

Agro Connect: A Comprehensive Farm Management Web Application for Modern Agriculture

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Abstract - Agriculture is one of the most important sectors of our Economy. Many young individuals have started studying about agriculture, yet they face many challenges that affect their productivity. Agriculture aims to revolutionize agriculture practices by providing a unified platform for farm management, crop information and livestock reporting. This project uses latest technologies that offer information about soil type, seed varieties, crop types, urea and fertilizers, which would enhance farmer's decisions at an ease. The platform's easy to use interface allows farmers to access and interpret data easily.

Keywords: Farm Management Software, Seed Type Analysis, Agricultural Statistics and Reporting, Crop Data, Agro Connect Platform.

I. INTRODUCTION

Agriculture is a vital sector, contributing significantly to the GDP of many nations. However, farmers frequently encounter obstacles such as limited access to real-time data, inefficient resource allocation, and fragmented market connectivity. Traditional farm management methods, often manual and time-consuming, fail to harness the power of modern technology. Agro Connect emerges as a solution, offering a centralized platform that integrates farm management, data analysis, and e-commerce functionalities. This paper outlines the development, features, and benefits of Agro Connect, highlighting its role in modernizing agriculture.

In Agro Connect, the users can have access to all the information just in a single application. This includes getting weather info, like humidity, temperature, chances of rain, and windspeed. Also, it gives an overview of the statistics like how much profit the user earned in the present year, getting milk production info with an average rate per month, egg production info if the user has poultry at their farm, also recommendations about fertilizers and urea according to the cultivated crop with urea recommendation, getting a excel record, latest news on agriculture, market, weather and much more.

1.1 Dashboard

The Dashboard is like a homepage of our application. It consists of Statistics Overview of the current year, in a chart format. Also, it has got a weather module, which fetches weather of the user's present city and shows weather data like temperature, wind speed, humidity, etc.

The Dashboard also has a feature to manually enter Today's Milk and Poultry Record like Date, Quantity, Shift, Rate. The Total Amount will be calculated by multiplying rate with the quantity using the following formula:

$$\text{Total Amount} = \text{Quantity} \times \text{Rate}$$

1.2 Recommendation

The Recommendation page consists of Soil information, which displays the quality of soil in percentage for the current planted crop. Also, it has Crop Info module, which shows the water and sunlight requirement of the crop. The page has Pesticide and Urea Recommendation module, which recommends the best for current planted crop. The module also prints the Fertilizer and Urea interval time in days. The page also has dedicated section for next season's crop, which gives an idea what to plant according to soil type, weather conditions, water and sunlight requirement.

1.3 Latest News

The News page is designed to provide news about weather, govt. schemes, latest news, and market related news by which the user would be kept updated according to his city. The news will be uploaded from our separate module and will be checked for accuracy from other sources as well.

1.4 Marketplace

The Marketplace page is an e-commerce store, where a user can get Agro-based products like seeds, fertilizers and urea. These products would also be suggested in urea and fertilizer recommendations. This module has complete interface from selecting goods, to adding them in the cart, and ordering them to user's address and paying online/cash on

delivery. These orders will be visible on the admin portal, where the orders can be checked and we can start the process.

1.5 Support

The Support page contains a contact us button, which redirects to our support service where users can get help from our support members, also it has developer profiles, and their images.

II. LITERATURE REVIEW

Existing farm management tools often lack comprehensive features and fail to integrate multiple aspects of farming into a single platform. While some applications focus on weather forecasting or market trends, they rarely provide holistic solutions. Agro Connect bridges this gap by combining real-time data, actionable recommendations, and a marketplace within one application. The use of React and Flask ensures a responsive and scalable platform, while WordPress integration facilitates a seamless shopping experience.

Crop recommendation system for precision agriculture. This Paper proposes a system which solves a common problem which exists among Indian farmers, as they don't choose a right crop based on the soil requirements. So, we are merging the solution, where we can analyze the soil and weather conditions of user's city and recommend the crop for plantation.

Integrating information technology and operational research in the management of milk collection. This research gives an idea on why is milk collection necessary as it also includes transportation cost, labour costs, fuel, etc. Only the milk rates and total production is useful according to the user. We have planned to include the given system which would include all these costs and deduct the estimates from user's production.

III. RESULTS AND DISCUSSIONS

Agro Connect is built on a robust architecture designed for scalability and user-friendliness. The frontend, developed using React and Tailwind CSS, ensures a responsive and intuitive user interface. The backend, powered by Python and Flask, handles data processing and API management efficiently. A relational database (MySQL) stores farm records, user data, and marketplace information. WordPress is integrated to manage the e-commerce functionality, enabling farmers to purchase agricultural supplies directly through the app. APIs for weather updates, government schemes, and market data enhance the application's utility.

