WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Website for Sharing Farmer's Experiences, Tips, Best Practices in Precision Agriculture

Pinninti Swarnalatha[1], Mr. A.Ravi Kishore[2]

[1]Student, Rajam, Vizianagaram, 532127, India
[2]Assistant professor, Rajam, Vizianagaram, 532127, India.

A B S T R A C T

Primary goal of precision agriculture is to enhance the management of farming operations, and this necessitates the maintenance of detailed records regarding agricultural tasks. Traditionally, farmers rely on handwritten paper records, which proves to be a cumbersome and time-consuming process. Retrieving historical agricultural data and effectively managing the costs associated with agricultural production becomes a challenging endeavor using this approach. To address these limitations, a comprehensive system known as iFarm has been conceived. iFarm is can be specifically designed to streamline and optimize farming management practices. A framework where useful to share farmers expriences, tips, and best practices. The iFarm system encompasses several key components, including smartphone applications, web browsers, and a cloud-based server. Operating on farmland, farmers can readily access their work plans through smartphone applications, input field-specific data directly into the cloud-based system, and instantaneously share this information with the central the head office. This real-time exchange of data is facilitated through smartphones. At the head office, farming experts can utilize web browsers to meticulously analyze the data stored in the cloud system. This analytical process enables the estimation of farming costs and the formulation of precise work plans. Consequently, decision-making is underpinned by data-driven insights, leading to improved efficiency and better control over agricultural product costs.

Keywords: Precision Management, cultivation Management, Cost Management, Agricultural Knowledge Sharing, iFarm, web database

Introduction

The world's population is projected to reach 9.7 billion by 2050, placing an immense strain on global food production systems. In order to meet this growing demand, agricultural productivity needs to be increased while minimizing the impact on the environment. Precision agriculture, also known as smart agriculture, has shown promise as an approach to solving these problems. This data-driven approach integrates advanced technologies and analytical tools to optimize crop production and resource management.

The primary goal of precision agriculture is to enhance the management of farming operations, which necessitates the maintenance of detailed records regarding agricultural tasks. Traditionally, farmers have relied on handwritten paper records to track crop yields, fertilizer and pesticide applications, and other critical information. However, this manual approach is cumbersome, time-consuming, and prone to errors. Retrieving historical agricultural data and effectively managing the costs associated with agricultural production become challenging endeavors using this method.

To address these limitations, a comprehensive system known as iFarm has been conceived and developed. iFarm is specifically designed to streamline and optimize farming management practices, providing farmers with a centralized platform to collect, analyze, and share agricultural data. This cloud-based system encompasses several key components, including smartphone applications, web browsers, and a cloud-based server.

Literature Survey

In Paper [1]: A web-based agricultural management system is described on this webpage. The system provides six main functions: field manager, out-field manager, seedling manager, task manager, cost manager, and ledger manager. It uses cloud applications on SaaS for data update and maintenance. It is implemented using Apache, Ruby on Rails, and MySQL. It can also be used with geoMation Farm and NEC's M2M Solution.

In Paper [2]: The iFarm system is a web-based agricultural management platform that integrates smartphone applications, web browsers, and a cloud server to facilitate real-time data sharing and analysis between farmers and the head office. It offers cost-effective and accessible functions for field and seedling management, task and cost management, and ledger management. The system's smartphone applications enable workers to input and synchronize work histories, contributing to precision agriculture and cultivation management. The implementation utilizes Apache, Ruby on Rails, and MySQL.

In Paper [3]: Traditional farming struggles with scheduling due to declining knowledge and manpower. This system uses data to predict harvests and schedule work, helping new farmers succeed. It can be improved by storing real data and using sensors to refine predictions.

In Paper [4]: This article proposes a new approach for precision farming decision support systems: using GIS web services. They argue these webservices offer advantages like easy data sharing and reduced development costs. They further detail the development process using SOMA architecture, highlighting specific stages like service identification and allocation. Ultimately, they conclude that this web-based approach effectively overcomes limitations of traditional GIS applications in precision farming.

In Paper [5]: It highlights concerns about data privacy and proposes homomorphic encryption as a solution. This innovative technique lets you search encrypted data without decrypting it, ensuring both security and searchability. The system involves four key players: the data owner, an administrator, a cloud server, and the data user. This approach promises secure storage and enhanced privacy for cloud-based data retrieval.

Methodology

The methodology for improving agricultural management through a digital platform called iFarm, focusing on real-time data capture, analysis, and decision-making. Here's a breakdown of the key components:

Data capture:

Smartphone app: Farmers use a smartphone app to access work plans and directly input field-specific data, such as soil conditions, planting dates, and harvest yields, into the cloud-based system.

Real-time exchange: The app facilitates instant data sharing with the central server at the head office.

Data analysis:

Cloud-based server: All data is stored and accessed through a secure cloud server, allowing head office personnel to view information from any location.

