

Farming System for Stable Market Access: A Review

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ABSTRACT: Every day new technology is arriving and billions of people were connected to the Internet. Purchasing goods, groceries, clothes everything is online. He or She can able to place the order from their smartphone within a minute. But, Farmers are still lack of benefitting from the internet. As we all knew that Farmers are the backbone of our country and without them, we can't complete a day. Well, this idea is completely dedicated to farmers and helps them in generating good profitable revenue by using our platform. This is an online eCommerce platform that enables a farmer to buy or sell anything related to the agriculture. Nowadays smartphone is like a coin in a pocket. So, it's not a big question of thinking about smartphones with a farmer. Also, most of them are already familiar with social media accounts and it is quite easy to play with our online e-platform. But, there will be demo videos for each like registration, adding products, payment, etc. Safe payment gateway with a good logistic delivery partner, A farmer can do profitable business from his/her home itself. Both time and energy are also saved. This portal helps farmers to sell their agriculture produce online and is used to suggest best practices for farming. Hence it also provides a wider market and doesn't restrict them from the local market. It helps the wholesaler vendors and retailer vendors for expanding their business.

KEYWORDS: eCommerce, Farming, Equipment Rental.

I. INTRODUCTION

Agriculture, as the backbone of many economies, faces challenges stemming from uncertainties in weather conditions, market dynamics, and resource management[1]. In response to these challenges, we present the AI Farmer Support System—a trans- formative solution aimed at predicting crop yield and market prices to empower farmers with data-driven insights[2]. In this era of technological advancements, the integration of artificial intelligence and data analytics holds immense potential for revolutionizing traditional farming practices[3].

The AI Farmer Support System employs a novel sliding window non-linear regres- sion technique, allowing for a dynamic and accurate analysis of multiple factors influencing agricultural production [4]. By considering historical data related to rainfall, temperature, market dynamics, and prior crop yields, the system goes beyond conventional approaches, providing a comprehensive understanding of the agricultural ecosystem [5]. This approach enables the x cgeneration of precise predictions for crop yield and market prices[6].

Our system is not just a predictive tool; it is a decision support system crafted to empower farmers in making informed choices about the crops they cultivate[7]. By aligning these choices with market demand and optimizing yields, the system contributes to the economic viability of agriculture[8]. The impact of such a techno- logical intervention extends beyond individual farms, representing a promising step towards improving the economic sustainability of agriculture and enhancing the livelihoods of millions of Indian farmers[9].

This paper outlines the architecture, methodologies, and key components of the AI Farmer Support System[10]. We present our findings, including the accuracy of predictions, user feedback, and the system's potential for societal impact [11]. As we delve into the intricacies of this innovative approach, we invite the reader to explore how technology can be harnessed to address real-world challenges and contribute to the sustainable development of the agricultural sector[12].

II. LITERATURE SURVEY

1. “Artificial intelligence-based decision support systems in smart agriculture: Bibliometric analysis for operational insights and future directions.”

As the world population is expected to touch 9.73 billion by 2050, according to the Food and Agriculture Organization (FAO), the demand for agricultural needs is increasing proportionately. Smart Agriculture is replacing conventional farming systems, employing advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning (ML) to ensure higher productivity and precise agriculture management to overcome food demand. In recent years, there has been an increased interest in researchers within Smart Agriculture. Previous literature reviews have also conducted similar bibliometric analyses; however, there is a lack of research in Operations Research (OR) insights into Smart Agriculture.

2. “Demand Based Crop Recommender System for Farmers.”

About half of the population of India depends on agriculture for its livelihood, but its contribution towards the GDP of India is only 14 per cent. One possible reason for this is the lack of adequate crop planning by farmers. There is no system in place to advice farmers what crops to grow. In this paper we present an attempt to predict crop yield and price that a farmer can obtain from his land, by analyzing patterns in past data. We make use of a sliding window non-linear regression technique to predict based on different factors affecting agricultural production such as rainfall, temperature, market prices, area of land and past yield of a crop. The analysis is done for several districts of the state of Tamil Nadu, India. Our system intends to suggest the best crop choices for a farmer to adapt to the demand of the prevailing social crisis facing many farmers today.

3. “Crop Recommender System Using Machine Learning Approach.”

Agriculture and its allied sectors are undoubtedly the largest providers of livelihoods in rural India. The agriculture sector is also a significant contributor factor to the country’s Gross Domestic Product (GDP). Blessing to the country is the overwhelming size of the agricultural sector. However, regrettable is the yield per hectare of crops in comparison to international standards. This is one of the possible causes for a higher suicide rate among marginal farmers in India. This paper proposes a viable and user-friendly yield prediction system for the farmers. The proposed system provides connectivity to farmers via a mobile application. GPS helps to identify the user location. The user provides the area soil type as input. Machine learning algorithms allow choosing the most profitable crop list or predicting the crop yield for a user-selected crop. To predict the crop yield, selected Machine Learning algorithms such as Support Vector Machine (SVM), Artificial Neural Network (ANN), Random Forest (RF), Multivariate Linear Regression (MIR), and K-Nearest Neighbour (KNN) are used. Among them, the Random Forest showed the best results with 95% accuracy. Additionally, the system also suggests the best time to use the fertilizers to boost up the yield.

