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CropTech Portal

Prof. Deepali Shrikhande
Department, Information Technology
Vidyalankar Institute Of Technology
Mumbai, India
deepali.shrikhande@vit.edu.in

Priya Jamanu
Department, Information Technology
Vidyalankar Institute Of Technology
Mumbai, India
priya.jamanu@vit.edu.in

Gauri Kakad
Department, Information Technology
Vidyalankar Institute Of Technology
Mumbai, India
gauri.kakad@vit.edu.in

Sanyukta Adhate
Department, Information Technology
Vidyalankar Institute Of Technology
Mumbai, India

***Abstract*— Introducing the Crop Tech Portal- an innovative platform revolutionizing crop production for farmers worldwide. This cutting-edge portal empowers farmers with seamless access to a wealth of agricultural information, resources and tools for farmers. Boasting features such as location-based weather forecasts, government schemes, crop guides, and pricing information for cereals, pulses, and fruits, the portal is meticulously designed using advance algorithms like random forest and gradient descent. Agricultural production mainly depends on weather conditions. Both aspects are interiorly connected with each other in several aspects, as climate change is the key factor of plant biotic and abiotic stresses, which have an adverse influence on global agriculture production. These abstract details the developmental journey and implementation of the CropTech Portal, emphasizing its user-friendly interface and robust technology foundation, adaptable to the diverse needs of farmers worldwide. User-friendly and accessible on various devices, including mobile phones and tablets, the Agricultural Portal marks a transformative stride in agricultural technology.**

Keywords—CropTech Portal, Crop Production. Farmers, user-friendly.

I. INTRODUCTION

As we know that agriculture is the backbone of any country, and it has become the most significant growing sector all over the world because of increasing population. About 60% of our country's population works in agriculture which contributes more to our country's GDP and employment. The main challenge in the agriculture industry is to improve farming efficiency and quality to fulfil the speedily increasing demand for food. Apart from mounting population, the climate circumstances are also a huge challenge in the agricultural industry. Farmers face a multitude of challenges that can vary depending on factors such as location, climate, economic conditions and government policies. In many regions sudden floods or other natural disasters can lead to crop damage They also face price volatility for their crops, impacting their income and financial stability. Some farmers are even not aware about the government schemes. Infestations can lead to significant crop losses if not managed effectively by offering different services such as weather forecast, crop prices, crop guide, crop recommendation and government policies. In our project, we will make use of ML algorithms to assist farmers to know crop yield predictions and favourable weather predictions. It also assists the farmers to sell the crops directly to customers.

This CropTech Portal is an online platform which provides access to variety of resources and services to farmers and other stakeholders in the agriculture industry. The main objective of such a portal is to help farmers by providing them with information, recommendations and services that can help them make informed decisions and adopt best practices. Some of the basic concepts that are central to an agricultural portal for better crop production include: Market Intelligence: This refers to the information that farmers need to make. Informed decisions about when to sell their crops and at what prices. CropTech Portal provides farmers with access to real-time market information that can help them get the best possible. Weather data: Farmers must be able to plan their planting and harvesting scheduled in accordance with the weather as it is so important to agriculture. Agricultural portals give farmers access to weather alerts and forecasts, which can aid them in making decisions, regarding pest control, irrigation and other tasks.

II. LITERATURE SURVEY

[1] Analysis shows that the most frequently utilized features in these models are soil type, temperature, and rainfall, with Artificial Neural Networks being the most frequently used technique. The parameters that the author employed were State, district, season, and area. The crop's yield in the desired year can be predicted by the user. In order to estimate the yield, the study employs sophisticated regression techniques like Kernel Ridge and Lasso. It also makes use of the idea of stacking

regression to improve the algorithms and produce better predictions.

[2] In this paper, the author says, yield prediction was performed by considering farmers' experience on a particular field and crop. Different Data Mining techniques are used an evaluated in agriculture for estimating the future year's crop production. This is achieved by applying association rule mining on agriculture data. This research paper focuses on the creation of a prediction model which may be used for future prediction of crop yield. This paper presents a brief analysis of crop yield prediction using a data mining technique based on association rules for the selected region.

[3] The author describes how the od farming data can be utilized to depict the future expectation of harvests and yield. It likewise proposes to the ranchers what kind of yield can be developed utilizing the climate station data and gives the appropriate data to incline toward the precise season for cultivating. The curse on the harvest yield is broken by utilizing different ecological elements and Regression Analysis (RA), Linear Regression (LR) Algorithms utilizing the various data mining strategies how to improve harvest production.

