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Farming Made Easy Using Machine Learning

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Abstract: Agriculture is the primary mainstay of the economy in our country. In recent years, because of uncertain trends in climate and other fluctuations in the price trends, the price of the crop has varied to a greater extent. Farmers remain oblivious to these uncertainties, which spoil the crops and cause massive losses. They are unaware of the crop type that would benefit them most. Due to their limited knowledge of different crop diseases and their specific remedies, crops get damaged. This system is handy, easy. It provides accurate results in predicting the price of the crop. This framework utilises Machine Learning's Decision Tree Regression Algorithm to predict crop price. The attributes considered for prediction are rainfall, wholesale price index, month, and year. Consequently, the system gives an advanced forecast to the farmers, which grows the speed of profit to them and consequently the country's economy. This system also incorporates other modules like weather forecast, crop recommendation, fertiliser recommendation, and shop, a chat portal, and a guide are also implemented.

Keywords: **crop, forecast, ML.**

I. INTRODUCTION:

India being a rural nation, its economy transcendently relies upon agricultural yield development and unified agroindustry items. It is currently quickly advancing towards a specialized turn of events. India now is rapidly progressing towards technical development. Smart farming is changing the face of agriculture in India. Technology can provide a solution to most challenges farmers face. It can help them predict weather more accurately, decrease waste, boost output and increase their profit margins. In the status quo, the farmers and the consumers find it difficult in the real world to determine the accurate prices of crops without having prior knowledge of the fluctuating trend prices or weather conditions. Accordingly, innovation will end up being helpful to agriculture. The paper aims to predict crop prices in advance. This work is based on finding proper regional datasets that help us in achieving high accuracy and better performance. Our system, Argo-Genius, is using Machine Learning to build the Price Predicting Model. In the past few years, a lot of fluctuation in the prices of the crop has been seen. This has increased the rate of crop damage produced each year.

The main aim of this prediction system is to ensure that the farmers get a better idea about their yield and deal with the value risk. Weather is also highly unpredictable these days. It also affects the crop production. The proposed system will also forecast the weather helping the farmer make correct decisions regarding field ploughing, field harvesting etc. Similarly, fertilizers play an important role. Fertilizers load the soil with the required nutrients that the crops eliminate from the soil. Crop yields and production will be fundamentally decreased if fertilizers are not used. That is the reason fertilizers

are utilized to enhance the soil's supplement stocks with minerals that can be immediately assimilated and utilized by crops. Our system will provide fertilizer consumption based on different crops and provide a portal to buy the fertilizers and seeds from the user's location. They can even get the exact location along with the address of the fertilizer and seed shop. The provided fertilizers will get more profit to the farmers on the growing system suggested crop. It will also show the best suited crop based on cultivation date and month and location details, thereby maximizing the yield.

It will provide multilingual and region specific guide books for the farmers. Any farmer who is new to this field and who wishes to gain information from his ancestors but having the same methods documented will be highly beneficial. We have also provided maps for the farmers to gain knowledge. Our system will provide two different types of maps for the farmer to gain the knowledge about how the land and where they should start their farming. Irrigation maps show the irrigated-non irrigated area over the country. Agriculture land view map will provide an overview of agricultural land present in various states of India and help farmers to analyze the non Agricultural land which can further be improved. Maps make the farmers easy to understand they have to just hover on the state they are thinking of starting their farming and they will get the information about that state and they can decide whether they should change the place or should start farming. If the farmers are new in this field it is the best thing for them as the most important thing in farming is to firstly choose the land and place of farming. Moving in the same direction, our system will incorporate a chat application which helps in information sharing. Often farmers have certain queries which cannot be solved due to their limited knowledge, hence we are building a platform where information can be exchanged. Language can pose as a barrier to the users. Since the majority of non- English speaking farm workers in India are native Hindispeakers, we anticipate that once these resources are developed they might be translated to other languages as well. Hence, to make the website user friendly, we have provided language translation.

Farmers should know about their location, date of cultivation of their crop. Our system is a web application, which is developed based on machine learning concepts. The proposed system applies machine learning and prediction algorithms like Naive Bayers, Decision Trees and K-Nearest Neighbour to identify the most accurate model and then process it. This in turn will help predict the price of the crop.

II. LITERATURE SURVEY

The following papers focused on predicting crop price using Machine Learning and providing results. In April 2019, the exploration targets foreseeing both the cost and benefit of the given harvest before planting. The preparing datasets so acquired give enough bits of knowledge to foresee the suitable cost and request in the business sectors [1]. The authors have predicted the most profitable crops and its expected price during harvesting time according to the location, by predicting different historical raw datasets using different machine learning algorithms. The work shown by Nishiba [2] is the expected utilization of data mining procedures in foreseeing the harvest yield dependent on the input parameters average rainfall and area of the field. The easy to-use website page created for anticipating crop yield can be utilized by any client by giving the normal precipitation and region of that place. Different Data Mining techniques are applied to different datasets. This paper can also include certain modules [11] which can help farmers to make certain decisions based on the harvested area or current trends in the market. The system can be extended by visualizing the crop details in a map with details, which will help farmers to view the nearby district cultivation details. Proposed system can be enhanced by providing a graphical visualization of predicted prices for better understanding. This system is