IV. FEATURES AND FUNCTIONALITIES

Agro Connect offers a suite of features tailored to the needs of modern farmers:

1. Dashboard:

The Dashboard provides a comprehensive overview of farm performance, including statistics for the current year, real-time weather updates, and quarterly records of farm activities. Farmers can track seed information, egg production, and milk production, enabling them to make informed decisions.

2. Recommendation System:

The Recommendation System analyses soil health and provides tailored suggestions for crop cultivation, pesticide use, and urea application. It also offers guidance on selecting seeds for the next planting season, ensuring optimal yields.

3. Latest News:

This feature delivers timely updates on weather conditions, government schemes, and market trends. Farmers can stay informed about potential risks and opportunities, enhancing their preparedness and decision-making.

4. Reports:

Agro Connect generates detailed reports on yearly income, harvest records, milk production, and poultry activities. These insights help farmers evaluate their performance and plan for future cycles.

5. Marketplace:

The Marketplace, powered by WordPress, allows farmers to purchase seeds, fertilizers, and other supplies directly through the app. This integration simplifies the procurement process and ensures access to quality products.

6. Support Page:

The Support Page provides farmers with access to customer support and information about the developers. This feature fosters trust and ensures users can seek assistance when needed.

V. IMPLEMENTATION

Agro Connect was developed using an Agile methodology, enabling iterative testing and refinement. Key challenges included data integration, user authentication, and ensuring scalability. These were addressed through the use of RESTful APIs, JWT for secure authentication, and cloud

hosting. The application’s modular design allows for easy updates and scalability, ensuring it can adapt to evolving user needs.

The main files of the project include react and python flask and the database which will have everything the user needs, also the user information will be stored in the database. The user’s information is stored in user table and the location of the user is fetched from the database for the weather module.



Figure 2: Dashboard

The following image is from the recommendations page, which gives an info about the crop, including water and sunlight requirement. It also has Fertilizer and Urea Recommendation. The bottom-most part of the page has next season crop info, which gives options on what the next plant could be. The Recommendation also has buy now buttons which redirects the user to the marketplace where the user can shop for the product.

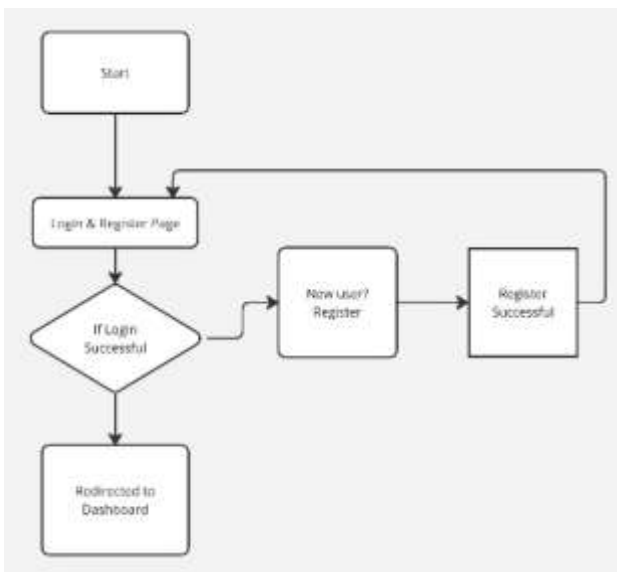


Figure 1: Implementation

Also, the milk production and egg production has got a separate table, where the milk and egg production data such as date, quantity, rate and amount will be stored. This data will also be fetched for the statistics and reports module.

The marketplace consists of seeds, fertilizers and urea. This e-commerce platform is being made by using WordPress, which provides various options for theming, product and cart management, and also the shipping and inventory management.

VI. RESULTS AND DISCUSSION

The output of the implemented model is shown here. The dashboard given in the screenshot below provides a detailed UI of the main page after the user logs in with his account. After the registration, all the user inserted data is sent to a database which stores the user information like name, city, agriculture land, etc.



Figure 3: Recommendation

Initial feedback from farmers has been overwhelmingly positive, with users praising the application’s ease of use and comprehensive features. Agro Connect has demonstrated its potential to improve farm productivity, enhance resource management, and increase market access. However, its reliance on internet connectivity and the need for continuous updates remain limitations that must be addressed in future iterations.

VII. FUTURE WORK

Future developments for Agro Connect include expanding its functionality through mobile app development, integrating AI for predictive analytics, and leveraging blockchain technology to enhance supply chain transparency. These advancements will further solidify Agro Connect’s position as a leading farm management solution.

Also, we have planned to make Agro Connect multi-user and add a social network or community, where users can connect with each other, share pictures and videos, and provide more information.

We also planned to add a section dedicated to farm related businesses, where users could know about the possibilities on side businesses with farming by side.

VIII. CONCLUSION

Agro Connect represents a significant step forward in the integration of technology and agriculture. By providing farmers with real-time data, actionable insights, and a seamless marketplace, it empowers them to make informed decisions and improve their livelihoods. The application's scalable architecture and user-centric design make it a valuable asset for the agricultural sector, paving the way for a more sustainable and efficient future.

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