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Fair Price based Expert System for Groceries

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Abstract: *E-commerce is one of the extremely fast-paced marketing businesses around the world. Over the last few decades, several major e-commerce organizations have emerged such as Amazon, Flipkart that sell the majority varieties of merchandise and also other competitors like Dollar shave club and big basket are playing a major role in this highly competitive business with domesticated products.*

Advantage of the use of this e-commerce manner of marketing may be available in any respect time consistent with the benefit of the customer which can also be the motive of gaining some profit within the marketplace. However, for almost, all merchandise/products charges vary.

E-Commerce is a method to make the buying experience for clients extra smooth and interactive with the aid of introducing bargaining features, which are otherwise handiest familiar in physical brick and mortar stores.

This can also be designed in a way that could provide gains for retailers to attract the majority of the attention and also all offers made by retailers need to have a specific goal to be reached to sell.

Through this Fair-Price Model, Customers get benefited with the aid of buying the product at its quality possible price.

Keywords: *Prediction, supervised learning, machine learning, expert system, data analytics*

I. INTRODUCTION

In the traditional system, the farmer sells their goods to the distributor and then distributor sells it to the consumers. In this traditional system the farmer sells the good at the lower cost than expected and distributor sells the goods at high rates to the local vendors, therefore making the profit. The farmers do not get the fair profit in this system and consumers get the product at expensive rates than the fair price.

In our proposed system the farmers can predict a future price for their products so that they can make profits in a way that the predicted price in within a certain range and fair to the consumers.

The proposed system also offers functionality to provide product related analytical information and collect user data for further improvement of the ML model.

The research paper analyses the algorithms and methods used to implement prediction of prices. It is directed towards predicting prices and also to provide a detailed analysis of products based on several factors that may have a direct impact on the price of the product.

While attempts have been made to predict the prices of products, however they have not yet been implemented for the agricultural products produced by farmers.

II. LITERATURE SURVEY

In the research paper named Intelligent Sales prediction using machine learning techniques [1]Sunita Chetriyan, Shaniba Ibrahim,Saju Mahonan, Susan Treesa used the Decision Tree Algorithm for the Sales trend prediction ,in results it is shown that the prediction efficiency of algorithm is 71%.

They suggested that using gradient boost tree can increase the accuracy of the algorithm.

In the research paper named Machine Learning in prediction of stock market based on historical data and data from twitter sentiment analysis [2]Alexander Porshnev,Ilya Redkin,Alexy Shevchenko used the SVM and Neural Network Algorithm for Twitter sentiment analysis and the Stock price prediction ,in results it is discovered that the prediction efficiency of algorithm is 64.10%.

They suggested that using Lexicon based approach can increase the accuracy of the algorithm.

In the research paper named Predicting stock market trends using random forests [3]T.Manojlovic and I. Stajduhar used the Random forest algorithm for the Stock Price prediction ,in results it is concluded that the prediction efficiency of algorithm is 60%.They suggested that for future research using Hybrid Model can increase the accuracy of the algorithm.

TABLE I Literature Survey Of Five Research Papers

Sr. no.	Title Of Paper	Technique used	Efficiency	Future Scope
1	Intelligent sales prediction using ml	Decision tree algorithm	71.00%	Used with gradient boosted tree can increase accuracy
2	ML in prediction of stock market based on historical data and data from twitter sentiment analysis	SVM and neural network algorithms.	64.10%	Can improve accuracy using a lexicon based approach
3	Predicting stock market trends using random forests	Random forest algorithm	60.00%	Hybrid model can be used to improve accuracy
4	Stock price prediction using regression based sentiment analysis	Linear Regression	86.12%	Can improve accuracy using POS tagging and word weighting
5	Predicting math test scores using k-nearest	K-nearest algorithm	81.12%	Can improve accuracy using categorization algorithms
6	Share Price Prediction using Machine Learning Technique	LSTM and RNN	78%	Train the model for all the NSE data from the their web and identified the input and group them and provide input according to the user configuration this RNN based architecture proved very efficient
7	Online Price Prediction system of consumption commodities	Regression Analysis and statistical testing	83.34%	Hybrid model can be used to improve accuracy
8	Future Predictions in Indian Stock Market through Linguistic-Temporal Approach	APRIORI algorithm	68%	In order to avoid costly database scan we can perform the same with FP growth.
9	Using Classification Techniques to Predict Gold Price Movement	Regression, Support vector machine (SVM), Decision Tree, K-Nearest Neighbor (KNN)	60.26%	They think increasing the number of the training data may help in improving the performance results
10	Stock Market Prediction	SVM , GASVM and PCASVM	68%	increasing the number of the training data may improve the performance results