[4] This paper uses machine learning algorithms, direct relapse demonstrated from insights, and two enhancement techniques, the Normal condition strategy, and the Gradient plunge technique to anticipate the weather based on a couple of parameters. This work utilizes the ordinary condition model's speculation and contrasts it and the angle plunge model to give a superior thought of the productivity of the models. This paper is about the use of machine learning algorithms, direct relapse demonstrates from inside, and two enhancement techniques.

[5] We provide a yield modeling method based on a semiparametric deep neural network variant that can simultaneously account for the known parametric structure and undiscovered cross-sectional variability, as well as complex nonlinear relationships in high dimensional datasets. We demonstrate that in predicting the yields of years held during model training, this technique performs better than fully nonparametric neural networks and classical statistical methods. In the warmer scenarios and areas, our method is less gloomy.

[6] The yield of practically every type of crop cultivated in India is forecast in this study. Simple factors like State, district, season, and area are used to give this script a unique touch. The user can also anticipate the crop's output in whatever year they choose. The study predicts the yield using sophisticated regression techniques such as Kernel Ridge, Lasso, and ENEt algorithms. It also applies the idea of stacking regression to improve the algorithms' performance and produce a more accurate prediction.

[7] In this paper, we can predict the things like rainy, windy, sunny, stormy, floods and variations in temperature, etc. Nowadays, the weather is making a bad impact, as society is growing more and more, causing much damage, injury, and loss of life for farmers. Weather forecasting is very important for agriculture and terrace gardening. Weather forecasting will help remote areas for better crop production. In this paper, a low-cost solution for weather forecast prediction is discussed.

[8] This paper uses algorithms such as Random Forest, Support Vector Machine, Weather and K-Nearest neighbour, which are used for better performance results for each selected weather parameter. We also use soil and weather parameters such as soil type, soil fertility, maximum temperature, minimum temperature, and rainfall are used to identify suitable crops for specified farms or land. Ethiopia consolidates both remotely detected information (RSD) and agrarian overview information for a considerable beneficiary of specially appointed imported nourishment help.

III. PROBLEM STATEMENT

The agricultural sector is vital component of the global economy, providing food, raw materials and livelihoods for a significant portion of population. However, it faces several critical challenges, including food security, sustainability, and climate change adaption. Access to relevant and up-to-date information. Resources and services is essential for improving agricultural practices and ensuring the well-being of farmers and the sector as whole. Currently, agriculture stakeholders, including farmers, agronomists, researchers and policymakers, encounter several obstacles that hinder their ability to access valuable resources and information.

IV. EXISTING SYSTEM

Before the introduction of CropTech portal, farmers typically relied on traditional methods and local resources for agricultural information. For example, a farmer might have consulted local agricultural extension officers, received information through community gatherings, or relied on printed materials and personal experience. In order to solve the unfair conflicts of wages to the farmers, a web portal for trading has been designed by (Raghu Raman D) which is based on providing details of seeds and fertilizers of produce at fair prices and would bridge up all the unfair means of crop produce, procurement and sales. Venkateswararo has designed and E-application System which allows farmers to set their own price to their products and allows buyers for e-auction. Farmers can set the initial bid amount based on the quality. Due to development of this system, direct profit amount is provided to the farmer directly and advancement to this system will bring more communication about requirements between farmers and customers without a middleman.

To get around the middleman's problems Raghu Raman has developed a highly effective e-portal for furs with the goal of eliminating the intermediary in the supply chain that connects farmers with consumers by selling agricultural produce, specifically seeds and fancier. In an effort to raise farmers'

standard of living, this webpage also offers information on the different kinds of seeds that are accessible in Tamil Nadu. The portal has created chatbot technology to facilitate communication between farmers and customers. A chatbot technology is developed in the portal to make a communication bridge between farmer and customer. Techno Serve helps small farmers growing high value crops to achieve secure partnership with buyers that pay higher prices. Earn greater incomes by improving the quality and quantity of their crops. By increasing access these resources and market connections, It assists in giving farmers a steady, long-term market with the important feature of giving them access to all facilities so they can live quiet lives. To help farmers execute the appropriate farming practices and many other aspects of farming from the first day of cultivation till the actual selling of products to the consumer, a full-fledged website portal with consulting benefits has been established.

