



Smart Crop Advisory System

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Abstract

The **Smart Crop Advisory System** is a web-based agricultural decision-support platform that uses Artificial Intelligence (AI) and Machine Learning (ML) technologies to assist farmers in making informed farming decisions. Traditional agriculture faces several challenges, including unsuitable crop selection, unpredictable weather conditions, crop diseases, and fluctuations in market prices. The proposed system integrates essential agricultural services, including crop recommendation, weather forecasting, crop disease detection, agricultural market price information, and an AI-based multilingual voice assistant. It also provides farmer profile management, crop price trend analysis, and rainfall trend visualization through an interactive dashboard. The crop recommendation module helps farmers identify suitable crops based on relevant agricultural parameters, while the disease detection module supports the identification of potential crop diseases. Weather and market information help farmers plan agricultural activities and make informed selling decisions. The multilingual voice assistant aims to improve accessibility by enabling farmers to interact with the system through voice-based communication. Overall, the Smart Crop Advisory System aims to improve access to agricultural information, support effective decision-making, promote efficient resource utilization, and encourage sustainable farming practices.

Keywords: Smart Agriculture, Crop Recommendation, Machine Learning, Crop Disease Detection, Weather Forecasting, Market Price Analysis, Voice Assistant, Sustainable Agriculture.

I. INTRODUCTION

Agriculture is one of the most important sectors of the economy and plays a significant role in ensuring food security and supporting the livelihood of a large population. However, farmers often face difficulties in selecting suitable crops due to variations in soil conditions, weather, rainfall, temperature, humidity, and market requirements. Making crop-related decisions based only on traditional knowledge or limited information may result in reduced productivity, financial losses, and inefficient use of agricultural resources.

The rapid development of Artificial Intelligence (AI), Machine Learning (ML), and web technologies provides an opportunity to develop intelligent systems that can assist farmers in making better agricultural decisions. A Smart Crop Advisory System can analyze important agricultural parameters such as soil nutrients, temperature, humidity, rainfall, soil type, and other environmental conditions to recommend crops that are more suitable for a particular situation.



The proposed **Smart Crop Advisory System** is designed as a user-friendly platform that provides farmers with data-driven crop recommendations and useful agricultural information. The system allows farmers to register and maintain their profiles, enter relevant crop and agricultural information, and receive suitable crop recommendations. Machine learning techniques can be used to analyze the available data and identify suitable crops based on the given input parameters.

In addition to crop recommendation, the proposed system can maintain information about multiple farmers and the crops available with them. This feature can help customers or other users identify which farmers have particular crops available, thereby improving communication between farmers and potential buyers. Such an integrated approach can help reduce information gaps, improve crop-selection decisions, and provide better connectivity between agricultural producers and consumers.

The main objective of the proposed system is to provide an intelligent, accessible, and efficient decision-support platform for farmers. By combining machine learning, database management, and web-based technologies, the system aims to support better crop planning, improve agricultural productivity, and contribute towards the adoption of smart and sustainable farming practices.

II. LITERATURE REVIEW

Several researchers have explored the use of machine learning, artificial intelligence, and data-driven techniques to improve agricultural decision-making. Existing studies mainly focus on crop recommendation, crop yield prediction, soil analysis, disease identification, and weather-based agricultural advisory systems. These approaches demonstrate that intelligent technologies can assist farmers in selecting suitable crops and improving agricultural productivity.

A number of crop recommendation systems have been developed using machine learning algorithms by considering soil and climatic parameters. Parameters such as nitrogen, phosphorus, potassium, temperature, humidity, pH value, and rainfall are commonly used as input features. Machine learning models such as Decision Tree, Random Forest, Support Vector Machine, K-Nearest Neighbors, and Naive Bayes have been investigated for predicting suitable crops. These systems show that machine learning can identify relationships between environmental conditions and crop suitability more effectively than traditional manual decision-making methods.

Some existing research focuses on integrating weather information with soil characteristics to provide more accurate agricultural recommendations. Weather conditions can significantly influence crop growth, and therefore temperature, rainfall, and humidity are important factors in determining crop suitability. Such systems provide farmers with recommendations based on the combination of soil and climatic conditions, thereby supporting better crop planning.

