

Price and Demand Forecasting for Agricultural Commodity using Data mining Techniques

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Abstract - The Agricultural sector needs more support for development in developing countries like India. Price prediction helps the farmers and also the Government to make an effective decision.. Data Mining techniques can be used to solve this problem. This work is based on finding suitable data models that help in achieving high accuracy and generality of price prediction. We can create our algorithm to predict the future price for the crop using some of the parameters such as climate factor, supply details, demands and government policies.

Keywords - Data Mining, Crop price, Multiple Prediction, Climate factor, Supply details and Demand.

I. INTRODUCTION

Data mining is the process of extracting useful information from a large set of data. Data mining in agriculture is a research crop but also harvesting large amount of the data. Data mining provides methodology to transform those data into useful information for decision-making. Crop price changes fast and unstable which makes a great impact in our daily life. Crop price has attributes such as high nonlinear and high noise. So, it is hard to predict the Crop price. Data mining techniques can be used to develop an innovative model to predict the market agriculture for forecasting the market price of the respective commodities and also useful for farmers to plan their crop cultivation activities so that they could fetch more price in forecast price for planning and implementation of agriculture development programs to stabilize the market price for the respective commodity. Consumers can use price prediction for their daily lifestyle planning. This innovative application is not useful for farmers and consumers but also useful for agriculture planning; framing polices, schemes in agriculture and market planning. Time series forecasting takes an existing series of data to predict the future value.

II. LITERATURE REVIEW

Literature survey plays a very important role in the project development. Literature survey provides the required knowledge about the project and its background. It also helps in following the best practices in project development. Literature survey also helps in understanding the risk and feasibility of the project. The feasibility of the project depends upon the risk of the project. If the resources, time and money are not available for the project development, then the risk is higher. Literature survey also gives light on various tools, platforms and operating systems suitable for project development. Once programming begins then the programmers require a lot of support and advice.

- In this paper, author describes the capabilities of various algorithms in predicting several weather phenomena such as temperature, windy, humidity, rainfall these parameters concluded that major techniques like decision trees, artificial neural networks, clustering and regression algorithms are suitable to predict weather phenomena. This shows that the decision trees and k-means clustering are best-suited data mining techniques for this application [5].
- Many authors conclude that classification and summarization are the two main data mining techniques widely used in Weka [4] and Rapid Miner tool for weather forecasting.
- In [7] a prediction model of vegetable price was set by applying the neural network based genetic algorithm. Taking mushrooms price as an example

III. WORKFLOW DIAGRAM

In this approach, paper is completed in three stages as shown in the figure. Data collection, data pre-processing, predict the price. Generally Responsible parameters for the crop price prediction are Climate Change, Government Policy and Demand. These are collected from some websites and then perform the algorithm on available datasets and predict the future crop price such as months or years wise.

A. Data Collection

Crop prices are affected by several factors such as climate, supply and demand. It is very difficult to collect data based on these factors; we take only the most permissible crop price (turmeric, cotton) as experimental data.

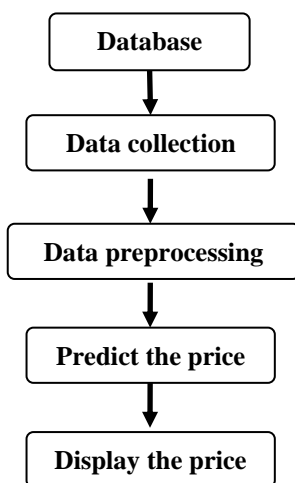


Fig 1: Work flow Diagram.

This diagram mostly depends on the final output. For long time forecasting, daily frequency data is preferred. Monthly data are used for forecasting because it has less noise. In this study turmeric, cotton price data from JAN 2011 to DEC 2016 are taken for creating the model. For simulating the model, previous month’s price of turmeric, cotton from Erode and Salem market was considered and later few monthly prices was considered as test data for the model. The data are collected from the website www.agmarket.nic.in

B. Data Preprocessing

Data preprocessing is to manipulate data into suitable for future analysis and processing. There are four stages in preprocessing. They are

- Decide which dataset will be used in the transformation.
- Collect appropriate additional data (internal or external). Explain why certain data was included or excluded.
- Derived attributes for algorithm then construct missing value and decide format can be changed.
- Integrate data: Integrate sources and store result (new tables and records).

The above steps are depicted in the figure 2.

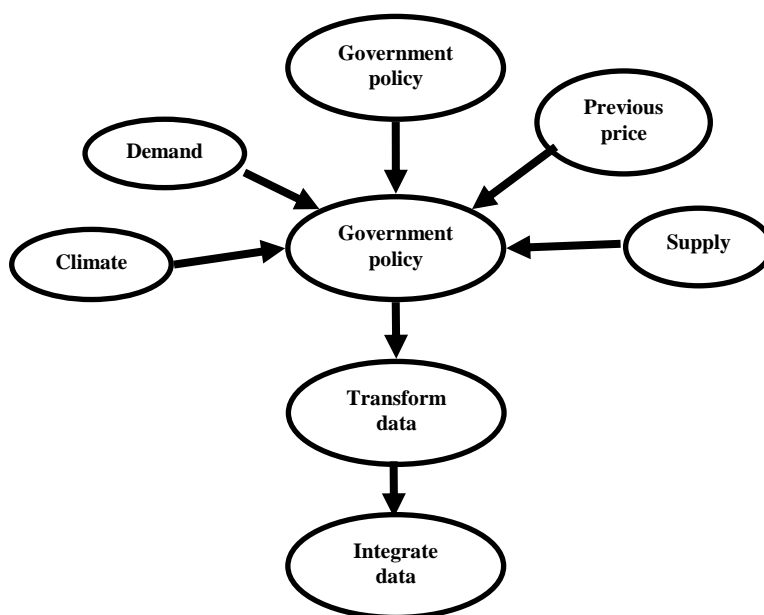


Fig 2 : Data Preprocessing

C. Predicting the price

In this paper, three-year data of crop price are taken as input and later one year data as output for yearly price prediction. So consider three input parameters for yearly price prediction. The price of the crop which is output under certain period, is the price of input in the previous period. Choice of activation function, learning rate and optimization target were determined by experiment

IV. EXPERIMENTAL RESEARCH AND ANALYSIS

Jan 2014 to Dec 2016 monthly prices data have been taken for prediction. Consider this data as a first data set. Select former five year price data as input and later three-month price data as output. For model construction and simulation coding, JAVA is used. The algorithm is constructed using previous year Jan 2014 price data and later month's data are used to test the model.

The main steps for predicting the price as follows:

- Step 1: Get period for prediction from the user.
- Step 2: Select previous year price details in the database.
- Step3: List out the factors (climate, supply & demand) which is the reason for that price in previous years.
- Step 4: Select details about factors at present.
- Step 5: Correlate above two different factors.
- Step 6: Find price based on the correlation.

The various parameters used are

- Period : 3 years
- Factors:
 - Climate in mm : 80 mm
 - Import/Export in Tons : 16000 tons
 - Demand in percent : 50%

The results is as follows

Year	Month	Climate in mm	Import/Export in tons	Demand in %	Predicted price
2018	January	80	16000	60	7000

V. CONCLUSION

In this paper, the prediction model of Crop market price is established. Three years Erode and Salem market price of turmeric as an example and simulated the result using Algorithms and predict the result. The prediction results of yearly are discussed. The larger dataset produced more accuracy result than the smaller data set. The result shows one way of predicting the market price of the crop with the non-linear time series. For future work some other parameter can be constructed for price prediction to increase the accuracy percentage.

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