V. PROPOSED METHODOLOGY

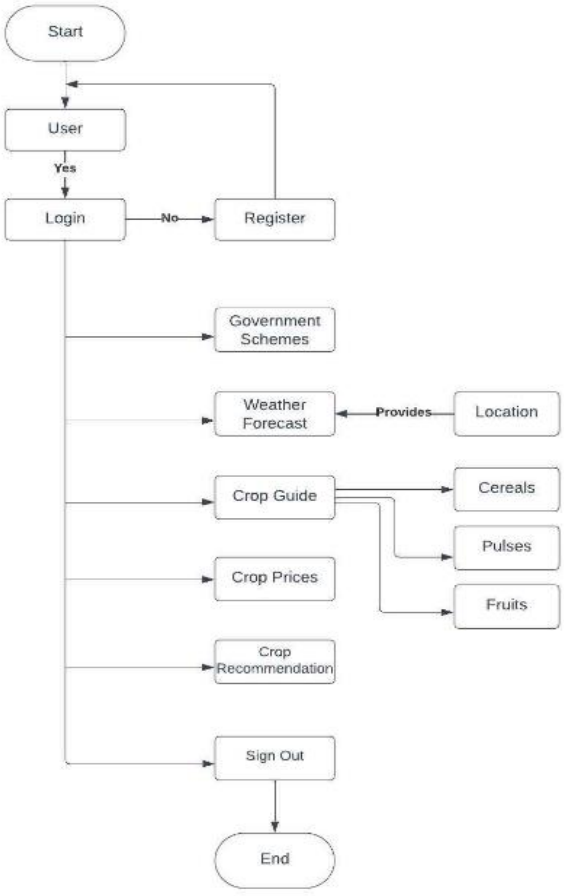

Fig 1. Flowchart for proposed system

The above figure is the design of our project CropTech Portal. The farmers and customers can login to the portal and make use of various options available in their respective domain.

1. User Registration: Users fill out a registration form with essential information such as name, email address, contact details. Upon successful registration, the system creates a user account with a unique identifier.

2. User login: Returning users provide their login credentials, typically consisting of a username or email and a password.

3. Government Schemes: In this section user may views various agriculture related schemes offered by government, as links of those schemes are mentioned so user can simply land on those sites.

4. Weather Forecast: In this section, location of registered user is fetched from an API and it will be displayed up to 7 days.

5. Crop Guide: In this section, user may get the information about various crops as there is category of crops like cereals, fruits and pulses.

6. Crop Prices: In crop prices section, user may get to know the prices of crops based on type of crop, fruits, etc. also based on location like state, district, etc.

7. Crop Recommendation: This feature recommends the crop production based on the nitrogen, phosphorous, potassium, humidity, temperature, pH value of soil and the amount of rainfall.

Machine Learning Algorithms:

For our project, we are using various kinds of Machine Learning Algorithms They are Decision Tree, Naïve Bayes Gaussian, K Nearest Neighbour, and Random Forest. Decision Tree gives the highest accuracy of all.

VI. RESULTS

Fig 2. Home Page

This is the home page of our portal which consists of options on the top such as Home, Weather, Government Schemes, Crop Guide, Crop Prices and Crop Recommendation.

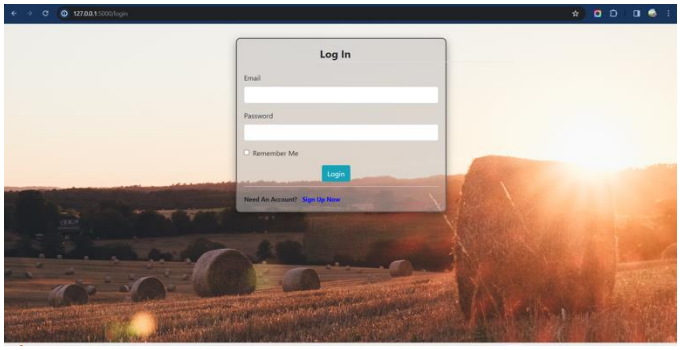

Fig 3. Login Page

The farmer has to put the credentials of the login, such as email and password after which his profile will be visible.

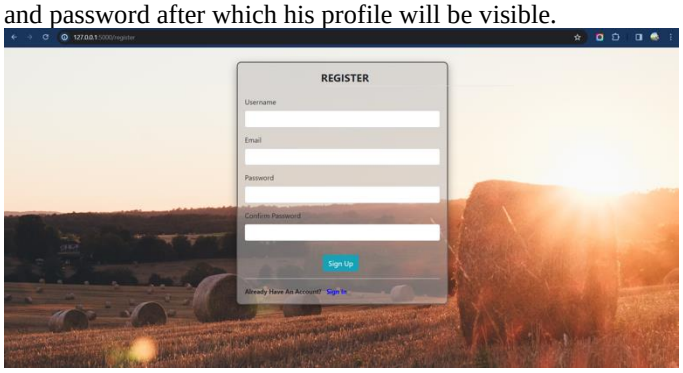

Fig 4. Signup Page

If the farmer account doesn't exist then he has to register using username, email and password.

