International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

DECISION MAKING SUPPORT SYSTEM FOR PREDICTION OF PRICES IN AGRICULTURAL COMMODITY

[1] [2] [3] [4]
Shobha N V, Deepika B , Meghana J S, Veadavathi A R
1.Student, Department of Computer Science Engineering, VVIET Mysore, India,
2.Student, Department of Computer Science Engineering, VVIET Mysore, India,
3.Student, Department of Computer Science Engineering, VVIET Mysore, India,
4.Faculty, Department of Computer Science Engineering, VVIET, Mysore, India,

ABSTRACT

India is a country where major source of living and economy is through agriculture and agricultural industry. Prediction of prices in agricultural commodity has always been a major problem for the farmers. Farmers aren't able to get desired price for their crops and that's why the suicide rate is increasing with every passing year. This project mainly focuses on proposing a decision making support model for prediction of prices in agricultural commodities. This project also includes techniques of data mining in agriculture that will help the farmers to predict the agricultural commodity prices. The objective of this project is to build a system which provides efficient and effective price prediction features. The aim is to propose a new framework and develop a system to make some advances towards more efficient price prediction.

Key words: Agricultural price prediction,Machine learning

INTRODUCTION

Data Science is the process of extracting important and useful information from large sets of data. Data

mining in agriculture is a novel research field. Farmers are not only harvesting vegetables and crops but also harvesting large amount of data. Data mining provides the methodology to transform these data into useful information for decision making. Agricultural commodity price changes fast and unstable which makes great impact in our daily life. Agricultural commodity price has attributes such as high nonlinear and high noise. So, it is hard to predict the price. Data mining classification techniques can be used to develop an innovative model to predict the market price of respective commodity. Price prediction is highly useful in agriculture for forecasting the market price for the respective commodities and also useful for farmers to plan their crop cultivation activities so that they could fetch more price in the market. Government can use the

market forecast price for planning and implementation of agriculture development programs to stabilize the market price for the respective commodity. Government can also take decision whether to allow or not to export and import of respective commodities. Consumers can use this price prediction for their daily lifestyle planning. This innovative application is not only useful for farmers and consumers but also useful for

agriculture planning, framing polices and schemes in agriculture and market planning.

1.1 Machine Learning

ML concerns with construction and study of system that can learn from data. For example, ML can be used in E-mail message to learn how to distinguish between spam and inbox messages. A computer program is said to be learn from experience E with respect to some task T and some performance P only if the program performance increases with experience E. ML is a branch of AI which contains statistical, probabilistic, optimization technique that can learn from past experience and discover the pattern from large complex data sets.

Types of ML:

There are there types of Machine learning(ML), they are

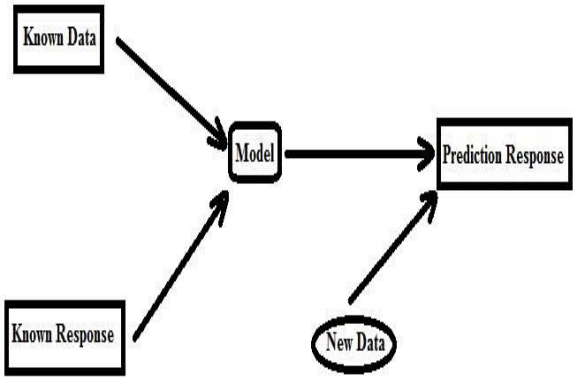
i. Supervised Machine Learning

ii. Unsupervised Machine Learning

iii. Semi-Supervised Machine Learning

Supervised Learning Technique

Its a predictive model used for the tasks where it involves prediction of one value using other values in the data-set. Supervised learning will have predefined labels. It classifies an object based on the parameters to one of the predefined set of labels. We have many algorithms to build model in supervised learning such as KNN, Naive bayes, Decision Tree, ID3, Random Forest, SVM , Regression techniques etc. Depending of the requirement, labels, parameters and data-set we select the appropriate algorithm for predictions. Algorithm is used to build a model that makes predictions based on evidence in the presence of uncertainty.



Proposed Model

LITURATURE SURVEY

Analysis of Soil Behavior and Prediction of Crop Yield using Data Mining Approach

Yield prediction is very popular among farmers these days, which particularly contributes to the proper selection of crops for sowing. This makes the problem of predicting the yielding of crops an interesting challenge. Earlier yield prediction was performed by considering the farmer's experience on a particular field and crop. This work presents a system, which uses data mining techniques in order to predict the category of the analyzed soil data-sets. The category, thus predicted will indicate the yielding of crops. The problem of predicting the crop yield is formalized as a classification rule, where Naive Bayes and K-Nearest Neighbor methods are used.

Effect of temperature and rainfall on paddy yield using data mining

Although crop production has been coupled to a number of parameters such a s evaporation, radiation, temperature, soil moisture and crop management practices [1], this work investigated the effect of temperature and rainfall variation on paddy yield. The aim was to determine the relationship between the daily temperature and actual paddy yield; daily rainfall and actual paddy yield at Ludhiana and Patiala of Punjab District, India. In addition, the research was carried out to predict the crop paddy yield at these lo cations within the agricultural region, given the prevalent temperature and rainfall conditions.