In the research paper named Stock price prediction using regression based sentiment analysis [4]Yahya Eru Cakra and Bayu Distiawan Trisedya used the Linear Regression for the Stock Price prediction ,in results it is shown that the prediction efficiency of algorithm is 86.12.They suggested that Can improve accuracy using POS tagging and word weighting can increase the accuracy of the algorithm. In the research paper named Predicting math test scores using k-nearest [5]Jessica Maikhanh Brown used the K-nearest algorithm in results. It shown that the prediction efficiency of algorithm is 81.12%.They suggested that using categorization algorithms can increase the accuracy of the algorithm. [6] In the research paper named Share Price Prediction using Machine Learning Technique Jeevan B ,Naresh E ,Vijaya kumar B P, Prashanth Kambli used the LSTM and RNN algorithm in results. It shown that the prediction efficiency of algorithm is 78%.They suggested that Training the model for all the NSE data from the their web and identified the input and group them and provide input according to the user configuration this RNN based architecture proved very efficient.

[7] In the research paper named Online Price Prediction system of consumption commodities Neti Sriwulan Sutiawan and Baskara Nugraha used the Regression Analysis and statistical testing in results. It shown that the prediction efficiency of algorithm is 83.34%.They suggested that using Hybrid model can be used to improve accuracy.

[8] In the research paper named Future Predictions in Indian Stock Market through Linguistic-Temporal Approach Priti Saxena, Bhaskar Pant , R.H. Goudar , Smriti Srivastav , Varsha Garg and Shreela Pareek used the APRIORI algorithm in results. It shown that the prediction efficiency of algorithm is 68%.They suggested that In order to avoid costly database scan we can perform the same with FP growth.

[9] In the research paper named Using Classification Techniques to Predict Gold Price Movement Wedad Ahmed Al-Dhuraibi and Jauhar Ali used the Regression, Support vector machine (SVM), Decision Tree, K-Nearest Neighbor (KNN)algorithm in results. It shown that the prediction efficiency of algorithm is 60.26%.They suggested that they think increasing the number of the training data may help in improving the performance results.

[10] In the research paper named Stock Market Prediction Radu Iacomin used the SVM, GASVM and PCASVM algorithm in results. It shown that the prediction efficiency of algorithm is 68%.They suggested that increasing the number of the training data may improve the performance results.

Since the results of Linear Regression algorithm and K-nearest Algorithm are more efficient in this case as compared to other algorithms, we have considered that we can use linear regression and k-nearest algorithms for our expert system.

III.PROPOSED SYSTEM

A. System Architecture

1) *Web Interface*: It is the Front End of the system through which user can interact with the system.

The Web Interface contains the following parts:-

- a) Login Portal
- b) User Details and Data Entry
- c) Analysis of Resultant Price

2) *Web Server*: It is the Middleware of the system which contains the actual raw data provided by the user and helps process that data for further use.

It performs the following tasks

- a) Web Hosting
- b) Database Services
- c) Store the ML Model

3) *ML Model*: It is the Back End of the system through which the raw data provided by the user will be used to predict the final price as result using Machine Learning techniques.

