IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 5, May 2024

Market Driven Crop Price Prediction

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Abstract: *The global agricultural sector faces significant challenges in ensuring food security, optimizing resource utilization, and adapting to changing environmental conditions. Accurate crop price prediction is crucial for addressing these challenges, yet existing methodologies often lack the ability to integrate market dynamics effectively. This paper proposes a novel framework for market- driven crop price prediction, leveraging advanced machine learning techniques and market data integration to enhance the accuracy and relevance of predictions. The crop price 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*

Keywords: crop yield

I. INTRODUCTION

In agro-based economies, where land resources are limited, the primary objective of agricultural planning is to maximize profits while navigating these constraints. Traditionally, farmers relied on their past experiences to predict farming outcomes, particularly in the cultivation of specific crops. However, the agricultural landscape is constantly evolving due to various factors such as climate change, market dynamics, and technological advancements. This necessitates a shift towards more sophisticated agricultural practices to effectively address emerging challenges.

One significant challenge arises from rural farmer's lack of awareness regarding new crop varieties and their potential benefits in terms of market demand and profitability estimation. This gap in knowledge often leads to uncertainties in revenue projections and can result in significant losses for farmers. To mitigate this issue, a proposed solution leverages the power of machine learning and prediction algorithms to estimate crop prices accurately.

The core objective of this proposed system is to minimize the impact of revenue uncertainties on farmers profitability and enhance overall financial outcomes. By integrating prediction data, current market prices, and insights into recommended crops, the system empowers farmers with valuable information for informed decision-making. Moreover, the system goes a step further by presenting forecast trends of specific crops monthly through graphical representations, aiding farmers in understanding market dynamics and planning their cultivation accordingly.

Machine learning techniques, particularly the Decision Tree Regressor, play a pivotal role in this system's ability to forecast crop prices accurately. By analyzing a multitude of factors including past and current rainfall patterns, previous year's prices, and future projections, the system generates precise predictions for specific crops over the next twelve months. This data-driven approach not only enhances farmer’s decision-making processes but also optimizes crop selection, ultimately leading to improved financial outcomes.

In essence, the proposed system represents a paradigm shift in agricultural planning by harnessing the power of technology to address longstanding challenges faced by rural farmers. By providing actionable insights and predictive capabilities, this system empowers farmers to make informed decisions, thereby maximizing profitability and contributing to sustainable agricultural development in agro-based economies.

II. LITERATURE SURVEY

Monali Paul, Santosh K Vishwakarma, Ashok Verma

Focus on crop yield anticipation through classification and examination of crops using data mining algorithms such as KNN and Naive Bayes. This approach enables the categorization of crops based on various parameters, aiding in informed decision-making for farmers.

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Abdullah Na, William Isaac, Ekaram Khan
Introduce a Smartphone app for real-time soil analysis, providing crucial information on soil pH, temperature, and humidity. This innovative solution facilitates remote monitoring and analysis of soil conditions, enabling farmers to make timely adjustments to their cultivation practices.

S. Nagini, Dr.T.V. Rajnikanth, B.V. Kiranmayee
Propose a method for exploratory data analysis and prediction modeling to anticipate crop yields. By employing regression approaches and machine learning techniques, this study offers predictive insights into crop production, assisting farmers in maximizing their yield potential.

Awanit Kumar, Shiv Kumar
Suggest a fuzzy logic-based prediction system for crop production forecasting. By utilizing fuzzy logic rules and K-means clustering, this approach offers a nuanced understanding of agricultural parameters such as land suitability, rainfall, and crop selection, aiding in informed decision-making for farmers.

Pooja More, Sachi Nene
Combine artificial neural network technology with machine learning algorithms like SVM and linear regression to predict the most suitable crops for cultivation. This integrated approach harnesses the power of advanced computational techniques to optimize crop selection decisions.

Rakesh Kumar I, M.P. Singh
Propose the Crop Selection Method (CSM) alongside machine learning algorithms to assist farmers in selecting appropriate crops for cultivation. The primary objective is to enhance farmers' profitability by recommending crops that align with their specific agricultural conditions and market demands.

