CROP PRICE PREDICTION USING MACHINE LEARNING

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ABSTRACT

Agricultural planning plays a vital role in the economic development of food security in a farming country. However, the farming sector is going through a difficult phase due to a lack of awareness in farming activities in India. Sometimes, in most cases, the farmers are not aware of the suitable crops according to their soil quality and soil structure. The system considers various parameters such as weather forecast and soil conditions and gives the best crop ideal for cultivation. The crop predictor can be applied to minimize losses when adverse situations occur. Farmers can use this system to maximize crop yield rates when the potential exists for favorable growing conditions. The system also includes crop price forecasting, where the system will consider the M.S.P., and the government decides M.S.P. to help estimate the price for the net 12 months based on the M.S.P. and previous year or month prices. It enables the farmer to calculate income. Based on crop forecasting and he can choose a more suitable crop and give more profit.

Keywords: Machine Learning, Decision Tree Regressor, Future Forecasting.

I.   INTRODUCTION

Achieving maximum profits with limited land resource is the goal of agriculture planning in agro-based country. Earlier farming predictions were performed based on farmers past experience in a particular field of crops. Now-a-days as the conditions are changing there is a need of advancement in the farming activities. What happens the farmers in rural areas are not aware of new crop and their benefits while farming them? The proposed system applies machine learning and prediction algorithms to forecast the prices of a particular crop. The aim of the system is to reduce the losses due to lack of knowledge about the revenue of their crop and increase the profits from the crops. The system integrates the data obtained from the past prediction, current prices and best crops to grow due to this farmers gets the idea and list of crops that can be cultivated. Machine Learning methods are widely used in prediction techniques like Decision tree Regressor. This in return gives the price predictions of the particular crop for the next twelve months. The proposed system considers the rainfall amount of past, current and future and also the previous year's prices. Based on these parameters the price of the crops are predicted using the machine learning algorithms more accurate prediction results are produced.

II.   LITERATURE SURVEY

Monali Paul, Santosh K Vishwakarma, Ashok Verma[1]

The purpose of this article is to anticipate crop yields, and crops are classified and examined. Data mining algorithms such as KNN and Naive Bayes are used to classify the data. The use of data mining to develop our idea will be advantageous

Abdullah Na, William Isaac, Ekaram Khan[2]

This study features a Smartphone app that will measure soil pH, temperature, and humidity in real time. Using a variety of methodologies, this study aids in remote soil analysis.

S. Nagini, Dr.T.V. Rajnikanth, B.V. Kiranmayee[3]

This work proposes a method for conducting exploratory data analysis to develop multiple prediction models. To anticipate good crops, several regression approaches, such as linear regression, are applied. Various machine learning techniques are used to predict the best yield for the farmer.

Awanit Kumar, Shiv Kumar[4]

The article suggested methods for predicting crop production for the coming year. The system employs fuzzy logic-based prediction methods. Fuzzy logic is a rule-based forecasting logic in which rules are applied to the land for agriculture, rainfall, and crop forecasting. K-means can be used to analyse the received data set by the system.

Pooja More, Sachi Nene[5]

To anticipate the most suited crops, this paper combines modern artificial neural network technology and machine learning algorithms such as SVM and linear regression.

Rakesh Kumar I, M.P. Singh[6]

CSM (crop selection method) and machine learning algorithms were proposed in the paper as strategies for appropriate crop selection. It is primarily concerned with boosting the farmer's profit by picking suitable crops.

III.   PROPOSED WORK

Our project aims to solve crop price forecasting problem in an efficient way to ensure guaranteed benefits to poor farmers. It uses machine learning techniques different data came out with better solutions. This solution uses Decision Tree regression techniques to predict crop values using trained data from certified datasets. Productivity can be increased by this application Understanding and predicting Cropper causes acne under various environmental conditions. An effective crop price forecasting systems can provide possibilities for customers that can satisfy customers in more contexts. Eventually, the results are displayed in the form of a web application so that poor farmers can reach them easily. Machine Learning based price prediction provides a unique way of combining technical and fundamental analysis methods. While technical analysis solely looks at historical Machine learning driven price predictions differ in two main aspects from traditional approaches:

- It can account for multiple price determinants thus improving accuracy.
- It provides localized (Mandy-level) predictions thus increasing their usability price, fundamental analysis consists of understanding external and internal factors that influence the prices of a certain commodity.