proposed to provide help to the farmers for expecting the best amount for their crops and for predicting the best price for the crops. This also helps the farmers to check previous prices of different commodities. The system can predict crops using [9] Random Forest, Polynomial Regression and Decision Tree algorithms. The best crop and its required fertilizers make the farmer more confident about the crop and its yield and also our system will do marketing work [4] by estimating total value of the crop based on current market price. The idea of the system can be extended by adding some extra features to the system like providing a nearby shop location portal for purchasing seeds and fertilizers. These papers aim at predicting the price and forecast through web application and it runs on efficient machine learning algorithms like using an Autoregressive Integrated Moving Average (ARIMA) model, Traditional ARIMA [6], Support Vector Regression Algorithm[8], and technologies having a general easy to use interface to the clients. The training datasets [7] acquired give sufficient bits of knowledge to foreseeing the appropriate price [10] and request in the markets. The results are displayed as web applications in order that poor farmers can access easily. Models can be improved by integrating this with other departments like horticulture, sericulture, and others towards the agricultural development of our country. Different agriculture departments have various problems in the current time. Incorporating them will not only increase the scope but also help the farmers new to this part of the spectrum. Their work may be expanded by building a framework for suggesting agriculture produce and dispersion for farmers. Utilizing this framework, we ought to get the same accuracy indeed when an information autonomous framework is utilized. Further, can be enhanced by making an android application for the same.

III. METHODOLOGY

The flowchart in the image represents a system for agricultural data processing and decision-making. Here's a textual breakdown of the process:

1. Data Collection – Information is gathered from the soil and crops.

2. Preprocess – The collected data undergoes preprocessing for cleaning and refinement.

3. Algorithm Implementation – Algorithms are applied to process the preprocessed data.

4. Database – The processed data is stored in a database.

5. User Input – Users provide input to the system (e.g., queries about crops or soil).

6. Model Creation – A model is created using both algorithm implementation and user input.

7. Web Application – The model is integrated into a web application for user accessibility.

Outputs of the Web Application: Crop Type – Identifies suitable crops. Soil Parameters – Displays soil characteristics. Crop Price – Provides market price details

1. Dataset Overview

The dataset contains information on government schemes and crop prediction models for various crops in different regions. The dataset aims to provide insights into the effectiveness of government schemes in improving crop yields and reducing losses due to pests, diseases, and weather conditions.

Variables

- **Scheme ID:** Unique identifier for each government scheme.
- **Crop Type:** Type of crop (e.g., wheat, rice, maize).
- **Region:** Region where the crop is grown.
- **Scheme Type:** Type of government scheme (e.g., subsidy, insurance, irrigation).
- **Crop Yield:** Predicted crop yield based on historical data and scheme implementation.
- **Weather Conditions:** Weather conditions (e.g., temperature, rainfall) during the crop growth period.
- **Pest and Disease Incidence:** Incidence of pests and diseases affecting the crop.
- **Scheme Effectiveness:** Effectiveness of the government scheme in improving crop yields and reducing losses.

Data Sources

1. Government Reports: Reports from government agencies on scheme implementation and crop yields.

2. Agricultural Databases: Databases containing information on crop yields, weather conditions, and pest and disease incidence.

3. Surveys and Studies: Surveys and studies conducted by research institutions and universities.

2. Data Preprocessing

1. Data Cleaning: Removal of missing or inconsistent data.

2. Data Transformation: Transformation of data into suitable formats for analysis.

3. Feature Engineering: Creation of new features (e.g., scheme effectiveness) based on existing variables.

Potential Applications

1. Crop Yield Prediction: Predicting crop yields based on government schemes and weather conditions.

2. Scheme Evaluation: Evaluating the effectiveness of government schemes in improving crop yields and reducing losses.

3. Decision Support: Providing decision support for policymakers and farmers to optimize scheme implementation and crop management.

Limitations

1. Data Quality: Data quality issues (e.g., missing data, inconsistencies) may affect analysis and predictions.

2. Limited Scope: The dataset may not cover all government schemes or crops.

3. Regional Variations: Regional variations in climate, soil, and other factors may affect scheme effectiveness.

By analysing this dataset, researchers and policymakers can gain insights into the effectiveness of government schemes in improving crop yields and reducing losses, ultimately informing decision-making and policy development.

IV. RESULT AND DISCUSSION

In the above graph red line represents original prices, and the green line represents predicted prices. By seeing the above graph farmer can understand the current price and what the future price will be. And now, close the above graph to view predicted values

This graph is about the crop Alassane Gram. The graph shows the predicted price and the original price of the crop.

V. CONCLUSION AND FUTURE SCOPE

This project is undertaken using machine learning and evaluates the performance by using KNN, Naive Bayes, and Decision Tree algorithms. In our proposed model, among the three algorithms, Decision Tree gives the best yield prediction as compared to the other algorithms. As most extreme sorts of harvests will be secured under this system, farmers may become more acquainted with the yield that they may never have developed. The work exhibited the expected utilisation of machine learning methods in forecasting the harvest cost dependent on the given attributes. The created web application is easy to understand, and the testing accuracy is over 90%.

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