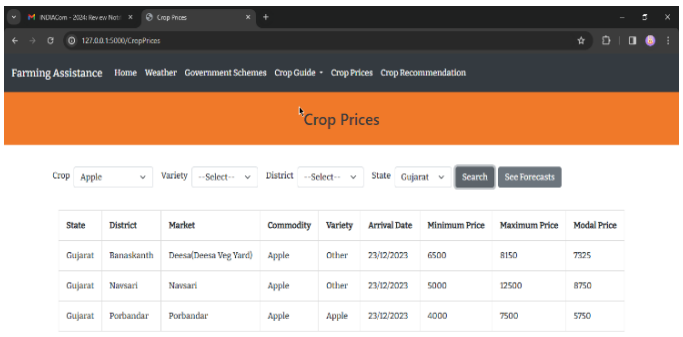

Fig 5. Crop Prices

This is where user may get to know the minimum and maximum price of any crop. They can also apply filter like state, district and the variety of crop.

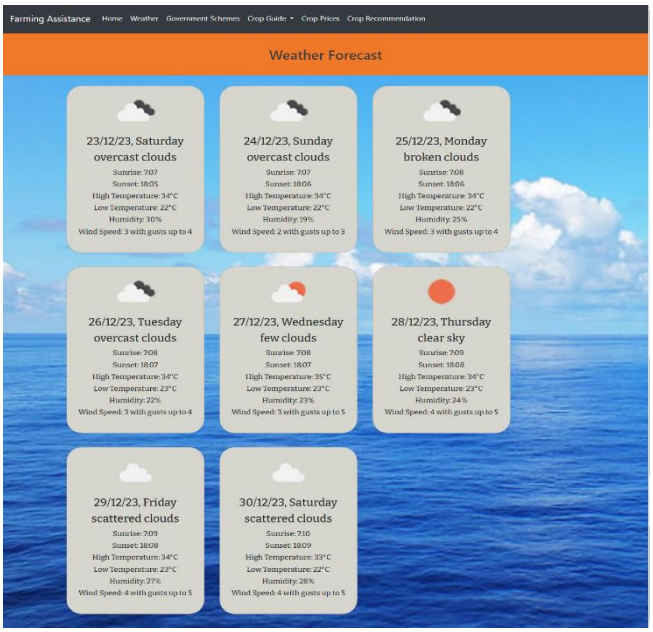

Fig 6. Weather Forecast

This is weather forecast where user may get to know the weekly forecast of temperature, humidity and wind speed.

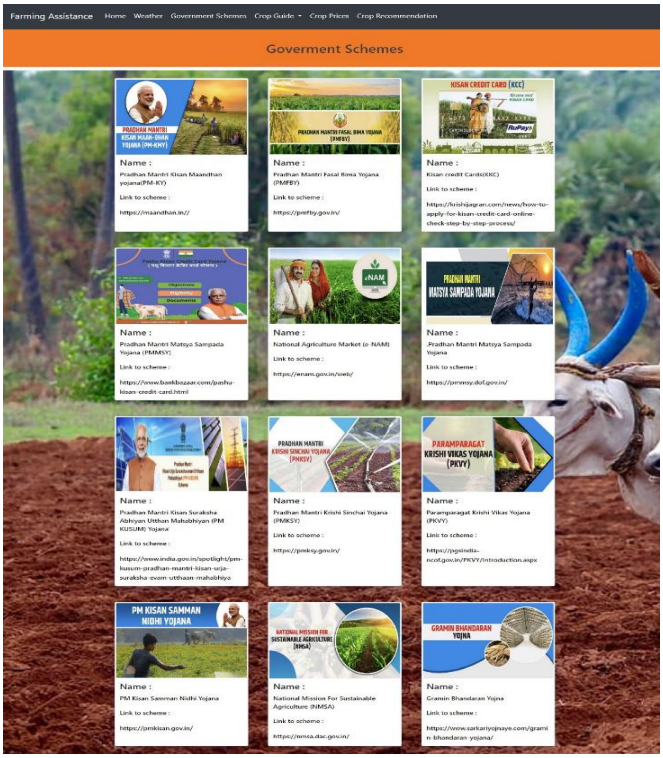

Fig 7. Government Schemes

Here user may get the information about any government schemes which will be beneficial to them. They can simply follow the links which is provided.