Individually technical analysis can be useful for providing accurate short-term prediction while fundamental analysis can help in long term forecast. By combining the two, higher accuracy in predictions can be achieved.

i) Decision Tree Algorithm:

The Decision Tree algorithm is a supervised learning algorithm. The decision tree technique, unlike other supervised learning algorithms, may be used to solve regression and classification issues. By learning basic choice rules inferred from prior data (training data), a decision tree can be used to develop a training model that can be used to forecast the target variable's class or value (training data).

We start at the top of the tree and work our way down to predict the record's class label in Decision Trees. The value of the original attribute and the value of the record's attribute are compared. Based on the comparison, we follow the branch that corresponds to that value and proceed to the next node.

Measures of property selection

When there are N attributes in the dataset, choose which ones to use as internal nodes at the root or at different levels of the tree might be difficult. The problem can't be solved by choosing any node as the root at random. If we adopt a random technique, we may end up with poor results and low precision.

Researchers worked together to come up with solutions to the attribute selection problem. They suggested using parameters like as :

1. Entropy
2. Information Gain
3. Gini Index
4. Gain Ratio
5. Reduction in Variance
6. Chi-Square

These criteria will be used to figure out the value of each characteristic. The values are sorted, and the features are arranged in a tree, with the most important feature at the top (in case of information gain).

When we use information gain as criteria, we examine hierarchical attributes, while we use the Gini index to evaluate continuous characteristics.

Regression in Decision Tree algorithm:

Since the data acquired from the datasets is continuous, we used Decision Tree Regression. Crops prices are seasonal based so it varies with time. In dataset, rainfall and WPI as the parameters for crop price prediction.
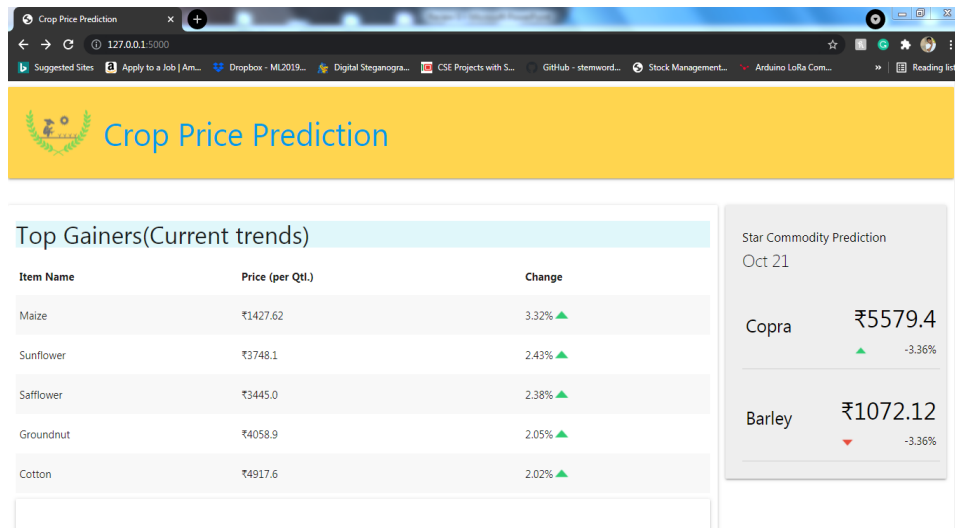
Architecture of Crop Price prediction
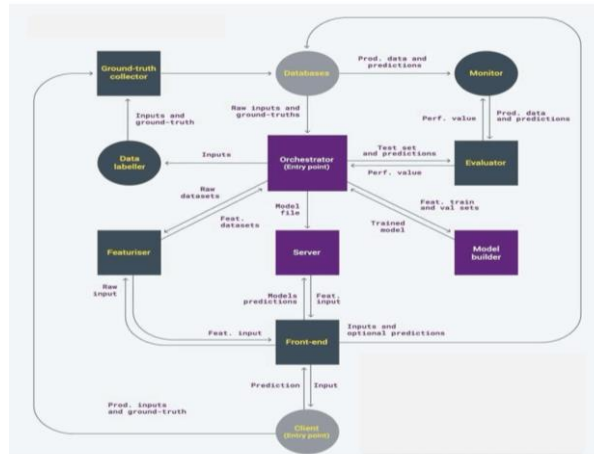
a) We have used Decision Tree Regresser for the crop price prediction, by this system we will get the price of each commodity, prime location of the crop and best season to grow the crop.
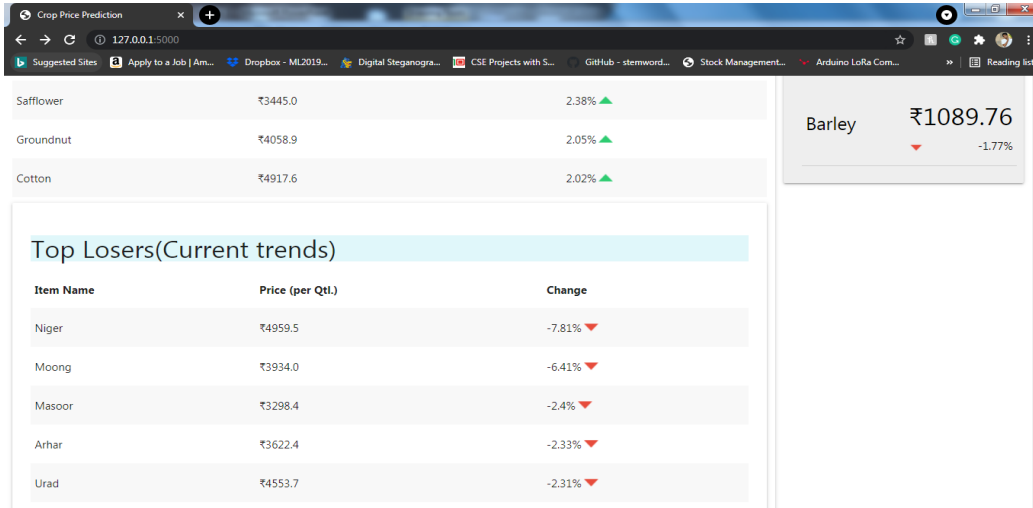
Commodities in the system:

1. Paddy
2. Wheat
3. Bajra
4. Niger
5. Moong
6. Copra
7. Maize
8. Cotton
9. Soya bean
10. Barley
11. Gingelly Seeds
12. Arhar
13. Masoor
14. Cotton
15. Ground Nut
16. Mustard Seeds
17. Gram
18. Sugar Cane
19. Ragi
20. Urad
21. Sunflower
22. Kardi Seed
23. Raw Jute
24. Jowar

## IV.   SYSTEM RESULTS

A python and flask based webpage in which it is used MySQL for the data storage. In the main page of website, we can able to see the Top Gainers of the present month and we can also see the Star Commodity Prediction of the year. We also see the Top Losers of the present month.
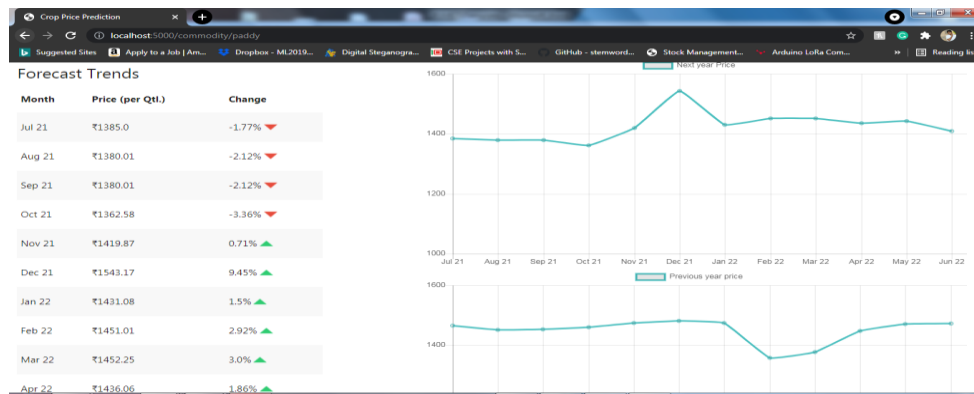