Other studies have proposed web-based and mobile-based agricultural advisory platforms to provide farmers with information related to crops, cultivation practices, fertilizers, irrigation, and market conditions. These platforms improve accessibility to agricultural information; however, many systems concentrate mainly on providing advisory information and do not provide an integrated mechanism for connecting farmers with potential customers based on crop availability.

Existing agricultural systems also demonstrate the importance of maintaining farmer and crop information in centralized databases. Maintaining details such as farmer profiles, cultivated crops, crop availability, and related information can improve information sharing and facilitate communication between different stakeholders in the agricultural sector.

Although existing approaches provide useful solutions for crop recommendation and agricultural advisory, there is still a need for an integrated system that combines intelligent crop recommendation with farmer information and crop availability. The proposed Smart Crop Advisory System addresses this gap by integrating machine learning-based crop recommendation, farmer registration, crop information management, and crop availability search within a single platform. The system is intended to provide a simple and accessible solution that supports farmers in making informed



cultivation decisions while also improving connectivity between farmers and potential customers.

Therefore, the proposed system builds upon the advantages of existing machine learning-based agricultural recommendation techniques while extending their functionality through farmer and crop-availability management. This integrated approach can provide a more practical and comprehensive platform for smart agricultural decision-making.

III. EXISTING SYSTEM

The existing agricultural advisory systems mainly provide farmers with information and recommendations based on traditional agricultural practices, predefined rules, or individual machine learning models. Farmers often depend on their personal experience, local knowledge, agricultural experts, or manually available information to select suitable crops. Although these methods can be useful, they may not always provide accurate and timely recommendations according to the specific soil and climatic conditions of a particular location.

Several existing crop recommendation systems use machine learning techniques to recommend suitable crops based on parameters such as nitrogen, phosphorus, potassium, temperature, humidity, soil pH, and rainfall. These systems can process agricultural data and predict crops that are more suitable for the given conditions.

Some existing agricultural applications provide information related to weather conditions, fertilizers, irrigation, crop diseases, and cultivation practices. These systems help farmers access useful agricultural information through web or mobile platforms.

In addition, some digital agricultural platforms maintain farmer and crop information. However, farmer registration, crop recommendation, and crop availability are often handled as separate functionalities. Customers or other users may also face difficulties in identifying which farmer has a particular crop available, especially when information is maintained manually or is not centrally accessible.

Limitations of the Existing System

- Dependence on traditional knowledge and manual decision-making.
- Limited personalization of crop recommendations.
- Difficulty in analyzing multiple soil and climatic parameters simultaneously.
- Farmer and crop information may not be maintained in an integrated platform.
- Limited facility for identifying farmers based on crop availability.
- Lack of direct integration between crop recommendation and farmer–customer connectivity.
- Manual processes may consume more time and may lead to inaccurate or outdated information.

IV. PROPOSED SYSTEM

The proposed **Smart Crop Advisory System** is an intelligent and user-friendly agricultural platform developed to assist farmers in making informed decisions regarding crop selection and management. The system integrates machine learning, database management, and web technologies to provide suitable crop recommendations based on agricultural and environmental parameters.

In the proposed system, farmers can register and create their profiles by providing the required personal and agricultural information. The farmer can enter parameters such as soil nutrients, soil pH, temperature, humidity, and rainfall. The system processes these inputs using a machine learning model and recommends a suitable crop based on the given conditions. This helps farmers reduce uncertainty in crop selection and supports better utilization of agricultural resources.



The system also includes a **crop availability management module**. Registered farmers can enter information about the crops they currently have available. The information is stored in a centralized database and can be updated whenever required. This enables the system to maintain up-to-date information about farmers and their available crops.

A **customer/user module** is also incorporated into the proposed system. Customers can search for a required crop through the platform and identify farmers who have that crop available. This creates a digital connection between farmers and potential customers and can make it easier to locate agricultural products directly from available sources.

The proposed system consists of several integrated modules, including **Farmer Registration and Login, Farmer Profile Management, Crop Recommendation, Crop Information Management, Crop Availability, Customer Search, and Database Management**. Each module works together to provide a comprehensive agricultural support platform.

