig 4: Crop Price Prediction

Figure 4 illustrates the prediction of prices for a particular crop on giving the required parameter values such as yield, max trade, MSP and rainfall, the system makes use of supervised learning techniques that suggests the best possible prices for the given commodity.

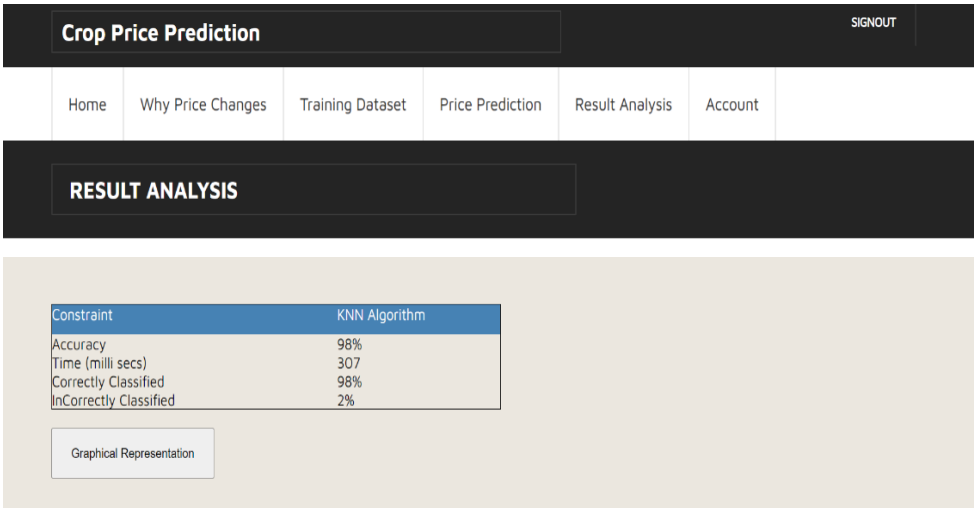


Fig 5: Calculated Accuracy

The accuracy shown in Fig 5 is obtained by comparing the training data with the predicted values .

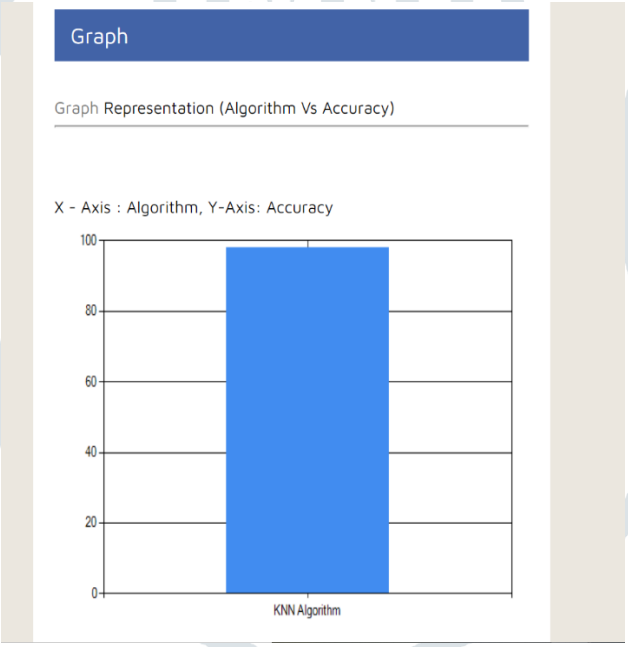


Fig 6:Graphical Representation of the obtained accuracy

The graph is plotted by mapping algorithm versus accuracy and the accuracy values vary on changing the k values.

VII. CONCLUSION

Many uncertainties and random factors exist in agricultural commodity market. Therefore, it is difficult to predict the agricultural commodity price. This system is mainly proposed to provide help to the farmers for expecting the better amount for their crops and for predicting the best price for the crops. This system will allow farmers to make better decisions for bidding the better prices for their crops in the market. . Some Data Mining techniques have not yet been applied to agricultural problems. As an example, Regression techniques may be employed for discovering important information from agricultural-related sets of data.

VIII. REFERENCES

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