III. METHODOLOGY

This project is related to agricultural products and offers various functions such as predicting product prices, presenting products, creating five winners and losers in agricultural products. The application is built using Flask, a microweb framework for Python. Provides functionality to redirect HTTP requests and render HTML templates. The algorithm used is decision tree regression to predict product value. Decision trees are a supervised learning algorithm used for regression and classification tasks. Here they are used to predict the price of various agricultural products based on factors such as month, year, and rainfall. It separates the input input (X) and the target variable (Y) from the data set.
The data collected will be having the separate training and testing sets which will predict the price of any product in the next month based on the current month, year, and rainfall. Similarly, the TwelveMonthsForecast function provides a 12-month crop price forecast. For example, the root path (`/`) leads to the page directory, while path like '/product/` indicates separate clipping. The `/ticker//` method provides information for the ticker display that appears to provide real-time information about crop prices. Flask 'render_template' function is used to render these templates using dynamic data passed in from Python code. This is useful for enabling web applications hosted in different directories to interact with the Flask server. Together, they provide users with a Web interface to access agricultural information and forecasts.

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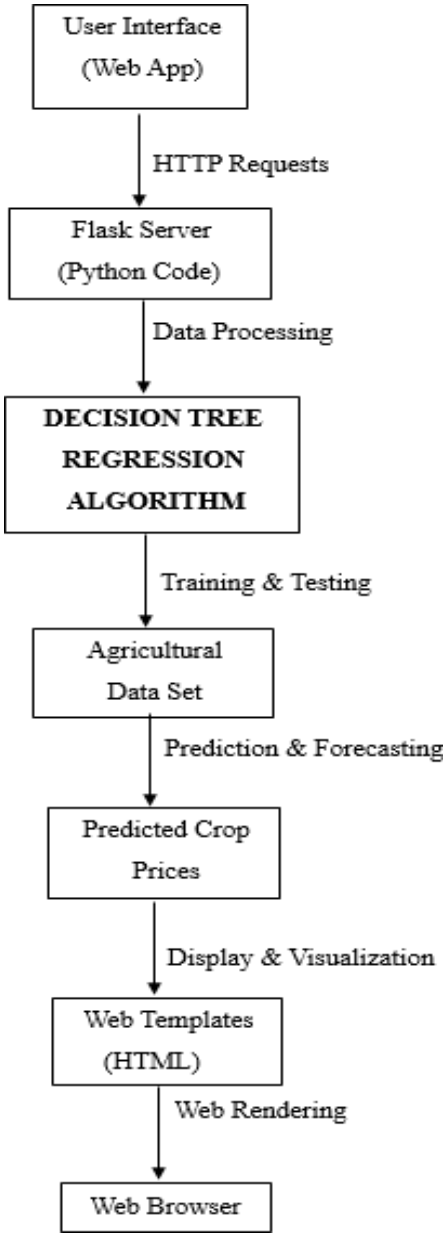

Fig: Methodology diagram

IV. RESULTS

On clicking the link, it redirects to the main page of the project which displays the price prediction of various crops, it also shows the top gainers and top losers according to the market price.

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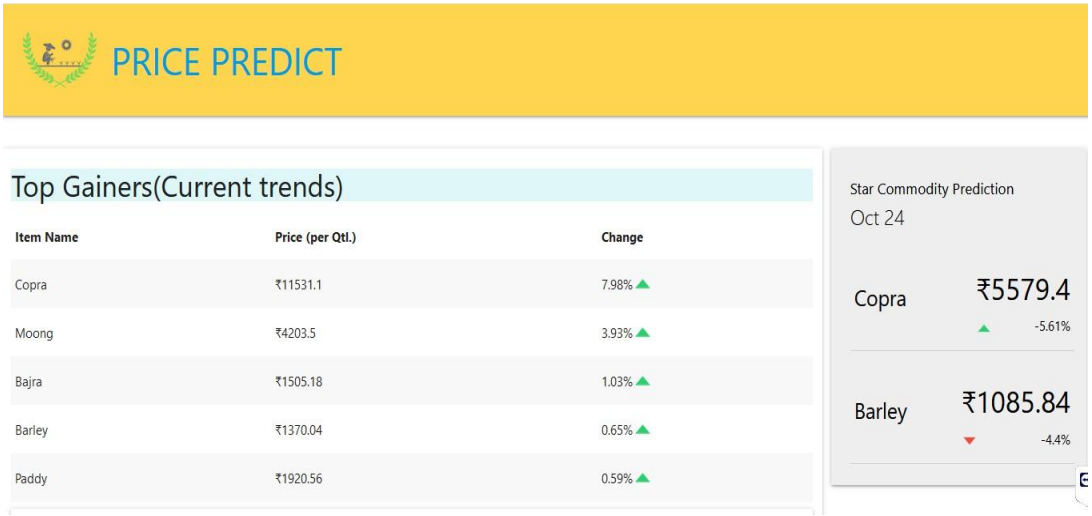

Fig: Main page

Fig: Top loser's page

In this page we can explore different products.