The proposed approach overcomes several limitations of existing systems by combining intelligent crop recommendation with farmer and crop-availability management. Instead of providing only general agricultural information, the system uses user-provided agricultural parameters to generate recommendations and maintains information about available crops and farmers.

Key Features of the Proposed System

- Provides machine learning-based crop recommendations.
- Uses soil and climatic parameters for crop selection.
- Provides secure farmer registration and login.
- Maintains farmer and crop information in a centralized database.
- Allows farmers to update crop availability.
- Enables customers to search for required crops.
- Helps identify farmers having specific crops available.
- Provides an integrated platform for agricultural decision-making.
- Reduces dependence on manual crop-selection methods.
- Improves communication between farmers and potential customers.

Features

1. Farmer Login and Registration

Allows farmers to create accounts and log in securely using their credentials. Provides access to agricultural services and personalized information.

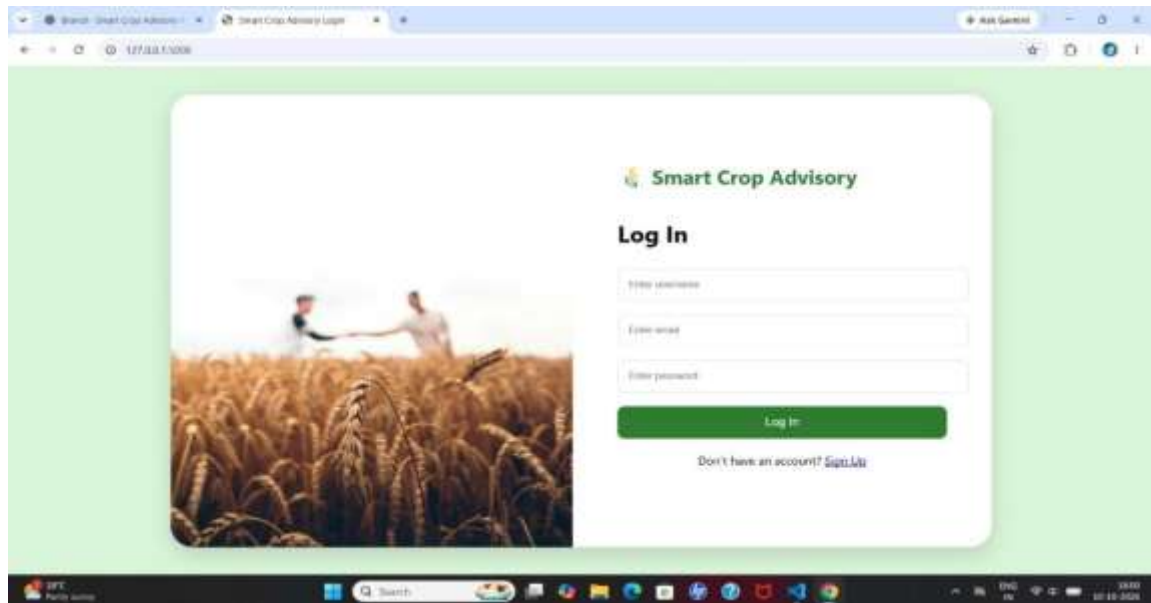


Fig 1: Login Interface of the Smart Crop Advisory System

2. Interactive Dashboard

Displays all major features of the Smart Crop Advisory System in one place. Provides easy navigation to crop recommendations, weather, diseases, and market prices.