4. “Performance Evaluation of Best Feature Subsets for Crop Yield Prediction Using Machine Learning Algorithms”

The rapid innovations and liberalized market economy in agriculture demand accuracy in Crop Yield Prediction (CYP). In accurate prediction, machine learning (ML) algorithms and the selected features play a major role. The performance of any ML algorithm may improve with the utilization of a distinct set of features in the same training dataset. This research work evaluates the most needed features for accurate CYP. The ML algorithms, namely, Artificial Neural Network, Support Vector Regression, K-Nearest Neighbour and Random Forest (8) are proposed for better accuracy. Agricultural dataset consists of 745 instances; 70% of data are randomly selected and are used to train the model and 30% are used for testing the model to assess the predictive ability. The results show that the RF algorithm reaches the highest accuracy by means of its emoranalysis values for all the distinct feature subsets using the same training agricultural data.

5. “Design of a smart hydroponics monitoring system using an ESP32 microcontroller and the Internet of Things”

This paper presents the design and construction of a hydroponics monitoring system that can collect parameters of hydroponic systems, such as temperature, water limit, pH level, and nutrient levels. The monitoring system was developed using an ESP32 microcontroller and several sensors, including total dissolved solids (TDS), pH, water level, and temperature sensors.

6. “Smart irrigation system based on IoT and machine learning”

This paper proposes an intelligent and flexible irrigation approach with low consumption and cost that can be deployed in different contexts. This approach is based on machine learning algorithms for smart agriculture. A set of

sensors (soil humidity, temperature, and rain) in an environment that ensures better plant growth for months, from which we collected data based on an acquisition map using the Node-RED platform and MongoDB.

7. “Design and Implementation of Smart Hydroponics Farming Using IoT-Based AI Controller with Mobile Application System” This article presented the design and implementations of AISHES with IoT, which is developed by integrating the Raspberry Pi, IoT environment with mobile application. The farmer observes and manages his hydroponics farm field using the Agri-Hydroponic program, which has manual and automated control modes. A Raspberry Pi controller based hardware design is installed in hydroponics farm field to monitor plant status using various sensors.

8. “A Smart Hydroponics Farming System Using Exact Inference in Bayesian Network” This study developed a smart hydroponics system that is used in automating the growing process of the crops using exact inference in Bayesian Network (BN). Sensors and actuators are installed in order to monitor and control the physical events such as light intensity, pH, electrical conductivity, water temperature, and relative humidity.

III. PROPOSED SYSTEM

In this system we are going to implement E-commerce platform for farmers by using this platform they can purchase the Agricultural product. This platform provides the agricultural product directly through the company or organization. In this system there is no middle man present, there is no middle man present means price does not increase by any chance. Farmers can go through the online platform and check the product availability and price, and accordingly purchase it. It saves the time and efforts for the farmers. They can purchase the product within time. This platform will help farmers to find out nearest markets, its current stock details and its demand for particular product within less time & with less effort. This analysis will thereby help to determine which market will be more profitable for his product. This platform can accommodate traditional marketing method as well as modern marketing methods. This application makes the farmer's requirement become easy. One can easily browse through the various details using the well-defined interfaces provided by the system.