Data Mining is an area in which huge amounts of data are analyzed in different dimensions and angles and further categorized and then eventually summarized in to useful information. Data Mining is the process of finding correlation or patterns among dozens of fields in large databases. The research is conducted taking under consideration the various stages of the paddy plant that are vegetative stage, reproductive stage, maturation stage and grain filling stage. System discovers the relationships between temperature, rainfall and paddy plant during all these stages using data mining technique “Association Rules Mining”. Data collected from government sector and we can make use of synthetic data for analysis and to predict the patterns between temperature, rainfall and paddy plant.

PROPOSED SYSTEM

Prediction is a statement about future events. Price Prediction for agricultural commodity has become the need of the hour for farmers. Although future events are uncertain, so accurate prediction is not

possible. This paper includes a decision making support model that can be helpful for farmers to predict prices. This model includes a portal in which farmers are required login their account with the credentials (username and password) which can be their name and mobile number as it is easy for them to remember.

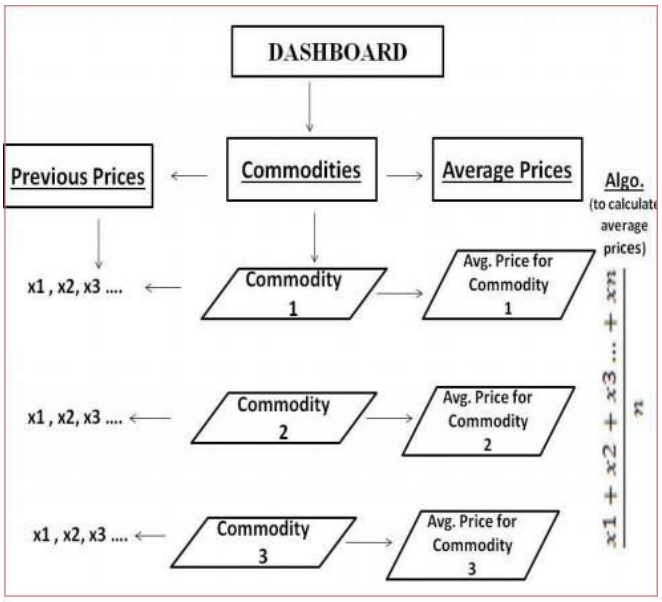


Fig. Decision making Support System for better price predictin in agricultural commodity.

As shown in fig, After login the dashboard appears. Farmers have to enter commodity name and previous selling price of the crop. Based on the previous prices, this model will be able to provide average prices for a particular crop which will be beneficial for farmers to make better decisions and predict prices.

Data-set Description

Project is a real time application which uses data science technique to process agriculture data. Proposed system finds the price details of agriculture commodities using data science technique. Proposed system can be used by farmers to know the agriculture commodity price by inputting data such as Max Trade, MSP, Crop, Rainfall, Year etc...these are the agriculture parameters used for price prediction. We collected data from agriculture departments and we have a huge datasets to get more accurate results. Training datasets means previous years price details of agriculture commodities. We collected the data for the region "Mysore". System is an generic application used for multiple regions.

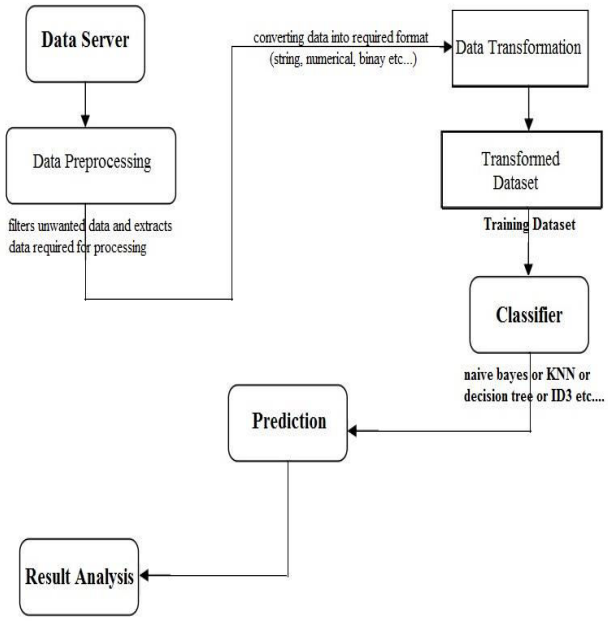
Methodology Used

Classification Rules (Classifiers)

Basically classification is used to classify each item in a set of data into one of the predefined set of classes or groups. Classification methods make use of mathematical techniques for problem solving

Ex: Employee statuses in a company (leaves or stay)

To predict which current employees are probably to leave in the future. In the project we use either "*naive bayes*" or "*KNN*" or "*decision tree*" classifier to process previous data and for prediction. These specified algorithms are most efficient and takes less time for processing data. These algorithms works fine for n number of parameters.