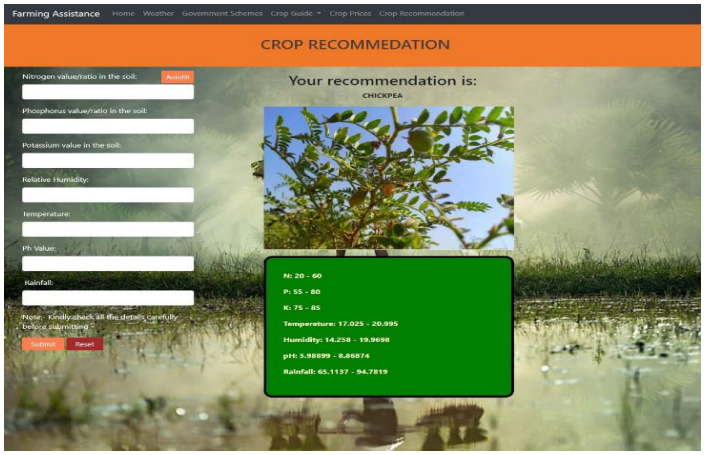

Fig 8. Crop Recommendation

It is used to recommend the crop based on many factors like nitrogen, phosphorus, potassium level of soil. Also, the relative humidity, temperature, pH value of soil and the rainfall in that area.

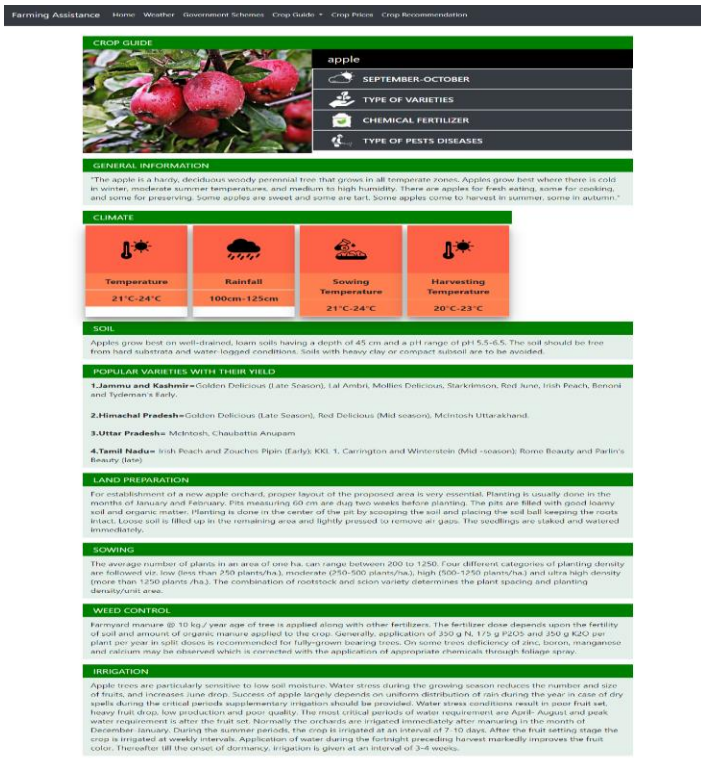

Fig 9. Crop Guide

Crop guide is basically for users to get to know the information about crops like the soil in which it is cultivated, states which grows particular crop and the methods and techniques to grow.

VII. CONCLUSION

In conclusion, the CropTech Portal emerges as a transformative force in the realm of agriculture, providing a holistic and technology-driven approach to crop production. By amalgamating real-time weather forecasts, government schemes, comprehensive crop guides, and dynamic pricing information, the portal equips farmers with the tools needed for informed decision-making. The user-friendly interface, scalability across diverse geographies, and adaptability to different farming scales

The user-friendly interface, scalability across diverse geographies, and adaptability to different farming scales underscore its commitment to inclusivity.

Looking ahead, the portal's commitment to embracing regional languages and simplifying data entry processes further amplifies its potential impact, ensuring accessibility to a broader spectrum of users. The envisioned integration of a sophisticated recommender system for agriculture production and distribution marks a pivotal step towards empowering farmers with personalized insights, fostering sustainability, and maximizing profitability.

In essence, the CropTech Portal not only stands as a technological milestone but also as a catalyst for positive change in global agriculture. Its multifaceted features, coupled with a forward-looking vision, position it as a key player in shaping the future of farming practices, driving efficiency, and promoting sustainable agriculture on a global scale.

VIII. FUTURE SCOPE

As a future scope, the web-based application can be made more user-friendly by targeting more populations by including all the different regional languages in the interface and providing a link to upload information instead of entering the test value manually. This research work can be enhanced to a high level by building a recommender system of agriculture production and distribution for farmers. By which farmers can make their own decision like which season which crop should sow so that they can get better profit. This system works for structured datasets or databases.

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