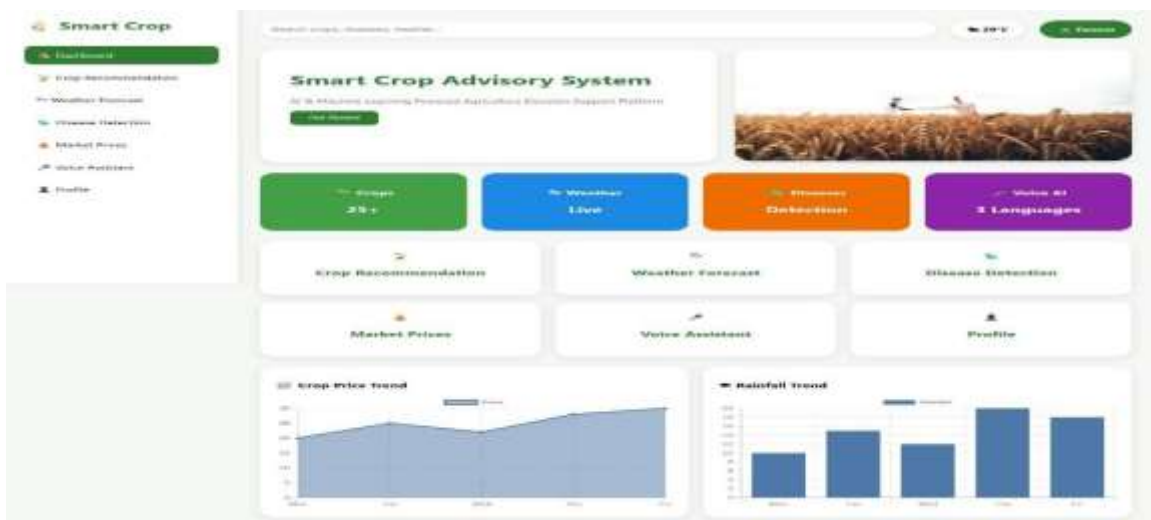


Fig 2: Dashboard of the Smart Crop Advisory System



3. Crop Disease Detection

Uses image processing or machine learning to identify potential crop diseases. Helps farmers recognize disease symptoms and take appropriate preventive measures.

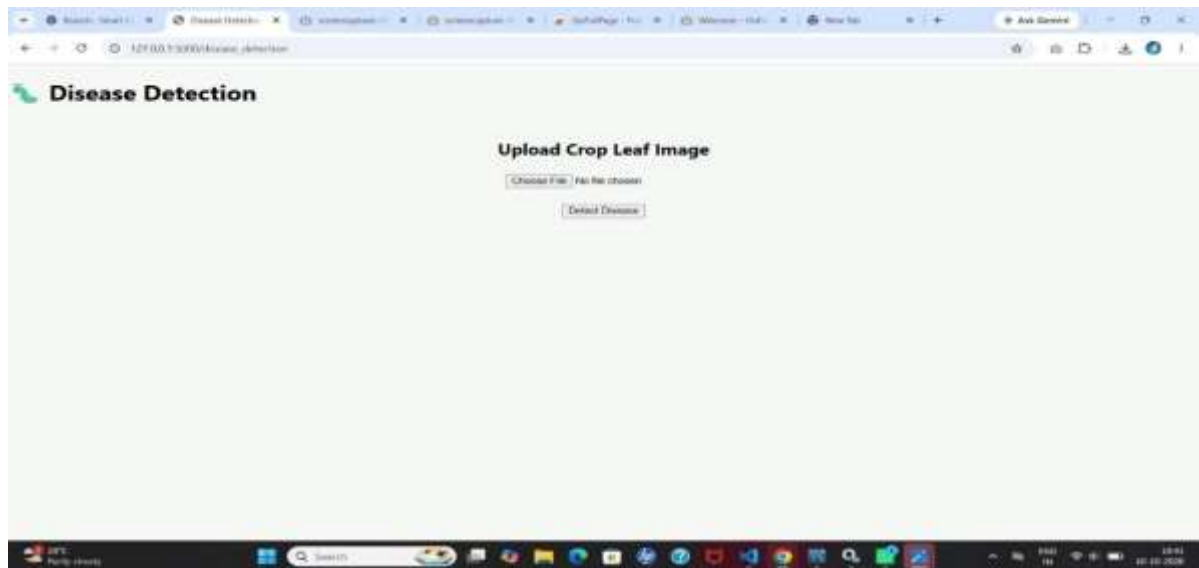


Fig 3: Crop Disease Detection

4. ML-Based Crop Recommendation

The system analyzes the soil and environmental parameters provided by the farmer using a machine learning model. Based on the analysis, the system recommends a suitable crop for cultivation.