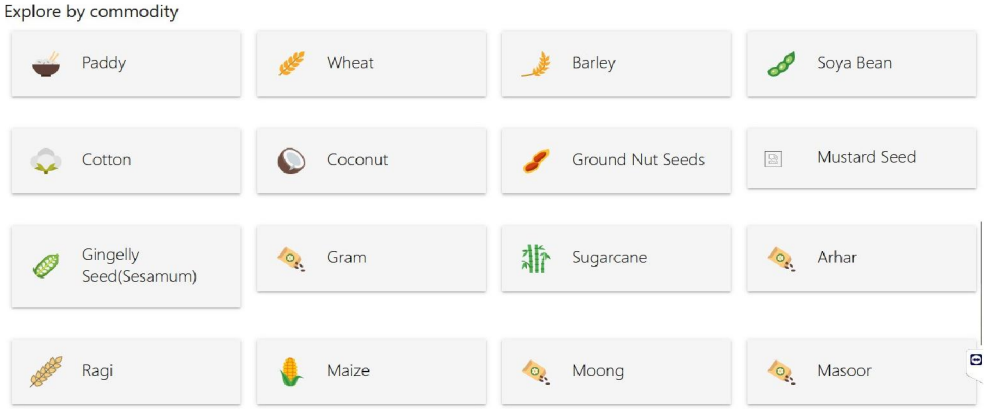

Fig: Commodity Page

By clicking on each commodity, we can get the details about the crops and the price predicted for the next twelve months will be displayed along with graph.

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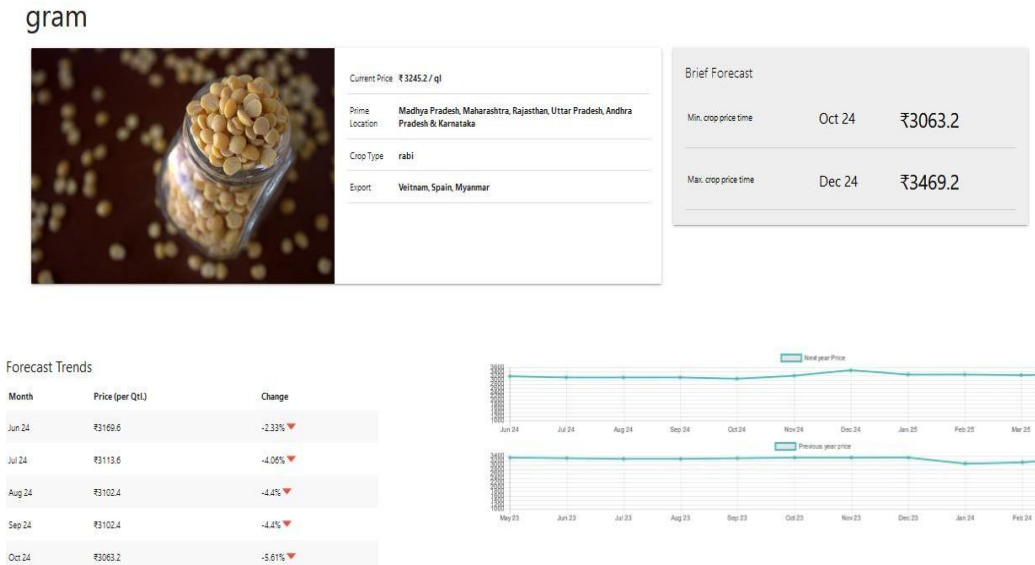

Fig: Price Prediction of the crop

V. CONCLUSION

Crop price forecasting has been studied for many years, especially in time series studies. Productivity issues are a major issue, especially in emerging markets like India.

In this paper, we use machine learning algorithms to predict crop prices over the next twelve months. Our models produce accurate forecasts by combining factors such as annual rainfall and wholesale price index (WPI). Smart decisions aimed at increasing their income. Looking to the future, there are many opportunities for further development. We aim to improve our estimates by including additional parameters, for example insurance and shipping costs.

Partnerships with NGOs and government agencies can help make these tools widely available even in remote village panchayats. Additionally, by providing support, we can ensure that all farmers, regardless of their education level, can benefit from this important resource. capacity. By continuing to develop and expand our approach, we can support the success and sustainability of farming communities.

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