In the system we can also see the explore by commodity section where the results are seen in the website for each commodity.
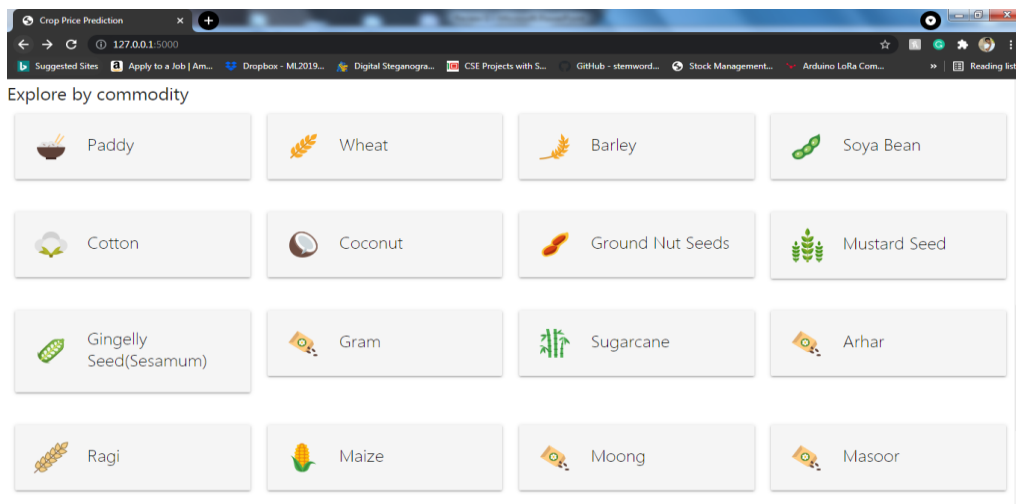
After clicking on each commodity we see the price of the crop, prime location, best season and export availability. And also the future 12 months predictions are as below:
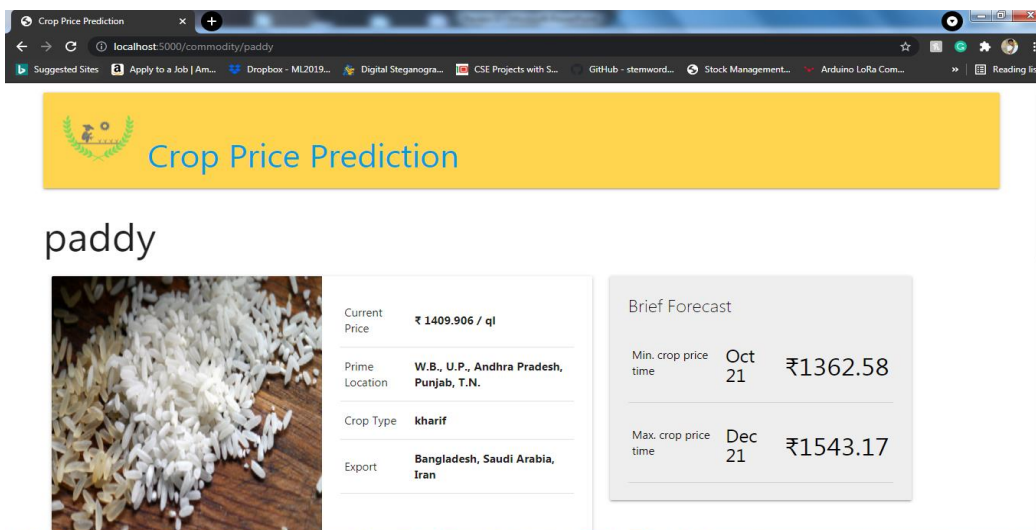
We can able to see some graphs right there which is the forecasting trends of next twelve months and previous twelve months.

V.   CONCLUSION

For years, crop price forecasting has been a well-studied subject in the discipline of time-series analysis. Quality difficulties are a crucial problem in growing economies like India. In our experiment we used the machine learning algorithm to predict the crop prices for the next twelve months. We have used annual rainfall and WPI (Wholesale Price Index) as the parameters for the prediction. We got the accurate results of the price predictions. This project is a helpful tool for farmers to increase their profits based on the predictions

There are lot of future developments for this project like crop prediction based on the crop prices we got and also if we able to include the various parameters like insurance, logistics prices for the better prediction.

We can make this tool helpful for farmers by collaborating with various NGO's and government to make it available village panchayat. We can recruit a technical support staff for the all the process, so that some illiterate farmers are also able to access this feature.

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