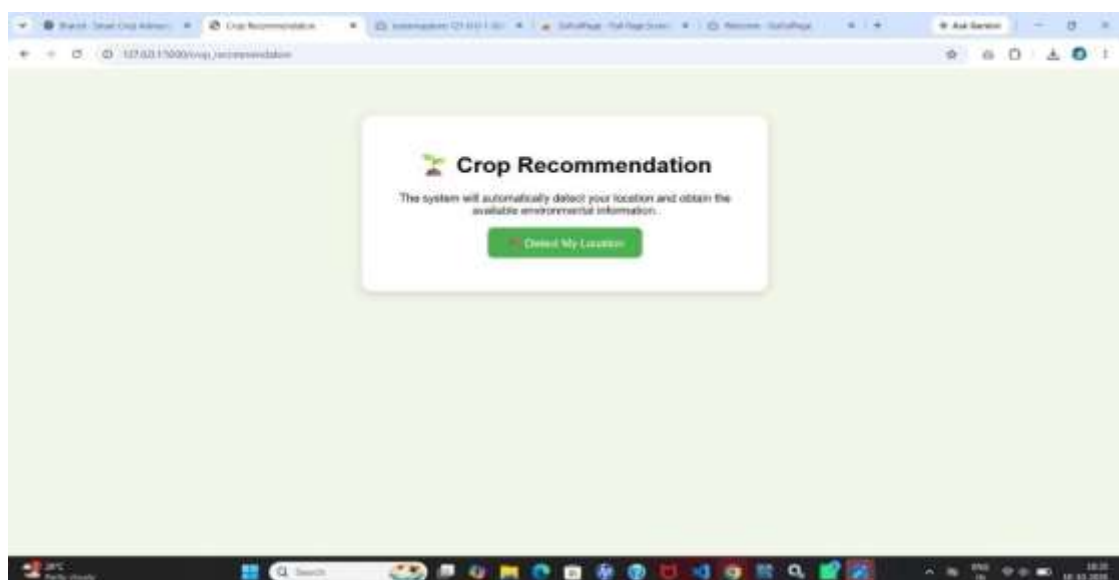


Fig 4: Crop Recommendation Module



5. Crop Information

The system provides information about recommended crops, including crop name and relevant cultivation information. This helps farmers understand the crop suggested by the system.

6. Crop Availability Management

Farmers can enter details about the crops they name, quantity, location, and availability currently have available. Information such as crop status can be maintained in the system.

7. Weather Forecasting

Provides weather information, including temperature and rainfall forecasts. Helps farmers plan irrigation, sowing, and other agricultural activities



Fig: Weather Forecast Module

8. Customer Crop Search

Customers can search for a required crop through the platform. The system displays the farmers who have the requested crop available, helping customers locate suitable sources.

9. Farmer Profile Management

Allows registered farmers to view and manage their personal information. Helps organize farmer details for convenient access to system services.

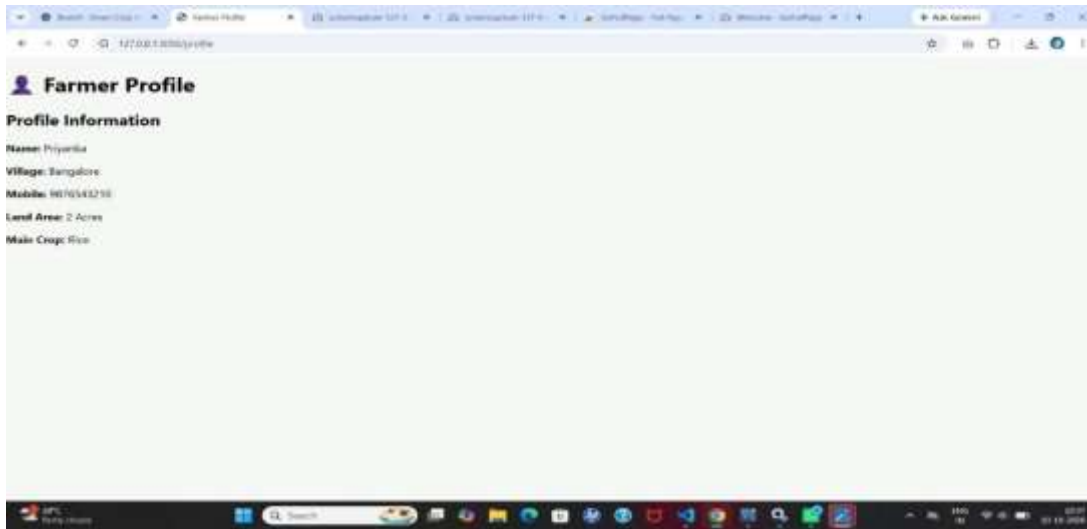


Fig: Farmer Profile Management Module

10. Crop Availability Updates

Farmers can update the availability of their crops whenever the quantity changes or the crop is no longer available. This helps maintain more accurate and updated information.