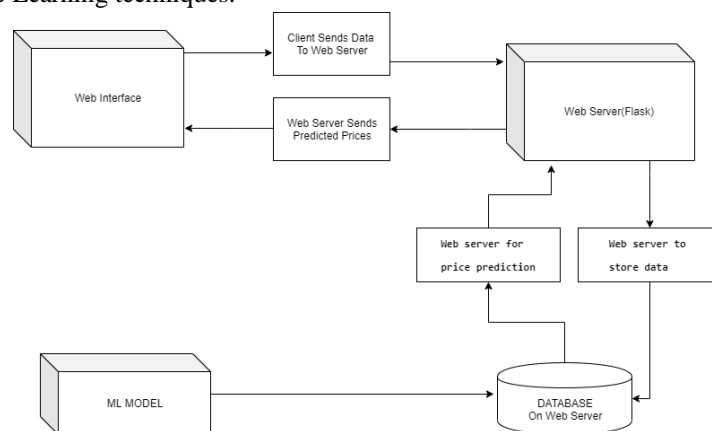


Fig. 1 System Architecture

B. Data Flow Diagrams

1) *DFD Level 0*



Fig. 2 DFD Level 0

2) DFD Level 1

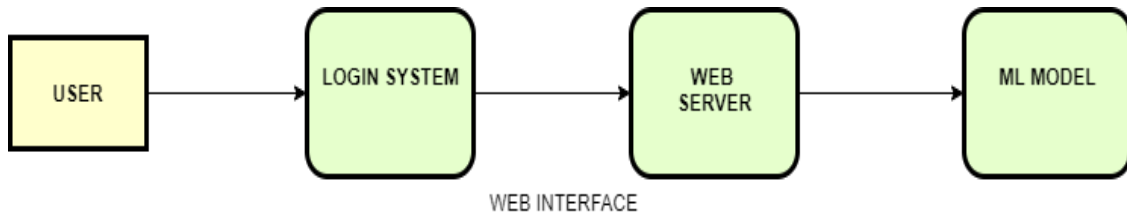


Fig. 3 DFD Level 1

3) DFD Level 2

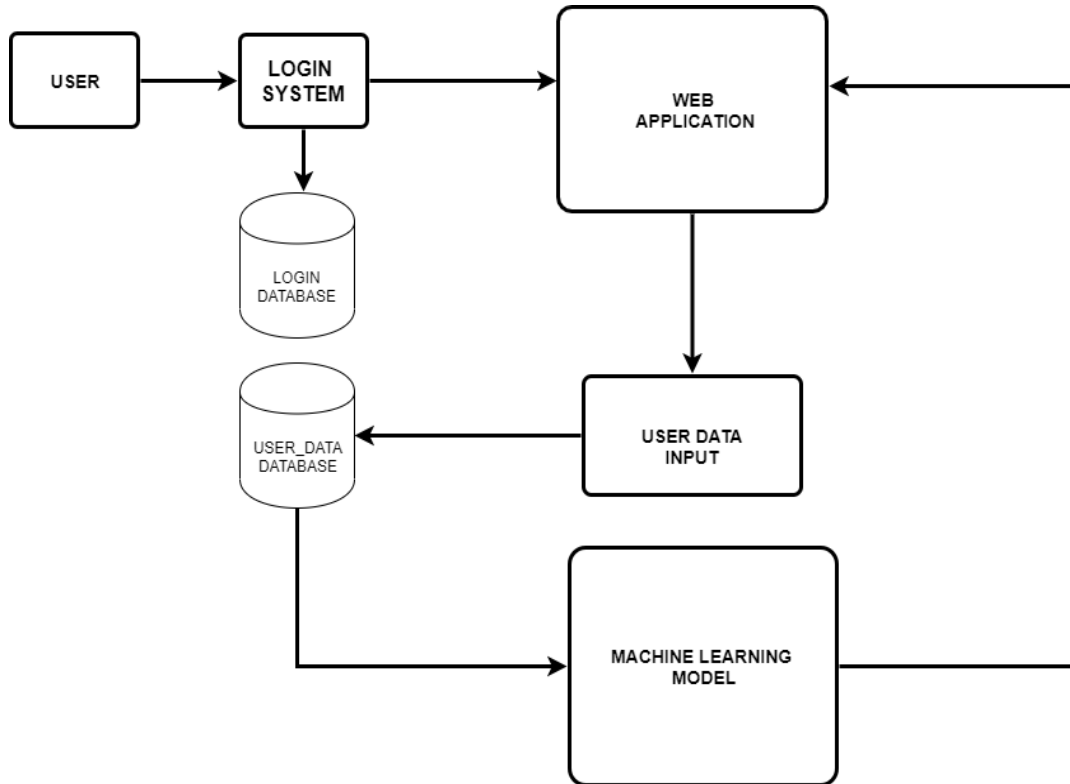


Fig. 4 DFD Level 2

IV. ANALYSIS AND DESIGN

A. Requirement Analysis

- 1) **Problem Definition:** To use the agricultural products as stock and predict their prices using Machine Learning and providing a detailed analysis of profit and sales to the end user.
- 2) **Hardware and Software Requirements**
 - a) **Hardware Requirements:** 4GB Ram, Intel/AMD Processor, 5GB Storage Space.
 - b) **Software Requirements:** Python 3, Latest Web Browser, Android 4.0

B. Analysis Phase

As per the requirements the System is to predict the price of the agricultural products produced by farmers. The data needed to be analyzed to predict the prices is That most of the system in field require a labeled dataset with season wise prices to make this system more Efficient and easily affordable.

Analysis of Work needed to be done in stages:-

- 1) Identifying the Factors that influence the price:
- 2) Create a Regression algorithm which can predict the most accurate and reasonable price.
- 3) Provide Analytical Data to users which will help them make investments in future products.