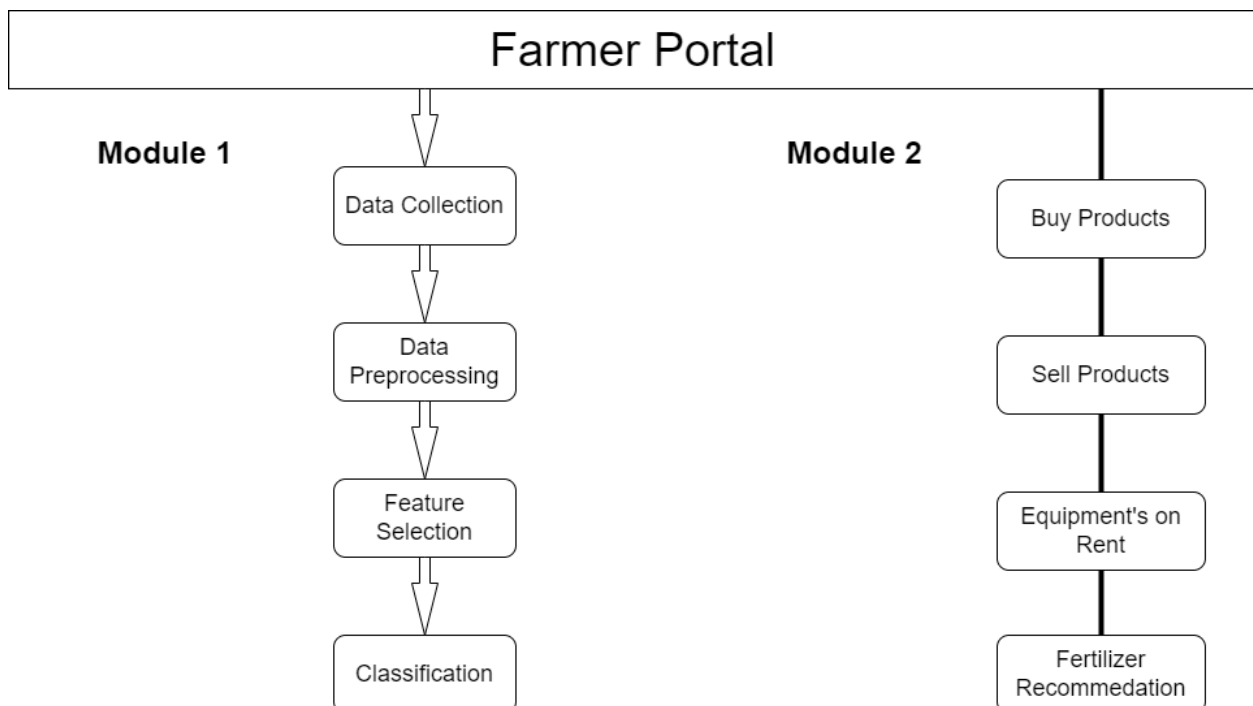


Figure 1. system architecture

IV. CONCLUSION

The Farmer Support System is a transformative tool for Indian farmers, offering data-driven insights for informed decision-making. Our research and implementation have demonstrated its significant impact on Indian agriculture and rural development. Key findings include improved crop yields and income stability among adopting farmers, reducing income fluctuations. The system's commitment to eco-friendly practices contributes to sustainability and environmental responsibility. Strong user adoption and engagement underline the system's practicality and acceptance. The feedback mechanism plays a pivotal role in its continuous improvement. As we look ahead, the AI Farmer Support System holds promise for empowering farmers, promoting sustainability, and expanding its impact through scalability and collaboration. In conclusion, this system represents a significant step towards improving Indian agriculture, benefiting millions of farmers, and promoting a sustainable future.

REFERENCES

- [1] Arslan Yousaf, Vahid Kayvanfar, Annamaria Mazzoni, Adel Elomori. "Artificial intelligence-based decision support systems in smart agriculture: Bibliometric analysis for operational insights and future directions."
- [2] Shilpa Pandey, Dr. Prem Ramesh, Anmol, B.R Aishwarya, Karuna Rohilla, Kumar Shaurya. "Crop Recommender System Using Machine Learning Approach."
- [3] S. Kanga Suba Raja, Rishi R, Sundaresan E, Srijit V. "Demand Based Crop Recommender System for Farmers."
- [4] Maya Gopal P. S. & Bhargavi R. "Performance Evaluation of Best Feature Subsets for Crop Yield Prediction Using Machine Learning Algorithms"
- [5] Kolin Sukhadia, M. B. Chaudhari. "A Survey on Rice Crop Yield Prediction in India Using Improved Classification Technique"
- [6] G. Mariammal, A. Suruliandi, S. P. Raja, and E. Poongothai. "Prediction of Land Suitability for Crop Cultivation Based on Soil and Environmental Characteristics using Modified Recursive Feature Elimination Technique with Various Classifiers"
- [7] Anees Abu Sneineh, Arafat A.A. Shabaneh, "Design of a smart hydroponics monitoring system using an ESP32 microcontroller and the Internet of Things", Elsevier, 2023.
- [8] Youness Tacea, Mohamed Tabaa, Sanaa Elfilali, Cherkaoui Leghriss, Hassna Bensag, Eric Renaulte, "Smart irrigation system based on IoT and machine learning", Elsevier, 2022.
- [9] S. V. S. Ramakrishnam Raju, Bhasker Dappuri, P. Ravi Kiran Varma, "Design and Implementation of Smart Hydroponics Farming Using IoT-Based AI Controller with Mobile Application System", Hindawi, 2022.
- [10] Melchizedek I. Alipio, Allen Earl M. Dela Cruz, Jess David A. Doria and Rowena Maria S. Fruto, "A Smart Hydroponics Farming System Using Exact Inference in Bayesian Network", IEEE, 2017.
- [11] A. Z. M. Tahmidul Kabir, Al Mamun Mizan, "IoT Based Low Cost Smart Indoor Farming Management System Using an Assistant Robot and Mobile App", EECCIS, 2020
- [12] V Sravani Kumari, Ravindra Changala, Nagulapally Pallavi, K Santoshi, Annapurna Gummadi, "Wireless Sensor Network Based Machine Learning For Precision Agriculture", IJCRT, 2023
- [13] A. A. Bamanikar, Harshal Awate, Jay Katre, Hritik Rasal, Akshaya Mahadik, "FARMERS AGRICULTURAL PORTAL", JETIR, 2022.
- [14] Supriya Ghavate and Joshi H. U, "Smart Farming using IoT and Machine Learning with Image Processing", INPRESSCO, 2021.
- [15] Devaka J. Punchedhewa and Prasad Wimalaratne, "Towards an ICT Enabled Farming Community", IEEE, 2021.
- [16] Shital Chaudhari, Vaishnavi Mhatre, Pooja Patil, Sandeep Chavan, "Smart Farm Application: A Modern Farming Technique Using Android Application", IRJET, 2018.





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