11. Database Management

The system maintains farmer profiles, soil parameters, crop recommendations, crop details, and crop availability information in a centralized database. This allows the system to efficiently store and retrieve agricultural information.

12. Admin Management

The administrator can manage registered farmers, customer information, crop records, and other system-related information. The admin can also monitor the overall functioning of the platform.

Overall System Features

- Farmer Registration and Login
- Farmer Profile Management
- Soil Parameter Analysis
- AI/ML-Based Crop Recommendation
- Crop Information Management
- Multiple Farmer Management
- Crop Availability Management
- Crop Quantity and Location Details
- Customer Registration and Login
- Crop Search Facility
- Crop Availability Updates
- Agricultural Information
- Database Management
- Admin Management
- Secure Data Storage



V. RESULT ANALYSIS

The proposed **Smart Crop Advisory System** was implemented successfully and tested with different farmer, soil, crop, and customer-related activities. Farmers were able to register on the platform, create their profiles, and provide relevant information such as location, farming details, soil parameters, and environmental conditions. The system successfully processed the provided agricultural parameters and generated suitable crop recommendations.

The crop recommendation module successfully analyzed important parameters such as nitrogen, phosphorus, potassium, soil pH, temperature, humidity, and rainfall. Based on the given input values, the machine learning model generated a suitable crop recommendation. This feature helps farmers make informed decisions regarding crop selection and reduces their dependence on manual crop-selection methods.

The farmer management module successfully maintained information related to multiple farmers and their agricultural activities. Farmers were able to add and update information about the crops they cultivate and the crops currently available with them. The crop availability module stored details such as crop name, quantity, location, and availability status in the database.

The customer module provided a simple way for users to search for required crops. Customers were able to view available crops and identify the farmers associated with those crops. By connecting farmer information and crop availability within the same platform, the system helps improve communication between farmers and potential customers.

The overall system provides a simple and user-friendly platform for intelligent agricultural decision-making. By combining machine learning-based crop recommendation, farmer profile management, crop availability, and customer crop search, the proposed system reduces the effort required to obtain agricultural information and supports better crop planning.

Figure 1: Smart Crop Advisory System Home Page

The home page provides an overview of the Smart Crop Advisory System and allows farmers and customers to access the available registration and login options.

Figure 2: Farmer Registration Page

The farmer registration page allows farmers to create an account by entering required information such as name, contact details, location, soil details, and farming information.

Figure 3: Farmer Login and Profile Management

The farmer login and profile management page allows registered farmers to securely access their accounts and view or update their personal and farming information.

Figure 4: Soil and Environmental Data Input Page

The soil and environmental data page allows farmers to enter parameters such as nitrogen, phosphorus, potassium, soil pH, temperature, humidity, and rainfall.

Figure 5: Crop Recommendation Page

The crop recommendation page displays the crop suggested by the machine learning model based on the agricultural and environmental parameters entered by the farmer.



Figure 6: Crop Availability Page

The crop availability page allows farmers to enter and update information about the crops they have available, including crop name, quantity, location, and availability status.

Figure 7: Customer Crop Search Page

The customer crop search page allows customers to search for a required crop and identify farmers who have the selected crop available.

Figure 8: Farmer Details / Crop Results Page

The farmer details page displays relevant information about farmers and their available crops, helping customers identify suitable sources for the required agricultural products.

VI. CONCLUSION

The proposed **Smart Crop Advisory System** provides an intelligent and user-friendly platform to support farmers in making informed decisions regarding crop selection and agricultural activities. The system uses soil and environmental parameters such as nitrogen, phosphorus, potassium, soil pH, temperature, humidity, and rainfall to generate suitable crop recommendations using machine learning techniques.