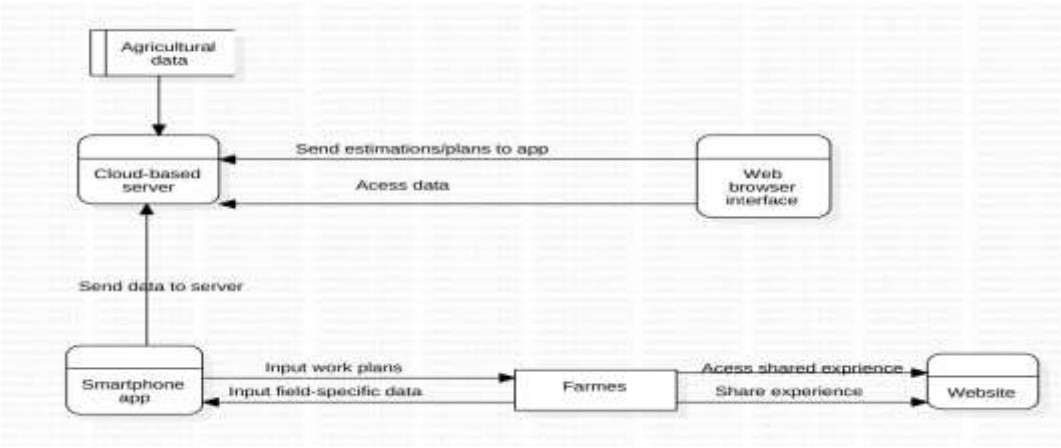
Web browser interface: Farming experts at the head office use web browsers to analyze the stored data through dashboards, reports, and visualizations

Decision-making:

Cost estimation: The system analyzes data to estimate resource usage and predict production costs, enabling farmers to optimize resource allocation and pricing.

Precise work plans: Based on data analysis, experts can formulate precise work plans, tailoring tasks to specific field conditions and maximizing efficiency.

Data-driven insights: All decisions are guided by real-time data and analytical insights, promoting better control over production costs and improving overall farm efficiency.



Additional note:

The abstract also mentions a website component for sharing experiences, tips, and best practices among farmers, potentially creating a collaborative knowledge base to further enhance the system's effectiveness.

This methodology aims to transform traditional farm management by replacing paper records with a connected, digital platform. By capturing and analyzing real-time data, iFarm empowers farmers to make data-driven decisions, optimize resource use, and ultimately improve farm profitability and sustainability.

Results and discussions:

The revolutionary precision agriculture method developed by iFarm has revolutionized farming operations and produced astounding results in a variety of ways. Through the use of cutting-edge technology, iFarm has revolutionized farming operations' efficiency by replacing antiquated paper-based processes with real-time digital data management. While providing farmers with field-specific data for accurate resource allocation and more intelligent decision-making, this move has drastically reduced the amount of time spent on administrative duties. Additionally, by carefully maximizing resource utilization, using focused pest management strategies, and continually monitoring soil health, iFarm's approach fosters sustainability by lowering environmental impact and promoting a more ecologically balanced farming ecosystem. Significantly, the platform's influence goes beyond individual farms, encouraging farmer cooperation via a specific community platform, advancing group learning, and motivating a broad adoption of effective and sustainable farming methods.

Conclusion:

Precision agriculture, which uses technology to maximize farming operations, represents a revolutionary change in agricultural practices. A contemporary technology called iFarm exactly meets the needs of modern farming by replacing laborious handwritten data. iFarm enables instantaneous data interchange via web browsers, cellphones, and cloud-based servers, giving farmers access to field-specific insights and smooth professional communication. This ground-breaking approach transforms decision-making while simultaneously addressing the problems associated with historical data. Accurate cost estimation is made possible by data analysis, which promotes data-driven and effective farm management. Moreover, iFarm encourages cooperation by providing a forum for farmers to exchange experiences and elevate agricultural quality.iFarm is leading the way in agricultural innovation by utilizing technology and data to improve efficiency, sustainability, and cost management. In the end, iFarm is the perfect example of precision agriculture and portends well for the farming sector going forward.

References

1. Murakami, Y. (2014, July). iFarm: development of web-based system of cultivation and cost management for agriculture. In 2014 Eighth International Conference on Complex, Intelligent and Software Intensive Systems (pp. 624-627). IEEE..
2. Murakami, Y., Utomo, S. K. T., Hosono, K., Umezawa, T., & Osawa, N. (2013, October). IFarm: development of cloud-based system of cultivation management for precision agriculture. In 2013 IEEE 2nd global conference on consumer electronics (GCCE) (pp. 233-234). IEEE.
3. Hato, K., Fujii, K., & Murakami, Y. (2015, July). Trial of an Automatic Schedule for Farming and Crop Prediction. In 2015 Ninth International Conference on Complex, Intelligent, and Software Intensive Systems (pp. 1-5). IEEE.
4. Tian-En, C., Li-ping, C., Yunbin, G., & Yanji, W. (2009, May). Spatial decision support system for precision farming based on GIS web service. In 2009 International Forum on Information Technology and Applications (Vol. 2, pp. 372-376). IEEE.
5. Alsudani, M. Q., Fakhruldeen, H. F., Al-Asady, H. A. J., & Jabbar, F. I. (2022). Storage and encryption file authentication for cloud-based data retrieval. Bulletin of Electrical Engineering and Informatics, 11(2), 1110-1116.