Methodology

Naïve Bayes Algorithm working

Sample Example (Paddy)

Parameters – Rainfall, Yield, MSP[m=3]

Outcomes – 50rs , 80rs [p=1/2=0.5]

Training Data-set (previous years data)

Data	Rainfall	Yield	MSP	Price
1	55	145	15	50rs
2	48	125	12	50rs
3	55	145	30	80rs
4	65	145	20	50rs
5	48	175	30	80rs

New Record (next year)

Features – Rainfall - 55, Yield – 125, MSP - 30

Crop Price– 50rs / 80rs ?

Naive Bayes works based on this formulae

P=[n_c + (m*p)]/(n+m)

50rs	80rs
55 P=[n_c + (m*p)]/(n+m) n=2, n_c=1,m=3,p=0.5 p=[1+(3*0.5)]/(2+3) p=0.5	55 P=[n_c + (m*p)]/(n+m) n=2, n_c=1,m=3,p=0.5 p=[1+(3*0.5)]/(2+3) p=0.5
125 P=[n_c + (m*p)]/(n+m) n=1, n_c=1,m=3,p=0.5 p=[1+(3*0.5)]/(2+3) p=0.5	125 P=[n_c + (m*p)]/(n+m) n=1, n_c=0,m=3,p=0.5 p=[0+(3*0.5)]/(2+3) p=0.3
30 P=[n_c + (m*p)]/(n+m) n=2, n_c=0,m=3,p=0.5 p=[0+(3*0.5)]/(2+3) p=0.3	30 P=[n_c + (m*p)]/(n+m) n=2, n_c=2,m=3,p=0.5 p=[2+(3*0.5)]/(2+3) p=0.7

50rs = 0.5 * 0.5 * 0.3 * 0.5 (p)

=0.0375

80rs = 0.5 * 0.3 * 0.7 * 0.5 (p)

=0.0525

Since 80rs > 50rs

So this new year it is classified to 80rs

Experiment Results

Naive Bayes Algorithm

Training datasets and testing datasets ratio and accuracy.

Ratio	Accuracy
60:40	88.5%
70:30	92.6%
80:20	94.2%
90:10	98.75%

Final Results

Constraint	Naive Bayes Algorithm
Accuracy	98.75%
Time (milli secs)	433
Correctly Classified	98.75%
InCorrectly Classified	1.25%

CONCLUSION

Prediction of price is a big problem for farmers and
farmers aren't aware for the market price. Agriculture
commodity price prediction helps the farmers and also Government to make effective decision.
Prediction of price in agricultural commodity has
always been a major problem for the farmers .
Farmers aren't able to get desired price for their crops
and that's why the suicide rate is increased with every
passing year.
Building a system which provides efficient and effective price prediction will help farmers and also agriculture sector to grow crops and get best profits.
Proposed system uses data science technique for effective results.

REFERENCES

[1] V. Brahmananda Rao ,K. Hada 1994: An experiment with linear regression in forecasting of spring rainfall over south Brazil

[2] K. Hrona_, P. Filzmoserb and K. Thompsonc 2009 : Linear regression with compositional explanatory variables.

[3] Goutami Bandyopadhyay, 2011: The Prediction of Indian Monsoon Rainfall: A Regression Approach.

[4] Fisher R.A., 1921. On the "probable error" of a coefficient of correlation deduced from a small sample. Metron 1: 3–32.

[5] Elumalai Kannan,2011.:Analysis of trends in India's Agricultural growth.

[6] PS Dutta,2010: Prediction of rainfall using datamining technique over assam.

[7] Hiral chandana ,2013 : Data Across the Agriculture Value Chain .

[8] CT Cheng, 2015 Heuristic Methods for Reservoir Monthly Inflow Forecasting.

[9] Griffith D.A., 2003. Spatial autocorrelation and spatial filtering. Springer, Berlin.

[10] Chandrasegar Thirumalai, Senthilkumar M, "An Assessment Framework of Intuitionistic Fuzzy Network for C2B Decision Making", International Conference on Electronics and Communication Systems (ICECS), IEEE & 978-1-4673-7832-1, Feb. 2016

[11] Rodgers J.L. & Nicewander W.A., 1988. Thirteen ways to look at the correlation coefficient. The American Statistician 42 (1): 59–66.

[12] F. Fioravanti, P. Nesi, "A method and tool for assessing object-oriented projects and metrics management," Journal of Systems and Software, Volume 53, Issue 2, 31 August 2000, Pages 111-136

[13] Galton F., 1875. Statistics by intercomparison. Philosophical Magazine 49: 33–46

[14] Chandrasegar Thirumalai, Viswanathan P, "Diophantine basedAsymmetric Cryptomata for Cloud Confidentiality and Blind Signature applications," JISA, Elsevier, 2017.

[15] Galton F., 1877. Typical laws of heredity. Proceedings of the Royal Institution 8: 282–301.