The system also provides farmer registration, profile management, crop information, and crop availability management facilities. Multiple farmers can maintain their information and update the crops available with them. The customer module enables users to search for required crops and identify farmers who have those crops available, thereby improving communication between farmers and potential customers.

By integrating machine learning-based crop recommendation with farmer and crop-availability management, the proposed system overcomes several limitations of traditional agricultural decision-making methods. It reduces the effort required to obtain agricultural information and provides a centralized platform for managing farmer and crop-related data.

Overall, the **Smart Crop Advisory System** demonstrates the potential of artificial intelligence, machine learning, and web technologies in supporting smart agriculture. The system can help farmers make better crop-selection decisions, improve access to agricultural information, and strengthen the connection between farmers and customers. Thus, the proposed system can serve as a useful technological solution for promoting efficient, data-driven, and sustainable agricultural practices.

VII. FUTURE ENHANCEMENT

The proposed Smart Crop Advisory System can be further enhanced by incorporating advanced technologies and additional agricultural services. Future versions of the system can use larger and more diverse agricultural datasets to improve the accuracy and reliability of crop recommendations.

The system can be enhanced with real-time weather forecasting and IoT-based sensors to automatically collect soil moisture, temperature, humidity, and other environmental parameters. This can reduce manual data entry and provide more accurate recommendations based on current field conditions.

A crop disease detection module can also be integrated using image processing and deep learning techniques. Farmers can upload images of affected crops or leaves, and the system can identify possible diseases and provide suitable preventive or management suggestions.



The system can further include fertilizer and irrigation recommendations based on soil conditions, selected crops, and weather information. A multilingual and voice-based interface can be developed to make the system easier to use for farmers who may have limited technical knowledge.

The farmer customer connectivity module can also be enhanced by adding online crop booking, price information, order management, notifications, and secure communication between farmers and customers. Integration with government agricultural schemes, market prices, and agricultural expert services can provide additional support to farmers.

Overall, these enhancements can make the Smart Crop Advisory System more intelligent, automated, accessible, and useful for real-world agricultural applications

The Smart Crop Advisory System can be further improved with the following features:

- Develop a mobile application for Android and iOS platforms.
- Add AI-based crop disease detection using crop and leaf images.
- Provide fertilizer and irrigation recommendations based on soil and crop conditions.
- Integrate real-time market prices to help farmers select profitable crops.
- Add multilingual and voice-based support for better accessibility to farmers.
- Introduce farmer and customer verification to improve system security and reliability.
- Add online crop booking, ordering, and secure payment facilities.
- Provide notifications for weather changes, crop recommendations, market prices, and crop availability.
- Integrate government agricultural schemes and expert advisory services.
- Add advanced analytics and reports for farmers, customers, and administrators.
- Use larger agricultural datasets and advanced machine learning models to improve crop recommendation accuracy.

REFERENCES

- [1] R. Medar, V. Rajpurohit, and S. Shweta, "Crop Recommendation System Using Machine Learning," International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 2019.
- [2] R. Sujatha and P. Isakki, "A Study on Crop Yield Prediction Using Machine Learning," International Journal of Engineering & Technology, 2019.
- [3] S. Ramesh and B. Vishnu Vardhan, "Data Mining Techniques for Crop Recommendation in Agriculture," International Journal of Advanced Research in Science, 2018.
- [4] P. Priyanka and T. R. Gopalakrishnan, "Crop Prediction on the Region Belts of India Using Machine Learning Algorithms," International Conference on Computing Technologies and Intelligent Data Engineering, 2017.
- [5] Monali Paul, Santosh K. Vishwakarma, and Ashok Verma, "Analysis of Soil Behaviour and Prediction of Crop Yield Using Data Mining Approach," International Conference on Computational Intelligence and Communication Networks, 2015.
- [6] S. Jeong, M. Resop, N. Mueller, and D. Fleisher, "Random Forests for Global and Regional Crop Yield Predictions," PLOS ONE, 2016.



- [7] K. R. Nagesh and S. Kumar, “Smart Agriculture System Using IoT and Machine Learning,” International Journal of Innovative Technology and Exploring Engineering, 2020.
- [8] FAO (Food and Agriculture Organization), “Digital Technologies in Agriculture and Rural Areas,” Food and Agriculture Organization of the United Nations, 2019.