C. Design Phase

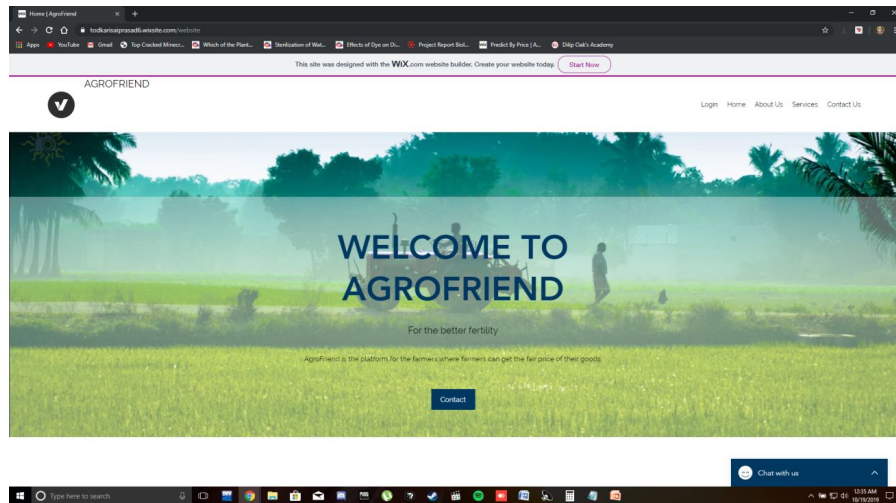


Fig. 5 Home Page

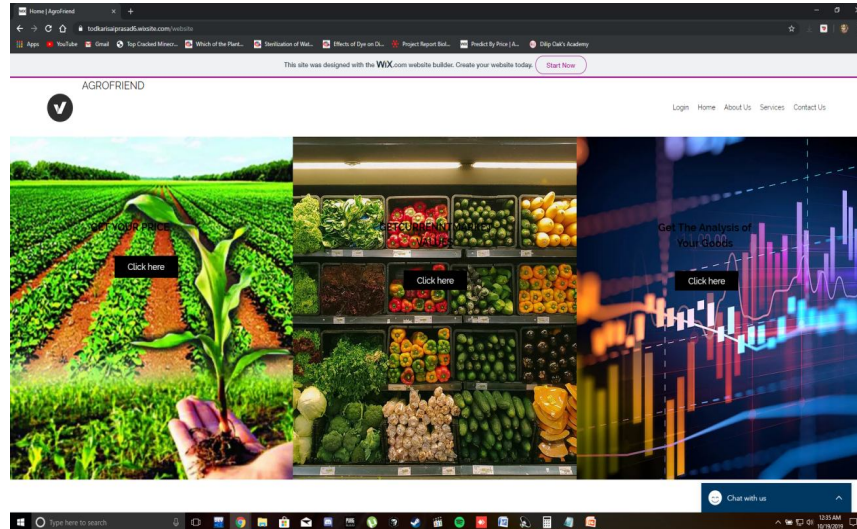


Fig. 6 Services Page

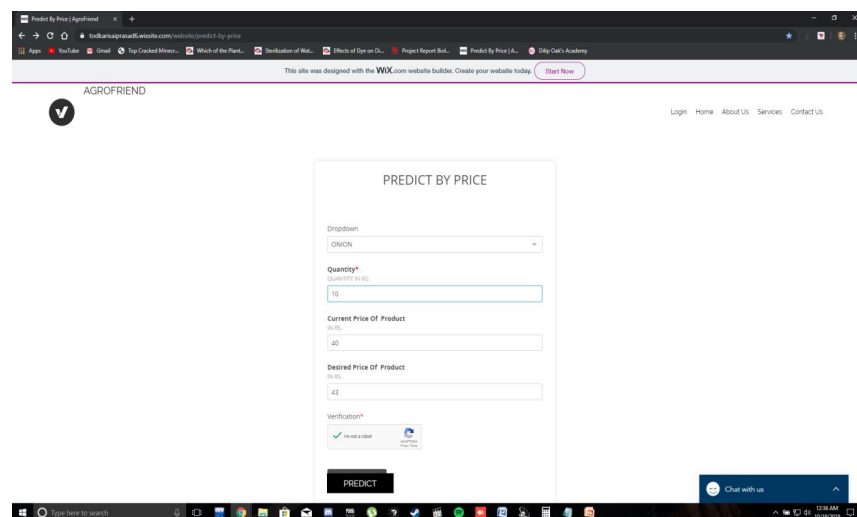


Fig. 7 Prediction Page

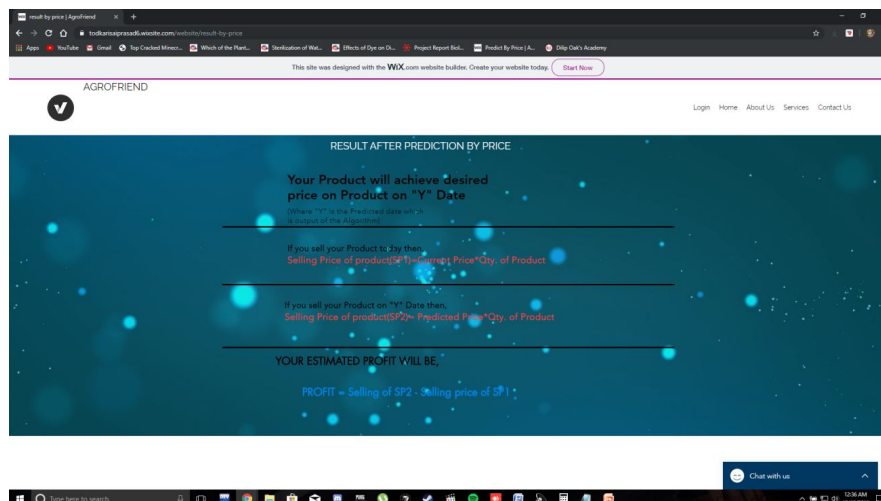


Fig. 8 Result Page

V. CONCLUSIONS

- A. We will develop the proposed expert system by using different machine learning algorithms to determine the best price predicted by each algorithm. The proposed expert system is to deploy on a web-application which will also be extended to an android application which will encompass the same functionality as that of the web- application itself.
- B. We will also work on finding real-time data for training our machine learning model as the predictions are to be made for real time data of users. Also we will add the data entered by the user in our training dataset which we will use to retrain the ML model after certain number of users enter the data which will help to improve the accuracy of the ML model.

VI. ACKNOWLEDGMENT

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